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Intensive Archaeological Survey of Portions of the Proposed Sand Hills Loop Phase I Pipeline, Reagan and Crockett Counties, Texas

Texas Antiquities Permit No. 8157

Prepared for

DCP Sand Hills Pipeline, LLC

Prepared by

SWCA Environmental Consultants

SWCA Project No. 42690.05

SWCA Cultural Resources Report No. 17-539

October 2017

INTENSIVE ARCHAEOLOGICAL SURVEY OF PORTIONS OF THE PROPOSED SAND HILLS LOOP PHASE I PIPELINE, REAGAN AND CROCKETT COUNTIES, TEXAS

TEXAS ANTIQUITIES PERMIT NO. 8157

Prepared for

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SWCA Project No. 42690.05

SWCA Cultural Resources Report No. 17-539

October 2017

ABSTRACT

On behalf of DCP Sand Hills Pipeline, LLC (DCP), SWCA Environmental Consultants (SWCA) conducted an intensive archaeological survey of portions of the proposed Sand Hills Loop Phase I Pipeline in Reagan and Crockett counties, Texas. Approximately 26 miles of the pipeline ("project") crosses through land owned by the University of Texas (UT). The majority of the proposed alignment has been previously investigated by Turpin and Sons, Inc. in 2011. As such, only portions of the alignment that deviate outside the 2011 survey corridor were investigated, as well as portions which cross or are adjacent to (within 300 feet) sites that were identified after the 2011 survey. These areas to be surveyed total 6.4 miles within a 100-foot-wide corridor (approx. 78 acres).

Archaeological investigations were conducted pursuant to the potential acquisition of a U.S. Army Corps of Engineers (USACE) Section 404 permit in accordance with 33 Code of Federal Regulations (CFR) Part 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Documents dated April 25, 2005 and January 31, 2007); and Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [USC] 470) and its implementing regulations 36 CFR 800. As the project area is owned by a political subdivision of the State of Texas, work was additionally conducted in compliance with the Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191) and accompanying Rules of Practice and Procedure (Texas Administrative Code, Title 13, Chapter 26) under Texas Antiquities Permit No. 8157.

As a result of the current investigation, nine cultural resources were identified or revisited. These include seven previously recorded archaeological sites (41CX1096, 41CX1317, 41CX1570, 41RG76, 41RG263, 41RG324, and 41RG343) located within or immediately adjacent to the survey corridor, in addition to two newly-identified sites (41RG389 and 41RG390) and one isolated find (UT-CX-50a-1). All cultural resources identified or revisited during the course of the investigation were assessed with regard to eligibility for the National Register of Historic Places (NRHP) and designation as a State Antiquities Landmark (SAL) and recommendation for avoidance, if applicable, as follows:

Two sites (41RG389 and 41RG390) and one isolated find (UT-CX-50a-1) are recommended NOT ELIGIBLE for the NRHP or for designation as a SAL. Owing to the paucity or commonality of recovered assemblages, lack of features, lack of unique character, and/or lack of contextual integrity, these resources possess negligible research value and are unlikely to contribute to the understanding of local and/or regional prehistory or history. Consequently, no further work was recommended for these resources.

The investigated portions of five sites (41RG76, 41RG263, 41RG343, 41CX1096, and 41CX1317) within the proposed workspace are recommended NOT ELIGIBLE for the NRHP or for designation as a SAL. Owing to the paucity or commonality of recovered assemblages, lack of features, lack of unique character, and/or lack of contextual integrity, the investigated portions of these resources possess negligible research value and are unlikely to contribute to the understanding of local and/or regional prehistory or history. The remaining unevaluated portions of these sites will not be affected by the proposed project; therefore, no further work was recommended for these sites at this time.

Two sites (41RG324 and 41CX1570) are located outside the proposed workspace and will not be impacted by the proposed project. Each of these sites are UNDETERMINED with regard to NRHP and SAL eligibility. As the proposed construction activities will have NO IMPACT on these sites, no additional work or avoidance measures are recommended at this time.

In accordance with Section 106 of the NHPA 36 CFR 800.4 (b)(1) and the Antiquities Code of Texas, SWCA has made a reasonable and good faith effort to identify significant cultural resources within the project area. No properties listed or otherwise eligible for the NRHP, or for designation as a SAL were identified within the project area. Consequently, SWCA recommends no further archaeological investigation and a finding of NO HISTORIC PROPERTIES AFFECTED under 36 CFR 800.4(d)(1). Per requirements of the Antiquities Code of Texas, project documentation will be curated with the Texas Archeological Research Laboratory in Austin.

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MANAGEMENT SUMMARY

Project Title. Intensive Archaeological Survey of Portions of the Proposed Sand Hills Loop Phase I Pipeline, Reagan and Crockett Counties, Texas

SWCA Project Number. 42690.05

Project Description. On behalf of DCP Sand Hills Pipeline, LLC (DCP), SWCA Environmental Consultants (SWCA) conducted an intensive archaeological survey of the proposed Sand Hills Loop Phase I Pipeline in Reagan and Crockett counties, Texas. Approximately 26 miles of the pipeline ("project") crosses through land owned by the University of Texas (UT). The majority of the proposed alignment has been previously investigated by Turpin and Sons, Inc. in 2011. As such, only portions of the alignment that deviate outside the 2011 survey corridor were investigated, as well as portions which cross or are adjacent to (within 300 feet) sites that were identified after the 2011 survey. These areas to be surveyed total 6.4 miles within a 100-foot-wide corridor.

Number of Acres Surveyed. Approximately 78 acres

Principal Investigator. Todd L. Butler

Dates of Work: September 19-21, 2017

Purpose of Work: Archaeological investigations were conducted pursuant to the potential acquisition of a U.S. Army Corps of Engineers (USACE) Section 404 permit in accordance with 33 Code of Federal Regulations (CFR) Part 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Documents dated April 25, 2005 and January 31, 2007); and Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [USC] 470) and its implementing regulations 36 CFR 800. As the project area is owned by a political subdivision of the State of Texas, work was additionally conducted in compliance with the Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191) and accompanying Rules of Practice and Procedure (Texas Administrative Code, Title 13, Chapter 26) under Texas Antiquities Permit No. 8157.

Number of Sites. Nine sites and 1 isolated find.

Eligibility. As a result of the current investigation, nine cultural resources were identified or revisited. These include seven previously recorded archaeological sites (41CX1096, 41CX1317, 41CX1570, 41RG76, 41RG263, 41RG324, and 41RG343) located within or immediately adjacent to the survey corridor, in addition to two newly-identified sites (41RG389 and 41RG390) and one isolated find (UT-CX-50a-1). All cultural resources identified or revisited during the course of the investigation were assessed with regard to eligibility for the National Register of Historic Places (NRHP) and designation as a State Antiquities Landmark (SAL) and recommendation for avoidance, if applicable, as follows:

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Two sites (41RG324 and 41CX1570) are located outside the proposed workspace and will not be impacted by the proposed project. Each of these sites are UNDETERMINED with regard to NRHP and SAL eligibility. As the proposed construction activities will have NO IMPACT on these sites, no additional work or avoidance measures are recommended at this time.

Curation. SWCA conducted a non-collection survey and, therefore, no cultural materials will be curated. Original survey documentation will be curated with the Texas Archeological Research Laboratory in Austin.

Comments. In accordance with Section 106 of the NHPA 36 CFR 800.4 (b)(1) and the Antiquities Code of Texas, SWCA has made a reasonable and good faith effort to identify significant cultural resources within the project area. No properties listed or otherwise eligible for the NRHP, or for designation as a SAL, were identified within the project area. Consequently, SWCA recommends no further archaeological investigation and a finding of NO HISTORIC PROPERTIES AFFECTED under 36 CFR 800.4(d)(1).

INTRODUCTION

On behalf of DCP Sand Hills Pipeline, LLC (DCP), SWCA Environmental Consultants (SWCA) conducted an intensive archaeological survey of the proposed Sand Hills Loop Phase I Pipeline in Reagan and Crockett counties, Texas. Approximately 26 miles of the pipeline ("project") crosses through land owned by the University of Texas (UT). The majority of the proposed alignment has been previously investigated by Turpin and Sons, Inc.(TAS) in 2011. As such, only portions of the alignment that deviate outside the 2011 survey corridor were investigated, as well as portions which cross or are adjacent to (within 300 feet) sites that were identified after the 2011 survey. These areas to be surveyed total 6.4 miles within a 100-foot-wide corridor.

Archaeological investigations were conducted pursuant to the potential acquisition of a U.S. Army Corps of Engineers (USACE) Section 404 permit in accordance with 33 Code of Federal Regulations (CFR) Part 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Documents dated April 25, 2005 and January 31, 2007); and Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [USC] 470) and its implementing regulations 36 CFR 800. As the project area is owned by a political subdivision of the State of Texas, work was additionally conducted in compliance with the Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191) and accompanying Rules of Practice and Procedure (Texas Administrative Code, Title 13, Chapter 26) under Texas Antiquities Permit No. 8157.

A background research and literature review was completed for the project and surrounding area. Additionally, SWCA archaeologists conducted an intensive archaeological survey of the area of effect of the project.

Todd L. Butler served as Principal Investigator for the project. The report was prepared by Susan E. Butler. The field survey was completed by Jacob Foreman and Caleb Foreman. Geographic information systems (GIS) support was provided and report graphics were prepared by GIS Specialists Colleen Kennedy and Kelly Shields. The report was edited by Joy Hengst.

Project Area Description

DCP proposes to construct approximately 26 miles of the 24-inch pipeline crossing through land owned by UT. The project is depicted on the Best, Texon SE, Big Lake SW, Schneeman Draw NW, and Schneeman Draw NE 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle maps (Figure 1; Appendix A). The portions of the project surveyed included areas of the alignment that deviated outside the 2011 survey corridor, as well as portions which cross or are adjacent to (within 300 feet) sites that were identified after the 2011 survey. These areas to be surveyed total 6.4 miles within a 100-foot-wide corridor.

The proposed pipeline will generally be constructed within a 100-foot-wide right-of-way (ROW) corridor, which includes a 50-foot-wide permanent and 50-foot-wide temporary construction corridor, as needed. With the exception of horizontal directional drilling (HDD) and bores at roads, rivers, and some other locations, the pipeline will be installed using the conventional open-cut construction method with the pipe being laid at approximately 4 feet below surface. Construction impacts will be confined to the 100-foot-wide ROW and include the clearing of vegetation, grading, and the stockpiling of soil. Additional temporary workspaces, including ancillary facilities and access roads, will be constructed, as needed. The line will be located adjacent to previously constructed pipeline.

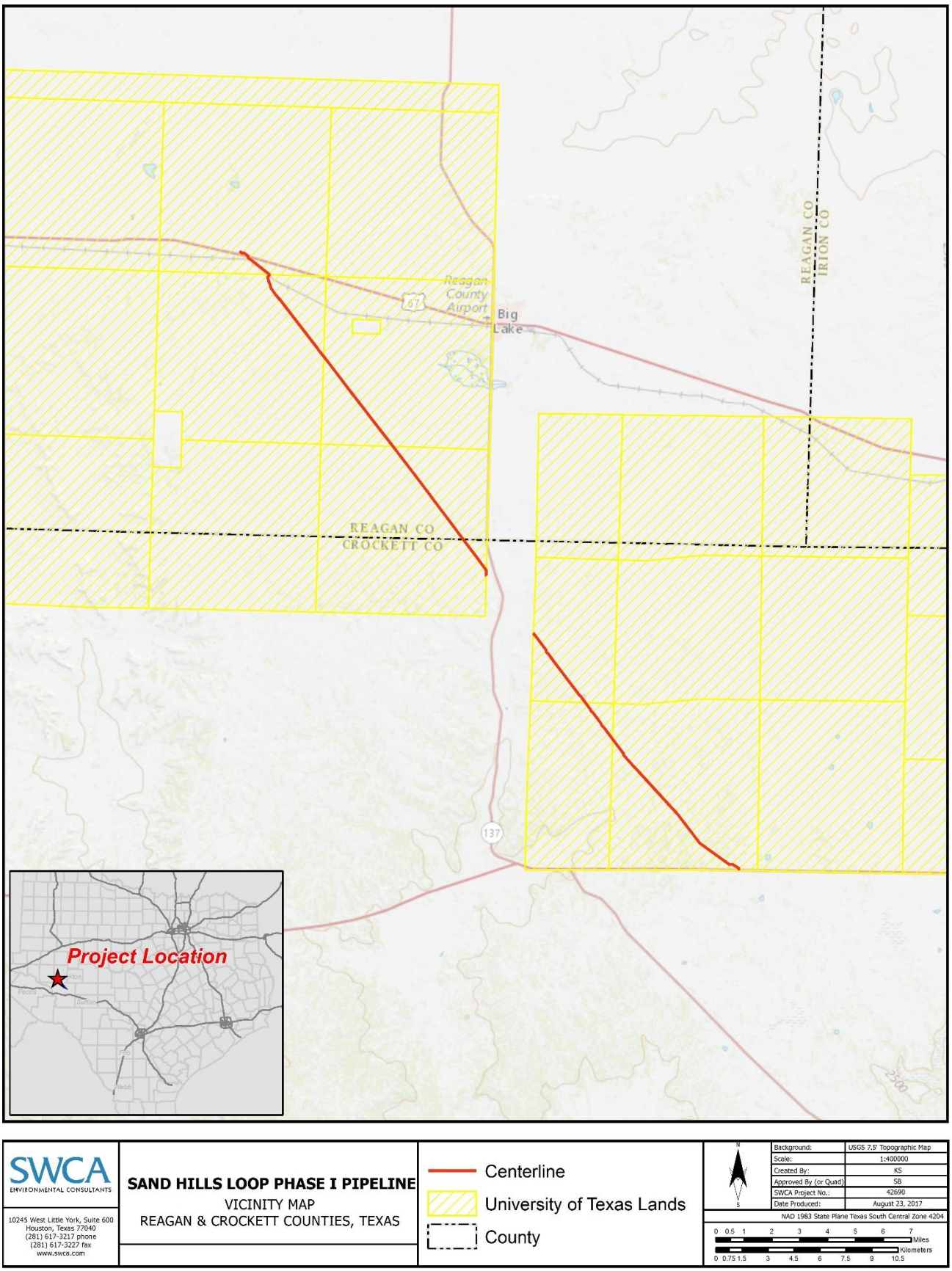

Figure 1. Project location map.

ENVIRONMENTAL SETTING

Physiographic Region

The project area is located within the Live Oak-Mesquite Savanna of the Edwards Plateau. The Edwards Plateau is an uplifted and elevated region originally formed from marine deposits of sandstone, limestone, shales, and dolomites more than 100 million years ago, during the Cretaceous Period when the region was covered by an ocean (Texas Parks and Wildlife Department 2017).

