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Revised Draft

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Management Summary

The Texas and New Mexico Power Company (TNMP) is proposing to rebuild a 69 kV transmission line from the Worsham substation to the Wickett substation consisting of approximately 28 miles (mi; 45 kilometers [km]) of line in Ward and Reeves counties, Texas. In advance of the proposed project, TNMP contracted HDR, Inc. (HDR) to conduct a cultural resources survey of the portion of the project that crosses land owned by the University of Texas under the Antiquities Code of Texas (13 Texas Administrative Code [TAC] 26.12)

The Area of Potential Effects (APE) included the 100-foot (ft; 30.5 meter [m])) wide transmission line right-of-way (ROW) on University of Texas land and the portions of the ROW within a 600 ft (183 m) buffer on either side of streams that are crossed by the transmission line. The general purpose of the survey was to determine the presence/absence of cultural resources by employing pedestrian survey, shovel testing, and photo-documentation. The cultural resources survey was conducted under Texas Antiquities Permit Number 8087. The field effort was led by Melanie Johnson on July 12–13, 2017. During the course of the survey, two stream crossings were encountered and surveyed. However, after consultation with the USACE Albuquerque office, these crossings were found not to fall under Section 404 jurisdiction.

The pedestrian survey on the 4.3-mi (6.9 km) section of transmission line on University of Texas land resulted in the discovery of seven isolated surface finds consisting of historic metal and glass. Three negative shovel tests were judgmentally placed within the APE on University of Texas land based. The pedestrian survey of two stream resulted in the discovery of eight isolated surface finds including historic metal, glass, brick, and concrete. Twenty-two shovel tests were dug between the two crossings. One of these shovel tests located at the crossing of the Pecos River was positive and revealed historic glass and metal from flood deposits.

One historic-age bridge was identified and documented at the Big Valley Canal survey area. Based on materials and wear, the bridge was likely built in the mid-twentieth century, possibly at the time the existing transmission line was installed. It is a single-span, steel girder bridge with a timber and steel substructure. The resource is recommended not eligible for listing in the National Register of Historic Places (NRHP).

A segment of the Big Valley Canal was identified within the APE. A segment of the canal outside of the Study Area was determined eligible for listing in the National Register of Historic Places (NRHP) by the Texas Historical Commission (THC) in 2000 and, in consultation with SHPO, the entire linear resource is considered eligible. The canal likely dates to c. 1906, when the Big Valley Irrigation Company was established to construct an irrigation system in the Lower Pecos River Basin. The project as proposed will have no adverse effect on this historic property.

In accordance with 13 TAC 26.12, no further archaeological investigations are recommended, and construction may proceed. In the event that any archaeological

deposits are encountered during construction, work should cease, and the Texas Historical Commission should be notified.

All records and materials generated by this project will be permanently curated at the Center for Archaeological Studies at Texas State University in San Marcos, Texas.

Contents

Tables

Figures

Abbreviations and Acronyms

APE	Area of Potential Effects
Atlas	Texas Archeological Sites Atlas
c.	Circa
CFR	Code of Federal Regulations
ft	Foot/Feet
GPS	Global Positioning System
HDR	HDR, Inc.
km	Kilometer(s)
m	Meter(s)
mi	Mile(s)
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
ROW	Right-of-Way
SAL	State Antiquities Landmark
T&P	Texas and Pacific Railway
TARL	Texas Archeological Research Laboratory
THC	Texas Historical Commission
TNMP	Texas New Mexico Power Company
UT	University of Texas