Geology

Geology in the project area is limited to three formations (Barnes 1987). Quaternary Deposits, undivided (Qu) consist of sand, silt, and gravel locally indurated with calcium carbonate (caliche) located on natural levees, stream channels, sand dunes, terraces, alluvial fans, and playa deposits. The Edwards Limestone formation (Ked) contains limestone deposits 350 to 400 feet thick. The Buda Limestone formation (Kbu) contains limestone up to 45 feet thick (Barnes 1987).

Soils

According to the Natural Resources Conservation Services (NRCS) Web Soil Survey (NRCS 2017), there are a number of soil series along the project alignment. Soils identified along the alignment are listed in Table 1.

Table 1. Soils within the project area.

Soils Series	Texture	Location	Description
Reagan	loam	flats, valleys, fans	Very deep, well drained, moderately or moderately slowly permeable calcareous soils that formed in alluvium and/or eolian deposits derived from limestone. Slopes range from 0 to 3 percent.
Ector	gravelly loam	ridges on dissected plateaus	Very shallow to shallow, well drained soils that are moderately permeable above a moderately slowly permeable limestone bedrock. They formed in calcareous loamy residuum derived from limestone. Slope ranges from 1 to 60 percent.
Angelo	clay loam	terraces on dissected plateaus	Deep or very deep, well drained, moderately slowly permeable soils formed in calcareous loamy and clayey alluvium derived from limestone. Slope ranges from 0 to 3 percent.
Noelke	silty clay loam	uplands	Very shallow and shallow to a petrocalcic horizon. They are well drained, and moderately permeable soils that formed in residuum over limestone.
Texon	silt loam	plains	Very deep, well drained, moderately slowly permeable soils that formed in eolian sediments overlying marl and limestone of the Buda Formation of Cretaceous age.
Irion	clay	shallow depressions	Very deep, well drained, very slowly permeable soils formed in clayey alluvium derived from limestone over fractured limestone bedrock of Buda Formation Cretaceous age.
Pandale	gravelly loam	uplands	Very deep, well drained, moderately permeable soils formed in calcareous loamy alluvium with reworked eolian sediments of Pleistocene and Holocene age. Slopes range from 0 to 5 percent.
Rio Diablo	silty clay	valleys, stream terraces	Very deep, well drained, moderately slowly permeable soils that formed in calcareous alluvium from limestone hills. Slopes range from 0 to 3 percent.

CULTURAL SETTING

The following cultural setting is divided into three prehistoric periods: Paleoindian, Archaic, and Late Prehistoric. The Archaic period is subdivided into four subperiods: Early, Middle, Late, and Transitional. The Historic period follows the Late Prehistoric, with the arrival of Europeans to central Texas. The Historic period is further divided into eras that influenced development in the region.

Prehistoric Cultural Setting

The project area is located within the Central Texas archaeological region, as defined by Perttula (2004). The prehistoric cultural history derives its information from several archaeological region chronologies, including Black (1989), Collins (1995, 2004), Hester (1978, 1980a, 1995, 2004), Johnson and Goode (1994), Perttula (2004), and Turpin (2004), which build upon the seminal efforts of Suhm (1960) and Prewitt (1981, 1985). Investigations at significant archaeological sites within the Central Texas archaeological region and the Edwards Plateau have contributed important information to understanding prehistory.

Paleoindian Period

Human occupation of the Central Texas region is thought to have begun approximately 12,000 years before present (B.P.) (Perttula 2004). This period correlates with the end of the late Pleistocene, the last ice age in North America. These early Texans are characterized by small, but highly mobile, bands of foragers who were specialized hunters of Pleistocene megafauna; however, Paleoindians probably used a much wider array of resources, including small fauna and plant foods (Bousman et al. 2002; Bousman et al. 2004; Bever and Meltzer 2007; Dering 2007; Meltzer and Bever 1995). Faunal remains from Kincaid Rockshelter and the Wilson-Leonard site (41WM235) support this view (Collins 1990; Collins et al. 1989).

Surficial and deeply buried open sites, protected (rockshelter) sites, and isolated artifacts represent Paleoindian occupations in the regions. Although Paleoindian sites are not well documented in the region, they can be generally classified according to broad site type categories extrapolated from nearby regions. Both open and protected (rockshelter) types are known. Usually these sites are near permanent sources of water, such as tributary creeks or springs. Bison kill sites, open and protected campsites, and non-occupation lithic sites are known from the Paleoindian period in Texas. Intra-site features include hearths and isolated burials. The Wilson-Leonard site (41WM235), Pavo Real (41BX52), and 41BX229 contain stratified Paleoindian deposits (Hester 1980b). The lower component at the Wilson-Leonard site contained a Paleoindian burial (Collins et al. 1998).

Collins (2004) and Turpin (2004) divide the Paleoindian period into early and late subperiods for the Central Texas region. Two projectile point styles, Clovis and Folsom, are included in the early subperiod. Clovis chipped stone artifact assemblages, including the diagnostic fluted lanceolate Clovis point, were produced by bifacial, flake, and prismatic-blade techniques on high quality, and oftentimes exotic, lithic materials (Collins 1990). Along with chipped stone artifacts, Clovis assemblages can include engraved stones, bone and ivory points, stone bolas, and ochre (Collins 1995:381; Collins et al. 1992). Clovis points are found evenly distributed along the eastern edge of the Edwards Plateau, where the presence of springs and outcrops of chert-bearing limestone are common (Meltzer and Bever 1995:58). Sites within the area yielding Clovis points and Clovis-age materials include Kincaid Rockshelter (Collins et al. 1989) and San Macros Springs (Takac 1991). Analyses of Clovis artifacts and site types suggest that Clovis peoples were well-adapted, generalized hunter-gatherers with the technology to hunt larger game, but not solely relying on it.

In contrast, Folsom tool kits—consisting of fluted Folsom points, thin unfluted (Midland) points, large thin bifaces, and endscrapers—are more indicative of specialized hunting, particularly of bison (Collins 2004:117). Folsom point distributions, both their frequency and spatial patterning, differ from the Clovis patterns, suggesting a shift in adaptation patterns (Bever and Meltzer 2007; Meltzer and Bever 1995:60, 74). Folsom points appear more frequently in the coastal plain, as well as the South Texas plain. As Folsom points are almost exclusively found in plains settings (they are conspicuously lacking in the Edwards Plateau), the technology perhaps marks a more specialized adaptation, likely to a more intensive reliance on *Bison antiqus*.

Postdating Clovis and Folsom points in the archaeological record are a series of dart point styles (primarily unfluted lanceolate darts) for which the temporal, technological, or cultural significance is unclear. Often, the Plainview type name is assigned to these dart points, but Collins (2004:117) has noted that many of the points typed as Plainview do not resemble Plainview type-site points in thinness and flaking technology. Recent investigations at the Wilson-Leonard site (see Bousman 1998) and a statistical analysis of a large sample of unfluted lanceolate points by Kerr and Dial (1998) have shed some light on this issue. At Wilson-Leonard, the Paleoindian projectile point sequence includes an expanding-stem dart point termed Wilson, which dates to ca. 10,000–9500 B.P. Postdating the Wilson component is a series of unfluted lanceolate points, referred to as Golondrina-Barber, St. Mary's Hall, and Angostura, but their chronological sequence is poorly understood. Nonetheless, it has become clear that the artifact and feature assemblages of the later Paleoindian subperiod appear to be Archaic-like in nature and, in many ways, may represent a transition between the early Paleoindian and succeeding Archaic periods (Collins 2004:118).

Archaic Period

The Archaic period for the Central Texas and Lower Pecos archaeological regions dates from ca. 8800 to 1250 B.P. (Collins 2004). In the South Texas region, this period is closer to ca. 8000 to 1250 B.P. (Perttula 2004). The Archaic period is generally believed to represent a shift toward hunting and gathering of a wider array of animal and plant resources, and a decrease in-group mobility (Willey and Phillips 1958:107–108).

In the eastern and southwestern United States and on the Great Plains, development of horticultural-based, semi-sedentary to sedentary societies succeeded in the Archaic period. In these areas, the Archaic truly represents a developmental stage of adaptation as Willey and Phillips (1958) define it. For Texas, this notion of the Archaic is somewhat problematic. An increasing amount of evidence suggests that Archaic-like adaptations were in place before the Archaic (Bousman et al. 2002; Collins 2004:117–118, 1998; Collins et al. 1989) and that these practices continued into the succeeding Late Prehistoric period (Collins 2004:118–119; Prewitt 1981:74).

As such, the Archaic period of Texas is not a developmental stage, but an arbitrary chronological construct and projectile point style sequence. Establishment of this sequence is based on several decades of archaeological investigations at stratified Archaic sites along the eastern and southern margins of the Edwards Plateau. Collins (2004) and Johnson and Goode (1994) have divided this sequence into three parts—Early, Middle, and Late—based on perceived (though not fully agreed upon by all scholars) technological, environmental, and adaptive changes. Turner and Hester (2011) and Black (1989) have designated another period at the end of the Archaic, referred to as Transitional Archaic.

EARLY ARCHAIC

The Early Archaic period (8800–6000 B.P.) is better documented than the Paleoindian period, however a complete understanding of cultural patterns does not yet exist. Early Archaic sites are small, and their tool assemblages are diverse (Weir 1976:115–122), suggesting that populations were highly mobile and low density (Prewitt 1985:217). It has been noted that many Early Archaic sites are concentrated along the eastern and southern margins of the Edwards Plateau (Johnson and Goode 1994; McKinney 1981). This distribution may indicate climatic conditions at the time, given that these environments have more reliable water sources and a more diverse resource base than other parts of the region (Turpin 2004).

Artifact assemblages of the Early Archaic include projectile points styles such as Hoxie, Bulverde, Gower, Wells, Martindale, and Uvalde, as well as early split stem projectile points. A variety of choppers and gouges, such as the triangular, concave based bifaces (known as Guadalupe tools), and the distally beveled Clear Fork unifaces, are present in the archaeological record. A variety of expedient tools, often nothing more than utilized flakes, are increasingly present in the Early Archaic (Black 1989).

The construction and use of rock hearths and ovens, which had been limited during the Paleoindian period, become more commonplace in the Early Archaic. The use of rock features suggests that retaining heat and releasing it slowly over an extended period were important in food processing and cooking and reflects a specialized subsistence strategy. Such a practice probably was related to cooking plant foods, particularly roots and bulbs, many of which must be subjected to prolonged periods of cooking to render them consumable and digestible (Black et al. 1997:257; Wandsnider 1997; Wilson 1930).

Botanical remains, as well as other organic materials, are often poorly preserved in Early Archaic sites, so the range of plant foods exploited and their level of importance in the overall subsistence strategy are poorly understood. The recovery of charred wild hyacinth (*Camassia scilloides*) bulbs from an Early Archaic feature at the Wilson-Leonard site provides some insights into the types of plant foods used and their importance in the Early Archaic diet (Collins et al. 1990).

At the Gatlin Site (41KR621) in Kerr County, the researchers interpreted two types of cooking based upon the encountered burned rock features (Houk et al. 2008). The first type is small-scale grilling/smoking of fauna and flora resources while the second type attributed to the earth ovens was large scale baking of flora and possibly fauna (Houk et al. 2008:13-17–13-18). The Gatlin researchers examined similar features from other Early Archaic sites in the region and noted that there is a wide variety concerning the occurrence of small and large burned rock features. Some Early Archaic sites solely contained large earth ovens while others had a ratio as high as 3:1 small to large features (Houk et al. 2008:13-18). Ultimately, the researchers concluded that supplementary data should be considered to garner a more complete interpretation of Early Archaic activities.

MIDDLE ARCHAIC

Cultural patterns during the Middle Archaic period (6000–4000 B.P.), point toward increased sedentary population intensively harvesting acorns, prickly pear cactus, and pecans, and hunting small and medium-size game, such as deer and turkey. The increase in the number of Middle Archaic sites and burials supports the concept of a larger, more sedentary population (Black and McGraw 1985; Prewitt 1981:73; Weir 1976:124, 135). Large bands may have formed, at least seasonally, to occupy a single area, or small groups may have used the same sites for longer periods (Weir 1976:130–131).

Sites of the Middle Archaic are numerous and often large in size and include open sites and some rockshelters along present or former streams, or in floodplains, low terraces, or along natural levees (Hester 2004; Turpin 2004). The increase of populations along rivers occurred as upland water resources dwindled (Turpin 2004). This population density increase likely fueled conflicts and social complexity (Turpin 2004).

Burned rock middens, as well as well-constructed hearths, are found at many sites with Middle and Late Archaic components in these archaeological regions. The development of burned rock middens toward the end of the Middle Archaic suggests a greater reliance on plant foods, although tool kits still imply a considerable dependence on hunting (Prewitt 1985:222–226). Middle Archaic projectile point styles include Bell, Andice, Calf Creek, Taylor, Nolan, Travis, and Pandale.

Bell and Andice points reflect a shift in lithic technology from the preceding Early Archaic Martindale and Uvalde point styles (Collins 2004:120). Johnson and Goode (1994:25) suggest that the Bell and Andice darts are parts of a specialized bison-hunting tool kit. They also believe that an influx of bison and bison-hunting groups from the Eastern Woodland margins during a slightly more mesic period marked the beginning of the Middle Archaic. Though no bison remains were recovered, Bell and Andice points and associated radiocarbon ages were recovered from the Gatlin site (Houk et al. 2008), Cibolo Crossing (Kibler and Scott 2000), Panther Springs Creek, and Granberg II (Black and McGraw 1985) sites in Bexar County. The distinctly-beveled Pandale point emerged with a limited regional distribution in the Lower Pecos region during this period (Turpin 2004).

Other artifacts from the Middle Archaic are choppers, gouges, and expedient tools, such as the small, bifacial and unifacial Clear Fork tools. Grinding stones and bases, referred to as manos and metates, show up in Middle Archaic artifact assemblages, as do a number of perforators, drills and awls. Chipped, polished, and ground stone artifacts are common in the regions. Less frequently encountered artifacts include tools and ornaments of bone, antler, and marine shell (Turner and Hester 1999).

Bison populations declined as more-xeric conditions returned during the later portion of the Middle Archaic. Later Middle Archaic projectile point styles (Nolan and Travis) represent another shift in lithic technology (Collins 2004:120–121; Johnson and Goode 1994:27). At the same time, this shift to drier conditions saw the burned rock middens develop, probably because intensified use of geophytic or xerophytic plants meant the debris from multiple rock ovens and hearths accumulated as middens on stable to slowly aggrading surfaces, as Kelley and Campbell (1942) suggested many years ago. Johnson and Goode (1994:26) believe that the dry conditions promoted the spread of yuccas and sotols, and that it was these plants that Middle Archaic peoples collected and cooked in large rock ovens.