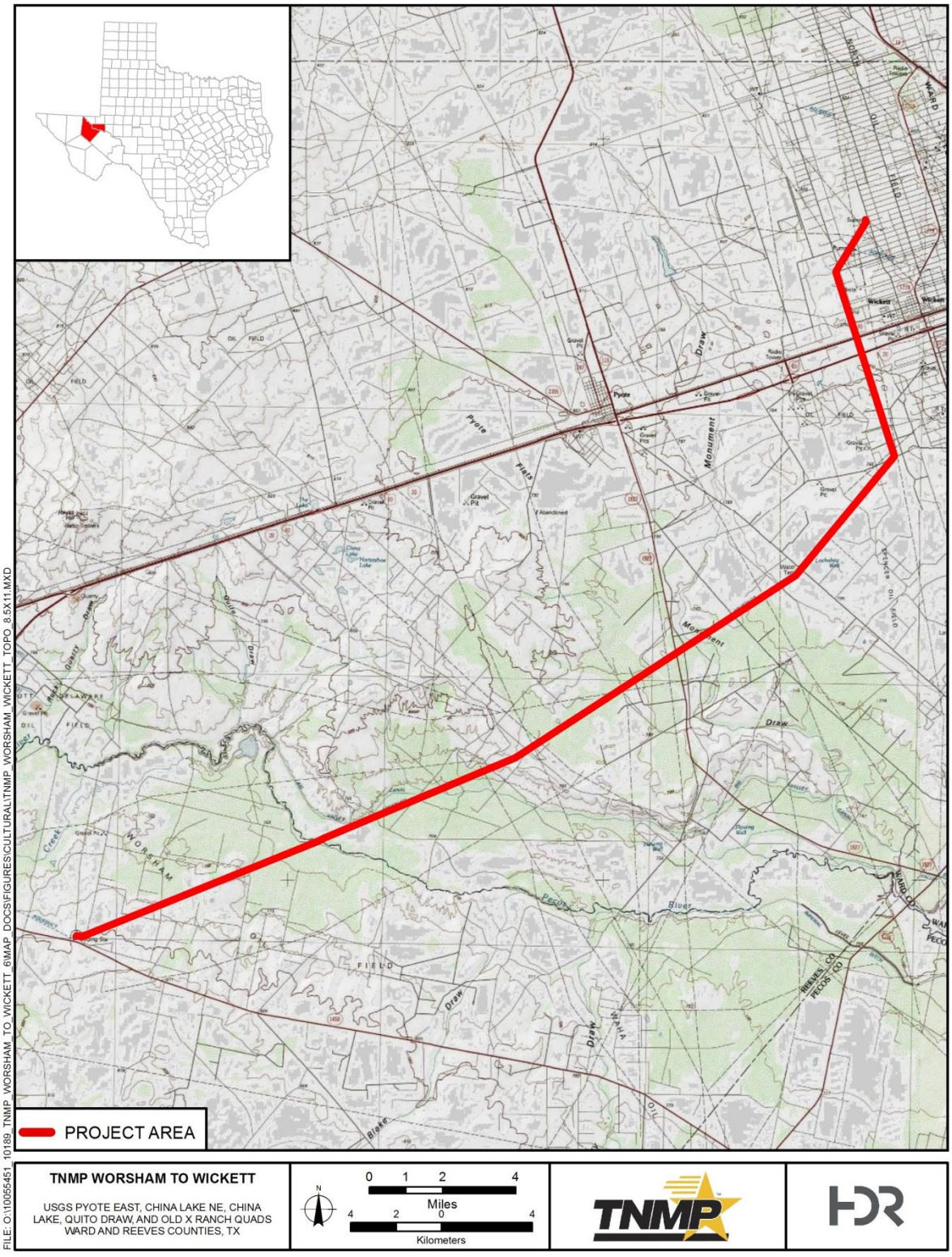
1 Introduction

TNMP is proposing to rebuild a 69 kV transmission line from the Worsham substation to the Wickett substation consisting of approximately 28 miles (mi; 45 kilometers [km]) of line in Ward and Reeves counties, Texas (Figure 1-1). In advance of the proposed project, TNMP contracted HDR to conduct a cultural resources survey of the portion of the project that crosses land owned by the University of Texas under the Antiquities Code of Texas (13 Texas Administrative Code [TAC] 26.12). The Area of Potential Effects (APE) included the 100 ft (30.5 m) wide transmission line right-of-way (ROW) on University of Texas land and the portions of the ROW within a 600-foot (ft; 183 meter [m]) buffer on either side of streams that are crossed by the transmission line.

The purpose of the archaeological investigation is to determine the presence/absence of archaeological resources within the APE as per the Antiquities Code of Texas (13 TAC 26.12) and to evaluate identified resources for their eligibility for inclusion in the NRHP or as a designated SAL. The cultural resources survey was conducted under Texas Antiquities Permit Number 8087. The field effort was led by Melanie Johnson on July 12–13, 2017.

All records and materials generated by this project will be permanently curated at the Center for Archaeological Studies at Texas State University in San Marcos, Texas.

Figure 1-1. Topographic Map of the Project Area.



2 Background

2.1 Geology and Soils

The underlying geology for a majority of the project area consists of Windblown cover sand of Pleistocene age (United States Geological Survey 2007). Other geologic units encountered in the project area include Windblown sand of Holocene age, Caliche of Holocene and Pleistocene age, Fluviatile terrace deposits of Pleistocene age, Alluvium of Holocene age, and Associated Alluvium and other Quaternary deposits of Pleistocene age (United States Geological Survey 2007).

According to data from the Natural Resources Conservation Service (NRCS; Soil Survey Staff 2016), the project area consists of 13 soil map units:

- Pyote soils, undulating
- Wickett and Sharvana soils, gently undulating
- Sharvana soils, nearly level
- Delnorte gravelly soils, undulating
- Upton gravelly soils, gently undulating
- McCarran soils, nearly level
- Ima fine sandy loam, 0 to 3 percent slopes
- Hodgins clay loam
- Gila fine sandy loam
- Arno clay
- Patrole silt loam
- Reakor association, nearly level
- Delnorte-Chilicotal association, rolling

2.2 Cultural History

2.2.1 Prehistoric

The project area falls within the Southern High Plains region which is divided into five temporal divisions: Paleoindian, Archaic, Ceramic, Protohistoric, and Historic (Johnson and Holliday 2012). These general divisions will provide a framework for the following discussion of the cultural chronology of the region (Table 2-1). It should be noted that the project area is located near the boundary between the Southern High Plains and Trans-Pecos regions, but the project setting is more closely related to the Southern High Plains region.

Table 2-1. Cultural Chronology

Cultural Stage	Time Periods
Paleoindian	11,500–8500 BP
Archaic	8500–2000 BP
Ceramic	2000 BP–AD1450
Protohistoric	AD 1450–1725
Historic	AD 1725–1950

2.2.2 Paleoindian Period (11,500–8500 BP)

The Southern High Plains is known for its high concentration of Paleoindian sites located within it (Holliday 1997). Researchers have subdivided the Paleoindian period based on projectile point types. These subdivisions are Clovis (11,500–11,000 BP), Folsom (10,800–10,300 BP), and Late Paleoindian (10,000–8500 BP) (Johnson and Holliday 2012). Paleoindian people are believed to have been hunter gatherers and are typically associated with the exploitation of megafauna such as mammoth and bison.

The Clovis complex in the Southern High Plains coincided with a period of a cooler and wetter environment which was probably well suited to the needs of these hunter gatherers (Holliday 1997). During this period, megafauna were abundant, along with other food sources utilized by Clovis groups (Holliday 1997). Several Clovis sites have been identified in the Southern High Plains region. Clovis sites such as Blackwater Draw Locality #1, Miami, and Lubbock Lake contained the processed remains of various megafauna and other animals along with Clovis points. At Miami, Clovis points were reused as butchering tools (Johnson and Holliday 2012).

Around 11,000 BP, the Folsom complex began to replace the Clovis complex in the Southern High Plains. During this time, climatic changes were underway. Seasonal fluctuations increased, and a general warming trend characterized this period (Johnson and Holliday 2012). In addition, the transition period witnessed widespread extinctions (Johnson and Holliday 2012). Folsom sites in the region, such as Lake Theo and Lipscomb, consist of bison kill and butchering sites (Johnson and Holliday 2012). Lake Theo represents an extended camp associated with the bison kill. Both transported tools

as well as expedient lithic tools made from local materials were recovered from the site (Johnson and Holliday 2012). Lipscomb represents the largest single-event Folsom kill in North America, with evidence of at least 55 bison present at the site (Johnson and Holliday 2012).

The Late Paleoindian complex in the Southern High Plains began around 10,000 BP. Environmental conditions continued to become drier and warmer (Johnson and Holliday 2012). The lanceolate projectile points that characterize this period are not fluted and can be associated with two different cultures: the Plainview (10,000 BP) and Firstview (8600 BP) cultures (Johnson and Holliday 2012). Similar to the Folsom sites in the Southern High Plains, Late Paleoindian sites usually consist of bison kills, such as at Running Water Draw and Lubbock Lake (Johnson and Holliday 2012).

2.2.3 Archaic Period (8500–2000 BP)

The climate during the Archaic period in the Southern High Plains continued the drying and warming trend that began during the Paleoindian period (Johnson and Holliday 2012). The cultural development during the Archaic period is "… best conceived as a time of varied responses to a changing Holocene landscape, biota, and climate, on the one hand, and to equally dynamic hunting and gathering systems, on the other" (Kay 1998, 193). The Archaic period saw the introduction of various barbed projectile points which were used along with the atlatl (Hughes 2001). In addition, evidence of plant processing emerges during this period, indicating an increased reliance on plant based food sources (Hughes 2001). This period is divided into three subdivisions; the Early Archaic, Middle Archaic, and Late Archaic.

Only two Early Archaic sites, Lubbock Lake and San Juan, have been excavated in this region (Johnson and Holliday 2012). As such, our understanding of the Early Archaic in the Southern High Plains is fairly limited. Radiocarbon dates from both sites date them to around 8000 BP. The sites show evidence of continued bison hunting, and the only evidence of lithic tools at the sites are the lithic retouch flakes (Johnson and Holliday 2012).

The Middle Archaic period is much better documented, with several excavated sites in good stratigraphic context (Johnson and Holliday 2012). The climate during the Middle Archaic is known as the Altithermal, which is characterized by semiarid to arid conditions, reduced vegetation, and decreased surface water (Johnson and Holliday 2012). Three sites from the Middle Archaic had excavated wells to cope with the diminished surface water during this period (Johnson and Holliday 2012). Evidence of plant processing is notable during the Middle Archaic, such as a broken sandstone metate and an oval oven discovered at Lubbock Lake and dated to 4800 BP (Johnson and Holliday 2012). As the Archaic period progressed, the lithic tool kit became more diverse, including more projectile points, knives, and ground stone (Hughes 2001). The Middle Archaic period began to transition into the Late Archaic as the climate began to cool around 4500 BP (Johnson and Holliday 2012).

In the Southern High Plains, the Late Archaic period saw the dawn of the Medithermal climate, which is similar to modern climactic conditions (Hughes 2001). The Late Archaic period saw an increase in the number of sites in the region (Hughes 2001). Few sites are in good stratigraphic context, but the sites during this time were usually campsites consisting of hearths, lithic materials, and animal remains (Johnson and Holliday 2012;

Hughes 2001). Bison kills have been associated with Late Archaic sites, such as at San Juan, Area III, where at least seven bison were killed and butchered (Johnson and Holliday 2012). The Archaic period came to an end in the Southern High Plains around 2000 BP.

2.2.4 Ceramic Period (2000 BP–AD 1450)

The Ceramic period is marked by the introduction of new technologies such as ceramics and the bow and arrow (Johnson and Holliday 2012). The climate during this period shifted between moderate, modern conditions and periodic droughts (Johnson and Holliday 2012). Groups became more sedentary and began using horticulture to supplement their diet (Hughes 2001). The Early Ceramic period was a transitional phase from the Archaic period (Johnson and Holliday 2012). Two complexes have been noted in the region: they are the Palo Duro complex (2000 BP–AD 1100) and the Antelope Creek focus (AD 1200–1450) (Boyd 2012; Hughes 2001).

The Caprock Canyonlands region developed unique characteristics during the Early Ceramic period, and some researchers have termed it the Palo Duro complex (Boyd 2012). The Caprock Escarpment provided a lush environment for prehistoric peoples, with reliable water sources and other resources. The region would have been an enticing settlement location (Boyd 2012). The Palo Duro complex is characterized by the influence of the Jornada Mogollon cultures of New Mexico, the Trans-Pecos, and Chihuahua (Boyd 2012). The complex was first established during the excavation of Deadman's Shelter (41SW73), which consisted of corner and basal notched projectile points and Mogollon brownware ceramics (Boyd 2012). Evidence suggests that people during this time were semi-sedentary, seasonally living in pithouses at sites such as Kent Creek (41HL66), as well as open camps and rock shelters, such as Deadman's Shelter (Boyd 2012).

Beginning around AD 1200, the Antelope Creek focus is characterized by the unique architecture in the region, utilizing stone-slab wall foundations to construct single and multi-room dwellings in the Texas and Oklahoma Panhandles (Lintz 1984). Artifact assemblages include unnotched and side-notched projectile points, ground and pecked stone tools, cord-marked ceramics, bone tools, and utilized mussel shells (Lintz 1984; Hughes 2001). The Antelope Creek focus is closely related to the Plains Village tradition based on the architectural features as well as the various artifacts found associated with the focus (Hughes 2001). These groups relied on a mixture of hunting, gathering, and horticulture for subsistence (Brooks 2012). Ceramics and obsidian provide evidence of trade among the Antelope Creek peoples with Puebloan peoples and surrounding Plains groups (Brooks 2012). Warfare among the groups is also apparent based on burned structures and human remains at some sites, such as disarticulated human remains found at the Footprint site (Brooks 2012). Around AD 1450, prior to the arrival of Coronado, the Antelope Creep peoples seem to have left the region, probably as a result of climactic pressures and the intrusions of the Apache (Lintz 1984).

2.2.5 Protohistoric Period (AD 1450–1725)

The Protohistoric period refers to the time when Europeans were present in the region but not visible in the aboriginal archaeological record (Johnson and Holliday 2012). By the arrival of Coronado, the area was occupied by the Apaches (Hughes 2001). Coronado described them as nomadic hunter-gatherers, reliant on big game, such as

bison (Hughes 2001). This is supported by Protohistoric sites which are typically camp sites or bison kill sites (Johnson and Holliday 2012). Two complexes have been identified in the Southern High Plains during the Protohistoric period: the Edwards complex (AD 1500–1650) and the Wheeler complex (AD 1650–1725) (Hofman 1984).

The Edwards complex was located in what is today southwest Oklahoma (Hofman 1984). The complex is characterized by the grey, sand-tempered plain-surfaced ceramics found on their sites (Hofman 1984). Artifact assemblages from Edwards complex sites consist of projectile points (primarily unnotched Fresno points) drills, bison bone tools (such as a bison-scapula hoe), and the plain grey ceramics (Hofman 1984). Chipped stone tools from Edwards complex sites are primarily made from Alibates, with Kay County flint only comprising about 10 percent of the assemblages and a notable presence of obsidian, which comprised about 4 percent (Hofman 1984). Subsistence patterns relied on bison hunting, but some degree of horticulture is apparent in the archaeological record (Hofman 1984). The Edwards complex peoples traded with both the Puebloans and Prairie Villages (Hoffman 1984).

Around AD 1650, the Wheeler complex emerged in west central Oklahoma (Hofman 1984). The primary difference between the Wheeler and Edwards complexes is the dominating lithic material used for chipped stone tools at the sites (Hofman 1984). The dominant lithic material at Wheeler complex sites is Kay County flint with Alibates and Edwards chert comprising a minor portion of the lithic assemblage (Hofman 1984). This shift in lithic materials could reflect a change in trade networks and resource procurement (Hofman 1984). A distinguishing chipped stone tool for the Wheeler complex is the large scrapers made of Kay County chert found on the sites (Hofman 1984). In addition, European trade items, such as glass beads, have been recorded at Wheeler complex sites (Hofman 1984). By AD 1725, the European influence in the region had grown, ending the Protohistoric period and giving rise to the Historic.