LATE ARCHAIC

During the succeeding Late Archaic period (4000 to 1250 B.P.), populations continued to increase (Prewitt 1985:217). As evidenced by stratified Archaic sites, such as Loeve-Fox, Cibolo Crossing, and Panther Springs Creek, the Late Archaic components contain the densest concentrations of cultural materials of all the Archaic periods. Establishment of large cemeteries along drainages also suggests certain groups had strong territorial ties (Story 1985:40).

Middle Archaic subsistence technology, including the use of rock and earth ovens, continued into the Late Archaic period. Collins (2004:121) states that, at the beginning of the Late Archaic period, the use of rock ovens, and the resultant formation of burned rock middens, reached its zenith, and that the use of rock and earth ovens declined during the latter half of the Late Archaic. There is mounting chronological data that midden formation culminated much later and that this high level of rock and earth oven use continued into the early Late Prehistoric period (Black et al. 1997:270–284; Kleinbach et al. 1995:795). The prevalence of burned rock midden development in the eastern part of the Central Texas archaeological region after 2000 B.P. parallels the widely recognized occurrence of post-2000 B.P. middens in the western reaches of the Edwards Plateau (Goode 1991).

The use of rock and earth ovens (and the formation of burned rock middens) for processing and cooking plant foods suggests that this technology was part of a generalized foraging strategy. Considering the amount of energy involved in collecting plants, constructing hot rock cooking appliances, and gathering fuel, the caloric return of most plant foods is relatively low (Dering 1999). This suggests that plant foods were part of a broad-based diet (Kibler and Scott 2000:134) or part of a generalized foraging strategy, an idea Prewitt (1981) put forth earlier.

At times during the Late Archaic, this generalized foraging strategy appears to have been marked by shifts to a specialized economy focused on bison hunting (Kibler and Scott 2000:125–137). Castroville, Montell, and Marcos dart points are elements of tool kits often associated with bison hunting (Collins 1968). Archaeological evidence of this association is seen at Bonfire Shelter in Val Verde County (Dibble and Lorrain 1968), Jonas Terrace in Medina County (Johnson 1995), Oblate Rockshelter in Comal County (Johnson et al. 1962:116), John Ischy in Williamson County (Sorrow 1969), and Panther Springs Creek in Bexar County (Black and McGraw 1985).

TRANSITIONAL ARCHAIC

As Collins (2004:122–123) notes, diverse and comparatively complex archaeological manifestations toward the end of the Late Archaic attest to the emergence of kinds of human conduct without precedent in the area. This period (2250–1250 B.P.), referred to as the Transitional Archaic (Turner and Hester 1999) or Terminal Archaic (Black 1989), is not recognized by all researchers. Other chronologies terminate the Late Archaic at around 1200–1250 B.P. (Collins 2004; Johnson and Goode 1994) to encompass this later subperiod. Johnson et al. (1962) originally designated the Transitional Archaic as a subperiod of the Archaic because of the similarities between the latest dart point types and the earliest arrow point types. Since then, however, the designation has failed to be universally accepted by researchers. In two recent chronologies for Central Texas, Collins (2004) does not include the Transitional as a subperiod of the Archaic. Johnson and Goode (1994) and Turpin (2004) separate the Late Archaic into two subperiods. The Transitional Archaic, as it is used here, closely corresponds to Johnson and Goode's (1994) Late Archaic II, but begins after the appearance of Marcos points, not with it. In this scheme, the Transitional Archaic coincides with the last two style intervals recognized by Collins (2004) for the Late Archaic subperiod.

During the Transitional Archaic, smaller dart point forms such as Darl, Ensor, Fairland, and Frio were developed (Turner and Hester 1999). These points were probably ancestral to the first Late Prehistoric arrow point types and may have temporally overlapped them (Hester 1995; Houk and Lohse 1993).

Several researchers believe that the increased interaction between groups at the end of the Late Archaic was an important catalyst for cultural change (Collins 2004; Johnson and Goode 1994). This change may have included increased regional stress and conflict between groups as interaction became more frequent (Houk et al. 1997). In Bexar County, for instance, researchers noted a distinct shift in settlement patterns during this period (Houk et al. 1997). Groups began to use hilltops as camps rather than just lithic procurement locations. These elevated locations would have provided points from which to observe game and other groups of humans as they moved through the surrounding creek valleys and upland prairies (Houk et al. 1997). In the Lower Pecos region, small rockshelter occupancy intensified during this period and a greater emphasis on the procurement and processing of vegetal materials has been identified (Turpin 2004).

Overall, the Archaic period represents a hunting and gathering way of life that was successful and remained virtually unchanged for more than 7,500 years. This notion is based in part on fairly consistent artifact and tool assemblages through time and place and on resource patches that were used continually for several millennia, as the formation of burned rock middens show. This pattern of generalized foraging, though marked by brief shifts to a heavy reliance on bison, continued almost unchanged into the succeeding Late Prehistoric period.

Late Prehistoric Period

Introduction of the bow and arrow and, later, ceramics, marks the Late Prehistoric period (1250–350 B.P.) in this region. Population densities dropped considerably from their Late Archaic peak (Prewitt 1985:217). Subsistence strategies did not differ greatly from the preceding period, although bison again became an important economic resource during the latter part of the Late Prehistoric period (Prewitt 1981:74). Rock and earth ovens were utilized for plant food processing (Black et al. 1997; Kleinbach et al. 1995:795). Horticulture came into play very late in the area but was of seemingly minor importance to overall subsistence strategies (Collins 1995:385).

Artifact assemblages include Scallorn, Perdiz, and Edwards projectile points, worked stone, thermally altered stone, hematite, bone, and shell. The points are associated with the use of the bow and arrow in the region, probably introduced sometime around 1350–1150 B.P. Arrow shaft straighteners are also found during this period (Hester 2004). Additionally, further interaction with external groups is noted, including a possible north-south trade network, as evidenced by exotic obsidian from Idaho and Mexico that has been recovered from Late Prehistoric sites (Hester 2004).

The earlier Austin phase (identified by Scallorn and Edwards points) and the later Toyah phase (defined through Perdiz points) divide the Late Prehistoric period throughout Central and South Texas (Black 1989; Story 1990). These divisions were originally recognized by Suhm (1960) and Jelks (1962), and remain an accepted separation of the period. Although a distinct change in the material culture between the phases can be seen in the archaeological record, there is some debate over the cultural underpinnings that prompted the change. The different arrow point styles (and other associated artifacts in the assemblage) may represent distinct cultural groups (Johnson 1994), but others challenge this view (e.g., Black and Creel 1997), and attribute the change to a spread of new technological ideas in response to the increase of a different economic resource in bison populations (Ricklis 1992). Nevertheless, prehistoric communities traced through cultural remains assigned to the Austin phase (1250–650 B.P.), like many of the Archaic period cultures before them, relied on a hunting and gathering subsistence with more of an emphasis on gathering (Prewitt 1981:83). Communities attributed to the Toyah phase (650–200 B.P.) relied more on bison procurement (Prewitt 1981:84).

Around 1000–750 B.P., slightly more xeric, or drought-prone, climatic conditions returned to the region, and bison came back in large numbers (Huebner 1991; Toomey 1993). Using this vast resource, Toyah peoples were equipped with Perdiz point-tipped arrows, endscrapers, four-beveled-edge knives, and plain bone-tempered ceramics. Toyah technology and subsistence strategies represent a completely different tradition from the preceding Austin phase. Collins (1995:388) states that formation of burned rock middens ceased as bison hunting and group mobility obtained a level of importance not witnessed since Folsom times. Although the importance of bison hunting, and high group mobility hardly can be disputed, the argument that burned rock midden development ceased during the Toyah phase is tenuous. A recent examination of Toyah-age radiocarbon assays and assemblages by Black et al. (1997) suggests that their association with burned rock middens represents more than a "thin veneer" capping Archaic-age features. Black et al. (1997) claim that burned rock midden formations, although not as prevalent as in earlier periods, was part of the adaptive strategies of Toyah peoples.

As noted above, the Infierno phase of the Lower Pecos region is possibly related to the Toyah phase of the Central and South Texas regions. While fewer than 12 sites have been attributed to this phase, the sites are distinctly characterized by paired stone rings that were presumably supports for brush or hide-covered structures (Turpin 2004). Additionally, the tool kits from this phase primarily contain four artifact types, including small, triangular stemmed arrow points, steeply-beveled endscrapers, four-beveled knives, and plain ceramics (Turpin 2004).

Historic Cultural Setting

Landscape features have dictated human movement and subsistence patterns for thousands of years. Specifically, geographical influences during the Historic period confined settlements to riparian zones and limited farming to these areas. The larger rugged landscape was used for sheep, goat, and cattle ranching. These practices were introduced and promoted by the Spanish as part of their colonial agenda and many were carried through to the twentieth century, giving Texas a strong agricultural history dominating economic, social, and cultural patterns over the years (Freeman 1994).

Spanish Colonial Period

The historic period in these regions of Texas roughly begins when Europeans first enter the region (ca. 1630 A.D.), however, several sixteenth century expeditions have been reported in the area, most notably Alvar Nuñez Cabeza de Vaca's travels stemming from the failed 1527 Panfilo de Narvaez expedition. Cabeza de Vaca reportedly lived and traveled with various aboriginal groups across coastal and interior Texas around 1528 (Chipman 2011; Foster 1995; Krieger 2002). Although Cabeza de Vaca's exact path is not clear, his journey likely passed closer to present day Freer, Texas (Krieger 2002).

Motivated more by a fear of French expansion than anything else, the Spanish explored and established missions in eastern and central Texas during the latter part of the seventeenth century (Foster 1995). The first Europeans to pass near the project area were probably Spanish explorers and missionaries with "sword and cross" coming northward from Mexico City (Foster 1995; Weddle 1968). With the exception of these Spanish expeditions or "entradas", Texas during the early Historic period was claimed by Spain, but basically remained without an established Spanish presence until around 1700. (Foster 1995). These entrada routes followed established Indian trade routes and were the genesis of the Spanish road system throughout Texas. Many of these Spanish roads have been incorporated into the Texas highway network that is in use today (Foster 1995:1). The first early overland Spanish entrada was led by Governor Alonso de Léon, which passed between present day Uvalde and Pearsall, Texas in 1689 and 1690 (Foster 1995:17–49). Subsequent overland entradas into the eighteenth century generally followed de Léon's early route, which became the Upper Presidio Road from 1795–1850 (McGraw et al. 1991).

Spanish expeditions throughout the seventeenth and eighteenth centuries established not only the mission system, but also introduced livestock and ranching practices that would influence generations of Texans. Sheep, goats, cattle, and hogs were shipped in to create mission and private ranches. These ranches were developed as a means to create an autonomous settlement system in a relatively hostile environment prone to attacks by the Comanche, Apache, and Norteños.

By the end of the eighteenth century, ranching practices were on the rise. Spurred on by demands from eastern markets, Texas ranches flourished. Further, east Texas missions were secularized in 1794, creating a greater need for meat and other goods (Freeman 1994). As a result of the changing economic and political environment, the proliferation of private ranches increased over time. Eighteenth century Spanish ranching practices were carried into the nineteenth century, having an influence on European and American settlers moving into Texas from both Europe and the older states of the southeast. This influence included the introduction of twice-a-year breeding, the choice of specific breeds, and the establishment of specific ranching methods, terminology, and organization (Freeman 1994:10).

Mexico and the Republic of Texas

The beginning of the nineteenth century proved difficult for Spain. The Napoleonic wars left the country in an economic and political crisis, which was greatly felt in the territories of New Spain. After years of struggle, threats from the United States to the north and east, and the breakdown of government organization, Mexico finally gained its independence in 1821 (de la Teja 2011).

Ranching practices began to shift even more during this time with an influx of new settlers from the southern United States and Europe. Under Spanish law, foreigners were initially forbidden to settle in Spanish lands. However, due to a dearth of settlers willing to travel into the dangerous northern regions of New Spain, the government made allowances. By 1820, Texas was opened, and settlers arrived in waves, under the authority of men like Stephen F. Austin, taking advantage of cheap land and liberal laws under Spain and then Mexico (Henson 2011). Their influences added to methods of breeding and herding practices in the area, building on established Spanish colonial traditions. The colonists also brought new crops and farming practices with them. In fact, the anti-slavery ideals of Mexico were set aside by Mexican officials in Texas to lure Anglo settlers with much desired agricultural practices from southern states. Settlers also moved to Texas with the idea that the area would soon be annexed by the United States and would be a worthy investment as more people moved west. Further, Texas functioned as a safe-haven from debt, granting debt-laden families and individuals a clean start (Henson 2011).

In the early years of the Mexican republic, the new government made every attempt to live up to the *Plan de Iguala,* which was created in 1821 as Mexico pushed for independence. This plan called for the preservation and importance of the Catholic Church, for the equality of Mexican citizens, and for Mexican independence as a constitutional monarchy (de la Teja 2011). The Mexican Constitution of 1824 further established these goals. Modeled after the United States Constitution in format, and the Spanish Constitution of 1812 in spirit, the document established an American-style judicial, legislative, and executive branch system, with the publicly funded Catholic Church as the official faith. Texas was represented by José María Erasmo Seguín at the constitutional assembly, however, the diverse population of Texas was not fully represented at the assembly, and the document was not ratified by public vote (McKay 2011).

By 1835, Texans were growing unhappy and restless. The Mexican government had failed to provide the liberal and democratic environment that many European and American settlers had envisioned. The republican ideals established in the Constitution of 1824 were pushed aside and replaced by a growing dictatorship lead by Antonio López de Santa Anna. Texans decided to handle the crisis swiftly by creating a series of assemblies and a provisional government. Wrought with internal strife, the Texans did not fully organize until a convention meeting was held at Washington-on-the-Brazos on March 1, 1836. The convention appointed Sam Houston as Commander-in-Chief of the new Revolutionary Army and made rapid decisions about a new government, a new constitution, and the possibility of war (Nance 2011).

The next several months would prove challenging to the new government and Texas settlers. In March 1836, news of the fall of the Alamo, reached settlers quickly. South-Central Texas was one of the first areas affected by the news, due to close proximity to San Antonio. As Sam Houston retreated in late March, settlers followed, creating a large-scale exodus out of Texas. Known as the 'Runaway Scrape', the flight out of Texas continued at a steady pace until the decisive Battle of San Jacinto in late April 1836. After Houston's victory at San Jacinto, settlers slowly began to make their way back to their farms and ranches, only to find missing cattle and damaged property (Covington 2011).