2.2.6 Historic European and Euro-American Cultural Period (1725–1950)

Ward County

Prior to the establishment of Ward County in 1887, Jumano, Apache, and Comanche groups likely occupied and/or traveled through the area, identified by Spanish explorers as far back as 1583. Two early transportation paths through the county in the mid-nineteenth century were the Emigrant Road (identified on an 1849 land survey) and the Butterfield Overland Mail (1858–1861). The Lower Emigrant Road connected El Paso to San Antonio and was used for commercial and military purposes. The Butterfield road connected San Francisco with Saint Louis and Memphis, delivering both mail and passengers. Euro-American settlement of Ward County began in earnest, however, with ranchers moving in after the arrival of the Texas and Pacific Railway (T&P) in 1881 (Justice and Leffler 2016). As was the case across Texas, moving livestock via rail was much more efficient than cattle driving, and sales opportunities for both livestock and crops increased dramatically as rail lines linked to large, regional markets. The T&P established stations at Sand Hills, Monahans, Aroya, Pyote, Quito, Quito Quarry, and Barstow, with Barstow serving as the county seat when Ward County was officially organized in 1892. Communities grew slowly around the stations, with settlers offering goods and services to ranchers in the vicinity.

In 1890, there were 75 people living in Ward County (Justice and Leffler 2016). Two federal laws enacted in this timeframe had significant implications on the population and development of the county over the next few decades. The Carey Act of 1894 (also known as the Desert Land Act) allowed private companies to build irrigation systems in 20 western states. Under this law, the federal government transferred public lands to states with reclamation (irrigation) programs, and then each state would offer land to settlers at a nominal rate. Private citizens established development companies that would install the irrigation infrastructure and charge farmers who used the system. Development companies would therefore maintain the systems and make a profit, the individual state would increase its tax base by having a growing population, and each settler was able to invest in usable, irrigated farmland (Dowell and Breeding 1967:72). It should be noted that, under this act, title to the land would not change hands until the property had been irrigated for 10 years.

By 1900, there were 167 farms and ranches in Ward County, and the population reached 1,451. The vast majority of acreage was still allocated to ranching, with only 83 acres of corn and 1,500 acres of cotton in 1900. In order to remedy the lack of regulatory oversight in the Carey Act, the U.S. Congress passed the Newlands Reclamation Act of 1902. In addition to creating the U.S. Reclamation Bureau and the U.S. Geological Survey, the act allowed the federal government to commission water diversion, retention, and transmission projects in western states. While Texas was not one of the original 13 states named, it was added to the list in 1906.

The Carey and Newlands Acts prompted extensive irrigation work in the Lower Pecos River Basin. As a result of the laws, ten major irrigation projects were undertaken in the basin, including canals commissioned by the Big Valley Irrigation Company, which was established in 1906 (Texas Permian Historical Society 1962:15). USGS topographic maps of the China Lake Quadrangle indicate a canal encountered during the cultural resources survey of the APE is the Big Valley Canal. The canal segment in the APE is associated with Site 41WR75, a previously surveyed segment outside the Study Area for the Project, which has been determined eligible for listing in the NRHP.

Despite flooding and drought on and off through the next decade, Ward County agriculture interests continued to expand. By 1910, the county had 2,389 residents and 231 farms and ranches. Ward County remained at almost the same levels in 1920, with 238 farms and ranches and a population of 2,615 (Justice and Leffler 2016). A shift in the county's economic focus took hold in the late 1920s, after a large oil reserve was discovered just north at the Hetrick oilfield in Winkler County in 1926. Additional rail infrastructure was added in Wickett, Pyote, and Monahans, and a new line from New Mexico to Monahans was installed in 1929 (Justice and Leffler 2016). Due to the increased oil activity, the population in Ward County jumped from 4,599 in 1930 to 9,575 in 1940. Monahans was at the center of the county's oil activity, and a 1939 countywide vote passed to relocate the county seat from Barstow to Monahans. Oil interests continued to direct the local economy through the 1960s.

Pyote was chosen as the site of an Army airfield to support World War II efforts, and its opening in 1942 catalyzed more growth in the county. Ward County's population reached 13,346 in 1950 (Justice and Leffler 2016). When oil production dropped off in the 1960s, ranching once again helped strengthen the local economy. Farming did not experience the same resurgence. In the 1980s, 88 percent of land in the county was allocated for

agriculture, but cultivated land accounted for less than one percent. After reaching a high of 14,917 in 1960, Ward County's population remained steady in the 13,000–14,000 range before dropping under 11,000 in 2000 (Justice and Leffler 2016).

Reeves County

Prior to the establishment of Reeves County in 1883, Jumano groups irrigated crops of corn and peaches in the vicinity of San Solomon Spring, and three Jumano guides assisted the Antonio de Espejo expedition near Toyah Lake in 1583 (Smith 2016). Corn cultivation by Mescalero groups in the Toyah Creek area was noted by travelers in 1849. Settlers of Mexican descent were also present in the Reeves County area, noted as supplying Fort Davis with grains, vegetables, and beef in the second half of the nineteenth century (Smith 2016). Euro-American settlement first occurred in the 1870s.

The T&P arrived in Reeves County in 1881, as it did in Ward County. The line through Ward continued southwest through Reeves, with section houses built at Pecos and Toyah. Reeves County was established in 1883 from Pecos County, and officially organized in 1884 with Pecos as the county seat. Ranching was the county's primary economic driver. The county's population was 1,247 in 1890 and, with the completion of the Pecos River rail line in 1890 bringing additional settlers and manufacturing interests, the county's population reached 1,847 by 1900 (Smith 2016).

Agriculture remained most important to the local economy through the twentieth century. While free use of state land ended in Texas in 1900, local ranchers were able to acquire up to four sections of school lands in West Texas at excellent rates in 1901–1905. This opportunity also helped increase the number of new settlers in the area, which reached 4,392 in 1910. Most farms were subsistence farms at this point (Smith 2016). The addition of the Pecos Valley Southern Railway in 1911 helped facilitate larger-scale agricultural operations; however, a 1916 drought forced many of the newer family farms out of business (Smith 2016).

Oil interest in the Delaware basin began in the 1920s and, although there was little early return, the county's population grew to 6,407 by 1930. The agriculture economy changed in the wake of the Great Depression, from largely farmer-owned operations to tenant farming. Raising livestock remained much more prevalent than harvesting crops, as livestock in the county was valued at more than $1 million while crops brought in just over $375,000 in 1940 (Smith 2016). The county's population continued to grow in the mid-twentieth century, from 8,006 in 1940 to 11,745 in 1950. In the 1950s, crops outpaced livestock in the local economy, gas interests in the Toyah field helped boost the economy. The county population reached 17,644 in 1960 (Smith 2016). Development of three oilfields in the 1970s helped solidify the county's financial standing, although farming and ranching continued as its backbone.