By late 1836, Texas had defeated Mexico, created a new constitution, and elected a new executive, judicial, and legislative staff. Sam Houston led the new Republic of Texas as president and Stephen F. Austin acted as secretary of state. The new government worked quickly to create the Texas postal system, create an organized militia, and establish the Republic of Texas boundaries. Sam Houston also worked with land grant issues and settler's rights. By the end of the Texas Revolution, Texas had over 251,000,000 acres of land as public domain. This land was not only used to support public works in the new Republic of Texas, but also to encourage further settlement. Generous grants were provided to veterans of the war. Land grants of 1,280 acres for heads of families and 640 acres for single men were offered to settlers arriving in Texas in 1836 and 1837. New settlers were required to live in Texas at least three years to receive their land title (Nance 2011). Texas also attempted to sell land to new settlers well below the going rate at the time. Running into organizational trouble with grants and sales, the first homestead law went into effect in 1839. This law granted 50 acres or one town lot to every citizen or head of family (Nance 2011).

The Republic of Texas also encouraged larger settlements of new immigrants through land grants and colonization contracts. These efforts garnered varying levels of success, but minimally opened the door to a wave of German immigrants into the region that would last throughout the years of the nineteenth century and create important cultural and social contributions to development of the Texas Hill Country.

Antebellum Texas and the United States

In December 1845, Texas became part of the United States. The offer was generous; Texas would become a slave state, instead of a territory, and would retain the ability to keep public lands and debts. Texas would also have the capability to divide into four additional states, if needed, and the United States Navy would offer protection along the Gulf coast.

Despite a constant threat of Indian raids and the occasional threat of starvation, settlers continued to arrive in the area, taking advantage of available land under the Pre-emption Act of 1845 and the Homestead Act of 1845 (Curtis 1943). Scouting trips to the area also reported an abundance and variety of wild game, picturesque hills and streams, and ideal country for livestock grazing. United States forts were also established throughout the western edge of the established frontier to offer protection to settlers.

German and Anglo-American settlers adapted quickly to the new landscape. Breeding experiments with native and imported goats and sheep produced hybrid animals suited to the Hill Country environment. Capitalizing on their successful breeding experiments, German families often built mills to produce cloth. This effort was timed perfectly to meet an increased demand for wool cloth over cotton within the larger context of the United States. Wool manufacturing techniques were also becoming more streamlined, enabling faster production. Further, low land prices and favorable climate lured ranchers from other parts of the United States. These factors, in conjunction with George Wilkins Kendall's wool promotion campaign activities, created the first "sheep boom" in Texas. Cattle numbers were also on the rise and by the onset of the Civil War; Texas had more than 3.5 million head, outnumbering all other states (Freeman 1994).

Until the early twentieth century, transportation and circulation routes in Texas remained rudimentary and fairly disconnected. Spanish Colonial roads took advantage of existing Native American trails, initially to access interior portions of the territory. Later, settlers from the United States and other European countries continued to use established trails, and created new ones, as they entered the region. By the early- to mid-nineteenth century, most of the roads in Texas were created by sustained use and ease of access, rather than by design (Wallace 2008).

Efforts to create a coherent transportation system began in the first years of the Republic of Texas. The young Republic of Texas created a Commissioner of Roads and Revenue along with the Texas Rail Road Navigation and Banking Company (Wallace 2008; Werner 2011). Lack of funds plagued both, leaving existing roads in poor condition, with no hope for the establishment of new circulation systems. Road development and maintenance responsibility fell primarily to the counties, which appointed a local overseer and crew. This group of selected men, usually comprised of local landowners, rotated every few months. Therefore, road building in the early years of the Republic of Texas, and through the rest of the nineteenth century, was primarily a local endeavor shared by the community.

True progress for roads came about due to the California Gold Rush (ca. 1850). During that time, Texas functioned as a staging ground for thousands heading west to California on the news of the discovery of gold. Routes also existed through Arkansas and Missouri, but Texas offered warmer weather, and thus an earlier start date. Texas also had an established trail system, which was mapped during the Mexican American War, and a recently created military route running from San Antonio to El Paso (Wallace 2008). Due to the influx and movement of people across the state, new webs of connection were established, linking town sites and settlements. The condition of these trails and roads would remain in poor condition for years to come, with upkeep in the hands of local governments (Wallace 2008). The first rail system in Texas was built in the 1850s, connecting Houston to Cypress. However, true progress on this front would not be seen until the reconstruction years (Werner 2011).

The Civil War

Texas was a divided state as the Civil War began in 1861. The new state had fought hard to be granted admission to the Union, however, ties to the older states of the south, including slavery and agricultural practices, were strong. In fact, the majority of the established and growing Anglo population came from southern states. This group saw the Civil War and the election of President Abraham Lincoln as a threat to the State of Texas and its southern heritage and institutions (Campbell 2011).

Texas Hill Country counties were even more divided, with narrow margins winning in favor of secession. The vote against secession was led by the large number of German settlers in the area. By 1861, Germans in Kerr, Gillespie, and Kendall counties created the Union League to create organized groups to fight against local native raids and Confederate threats. Seen as an act of rebellion against the State of Texas and the Confederacy, Union troops were called in to quell the group. Finding themselves in a dangerous situation, the Unionists decided to flee to Mexico. They were intercepted and attacked by Confederate troops on the Nueces River in Kinney County, in what is now known as the Battle of the Nueces. While the division over succession and the outcome of the Battle of Nueces (seen by many German settlers as a massacre) created tensions between Anglo and Germans even after the Civil War was over, the counties in the Hill Country recovered from the war quickly, with successful agriculture and ranching practices in place for future growth (Odintz 2016).

Reconstruction and Growth

The Hill Country counties and settlements recovered quickly from the Civil War. George Wilkins Kendall continued to promote goat and sheep ranching in Texas throughout the United States. As a result, the industries survived the war and went on to create a second wool or sheep boom through the mid-1880s. Key factors influencing the success of sheep ranching at this time included the influx of both northern and southern ranchers to the area, the removal and destruction of the buffalo herds along with native populations to the west (allowing for new, open pastureland), and higher wool prices (Freeman 1994).

The development of ranching infrastructure also helped establish the sheep, goat, and cattle industries in the area. Systems of markets and warehouses with specific architectural features designed to package, store, and sell wool and mohair were created. Railway systems further aided ranching activities farther west, creating access to the Edwards Plateau (Freeman 1994). In fact, railroads would eventually eclipse roads in focus and importance as they pulled in funding from both the state and outside resources. The Texas Railroad Commission was established in 1891 to regulate the powerful railroad companies. By 1900, Texas had more miles of track than any other state in the Union; however, these lines still left much of the expansive western half of Texas with little or no rail access, despite railroad growth (Werner 2011; Wallace 2008).

By the mid-1880s to early-1890s, the wool boom and the cattle industry were in decline, brought on by over-grazed grasslands, extreme weather conditions (including drought and harsh winters), and the introduction of barbed wire. In addition, the Texas economy was heavily impacted by the Panic of 1893, which was a severe economic depression brought on by bank failures and over speculation in railroad construction. Sheep and cattle ranchers generally pulled through, reorganizing ranching practices and creating support systems and organizations for protection and promotion (Freeman 1994). Diversification of ranching and farming also became more popular. Ranchers focused their attention specifically on mohair production and Angora goats, setting the stage for the growth and boom of that industry into the twentieth century (Freeman 1994).

The Twentieth Century

Crockett County had been established in 1891 (Campbell 2011; Smith 2016a). Reagan County was carved out of Tom Green County in 1903 (Smith 2016b). Smaller, adept, diversified farms and ranches dominated the landscape of the Edwards Plateau by 1900. The "ranching triumvirate" of cattle, sheep, and Angora goats set Texas at the national forefront of ranching production (Freeman 1994:18). Agricultural crops, such as cotton, corn, wheat, oats, and various grasses for hay production, further diversified output, strengthening independent farms and ranches (Freeman 1994).

As railways continued to be built well into the twentieth century, new roads followed, creating a linked network. Rails functioned as the "main arteries of travel" and roads as "the veins" (Pratt 1910:106). Railroad companies soon realized that a good road system could greatly aid their business and they became one of the most ardent supporters of the good roads movement (Wallace 2008). Road systems also benefitted from the arrival of post offices. The Rural Free Delivery of Mail system brought mail to isolated ranches and farms. Postmen refused to use roads in poor conditions and consistently reported conditions to the proper authorities when they could not make their deliveries. This system united rural roads and post routes, engaging federal and state government interests. This new level of involvement with roads and their development stretched significantly beyond the previous scope of county court control (Wallace 2008).

The fate of road improvement and system expansion was sealed with the introduction of the automobile and the Federal Highway Act of 1916 and 1917. The new acts provided matching funding to states and a regulatory partnership to assist with building plans (location, design, and cost estimates). In response to these Acts, the Texas Highway Department was established in 1917. Soon after, the Highway Department would become the largest agency in the state (Wallace 2008). By 1917, Texas was well on its way to creating a new and complete highway system. The system included several national marked highway routes including the nascent Old Spanish Trail Transcontinental Highway (American Highway Association 1917; Luther 2010).

The creation of good roads not only enabled farmers and ranchers to get products to markets and railways easier, but also enabled motorists to take advantage of the Texas Hill Country. The Texas Highway Department responded to this growing need by designing and improving the supporting infrastructure, such as bridges and roadside stops.

Despite advancements made in infrastructure technology and funding, ranching, and the nascent tourism industry, the depression took its toll on the towns, farms, and ranches of the Texas Hill Country. Because the area was primarily rural, the effects of the depression were not felt initially. However, by the early 1930s, changes began to occur in local economies. The Texas legislature responded and, in 1931, all state agencies were required to use only American-made materials and machinery in all new construction projects. The Texas Highway Department worked together with the legislature to make sure Texas firms and material suppliers received all of the contracts for road and bridge work.

Crockett and Reagan counties were less affected by the depression than others in the region, primarily due to the discovery of oil. The economy of Reagan County shifted from agriculture and more to petroleum with the Big Lake oilfield started to produce in 1923 (Smith 2016b). In 1925, oil was discovered on L.P. Powell's ranch in north-central Crockett County; however, no major oil boom occurred though exploration and production increased through the 1930s and later (Smith 2016a).

As the depression advanced, the state legislature and the Texas Highway Department looked for other ways to increase the number of jobs for out-of-work Texans. In 1932, the Texas Highway Department mandated that machines should be used as a last result and all construction should be built by hand, when at all possible. In that same year, Texas began to receive federal aid under the Emergency Relief and Construction Act. Funding continued under Roosevelt's New Deal programs, which covered 100 percent of the costs and aided in economic recovery throughout the state (Wallace 2008).

By the 1940s, agriculture and ranching showed signs of recovery. In the 1950s, another oil boom began with oil in the Spraberry Trend area being produced (Smith 2016a, b). Throughout the remainder of the twentieth century, ranching dominated the economy in the area, being supplemented by the oil and gas industry (Smith 2016a, b).

BACKGROUND REVIEW

The background review consisted of a cultural resources and environmental literature review of the proposed project area, as well as a 1-mile radius around the project area. An SWCA archaeologist reviewed the corresponding USGS 7.5-minute topographic quadrangle map on the Texas Archeological Sites Atlas (TASA), a restricted online database, for any previously recorded surveys and historic or prehistoric sites located in or near the project area. Site files, relevant maps, National Register of Historic Places (NRHP) properties, State Antiquities Landmark (SAL) listings, Registered Texas Historic Landmarks, cemeteries, and local neighborhood surveys were also examined. Listings on TASA are limited to projects under purview of the Antiquities Code of Texas or the NHPA of 1966. Therefore, all work conducted in the area may not be available. The Texas Historic Sites Overlay (Foster et al. 2006), aerial photographs, Bureau of Economic Geology Maps, and the NRCS Web Soil Survey were also examined for historical and environmental information related to the project area.

Previous Investigations

The background review revealed that at least 11 previous cultural resources surveys intersect the project corridor (Table 2). Some of these surveys were completed in a grid pattern across the UT Lands and cross the project alignment in multiple locations. An additional survey is located adjacent to the project area for approximately 1.6 miles and 8 additional surveys have been completed within 1 mile of the proposed centerline. The 2011 survey of the original Sand Hills Pipeline was completed by TAS and is co-located with the proposed loop, with the exception of a few areas. None of the surveys identified significant resources in the project area (Texas Historical Commission [THC] 2017).

Due to the co-location with the 2011 Sand Hills Pipeline survey, only approximately 6.4 miles of the 26 miles within UT Lands will need to be surveyed. This includes areas where the loop deviates outside of the previous 100-foot-wide survey corridor, as well as where the alignment crosses or is adjacent to (within 300 feet) sites that were identified after the 2011 survey.

Previously Recorded Cultural Resources

A total of 48 archaeological sites are located within 1 mile of the project alignment (Table 3). No cemeteries, historical markers, or NRHP properties are located within 1 mile of the project alignment (THC 2017). Seven previously recorded archaeological sites are located within or immediately adjacent to (within 300 feet) the project centerline. These sites had not been identified during the 2011 TAS Sand Hills Pipeline survey.

Site 41RG76 is the historic "ghost" town of Best, Texas, dating from the 1920s to approximately the 1950s (THC 2017). The only remaining structure of the town is the jail house, which was evaluated as being in poor condition during the 2014 Brazos Valley Research Associates (BVRA) jail survey. BVRA assessed the site as having little value beyond archival research (THC 2017). The extant jail house will not be impacted by the proposed project.

Site 41RG263 is a prehistoric campsite, possible dating to the Archaic period (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified a large fire-cracked rock (FCR) scatter, a deflated hearth, seven projectile points (two identified as possible Frio points), three unifaces, four bifaces, one tested core, two groundstone tools, one chopper, and debitage, which was scattered across the site. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

Site 41RG324 is a prehistoric campsite of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified two deflated hearths, one Ensor point, one utilized flake, and seven flakes. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

Site 41RG343 is a prehistoric campsite/lithic procurement site of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified two deflated hearths, 1 bifacial knife, utilized flakes, utilized cores, and scattered lithics. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

Site 41CX1096 is a prehistoric campsite of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified debitage, two deflated FCR clusters, and two scrapers. The site was noted to have considerable ground disturbance and TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

Site 41CX1317 is an historic World War II bombardier target site (THC 2017). The USACE created a number of target shapes (created using caliche) on the ground to be used as bombing practice for the San Angelo Air Force Base. Target shapes in this location include ships, air fields, and oil depots. The targets are almost entirely obscured by ground disturbance. The site was recorded by TAS during the Barnhart 3D Seismic survey and TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

Site 41CX1570 is a prehistoric campsite of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2014 Dawson UL Block seismic survey. TAS identified two deflated hearths at the site. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

Table 2. Previous cultural resources surveys within 1 mile of the project area.

Atlas No.	Quadrangle(s)	Distance	Project	Year	Investigator	Agency/Sponsor	TAC No.
4610	Texon, Best	Intersects	unknown AAPL survey	1988	unknown	Bureau of Land Management	
3159	Schneeman Draw NE	> 0.5 mile	unknown survey	1990	unknown	Federal Energy Regulatory Commission	
9983	Best	< 0.5 mile	unknown survey	2001	unknown	Texas Department of Transportation	
20678	Best, Texon SE, Big Lake SW, Schneeman Draw NW, Schneeman Draw NE	Intersects	Pangea West 3D Seismic survey	2011	TAS	THC	6037
25311	Texon, Best	< 0.5 mile	Lone Star NGL Pipeline	2011	TRC	THC	6184
unknown	Texon, Best, Big Lake, Texon SE, Big Lake SW, Schneeman Draw NW, Schneeman Draw NW	Co-located	DCP Sand Hills Pipeline	2011	TAS	THC	6090
36558/ 61749	Texon, Best, Big Lake, Texon SE, Big Lake SW, Schneeman Draw NW, Schneeman Draw NW	Intersects	Seismic Blocks - Pioneer, East Crockett, Central, and South Big Lake	2011/ 2012	TAS	THC	6098
20388	Schneeman Draw NW, Schneeman Draw NE	Intersects	Transmission Line	2012	TAS	THC	6137
25724	Texon SE, Best, Lone Mountain, Texon SE, Big Lake, Big Lake SW	Intersects	Global Seismic Blocks	2012	TAS	THC	6191
48204	Best	< 0.5 mile	EOC Cell Towers	2013	TAS	Federal Communications Commission (FCC)/THC	6667
unknown	Schneeman Draw NW	Intersects	Barnhart 3D Seismic Blocks	2013	TAS	THC	6231
1799	Best	> 0.5 mile	DCP UL 20" Gathering Line	2014	TAS	THC	7053
51796	Big Lake SW	Intersects	Lucid Energy U50 Pipeline	2014	TAS	THC	6768
57880	Best	Adjacent	DCP Pipeline survey (adjacent to approx 1.6 miles of project area)	2014	TAS	THC	6787
60094	Best, Big Lake, Big Lake SW, Big Lake SE	Intersects	JP Energy Permian EP West Pipeline	2014	TAS	THC	6869
60095	Best	< 0.5 mile	Mangrove Cell Tower location	2014	TAS	FCC/THC	6897
60619	Best	< 0.5 mile	Lucid WesTex Big Lake 8 Lateral	2014	TAS	THC	6891
60859	Big Lake SW, Schneeman Draw NW	Intersects	Dawson UL Block 50 Seismic	2014	TAS	THC	6829
61877	Schneeman Draw NW, Schneeman Draw NE	< 0.5 mile	Lucid Energy Crockett Extension	2014	TAS	THC	6996
65922	Best	Intersects	JP Energy 8 S Trunk line ROW	2014	TAS	THC	7233

Table 3. Previously recorded archaeological sites within 1 mile of the project area.

USGS Quadrangle	Site	Distance	Relative Age	Time Period	Type	NRHP / Other Status	TAC No
Schneeman Draw NW	41CX1042	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1043	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1044	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1045	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NE	41CX1047	> 0.5 mile	Prehistoric	Archaic	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NE	41CX1048	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1049	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1050	< 0.5 mile	Prehistoric	Archaic	campsite	Undetermined (THC 3/2/12)	6037
Schneeman Draw NE	41CX1054	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1055	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1056	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NE	41CX1057	< 0.5 mile	Prehistoric	unknown	campsite	Determined Not Eligible within Project Right-of-Way (THC 9/13/12)	6037
Schneeman Draw NE	41CX1058	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Big Lake SW	41CX1063	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Big Lake SW	41CX1064	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NE	41CX1077	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NE	41CX1078	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1081	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Schneeman Draw NW	41CX1082	> 0.5 mile	Prehistoric	unknown	lithic scatter	Recommended Not Eligible	
Big Lake SW	**41CX1096**	**Intersects**	**Prehistoric**	**unknown**	**campsite**	**Undetermined**	**6098**
Big Lake SW	41CX1097	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined	6098
Schneeman Draw NW	**41CX1317**	**Intersects**	**Historic**	**World War II**	**Bombardier Target Practice**	**Undetermined**	**6231**
Big Lake SW	41CX1551	< 0.5 mile	Prehistoric	unknown	campsite	Determined Not Eligible (THC 2/19/14)	6768
Schneeman Draw NW	41CX1564	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 8/21/14)	6829
Schneeman Draw NW	**41CX1570**	**< 300 feet**	**Prehistoric**	**unknown**	**campsite**	**Undetermined (THC 8/12/14)**	**6829**
Best	41RG19	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined	6191

USGS Quadrangle	Site	Distance	Relative Age	Time Period	Type	NRHP / Other Status	TAC No
Best	41RG20	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 7/5/13)	6098
Best	41RG21	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined	
Best	41RG22	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 7/5/13)	6098
Best	41RG23	> 0.5 mile	Prehistoric	Middle-Late Archaic	campsite	Recommended Eligible	
Best	41RG25	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined	
Best	41RG60	> 0.5 mile	Prehistoric	Archaic	campsite	Recommended Not Eligible	7233
Best	41RG61	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 7/5/13)	6098
Best	41RG63	> 0.5 mile	Prehistoric	unknown	campsite	Recommended Not Eligible	6191
Texon SE	41RG70	> 0.5 mile	Multicomponent	Middle Archaic / late 1900s-?	campsite / homestead	Undetermined (THC 1/13/12)	6037
Best	**41RG76**	**Intersects**	**Historic**	**1920s-1950s**	**Ghost Town Best, Texas**	**Undetermined**	
Texon SE/ Big Lake SW	41RG85	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 1/13/12)	6037
Texon SE	**41RG263**	**< 300 feet**	**Prehistoric**	**possible Archaic**	**campsite**	**Undetermined**	**6098**
Best	41RG265	< 0.5 mile	Prehistoric	unknown	lithic scatter	Undetermined	6191
Best	41RG266	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 7/5/13)	6098
Best	41RG267	> 0.5 mile	Prehistoric	unknown	lithic procurement	Undetermined (THC 7/5/13)	6098
Best	41RG274	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 7/5/13)	6098
Best	41RG302	> 0.5 mile	Prehistoric	unknown	lithic scatter/ procurement	Undetermined	6191
Best	41RG307	> 0.5 mile	Prehistoric	unknown	lithic procurement	Undetermined	6191
Best	41RG308	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 7/5/13)	6098
Best	41RG312	< 0.5 mile	Prehistoric	unknown	campsite	Undetermined (THC 7/5/13)	6098
Texon	41RG319	> 0.5 mile	Prehistoric	unknown	lithic procurement	Undetermined (THC 7/5/13)	6098
Best	**41RG324**	**< 300 feet**	**Prehistoric**	**unknown**	**campsite**	**Undetermined**	**6098**
Best	41RG337	> 0.5 mile	Prehistoric	unknown	lithic procurement	Undetermined	6098
Best	**41RG343**	**Intersects**	**Prehistoric**	**unknown**	**campsite**	**Undetermined**	**6098**
Texon SE	41RG363	> 0.5 mile	Prehistoric	unknown	campsite	Undetermined	6098

FIELD INVESTIGATIONS

Field Methods

The archaeological investigation of the proposed project area was designed to be of sufficient intensity to determine the nature, extent, and if possible, significance of any cultural resources located within the project area. An intensive pedestrian survey with systematic shovel testing was conducted within the project area.

The survey met all THC minimum archaeological survey standards for such projects with any exceptions thoroughly documented. The field survey consisted of two archaeologists walking one transect within a 100-foot-wide survey corridor. During the survey, the archaeologists examined the ground surface and erosional profiles for cultural resources. This examination included pedestrian survey with shovel testing within the proposed project area.

Shovel tests were 30 cm in diameter and excavated in 20-cm arbitrary levels to 1 m in depth, to culturally sterile deposits, or to the anticipated depth of disturbance for the project, whichever came first. The matrix was screened through ¼-inch hardware mesh. The location of each shovel test was plotted using a global positioning system (GPS) receiver, and each test was recorded on appropriate project field forms.

If an archaeological site was encountered in the proposed project area during the investigations, it was explored as much as possible with consideration to land access constraints. Any discovered sites were assessed in regards to potential significance so that recommendations can be made for proper management (avoidance, non-avoidance, or further work). Appropriate site data forms were filled out for each site discovered during the investigations. A detailed plan map of each site was produced, and site locations were be plotted on USGS 7.5-minute topographic maps and relevant project maps.

SWCA conducted a non-collection survey. Artifacts were tabulated, analyzed, and documented in the field, but not collected. As such, no artifacts will be curated from this project. Per requirements for the Antiquities Code of Texas, project documentation will be curated with the Texas Archeological Research Laboratory in Austin.

Results of Field Investigations

Intensive archaeological survey was conducted in portions of the project area from September 19–21, 2017. A total of 14 survey segments were investigated (Table 4). Within these segments, 104 shovel tests (STs) were excavated; all were negative for cultural materials. An additional 46 shovel tests were attempted, but not excavated, primarily due to bedrock at the surface. The results for all shovel tests are presented in Appendix B.

The majority of the project area is within areas of disturbance. Most is within the maintained utility corridor or within areas of pasture. Vegetation consisted primarily of desert scrub-shrub and short grasses. Bedrock was observed at the surface throughout much of the area. Soils tended to be very shallow loams that terminated at bedrock.

Table 4. Summary of survey segments within the project area.

Segment	County	Quadrangle	Appendix A: Sheet #	Length (feet)	Neg STs	Pos STs	NE STs	Cultural Resources Investigated
UT-RG-09	Reagan	Best	1-2	7417	35	0	13	41RG76, 41RG389, 41RG390
UT-RG-08a	Reagan	Best	2	2122	7	0	0	
UT-RG-08b	Reagan	Best	3	1337	2	0	3	
UT-RG-08c	Reagan	Best	5-6	1350	5	0	0	41RG343
UT-RG-08d	Reagan	Best	6	919	0	0	4	
UT-RG-11	Reagan	Best	6-7	494	0	0	3	41RG324
UT-RG-12	Reagan	Texon SE	13	842	0	0	4	41RG263
UT-CX-12	Crockett	Big Lake SW	16	983	4	0	0	41CX1096
UT-CX-50a	Crockett	Schneeman Draw NW, Big Lake SW	18-21	10954	28	0	14	IF UT-CX-50a-1
UT-CX-50b	Crockett	Schneeman Draw NW	21	516	3	0	0	41CX1570
UT-CX-51a	Crockett	Schneeman Draw NW	21-22	2275	8	0	0	41CX1317
UT-CX-51b	Crockett	Schneeman Draw NW	22	966	0	0	4	
UT-CX-46a	Crockett	Schneeman Draw NW	24	1360	5	0	0	
UT-CX-46b	Crockett	Schneeman Draw NE	30-31	2390	7	0	1	

Seven previously identified sites (41RG76, 41RG263, 41RG324, 41RG343, 41CX1096, 41CX1317, and 41CX1570) within or adjacent to the survey areas were investigated, as well as two newly-identified sites (41RG389 and 41RG390) and one isolated find (UT-RG-50a-1). Each resource identified or investigated received a preliminary assessment of eligibility for the NRHP and recommendation for avoidance, if applicable (Table 5). A discussion of the investigations conducted at each resource is presented below.

Table 5. Sites/resources, location relative to workspace, and NRHP and SAL status/recommendation.

Site/Resource	Cultural Affiliation	Within Workspace	NRHP & SAL Status / Recommendation
41RG76	Historic	Yes	Not Eligible **
41RG263	Prehistoric	Yes	Not Eligible **
41RG324	Prehistoric	No	Undetermined / No Impact
41RG343	Prehistoric	Yes	Not Eligible **
41RB389	Historic	Yes	Not Eligible
41RG390	Historic	Yes	Not Eligible
41CX1096	Prehistoric	Yes	Not Eligible **
41CX1317	Historic	Yes	Not Eligible **
41CX1570	Prehistoric	No	Undetermined / No Impact
IF UT-CX-50a-1	Prehistoric	Yes	Not Eligible

** The portion of the site currently investigated and/or within the survey corridor is recommended not eligible for the NRHP or SAL. The remainder of the site was not evaluated for NRHP or SAL eligibility.

Site 41RG76 (Revisit)

Site 41RG76 is the previously recorded historic "ghost" town of Best, Texas, which dates from the 1920s to approximately the 1950s (THC 2017). The 2014 BVRA jail survey determined that the only remaining structure of the town is the jail house, which was evaluated as being in poor condition. BVRA assessed the site as having little value beyond archival research (THC 2017).

A portion of the site is crossed by the proposed pipeline in survey segment UT-RG-09 (Appendix A: Sheet 1). SWCA revisited the site area on September 19, 2017. Vegetation in the area consisted of desert shrub-scrub and portions of the area were within the maintained pipeline corridor. Bedrock was observed at the surface across much of the area (Figure 2).

Figure 2. Overview of site 41RG76, facing east.

The current archaeological investigation of 41RG76 included systematic surface survey and subsurface shovel testing. The surface survey was conducted in transects spaced at 10-m intervals. Ground surface visibility was approximately 70-100 percent.

Several glass fragments and metal container fragments were observed scattered randomly across the site area (Figure 3). There were no concentrations of artifacts and these items are likely random pieces of debris.

Three shovel tests were excavated to within the site area; all were negative for cultural materials (Figure 4). A typical shovel test was excavated to a depth of 10 cmbs and exhibited yellowish brown (10YR 5/6) loam with approximately 30-40 percent degraded bedrock prior to terminating at bedrock.

Figure 3. Historic debris observed at site 41RG76.