3 Methods

3.1 Previous Investigations near the Project Area

A review of the THC's Archeological Sites Atlas (Atlas) indicated that, within a one-mile buffer zone, there have been eight archaeological surveys conducted, and one site has been recorded (Table 3-1, Figure 3-1). No Recorded Texas Historic Landmarks (RTHLs), Official Texas Historical Markers (OTHMs), cemeteries, National Register (NRHP) listed properties or districts, or previously inventoried properties have been recorded within the one-mile buffer. While not previously surveyed within one mile of the Project, an inquiry to THC revealed that the Big Valley Canal (41WR75), a linear resource encountered during the survey, is considered eligible for NRHP listing, including the segment of the canal within the APE.

Of the eight surveys conducted within the one-mile search radius, two cross the APE (ID's 8400004691 and 8500018750). The time range for the surveys within the one-mile radius spans from 1984 to 2010. Little information is recorded in the Atlas on the surveys conducted before 1995. The survey information is provided in Table 3-1 below.

Table 3-1. Previous Cultural Resources Surveys Conducted within One Mile of the Project Area.

ID	Agency	Report Title	Contractor	Year	Comments / Recommendations
8400004691	—	—	—	1995	—
8400004692	—	—	—	1995	—
8400004697	HUD	—	—	1984	—
8400004698	EPA	—	—	1995	—
8500018749	Texas Water Development Board	—	Center for Big Bend Studies	2010	—
8500018750	Texas Water Development Board	—	Center for Big Bend Studies	2010	—
8500013433	Federal Energy Regulatory Commission	—	PBS&J / Dixon	2004	—
8500014762	Federal Energy Regulatory Commission	Brownlow, Russell (2007) An Intensive Cultural Resources Survey of 12 Archeological High-Probability Areas along 42 Miles of Extra Work Spaces on the Longhorn Partners Pipeline Right-of-Way in Ward and Reeves Counties, Texas	Horizon / Brownlow	2007	—

According to the Atlas, one archaeological site is located within one mile of the project area but its limits do not enter the project area. Site 41RV93 is a historic artifact scatter recorded during a pedestrian survey conducted in 2016 and is located approximately 280 m south of the project area. The artifacts suggested dates between 1900 and the 1930s. Subsurface investigations did not yield cultural materials. This site has an unknown eligibility status for inclusion in the NRHP.

Figure 3-1. Previously Recorded Cultural Resources Located within One Mile of the APE.

CONFIDENTIAL INFORMATION

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3.2 Survey Methods

HDR conducted an intensive survey with shovel testing of the APE. The APE was 100 ft (30.5 m) wide and included the 4.3-mile portion on University of Texas land and the portions of the ROW within a 600 ft (183 m) buffer on either side of streams that are crossed by the transmission line. The field effort was led by Melanie Johnson on July 12–13, 2017.

The portion of the APE on land owned by the University of Texas was surveyed mainly through pedestrian survey. Three transects were walked within the ROW with judgmental shovel tests placed when ground surface visibility was less than 30 percent. Ground surface visibility did not drop below 30 percent on this entire section; however, shovel tests were placed at locations of changes in the topography.

During the survey of the remainder of the project area, two stream crossings were encountered and surveyed. At these locations, the area within 600 ft (183 m) on either side of the crossing were pedestrian surveyed, and shovel tests were placed at 30 m intervals. Previous disturbance prevented shovel testing in portions of the survey areas.

Each shovel test was approximately 30 centimeters (cm; 12 inches [in]) in diameter and was excavated in 20-cm (8-in) arbitrary levels to a depth of 80 cm (32 in) below surface. The soil removed was screened through 0.635-cm (0.25-in) mesh screen, and soil descriptions followed the guidelines and terminology established by the National Soil Survey Center (Schoeneberger et al. 2002). Soil colors were recorded using a Munsell Soil Color Chart. All excavated shovel tests were recorded on shovel test forms which note depth, soil matrix descriptions, and cultural materials recovered. Digital photographs were used to document the survey conditions, disturbances, and any cultural features observed; and details of each photograph were recorded on standardized forms. All shovel test locations were recorded using a Global Positioning System (GPS) unit.

During the course of the archaeological survey at the Big Valley Canal crossing (see Section 4.2), staff encountered a standing structure that was likely of historic age (50 years of age or older). The resource was photo-documented from multiple perspectives using a camera with at least 12-megapixel resolution. This documentation was then forwarded to Ann Keen, a Secretary of the Interior-qualified architectural historian at HDR, for evaluation.

All records and materials generated by this project will be permanently curated at the Center for Archaeological Studies at Texas State University in San Marcos, Texas.

4 Results

HDR conducted an intensive survey with shovel testing of the 100 ft (30.5 m) wide APE which included the 4.3-mile section on University of Texas land and portions of the ROW within a 600 ft (183 m) buffer on either side of streams that are crossed by the transmission line. The portion of the APE on University land was subject to an intensive survey consisting of a pedestrian survey and judgmental shovel testing as per 13 TAC 26.12. Additionally, two stream crossings were encountered and surveyed in Ward and Reeves counties, Texas. These crossings were subjected to an intensive archaeological survey. However, after consultation with the USACE Albuquerque office, these crossings were found not to fall under Section 404 jurisdiction.

4.1 University of Texas Land Survey

The project area crosses five land parcels owned by the University of Texas south of IH 20 (Figure 4-1). The setting is characterized by a thin layer of eolian (windblown) deposits and caliche with high ground surface visibility (approximately 60 percent throughout). Vegetation included various grasses, shrubs, and mesquite (Figure 4-3 and Figure 4-4).

This portion of the transmission line is 4.3 miles long and was subject to a pedestrian survey with judgmental shovel testing. The pedestrian survey yielded a total of seven isolated surface finds which included historic glass and metal (Table 4-1, Figure 4-2). These surface finds were scattered throughout the survey area and included a brown snuff bottle dating to the early-mid 20th Century, a brown screw-top bottle dating to the 1980s, metal cans, barbed wire, a metal pipe connector, various metal fragments, and a pop-top can dating to 1962–1975 (see Figure 4-8 through Figure 4-10).

Three shovel tests were dug within the University land survey corridor. The locations of these shovel tests were based on topographic changes in the landscape. The first shovel test was located in an obvious depression in the land. The soil profile consisted of reddish brown (5YR 4/3) sandy loam with 30-40 percent limestone gravel and limestone bedrock at 40 centimeters below surface (cmbs; 15.75 inches below surface [inbs]) (Figure 4-5). The other two shovel tests were placed on both banks of a wash (Figure 4-6). These shovel tests consisted of red (2.5YR 4/6) sand on both sides (Figure 4-7). No subsurface artifacts were encountered within these three shovel tests.

Table 4-1. Summary of Artifacts recorded as Isolated Finds within University Survey.