Site is the previously recorded ghost town of Best, Texas, which dates from the 1920s to 1950s. Previous investigators suggested that the remaining research value lies with the jail, the only extant building at the site, but no formal NRHP eligibility recommendation was provided. The current investigation encountered only a few random pieces of historic debris, encountered no features within the proposed project area, and the extant jail house will not be impacted by the proposed project. As such, the portion of site 41RG76 within the proposed workspace is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

Figure 4. Map Redacted

Site 41RG263 (Revisit)

Site 41RG263 is a previously recorded prehistoric campsite, possible dating to the Archaic period (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified a large FCR scatter, a deflated hearth, seven projectile points (two identified as possible Frio points), three unifaces, four bifaces, one tested core, two groundstone tools, one chopper, and debitage, which was scattered across the site. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

A small portion of the site extends into the proposed workspace in survey segment UT-RG-12 (Appendix A: Sheet 13). As such, SWCA investigated this portion of the site on September 20, 2017. The vegetation in the area was desert shrub-scrub with much of the site area within the existing pipeline corridor (Figure 5). Bedrock was observed at the surface across most of the area.

Figure 5. Overview of site 41RG263, facing southeast.

The current archaeological investigation of 41RG263 included systematic surface survey at 10-m intervals (Figure 6). No shovel tests were excavated due to bedrock at the surface. Ground surface visibility was approximately 70 to 90 percent. No artifacts or features were identified within the proposed workspace.

Site 41RG263 is a previously recorded prehistoric campsite, possibly dating to the Archaic period. No evidence of the site was identified during the current investigation. As such, the portion of site 41RG263 within the proposed workspace is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

Figure 6. Map Redacted

Site 41RG324

Site 41RG324 is a previously recorded prehistoric campsite of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified two deflated hearths, one Ensor point, one utilized flake, and seven flakes. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

As the site location is recorded with 300 feet of survey segment UT-RG-11 (Appendix A: Sheet 6-7), SWCA investigated the portion of the workspace adjacent to the site on September 21, 2017. The current workspace is within the maintained utility corridor. Vegetation included sparse desert grasses and bedrock was noted at the surface in the area.

Figure 7. Overview of workspace adjacent to site 41RG324, facing southeast.

The current archaeological investigation of the workspace adjacent to 41RG324 included systematic surface survey in transects spaced at 10-m intervals (Figure 8). Ground surface visibility was approximately 80-100 percent. No shovel tests were excavated due to bedrock at the surface. No evidence of the site was found within the proposed project area.

Site 41RG324 is a previously recorded campsite of unknown age or cultural affiliation. No evidence was found to suggest that the site extends into the proposed project area. As such, NRHP and SAL eligibility for site 41RG324 remains UNDETERMINED, and the proposed project will have NO IMPACT on the site. No further work is recommended at this time.

Figure 8. Map Redacted

Site 41RG343 (Revisit)

Site 41RG343 is a previously recorded prehistoric campsite/lithic procurement site of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified two deflated hearths, one bifacial knife, utilized flakes, utilized cores, and scattered lithics on the eroded surface of the site. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

The site is bisected by the proposed project in survey segment UT-RG-08c (Appendix A: Sheet 5-6). As such, SWCA investigated the alignment in this area on September 20, 2017. The portion of the site within the proposed project area is within the maintained pipeline corridor. Vegetation included very sparse desert shrub-scrub (Figure 9).

Figure 9. Overview of site 41RG343, facing southeast.

The current archaeological investigation of 41RG343 included systematic surface survey and subsurface shovel testing. The surface survey was conducted in transects spaced at 10-m intervals. Ground surface visibility ranged from 70 to 90 percent. No artifacts were observed within the proposed project area. One flake was observed on the surface outside the proposed workspace.

Five shovel tests were excavated within the site; all were negative for cultural materials (Figure 10). A typical shovel test was excavated to a depth of 10 cmbs and exhibited yellowish brown (10YR 5/4) sandy loam before terminating at bedrock.

Site 41RG343 is a previously recorded campsite/lithic procurement site of unknown age or cultural affiliation. Previous researchers noted that the research potential for the site was low and that no further work was recommended; however, no formal NRHP eligibility recommendation was provided. Only a small portion of the site is crossed by the proposed project and no evidence of the site was identified within that area. As such, the portion of site 41RG343 within the proposed workspace is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

Figure 10. Map Redacted

Site 41RG389 (UT-RG-09-1)

Site 41RG389 is an historic artifact scatter located within survey segment UT-RG-09, approximately 406 feet southeast of the intersection of U.S. 57 and Best Lane in southwestern Reagan County (Appendix A: Sheet 1). SWCA identified the site on September 19, 2017.

The site is located on an upland plain. Vegetation throughout the site area consisted of desert shrub-scrub (Figure 11).

Figure 11. Overview of site 41RG389, facing north.

Archaeological investigation of 41RG389 included systematic surface survey and subsurface shovel testing. The surface survey was conducted in transects spaced at 10-m intervals. Ground surface visibility was approximately 70 to 100 percent.

Thirteen shovel tests were excavated to delineate the site; all were negative for cultural materials. A typical shovel test was excavated to a depth of 20 cmbs and exhibited yellowish brown (10YR 5/4) sandy loam, terminating at bedrock.

Artifacts observed on the surface of 41RG389 include various debris such as colorless glass, wire nails, a shell button, milkglass, brown/amber glass, aqua glass bottle fragments (Fike 1987), whiteware fragments, a fork, a firebrick fragment (impressed A.P. Green/Empire D.P) a silverplated spoon (impressed VEIHL CRAWFORD HDW CO. on reverse), a liniment bottle seal (embossed W.F. YOUNG SPRINGFIELD MASS), a soft paste porcelain fragment (marked with MADE IN GERMANY/23), a glass jar base (embossed Kerr Glass Mfg Co Sand Springs OKLA PAT Aug 3 1915), and metal cans. Representative artifacts are illustrated in Figure 12 through Figure 15.

The A.P. Green Fire Brick Company made dry-pressed ("D.P.") in Mexico, Missouri from 1910 to 1942 (Missouri State Historical Society 2017; Mosier 2015). The W.F. Young Company has produced medicines and remedies for animals since 1892, including Absorbine liniment (W.F. Young 2017). No information was found about the Viehl mark on the spoon. The mark on the porcelain fragment is not specifically dateable ("23" may reference 1923 or a piece/style number); however, "made in Germany" was not included on ceramic marks prior to 1885 (Kovel and Kovel 1998).

Figure 12. A.P. Green fire brick fragment observed at site 41RG389.

Figure 13. Colorless glass, porcelain fragments, and wire nails observed at site 41RG389.

Figure 14. Liniment bottle seal observed at site 41RG389.

Figure 15. Kerr Glass jar with patent date of Aug 3 1915 observed at site 41RG389.

The site measures approximately 100 m northwest to southeast by 43 m northeast to southwest (Figure 16). The artifact scatter is located adjacent to a dirt road and approximately 200 feet from the Kansas City, Mexico, and Orient of Texas railroad which was built in 1912 and later merged with the Atchison, Topeka, and Santa Fe railroad (Zlatkovich 1981:44). Review of historic maps USGS 1928, 1958, 1970, 1986) and aerial photographs (NETR 1968, 1996) show that a dirt road was in use in the late 1960s and later. No structures are shown and no structures or features were identified at the site. The artifacts are likely discarded items from passing trains or vehicles. The artifacts suggest a date of the 1920s or later, if a single discard event, or possibly slightly earlier or later, if multiple events.

Site 41RG389 is an historic artifact scatter that is likely discarded items from passing trains or vehicles. No structures are known to have been in the area and no structures or features were identified. The site lacks the potential to contribute to the further understanding of local and/or regional history. As such, site 41RG389 is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

Figure 16. Map Redacted

Site 41RG390 (UT-RG-09-2)

Site 41RG390 is an historic artifact scatter located within survey segment UT-RG-09, approximately 0.25 mile southeast of the intersection of U.S. 57 and Best Lane in southwestern Reagan County (Appendix A: Sheet 1). SWCA identified the site on September 19, 2017.

The site is located on an upland plain. Vegetation throughout the site area consisted of desert shrub-scrub (Figure 17).

Figure 17. Overview of site 41RG390, view west.

Archaeological investigation of 41RG390 included systematic surface survey and subsurface shovel testing. The surface survey was conducted in transects spaced at 10-m intervals. Ground surface visibility ranged from 70 to 100 percent.

Thirteen shovel tests were excavated to delineate the site; all were negative for cultural materials. A typical shovel test was excavated to a depth of 20 cmbs and exhibited yellowish brown (10YR 5/4) sandy loam, terminating at bedrock.

Artifacts observed on the surface at 41RG390 include various debris such as colorless glass, milkglass, brown/amber glass, aqua glass bottle fragments, metal cans, a metal bucket, a colorless drinking glass/jelly jar (with an unidentifiable shield mark), a pharmaceutical bottle (embossed McCORMICK & Co BALTIMORE), a ceramic bowl (with East Liverpool Potters Cooperative Co. mark), and a 1925 Texas license plate.

McCormick and Company have been in business since 1882. The East Liverpool Potters mark dates from 1882-1925 (Gates & Ormerod 1982:24). Representative artifacts are illustrated in Figure 18 through Figure 21.

Figure 18. Jelly jar drinking glass observed at site 41RG390.

Figure 19. Pharmaceutical bottle embossed McCormick & Co Baltimore observed at site 41RG390.

Figure 20. Ceramic bowl with East Liverpool Potters Cooperative mark observed at site 41RG390.

Figure 21. 1925 Texas license plate observed at site 41RG390.

The site measures approximately 61 m northwest to southeast by 43 m northeast to southwest (Figure 22). The artifact scatter is located adjacent to a dirt road and approximately 200 feet from the Kansas City, Mexico, and Orient of Texas railroad which was built in 1912 and later merged with the Atchison, Topeka, and Santa Fe railroad (Zlatkovich 1981:44). Review of historic maps USGS 1928, 1958, 1970, 1986) and aerial photographs (NETR 1968, 1996) show that a dirt road was in use in the late 1960s and later. No structures are shown and no structures or features were identified at the site. The artifacts are likely discarded items from passing trains or vehicles. The artifacts suggest a date of the 1920s or later, if a single discard event, or possibly slightly later, if multiple events.

Site 41RG390 is an historic artifact scatter that is likely discarded items from passing trains or vehicles. No structures are known to have been in the area and no structures or features were identified. The site lacks the potential to contribute to the further understanding of local and/or regional history. As such, site 41RG390 is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

Figure 22. Map Redacted

Site 41CX1096 (Revisit)

Site 41CX1096 is a previously recorded prehistoric campsite of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2012 Big South Lake 3D Seismic survey. TAS identified debitage, two deflated FCR clusters, and two scrapers. The site was noted to have considerable ground disturbance and TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

As the site is crossed by survey segment UT-CX-12 (Appendix A: Sheet 16), SWCA revisited the site area on September 20, 2017. The portion of the site within the project area is primarily in the maintained pipeline corridor. Vegetation included desert scrub-shrub and short grasses. Bedrock was observed at surface across the area (Figure 23).

Figure 23. Overview of site 41CX1096, facing southeast.

The current archaeological investigation of 41CX1096 included systematic surface survey and subsurface shovel testing. The surface survey was conducted in transects spaced at 10-m intervals. Ground surface visibility ranged from 10 to 30 percent. No artifacts or cultural features were identified within the project area.

Four shovel tests were excavated within the project alignment in the vicinity of the site; all were negative for cultural materials (Figure 24). A typical shovel test was excavated to a depth of 10 cmbs and exhibited yellowish brown (10YR 5/4) sandy loam, terminating at bedrock.

Site 41CX1096 is a previously recorded prehistoric campsite of unknown age or cultural affiliation. Previous researchers have noted that the site has low research potential and recommended no further work; however, no formal NRHP eligibility recommendation was provided. No evidence of the site was observed within the proposed project. As such, the portion of site 41CX1096 within the proposed workspace is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

Figure 24. Map Redacted

Site 41CX1317 (Revisit)

Site 41CX1317 is a previously recorded historic World War II bombardier target site (THC 2017). During World War II, the USACE created a number of target shapes (created using caliche) on the ground to be used as bombing practice for the San Angelo Air Force Base. Target shapes in this location included ships, air fields, and oil depots. The site was recorded by TAS during the Barnhart 3D Seismic survey. The targets are almost entirely obscured by ground disturbance and TAS noted that the research potential for the site is low and recommended no further work (THC 2017). It should also be noted that there are five separate sites in various locations within Crockett County which share this trinomial; all are World War II bombardier target sites (THC 2017).

As the site is crossed by the project within survey segment UT-CX-51a (Appendix A: Sheet 21-22), SWCA revisited the site area on September 21, 2017. The portion of the site within the project area is primarily in the maintained utility corridor. Vegetation in the area included desert scrub-shrub and short grasses (Figure 25).

Figure 25. Overview of site 41CX1317, facing northwest.

The current archaeological investigation of 41CX1317 included systematic surface survey and subsurface shovel testing. The surface survey was conducted in transects spaced at 10-m intervals. Ground surface visibility ranged from 20 to 50 percent. Three pieces of rusted metal, possibly shrapnel, were observed on the surface of the site (Figure 26).

Eight shovel tests were excavated in the alignment in the vicinity of the site; all were negative for cultural materials (Figure 27). A typical shovel test was excavated to a depth of 10 to 20 cmbs and exhibited dark yellowish brown (10YR 4/4) loam, terminating at bedrock.

Figure 26. Rusted metal object observed at site 41CX1317.

Site 41CX1317 is a previously recorded historic World War II bombardier training site. Almost all of the targets have been obscured by agricultural and/or utility construction; no targets are visible within the project area. Previous researchers have noted that the site has limited value beyond archival research; however, no formal NRHP eligibility recommendation was provided. As such, the portion of the site within the proposed workspace is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

Figure 27. Map Redacted

Site 41CX1570

Site 41CX1570 is a previously recorded prehistoric campsite of unknown age or cultural affiliation (THC 2017). The site was recorded by TAS during the 2014 Dawson UL Block seismic survey. TAS identified two deflated hearths at the site. TAS noted that the research potential for the site is low and recommended no further work (THC 2017).

As the site is located within 300 feet of survey segment UT-CX-50b (Appendix A: Sheet 21), SWCA investigated the proposed alignment adjacent to the site on September 21, 2017. The proposed workspace in this area is mostly within the maintained utility corridor. Vegetation consisted of desert shrub-scrub and short grasses (Figure 28).

Figure 28. Overview of project area adjacent to site 41CX1570, facing northwest.

The current archaeological investigation of the alignment adjacent to 41CX1570 included systematic surface survey and subsurface shovel testing. The surface survey was conducted in transects spaced at 10-m intervals. Ground surface visibility was ranged from 50 to 70 percent. No artifacts or cultural features were identified.

Three shovel tests were excavated within the proposed workspace adjacent to the site; all were negative for cultural materials (Figure 29). A typical shovel test was excavated to a depth of 10 cmbs and exhibited brown (10YR 4/3) silty loam, terminating at bedrock.

Site 41CX1570 is a previously recorded prehistoric campsite of unknown age or cultural affiliation. Previous researchers have noted that the site has limited value beyond archival research; however, no formal NRHP eligibility recommendation was provided. The current investigation found no evidence that the site extends into the proposed workspace. As such, NRHP and SAL eligibility for site 41CX1570 remains UNDETERMINED and the proposed project will have NO IMPACT. No further work is recommended at this time.

Figure 29. Map Redacted

Isolated Find UT-CX-50a-1

Isolated find UT-CX-50a-1 is a prehistoric scraper (Figure 30) observed within survey segment UT-CX-50a on September 21, 2017 (Appendix A: Sheet 20). The isolated find was found on the surface within the maintained utility corridor. Vegetation in the area consisted of desert shrub-scrub and short grasses (Figure 31). Additional surface survey and subsurface shovel testing was conducted (Figure 32). No other artifacts and no cultural features were identified. Due to the limited amount of cultural material identified, the area was found insufficient to be considered as a site and a trinomial will not be requested. As such, isolated find UT-CX-50a-1 is recommended NOT ELIGIBLE for the NRHP or for designation as a SAL and no further work is recommended.

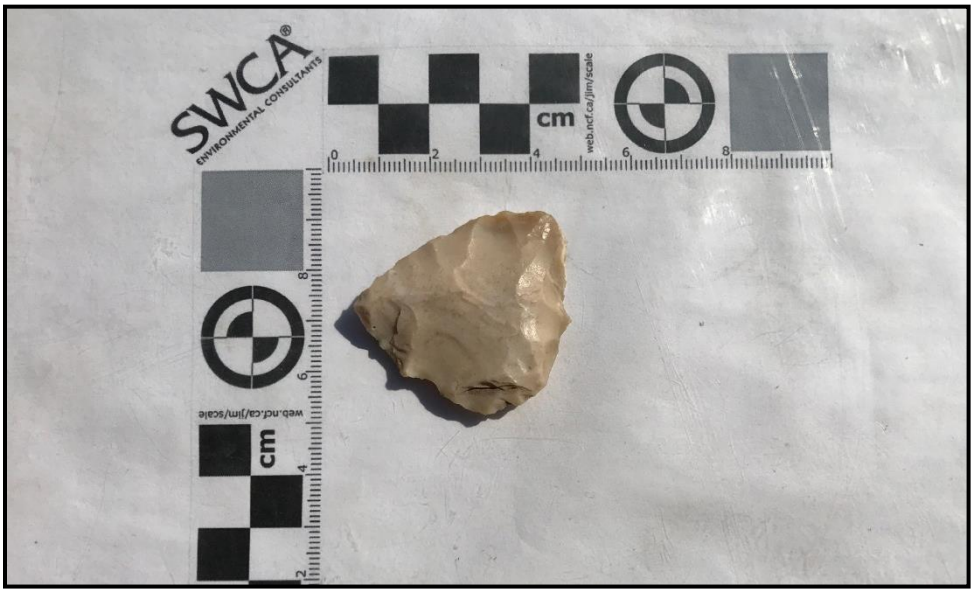

Figure 30. Scraper observed at isolated find UT-CX-50a-1.

Figure 31. Overview of isolated find UT-CX-50a-1, facing southeast.

Figure 32. Map Redacted

SUMMARY AND RECOMMENDATIONS

On behalf of DCP, SWCA conducted an intensive archaeological survey of portions of the proposed Sand Hills Loop Phase I Pipeline in Crockett and Reagan counties, Texas. Approximately 26 miles of the project crosses through land owned by UT. The majority of the proposed alignment has been previously investigated by TAS in 2011. As such, only portions of the alignment that deviate outside the 2011 survey corridor were investigated, as well as portions which cross or are adjacent to sites that were identified after the 2011 survey. These areas to be surveyed total 6.4 miles within a 100-foot-wide corridor (approximately 78 acres).

Archaeological investigations were conducted pursuant to the potential acquisition of a USACE Section 404 permit in accordance with 33 CFR Part 325, Appendix C, and Section 106 of the NHPA and its implementing regulations. As the project area is owned by a political subdivision of the State of Texas, work was additionally conducted in compliance with the Antiquities Code of Texas and accompanying Rules of Practice and Procedure under Texas Antiquities Permit No. 8157.

As a result of the current investigation, nine cultural resources were identified or revisited. These include seven previously recorded archaeological sites (41CX1096, 41CX1317, 41CX1570, 41RG76, 41RG263, 41RG324, and 41RG343) located within or immediately adjacent to the survey corridor, in addition to two newly-identified sites (41RG389 and 41RG390) and one isolated find (UT-CX-50a-1). All cultural resources identified or revisited during the course of the investigation were assessed with regard to eligibility for the NRHP and designation as a SAL and recommendation for avoidance, if applicable, as follows:

Two sites (41RG389 and 41RG390) and one isolated find (UT-CX-50a-1) are recommended NOT ELIGIBLE for the NRHP or for designation as a SAL. Owing to the paucity or commonality of recovered assemblages, lack of features, lack of unique character, and/or lack of contextual integrity, these resources possess negligible research value and are unlikely to contribute to the understanding of local and/or regional prehistory or history. Consequently, no further work was recommended for these resources.

The investigated portions of five sites (41RG76, 41RG263, 41RG343, 41CX1096, and 41CX1317) within the proposed workspace are recommended NOT ELIGIBLE for the NRHP or for designation as a SAL. Owing to the paucity or commonality of recovered assemblages, lack of features, lack of unique character, and/or lack of contextual integrity, the investigated portions of these resources possess negligible research value and are unlikely to contribute to the understanding of local and/or regional prehistory or history. The remaining unevaluated portions of these sites will not be affected by the proposed project; therefore, no further work was recommended for these sites at this time.

Two sites (41RG324 and 41CX1570) are located outside the proposed workspace and will not be impacted by the proposed project. Each of these sites are UNDETERMINED with regard to NRHP and SAL eligibility. As the proposed construction activities will have NO IMPACT on these sites, no additional work or avoidance measures are recommended at this time.

In accordance with Section 106 of the NHPA 36 CFR 800.4 (b)(1) and the Antiquities Code of Texas, SWCA has made a reasonable and good faith effort to identify significant cultural resources within the project area. No properties listed or otherwise eligible for the NRHP, or for designation as a SAL, were identified within the project area. Consequently, SWCA recommends no further archaeological investigation and a finding of NO HISTORIC PROPERTIES AFFECTED under 36 CFR 800.4(d)(1). Per requirements of the Antiquities Code of Texas, project documentation will be curated with the Texas Archeological Research Laboratory in Austin.

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APPENDIX A

Project Alignment Sheets
Redacted

APPENDIX B

Shovel Test Log

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-CX-12	1	1	0-10	N	10YR 5/4	sandy loam		upland plain; grass, scrub/shrub, mesquite; 20-30% GSV; degraded bedrock at surface	bedrock		41CX1096
UT-CX-12	2	1	0-10	N	10YR 5/4	sandy loam		upland plain; grass, scrub/shrub, mesquite; 20-30% GSV; degraded bedrock at surface; inside site 41CX1096; no evidence of cultural material	bedrock		41CX1096
UT-CX-12	3	1	0-20	N	10YR 4/3	loam	20% degraded bedrock	in shallow, wide drainage canal; ephemeral (dry); ~10% GSV	bedrock		41CX1096
UT-CX-12	4	1	0-10	N	10YR 5/4	sandy loam		rolling upland; 20% GSV; degraded bedrock at surface	bedrock		41CX1096
UT-CX-46a	1	1	0-10	N	10YR 4/3	loam	~40% degraded bedrock	upland plain grass pasture; floodplain; ~30% GSV	bedrock		
UT-CX-46a	2	1	0-20	N	10YR 4/3	loam	~40% degraded bedrock	upland plain grass pasture; floodplain; ~30% GSV	bedrock		
UT-CX-46a	3	1	0-10	N	10YR 4/3	loam	~40% degraded bedrock	upland plain grass pasture; floodplain; ~30% GSV	bedrock		
UT-CX-46a	4	1	0-20	N	10YR 4/3	loam	~40% degraded bedrock	upland plain grass pasture; floodplain; ~30% GSV	bedrock		
UT-CX-46a	5	1	0-20	N	10YR 4/3	loam	~40% degraded bedrock	upland plain grass pasture; floodplain; ~30% GSV	bedrock		
UT-CX-46b	1	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-46b	2	1	0-15	N	10YR 5/4	sandy loam		upland plain; tall grass and desert scrub/shrub; vegetation change to thicket understory; GSV 20-30%; shallow bedrock	bedrock		
UT-CX-46b	3	1	0-15	N	10YR 5/4	sandy loam		upland plain; tall grass and desert scrub/shrub; vegetation change to thicket understory; GSV 20-30%; shallow bedrock	bedrock		
UT-CX-46b	4	1	0-15	N	10YR 5/4	sandy loam		upland plain; tall grass and desert scrub/shrub; vegetation change to thicket understory; GSV 20-30%; shallow bedrock	bedrock		
UT-CX-46b	5	1	0-15	N	10YR 5/4	sandy loam		upland plain; tall grass and desert scrub/shrub; vegetation change to thicket understory; GSV 20-30%; shallow bedrock	bedrock		
UT-CX-46b	6	1	0-25	N	10YR 5/4	sandy loam		upland plain; tall grass and desert scrub/shrub becoming more sparse	bedrock		
UT-CX-46b	7	1	0-10	N	10YR 5/4	sandy loam		upland plain; tall grass and desert scrub/shrub becoming more sparse	bedrock		

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-CX-46b	8	1	0-10	N	10YR 5/4	sandy loam		upland plain; desert scrub/shrub w/ tall grass savannah; 10-20% GSV; degraded bedrock at surface	bedrock		
UT-CX-50a	1	-	-	NE	-	-		not excavated - exposed/degraded bedrock; cobbles at surface			
UT-CX-50a	2	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-50a	3	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-50a	4	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-50a	5	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-50a	6	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-50a	7	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-50a	8	1	0-20	N	10YR 5/4	loam		rolling upland; on slope (3-5%); grass pasture, shrub mesquite; 20-30% GSV; dry/compact/blocky	bedrock		
UT-CX-50a	9	1	0-30	N	10YR 3/3	clay loam	0-10% degraded bedrock	rolling upland; on slope (3-5%); grass pasture, shrub mesquite; 20-30% GSV; dry/compact/blocky	bedrock		
UT-CX-50a	10	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-50a	11	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-50a	12	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-50a	13	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-50a	14	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-50a	15	1	0-15	N	10YR 4/4	sandy clay loam	degraded bedrock	rolling upland; desert scrub/shrub, short grass; 50-90% GSV	bedrock		
UT-CX-50a	16	1	0-15	N	10YR 4/4	sandy clay loam	degraded bedrock	rolling upland; desert scrub/shrub, short grass; 50-90% GSV	bedrock		
UT-CX-50a	17	1	0-15	N	10YR 4/4	sandy clay loam	degraded bedrock	rolling upland; desert scrub/shrub, short grass; 50-90% GSV	bedrock		
UT-CX-50a	18	1	0-10	N	10YR 4/4	sandy clay loam	degraded bedrock	rolling upland; desert scrub/shrub, short grass; 50-90% GSV	bedrock		
UT-CX-50a	19	1	0-10	N	10YR 4/4	sandy clay loam	degraded bedrock	rolling upland; desert scrub/shrub, short grass; 50-90% GSV	bedrock		
UT-CX-50a	20	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-50a	21	-	-	NE	-	-		not excavated - bedrock at surface			
UT-CX-50a	22	1	0-15	N	10YR 4/4	sandy loam	degraded bedrock	rolling upland; desert scrub/shrub, short grass; 50-80% GSV; friable dry soils	bedrock		

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-CX-50a	23	1	0-15	N	10YR 4/4	sandy loam	degraded bedrock	rolling upland; desert scrub/shrub, short grass; 50-80% GSV; friable dry soils	bedrock		
UT-CX-50a	24	1	0-70	N	10YR 5/4	loam	~10% degraded bedrock	upland plain; 50-60% GSV; scrub shrub, mesquite, cacti, grasses; dry, friable soil	bedrock		IF UT-CX-50a-1
UT-CX-50a	25	1	0-10	N	10YR 5/4	loam	30% degraded bedrock	in extant pipeline corridor; degraded bedrock at surface; 100% GSV; very compact	bedrock		IF UT-CX-50a-1
UT-CX-50a	26	1	0-50	N	10YR 5/4	loam	degraded bedrock	edge of extant pipeline corridor; 40-60% GSV	bedrock		IF UT-CX-50a-1
UT-CX-50a	27	1	0-60	N	10YR 5/4	loam		rolling upland plain; 60-80% GSV; desert scrub/shrub and short grass	bedrock		IF UT-CX-50a-1
UT-CX-50a	28	1	0-60	N	10YR 5/4	loam		rolling upland plain; 60-80% GSV; desert scrub/shrub and short grass	bedrock		IF UT-CX-50a-1
UT-CX-50a	29	1	0-50	N	10YR 5/4	loam		rolling upland plain; 60-80% GSV; desert scrub/shrub and short grass	bedrock		IF UT-CX-50a-1
UT-CX-50a	30	1	0-60	N	10YR 5/4	loam		rolling upland plain; 60-80% GSV; desert scrub/shrub and short grass	bedrock		IF UT-CX-50a-1
UT-CX-50a	31	1	0-10	N	10YR 4/4	loam	degraded bedrock	in extant pipeline corridor; 80% GSV	bedrock		IF UT-CX-50a-1
UT-CX-50a	32	1	0-70	N	10YR 4/4	loam	degraded bedrock	edge of extant pipeline corridor; 40-50% GSV	bedrock		IF UT-CX-50a-1
UT-CX-50a	33	1	0-20	N	10YR 5/4	loam	30% degraded bedrock	upland plain; 60-70% GSV; scrub shrub mesquite; degraded bedrock at surface; compact/blocky	bedrock		
UT-CX-50a	34	1	0-30	N	10YR 5/4	loam	30% degraded bedrock	upland plain; 60-70% GSV; scrub shrub mesquite; degraded bedrock at surface; compact/blocky	bedrock		
UT-CX-50a	35	1	0-10	N	10YR 5/4	loam	30% degraded bedrock	upland plain; 60-70% GSV; scrub shrub mesquite; degraded bedrock at surface; compact/blocky	bedrock		
UT-CX-50a	36	1	0-10	N	10YR 5/4	loam	30% degraded bedrock	upland plain; 60-70% GSV; scrub shrub mesquite; degraded bedrock at surface; compact/blocky	bedrock		
UT-CX-50a	37	1	0-20	N	10YR 5/4	loam	30% degraded bedrock	upland plain; 60-70% GSV; scrub shrub mesquite; degraded bedrock at surface; compact/blocky	bedrock		
UT-CX-50a	38	1	0-10	N	10YR 5/4	loam	degraded bedrock	upland plain; sparse grass pasture; 70-90% GSV; dry blocky soil	bedrock		