Isolated Find	Artifact Type				
	Prehistoric Debitage	Prehistoric Tool Fragment	Historic Glass	Historic Metal	Historic Ceramic
ISO01				1	
ISO02				2	
ISO03				1	
ISO04			1		
ISO05				1	
ISO06				2	
ISO07				1	

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cultural materials

Figure 4-1

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Figure 4-2

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Figure 4-2. Survey Results on University of Texas Land, Page 2 of 4.

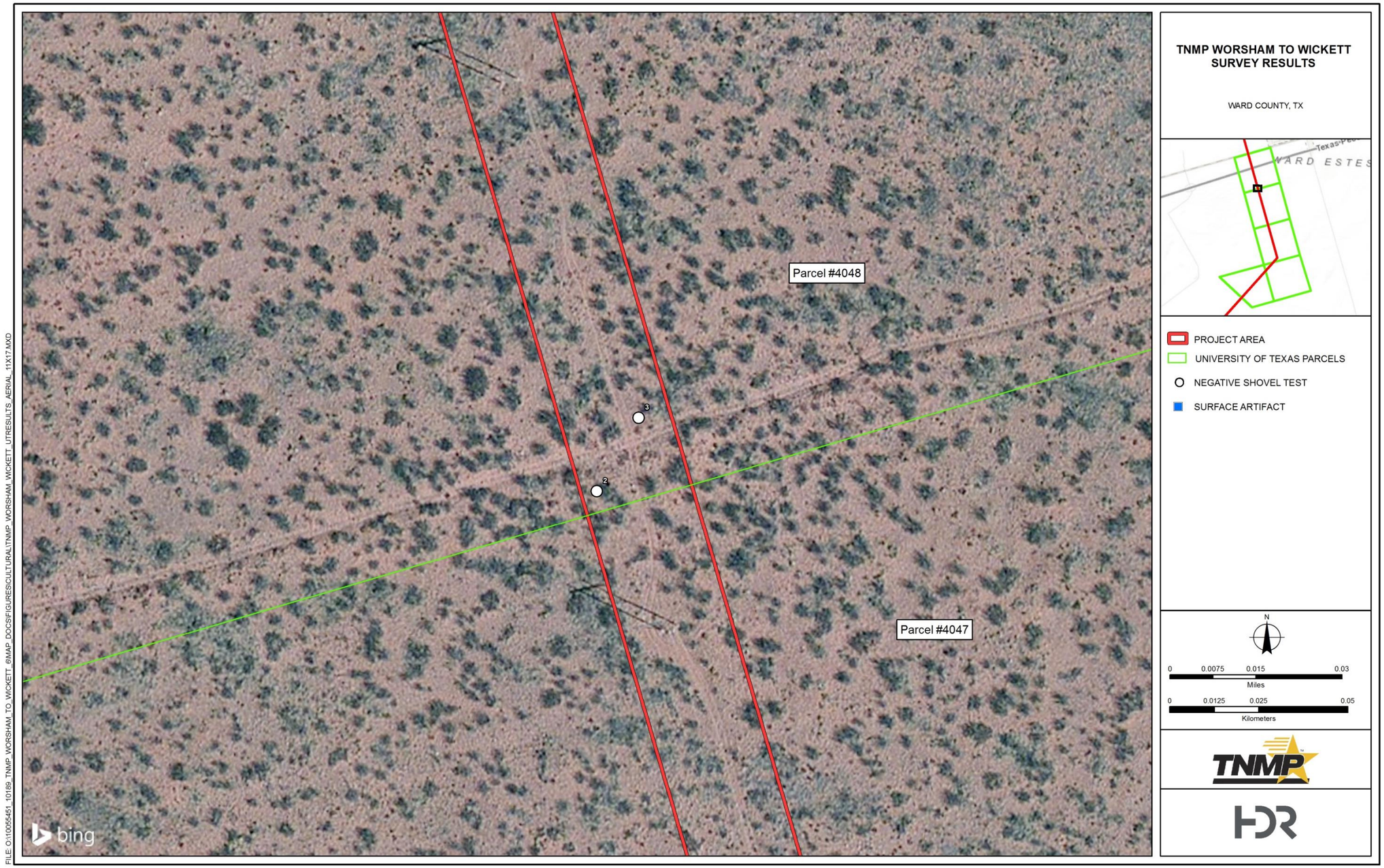

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Figure 4-3. Overview of the APE on University Land, Facing Southwest.

Figure 4-4. Typical Ground Surface on University Land.

Figure 4-5. Shovel Test 1 Located within Depression.

Figure 4-6. Overview of Wash, Facing Southeast.

Figure 4-7. Shovel Test 2 on South Side of Wash.

Figure 4-8. Brown Snuff Bottle (Early-Mid 20th C).

Figure 4-9. Screw-top Bottle (1980s).

Figure 4-10. Pop-top Can (1962–1975).

4.2 Big Valley Canal Crossing

The easternmost stream crossing, Big Valley Canal, is located approximately 2.7 miles northeast of the Pecos River along the transmission line (Figure 4-11). Although similar to the setting on University of Texas Land, this area is characterized by an increase of Mesquite and shrubs along the banks of the canal, which has a berm of roughly 5–6 ft (1.5–1.8 m) in height (Figure 4-18 and Figure 4-19).

The survey revealed a historic-age timber and steel bridge crossing the streambed to the east of the existing road (Figure 4-11 through Figure 4-17). Surface finds at this crossing include three nails near the bridge, a large metal can, and a large metal strap.

The Big Valley Canal begins at the Big Valley Dam, which controlled waterflow from the Pecos River into the canal, and eventually flows into the Grandfalls Canal at Grandfalls, Texas (Ely 2016:231). The dam was built in 1906 by the Big Valley Irrigation Company, destroying Emigrant's Crossing Station along the Butterfield Overland Mail Road (Ely 2016:231, 391). The route of the Big Valley Canal often parallels that of the Butterfield Road (Ely 2016:231). The canal was likely built in the same timeframe as the dam, c. 1906, as the Big Valley Irrigation Company was formed in 1906 for the purpose of building, maintaining, and operating this system. This effort was part of a boom-bust attempt to make the land along the Pecos River more agriculturally productive (Ely 2016:231). Although the plan was initially successful, water and soil salinity combined with flooding and droughts lead to an abandonment of attempts to farm along the Pecos River in this area by 1918 (Ely 2016:231, Justice and Leffler 2016). The Big Valley Canal is no longer in use (Ely 2016:231).

A portion of the Big Valley Canal outside the APE was designated as eligible for inclusion in the NRHP in 2000. Contact with the Texas Historical Commission confirmed that the entire length of the canal is eligible for listing in the NRHP.

Five shovel tests were dug northeast of the canal crossing (Figure 4-11). The typical soil profile consisted of reddish brown (5YR 5/4) sand, occasionally encountering clay at 30–50 cmbs (11.8–19.7 inbs). No cultural materials were encountered.

Six shovel tests were dug southwest of the canal crossing. The first shovel test was placed just south of the bridge. The soil profile consisted of reddish brown (5YR 4/3) sand with 10–15 percent caliche gravel beginning at 30 cmbs (11.8 inbs). The remaining soil profiles were similar to those on the northeast side of the canal crossing. No cultural materials were encountered.

Historic-age Bridge over Big Valley Canal

The single-span, timber and steel bridge across the Big Valley Canal appears to have been constructed in the mid-twentieth century, perhaps at the same time as the existing transmission line was installed (Figure 4-13 to Figure 4-17). Based on its materials and form, it was likely used by heavy trucks working on a construction project in the vicinity. Each abutment includes a horizontal wood plank retaining wall supported by four timber bearing pilings set into poured concrete footings and capped by a single timber member. The bridge deck is supported by four I-beam girders sitting atop the timber cap and attached to the cap and bearing piles with welded and bolted steel scraps. The bridge deck is wood transverse decking with remnants of two running strips affixed.

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Figure 4-11

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Figure 4-12. Overview of Crossing at Big Valley Canal, Facing Southwest.

Figure 4-13. Overview of Historic-age Bridge, Facing South.

Figure 4-14. Overview of Historic-age Bridge, Facing East.

Figure 4-15. Overview of Bridge Deck, Facing South.

Figure 4-16. Overview of Historic-age Bridge, Facing North.

Figure 4-17. Substructure of Historic-age Bridge.

Figure 4-18. Overview of Landscape Southwest of the Big Valley Canal Crossing, Facing North. Note Berm along Canal.

Figure 4-19. Ground Surface Southwest of the Big Valley Canal Crossing.

4.3 Pecos River Crossing

The second crossing is located at the Pecos River (Figure 4-21). At this location, only one floodplain exists on the western bank of the river. Within this floodplain, vegetation consisted of mixed trees, shrubs, and various grasses. The plains on either side of the Pecos River contained sparse grasses and mesquite. Soils were shallow and consisted of eolian deposits with high ground surface visibility. On the west side of the crossing, there was evidence of a berm for a destroyed concrete aqueduct (Figure 4-27).

The crossing at the Pecos River showed abundant signs of disturbance on both banks. The largest disturbance was the modern pipeline activity at this location. A pipeline crosses the Pecos River on the south side of the transmission line, which dictated the location of shovel tests on the west side of the crossing (Figure 4-21 and Figure 4-22). In addition, there was rubble composed of concrete and rebar on both sides of the crossing within the APE (Figure 4-25 and Figure 4-26). USGS topographic maps of the China Lake Quadrangle from 1965 and 1981 indicate that there was an aqueduct in this location, of which this rubble was likely a part.

On the east side of the Pecos crossing, the APE was systematically shovel tested up to 600 ft (183m) from the crossing (Figure 4-20). The typical soil profile included brown (7.5YR 5/4) sandy loam with very compact soil encountered at 40–60 cmbs (15.7–23.6 inbs) (Figure 4-31). All shovel tests except the one closest to the Pecos River were negative for cultural materials. The shovel test closest to the Pecos River yielded fragments of clear glass (n=4), brown glass (n-4), cement (n=1), unidentified pieces of metal (n=2), and a nail (n=1). This shovel test was within flood deposits and in an area with scattered surface artifacts, many of which were modern. Therefore, this shovel test was not delineated. Isolated surface artifacts in this portion of the APE included a scatter of large metal sheets near the first transmission line structure on the east side of the Pecos, a scatter of metal wire, and a scatter of concrete fragments.

The west side of the Pecos crossing featured more disturbances including a pipeline and concrete rubble from the aqueduct. Due to this, three shovel tests were placed on the north side of the ROW closer to the river and two were placed on the south side of the ROW farther from the river once past the pipeline and rubble up to 600 ft (183 m) from the crossing. The first shovel test was placed approximately 100 ft (30.48 m) from the crossing in order to get above the 100-year floodplain. The typical soil profile was similar to that of the east side of the Pecos. Surface finds included a brick among the rubble stamped with the word “ABILENE” and a scatter of clear glass (Figure 4-32 and Figure 4-33). Research indicated that the brick was produced by the Abilene Brick Company, c. 1917–1930. Established as the Abilene Pressed Brick Company by C. A. Lanius in 1909, by 1959, the Abilene Brick Company was producing 40,000 bricks per day (Greene 1959:B-1). No cultural materials were encountered during shovel testing.

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Figure 4-21. Overview of Pecos Crossing, Facing Southwest.

Figure 4-22. Overview of Pipeline Crossing the Pecos River, Facing Northeast.

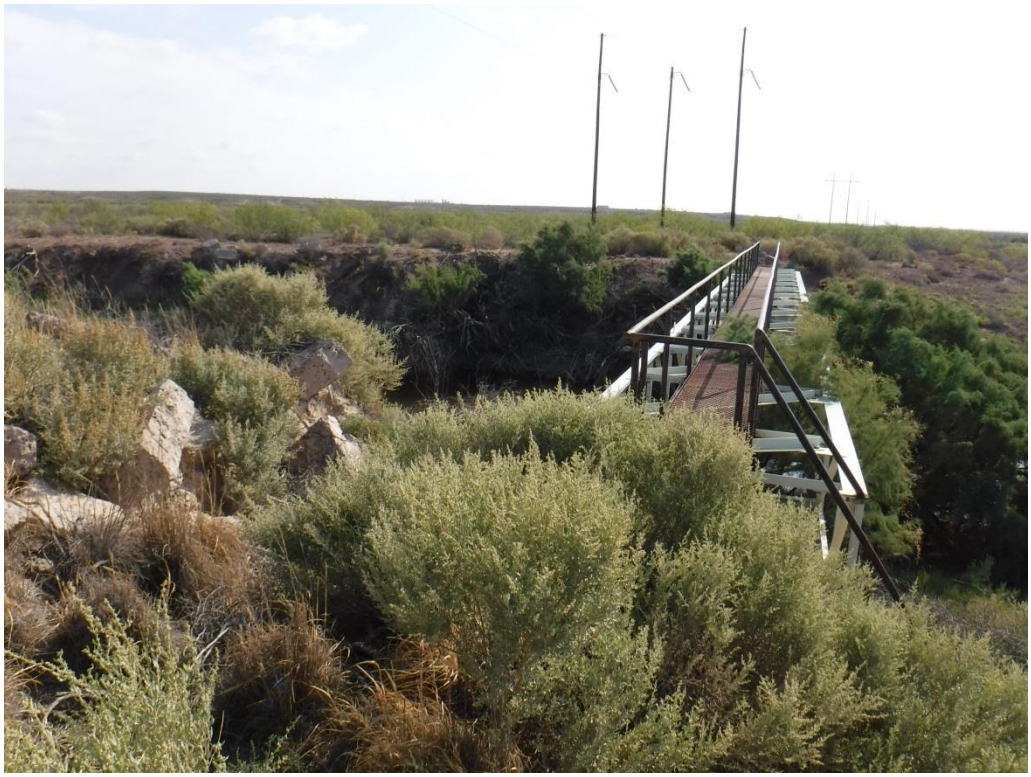

Figure 4-23. Evidence of Pipeline Activity within APE on West side of Pecos, Facing Northwest.