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-CX-50a	39	1	0-20	N	10YR 5/4	loam	degraded bedrock	upland plain; sparse grass pasture; 30-40% GSV; dry blocky soil	bedrock		
UT-CX-50a	40	1	0-20	N	10YR 5/4	loam		upland plain; sparse grass pasture; ~30% GSV; dry blocky soil	bedrock		
UT-CX-50a	41	1	0-20	N	10YR 5/4	loam		upland plain; sparse grass pasture; 40% GSV; dry blocky soil	bedrock		
UT-CX-50a	42	1	0-10	N	10YR 5/4	loam		upland plain; sparse grass pasture; 40% GSV; dry blocky soil	bedrock		
UT-CX-50b	1	1	0-10	N	10YR 4/3	silt loam	50-70% gravel	upland plain; grass pasture; 20-30% GSV; degraded bedrock at surface; friable/dry soil	bedrock		adjacent to 41CX1570
UT-CX-50b	2	1	0-10	N	10YR 4/3	silt loam		upland plain; grass pasture; 20-30% GSV; degraded bedrock at surface; friable/dry soil; possibly disturbed from previous pipeline construction; backfill from construction at surface	bedrock		adjacent to 41CX1570
UT-CX-50b	3	1	0-10	N	10YR 4/3	silt loam		upland plain; grass pasture; 20-30% GSV; degraded bedrock at surface; friable/dry soil	bedrock		adjacent to 41CX1570
UT-CX-51a	1	1	0-20	N	10YR 4/3	loam	degraded bedrock	upland plain; desert scrub/shrub vegetation and short grass; 40-50% GSV; in extant pipeline corridor	bedrock		41CX1317
UT-CX-51a	2	1	0-20	N	10YR 4/3	loam	degraded bedrock	upland plain; desert scrub/shrub vegetation and short grass; 40-50% GSV; in extant pipeline corridor	bedrock		41CX1317
UT-CX-51a	3	1	0-20	N	10YR 4/3	loam	degraded bedrock	upland plain; desert scrub/shrub vegetation and short grass; 40-50% GSV; in extant pipeline corridor	bedrock		41CX1317
UT-CX-51a	4	1	0-20	N	10YR 4/3	loam	degraded bedrock	upland plain; desert scrub/shrub vegetation and short grass; 40-50% GSV; in extant pipeline corridor	bedrock		41CX1317
UT-CX-51a	5	1	0-10	N	10YR 4/4	loam		upland plain; desert scrub/shrub vegetation and short grass; 40-50% GSV; in extant pipeline corridor; shallower bedrock	bedrock		41CX1317
UT-CX-51a	6	1	0-10	N	10YR 4/4	loam		upland plain; desert scrub/shrub vegetation and short grass; 40-50% GSV; in extant pipeline corridor; shallower bedrock	bedrock		41CX1317

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-CX-51a	7	1	0-10	N	10YR 4/4	loam		upland plain; desert scrub/shrub vegetation and short grass; 40-50% GSV; in extant pipeline corridor; shallower bedrock	bedrock		41CX1317
UT-CX-51a	8	1	0-10	N	10YR 4/4	loam	degraded bedrock	upland plain; desert scrub/shrub, short grass; 40-50% GSV; dry, friable soils	bedrock		41CX1317
UT-CX-51b	1	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-51b	2	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-51b	3	-	-	NE	-	-		not excavated – bedrock at surface			
UT-CX-51b	4	-	-	NE	-	-		not excavated – bedrock at surface			
UT-RG-08a	1	1	0-20	N	10YR 5/4	sandy loam	>50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-9% GSV	bedrock		
UT-RG-08a	2	1	0-20	N	10YR 5/4	sandy loam	>50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-9% GSV	bedrock		
UT-RG-08a	3	1	0-20	N	10YR 5/4	sandy loam	>50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-9% GSV	bedrock		
UT-RG-08a	4	1	0-10	N	10YR 5/4	sandy loam	>50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-9% GSV	bedrock		
UT-RG-08a	5	1	0-10	N	10YR 5/4	sandy loam	>50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-9% GSV	bedrock		
UT-RG-08a	6	1	0-10	N	10YR 5/4	sandy loam	>50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-9% GSV	bedrock		
UT-RG-08a	7	1	0-10	N	10YR 5/4	sandy loam	>50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-9% GSV	bedrock		
UT-RG-08b	1	1	0-5	N	10YR 5/4	sandy loam	~50% degraded bedrock	upland plain; desert scrub/shrub vegetation; 80-90% GSV	bedrock		
UT-RG-08b	2	-	-	NE	-	-		not excavated – bedrock at surface			
UT-RG-08b	3	-	-	NE	-	-		not excavated – bedrock at surface			
UT-RG-08b	4	1	0-10	N	10YR 5/4	sandy loam		upland plain; desert scrub/shrub vegetation; shallow bedrock; 80-90% GSV	bedrock		
UT-RG-08b	5	-	-	NE	-	-		not excavated – bedrock at surface			
UT-RG-08c	1	1	0-10	N	10YR 5/4	sandy loam		upland plain; base of large hill; scrub/shrub vegetation; 80-90% GSV; bedrock at ~10cmbs	bedrock		41RG343
UT-RG-08c	2	1	0-10	N	10YR 5/4	sandy loam		on top of ridge	bedrock		41RG343
UT-RG-08c	3	1	0-5	N	10YR 5/4	sandy loam		inside site boundary of 41RG343	bedrock		41RG343
UT-RG-08c	4	1	0-10	N	10YR 5/4	sandy loam		inside site boundary of 41RG343	bedrock		41RG343

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-RG-08c	5	1	0-10	N	10YR 5/4	sandy loam		southeast of site 41RG343	bedrock		41RG343
UT-RG-08d	1	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-08d	2	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-08d	3	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-08d	4	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	1	1	0-10	N	10YR 5/6	loam	30-40% degraded bedrock	upland plain; 90% GSV; very compact	bedrock		41RG76
UT-RG-09	2	1	0-10	N	10YR 5/6	loam		upland plain; 90% GSV; very compact; scrub/shrub vegetation	bedrock	surface in surrounding area - bottle glass, ferrous metal, whiteware; scatter	41RG76
UT-RG-09	3	1	0-10	N	10YR 6/4	loam	~40% degraded bedrock	upland plain; degraded bedrock at surface; mesquite, scrub/shrub vegetation	bedrock		41RG76
UT-RG-09	4	1	0-10	N	10YR 6/4	loam	~40% degraded bedrock	upland plain; degraded bedrock at surface; mesquite, scrub/shrub vegetation	bedrock		
UT-RG-09	5	1	0-10	N	10YR 6/4	loam	~40% degraded bedrock	upland plain; degraded bedrock at surface; mesquite, scrub/shrub vegetation	bedrock		
UT-RG-09	6	1	0-10	N	10YR 6/4	loam	~40% degraded bedrock	upland plain; degraded bedrock at surface; mesquite, scrub/shrub vegetation	bedrock		
UT-RG-09	7	1	0-10	N	10YR 6/4	loam	~40% degraded bedrock	upland plain; degraded bedrock at surface; mesquite, scrub/shrub vegetation	bedrock		
UT-RG-09	8	1	0-20	N	10YR 5/5	loam	30% degraded bedrock	upland plain; desert vegetation; degraded bedrock at surface; ~80% GSV	bedrock		
UT-RG-09	9	1	0-10	N	10YR 5/6	loam		upland plain; desert vegetation; degraded bedrock at surface; ~80% GSV; west of dirt road (Lone Wolf)	bedrock		41RG389
UT-RG-09	10	1	0-30	N	10YR 5/4	sandy loam	20% degraded bedrock	upland plain; 80% GSV; scrub/shrub, mesquite and cacti vegetation; friable soil	bedrock	surface - 5 m around ST: 3 colorless bottle glass shards, 2 nails, 1 whiteware/ tableware base	41RG389

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-RG-09	11	1	0-20	N	10YR 5/4	sandy loam	20% degraded bedrock	upland plain; 80% GSV; scrub/shrub, mesquite and cacti vegetation; friable soil	bedrock	surface - 5 m around ST: 2 tin cans, 1 colorless bottle glass; 1 nail; 2 brick fragments w/ "A.P. GREEN F/ EMPIRE D/"	41RG389
UT-RG-09	12	1	0-10	N	10YR 5/4	sandy loam		outside (NW) of surface scatter boundary	bedrock		41RG389
UT-RG-09	13	1	0-11	N	10YR 5/4	sandy loam	30% degraded bedrock	upland plain; 90% GSV	bedrock	surface - 5 m around ST: 1 spoon, 2 amber glass (body + base), 1 milk glass rim, 2 buttons, 1 colorless glass; 1 unknown hardware	41RG389
UT-RG-09	14	1	0-12	N	10YR 5/4	sandy loam		upland plain; 90% GSV	bedrock		41RG389
UT-RG-09	15	1	0-20	N	10YR 5/4	sandy loam	20% degraded bedrock	upland plain; 90% GSV; desert vegetation, scrub/shrub, mesquite; friable	bedrock	surface - 5 m around ST: 1 milk glass rim	41RG389
UT-RG-09	16	1	0-20	N	10YR 5/4	loam		upland plain; 90% GSV; desert vegetation, scrub/shrub, mesquite; friable	bedrock	surface - 5 m around ST: wire nails, tin cans, whiteware sherds, colorless bottle glass, amber bottle glass, 1 brick fragment	41RG389
UT-RG-09	17	1	0-10	N	10YR 5/5	loam	30% degraded bedrock	upland plain; 90% GSV; desert vegetation, mesquite, cacti	bedrock		41RG389
UT-RG-09	18	1	0-10	N	10YR 5/5	loam	30% degraded bedrock	upland plain; 90% GSV; desert vegetation, mesquite, cacti	bedrock	surface - 5 m around ST: 2 milk glass body shards, 1 fork, 1 amber glass neck/finish; 1 colorless glass base w/ maker's mark	41RG389
UT-RG-09	19	1	0-10	N	10YR 5/5	loam	30% degraded bedrock	upland plain; 90% GSV; desert vegetation, mesquite, cacti	bedrock		41RG389
UT-RG-09	20	1	0-10	N	10YR 5/5	loam	30% degraded bedrock	upland plain; 90% GSV; desert vegetation, mesquite, cacti	bedrock		41RG389

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-RG-09	21	1	0-20	N	10YR 5/5	loam		in existing corridor; 100% GSV; upland plain; degraded bedrock at surface; cacti, grass	bedrock		41RG389
UT-RG-09	22	1	0-20	N	10YR 5/5	loam		in extant pipeline corridor; 100% GSV; upland plain; degraded bedrock at surface; cacti, grass	bedrock		41RG389
UT-RG-09	23	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	24	1	0-10	N	10YR 5/4	sandy loam		upland plain; 905 GSV; scrub/shrub mesquite, cacti	bedrock		41RG390
UT-RG-09	25	1	0-10	N	10YR 5/4	sandy loam		upland plain; 90% GSV; scrub/shrub mesquite, cacti	bedrock	surface: ferrous metal cans, scrap metal, ceramic sherds and glass fragments	41RG390
UT-RG-09	26	1	0-10	N	10YR 5/4	sandy loam		upland plain; 90% GSV; scrub/shrub mesquite, cacti	bedrock		41RG390
UT-RG-09	27	1	0-10	N	10YR 5/4	sandy loam		upland plain; 90% GSV; scrub/shrub mesquite, cacti	bedrock		41RG390
UT-RG-09	28	1	0-10	N	10YR 5/4	sandy loam			bedrock	surface nearby: erected ferrous metal peg/ stake	41RG390
UT-RG-09	29	1	0-10	N	10YR 5/4	sandy loam			bedrock		41RG390
UT-RG-09	30	1	0-10	N	10YR 5/4	sandy loam			bedrock		41RG390
UT-RG-09	31	1	0-10	N	10YR 5/4	sandy loam		upland plain; 90% GSV; desert scrub/shrub, prickly pear	bedrock	surface: ferrous metal cans, scrap metal, ceramic sherds, glass fragments	41RG390
UT-RG-09	32	1	0-10	N	10YR 5/4	sandy loam			bedrock	surface: ferrous metal cans, scrap metal, and ceramic sherds	41RG390
UT-RG-09	33	1	0-10	N	10YR 5/4	sandy loam			bedrock		41RG390
UT-RG-09	34	1	0-10	N	10YR 5/4	sandy loam			bedrock		41RG390
UT-RG-09	35	1	0-10	N	10YR 5/4	sandy loam		edge of existing pipeline corridor; 90% GSV	bedrock		41RG390
UT-RG-09	36	1	0-10	N	10YR 5/4	sandy loam		in existing pipeline corridor; 90% GSV	bedrock		41RG390
UT-RG-09	37	-	-	NE	-	-		not excavated - bedrock at surface			41RG390
UT-RG-09	38	-	-	NE	-	-		not excavated - bedrock at surface			41RG390

Survey Segment	ST#	Level	Depth cmbs	Result	Munsell	Soil Texture	Inclusions	Description/Comments	Reason for Termination	Artifacts	Resource #
UT-RG-09	39	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	40	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	41	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	42	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	43	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	44	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	45	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	46	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	47	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-09	48	-	-	NE	-	-		not excavated - bedrock at surface			
UT-RG-11	1	-	-	NE	-	-		not excavated - bedrock at surface			adjacent to 41RG324
UT-RG-11	2	-	-	NE	-	-		not excavated - bedrock exposed/large cobbles at surface;80-100% GSV			adjacent to 41RG324
UT-RG-11	3	-	-	NE	-	-		not excavated - bedrock at surface			adjacent to 41RG324
UT-RG-11	4	-	-	NE	-	-		not excavated - bedrock at surface; 80-100%GSV			adjacent to 41RG324
UT-RG-12	1	-	-	NE	-	-		not excavated - exposed bedrock; degraded bedrock cobbles at surface			adjacent to 41RG263
UT-RG-12	2	-	-	NE	-	-		not excavated - bedrock at surface			adjacent to 41RG263
UT-RG-12	3	-	-	NE	-	-		not excavated - bedrock at surface			adjacent to 41RG263
UT-RG-12	4	-	-	NE	-	-		not excavated - bedrock at surface			adjacent to 41RG263