Figure 4-24. Overview of APE West of Pecos River, Facing West.

Figure 4-25. Concrete Aqueduct Rubble on West Side of Pecos, Facing Southwest.

Figure 4-26. Concrete Aqueduct Rubble within APE on West Side of Pecos, Facing East.

Figure 4-27. Berm for Concrete Aqueduct West of Pecos, Facing Southeast.

Figure 4-28. Rubble and Surface Cover on East Side of Pecos.

Figure 4-29. Modern Trash beneath Pipeline on West Side of Pecos.

Figure 4-30. Location of First Shovel Test on West Side of Pecos above Floodplain and North of Rubble, Facing East.

Figure 4-31. Shovel Test 22 Profile.

Figure 4-32. Brick with Maker's Mark ("ABILE—") found among Rubble on West Side of Pecos.

Figure 4-33. Glass Scatter West of Pecos.

Table 4-2. Summary of Artifacts Recorded as Isolated Finds at Crossings.

Isolated Find	Artifact Type					
	Prehistoric Debitage	Prehistoric Tool Fragment	Historic Glass	Historic Metal	Historic Ceramic	Concrete
ISO08				1		
ISO09				1		
ISO10				3		
ISO11				2		
ISO12				3		
ISO13						10
ISO14					1	
ISO15			20			

5 Summary and Recommendations

5.1 National Register Eligibility

5.1.1 Criteria for Evaluation of Eligibility

As part of this review process, cultural resources investigations are undertaken with the purpose of identifying resources that are listed in, or eligible for listing in, the NRHP. The assessment of significance of cultural resources is based on federal guidelines and regulations. Any cultural resource that is listed in or eligible for inclusion in the NRHP is known as a "historic property," and the term "eligible for inclusion in the NRHP" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP listing criteria (36 CFR 800.2). The criteria for evaluating properties for inclusion in the NRHP (36 CFR 60.4 [a–d]) are codified under the authority of the National Historic Preservation Act of 1966, as amended, and the Advisory Council on Historic Preservation has set forth guidelines to use in determining site eligibility. Subsequent to the identification of relevant historical themes and related research questions, these four criteria for eligibility are applied:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association and

A. that are *associated with events* that have made a significant contribution to the broad patterns of our history; or

B. that are *associated with the lives of persons* significant in our past; or

C. that *embody the distinctive characteristics* of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that have *yielded, or may be likely to yield, information important in prehistory or history*. Note that the application of Criterion D presupposes that the information imparted by the site is significant in history or prehistory [36 CFR 60.4, emphasis added].

The physical characteristics and historic significance of the overall property are examined when conducting NRHP evaluations. Although a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data are also required for individual components therein based on date, function, history, physical characteristics, and other information. Resources that do not relate in a significant way to the overall property may contribute if they independently meet the NRHP criteria.

For a historic resource, district, or landscape to be determined eligible for the NRHP, it must retain enough of its historic integrity to convey its significance. For the NRHP, there are seven aspects of integrity:

1. Location
2. Design
3. Setting
4. Materials
5. Workmanship
6. Feeling
7. Association

Occasionally, certain resources fall into categories in which they must be evaluated further using one or more of the following Criterion Considerations. If a resource identified during the reconnaissance-level survey falls into one of these categories, the following Criterion Considerations will be applied in conjunction with one or more of the four National Register criteria:

A. A religious property deriving primary significance from architectural or artistic distinction or historical importance, or

B. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event, or

C. A birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his or her productive life, or

D. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events, or

E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived, or

F. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance, or

G. A property achieving significance within the past 50 years if it is of exceptional importance (36 CFR 60.4).

The value of archaeological sites is often assessed under Criterion D. With regard specifically to this criterion, the goal of prehistoric archaeological research and management is to fill gaps in the knowledge about specific research domains. Scientific importance is driven, in part, by the research paradigms of the time and in part by the amount of information available about a particular research topic in a specific geographic area. In order to fulfill Criterion D, a site must possess certain attributes (e.g., intact buried cultural strata with functionally and temporally diagnostic materials, datable cultural features), such that further intensive research at the site could be expected to add additional information to relevant research questions.

5.2 Conclusion and Recommendation Summary

The cultural resources survey of the 100 ft (30.5 m) wide APE consisted of the portions of the TNMP Worsham to Wickett transmission line ROW on land owned by the University of Texas and within a 600 ft (183 m) buffer on either side of streams that are crossed by the transmission. During the course of the survey, the section of line on University of Texas land and two stream crossings were subjected to an intensive archaeological survey including pedestrian survey, shovel testing, and photo-documentation. One historic-age bridge and a canal were identified during the course of this survey. However, after consultation with the USACE Albuquerque office, these crossings were found not to fall under Section 404 jurisdiction.

The bridge over the Big Valley Canal was likely built in the mid-twentieth century, possibly at the time the existing transmission line was installed. It is a single-span, steel girder bridge with a timber and steel substructure. While no information specific to the bridge was uncovered during the course of this investigation, it is unlikely that this small bridge is associated with events or people integral to local, regional, or national history (Criteria A and B). It is a very small bridge using common materials and construction methods, and solves a basic engineering problem. It does not display the hallmarks of being the work of a master (Criterion C). It is unlikely to yield information important in history or prehistory (Criterion D). Therefore, the resource is recommended not eligible for listing in the National Register of Historic Places (NRHP).

A segment of the Big Valley Canal was also identified within the APE. A segment outside of the Study Area was determined eligible for listing in the NRHP by the THC in 2000 and, after consultation with THC, the entire linear resource is considered eligible. The canal likely dates to c. 1906, when the Big Valley Irrigation Company was established to construct an irrigation system in the Lower Pecos River Basin. The project as proposed will have no adverse effect on this historic property.

In accordance with 13 TAC 26.12, no further cultural resources investigations are recommended for the presently-defined project area, and the proposed rebuild of the 69 kV transmission line from the Worsham substation to the Wickett substation may proceed. However, in the event that any archaeological deposits are encountered during construction, work should cease, and the THC should be notified.

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