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Archaeological Survey Of The Sister Grove RWRRF Collin County, Texas

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ARCHAEOLOGICAL SURVEY OF THE

SISTER GROVE RWRRF

COLLIN COUNTY, TEXAS

Texas Antiquities Permit Number 9182

SWF-2020-00035

Kathryn A. Cross, MA
Principal Investigator

and

Kathryn M. Crater Gershtein, MA

With contributions from:
Delfin Weis, MSc, MA, RPA (SWCA) and John Lowe, MA (SWCA)

Submitted to:

CDM SMITH, INC.
12400 Coit Road, Suite 400
Dallas, Texas 75251

Submitted by:

AR CONSULTANTS, INC.
805 Business Parkway
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Cultural Resources Report 2020-02
October 13, 2020

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ABSTRACT

The North Texas Municipal Water District is planning to build the Sister Grove Regional Water Resource Recovery Facility on a 932-acre property in New Hope, Collin County, Texas. In total, 372 acres of this property will be impacted. In a cultural resource evaluation dated September 5, 2019, AR Consultants, Inc. recommended the survey of four areas with high potential for encountering prehistoric and historic archaeology, totaling 105 acres. CDM Smith, Inc. contracted with AR Consultants, Inc. to perform the survey under the authority of Texas Antiquities Permit 9182. Fieldwork occurred on December 4-5, 2019 and January 7, 2020. An addendum to Permit 9182 for the survey of a 4.2-mile-long, 96-inch-diameter pipeline that will connect the water facility to an 18.2-acre outfall property on Stiff Creek, surveyed by AR Consultants, Inc. in 2018, was approved in August 2020. On behalf of AR Consultants, Inc., SWCA Environmental Consultants surveyed 3.8 miles of the 120-foot-wide pipeline corridor between September 9-12, 2020. Based on background research, AR Consultants, Inc. predicted that there was potential for encountering prehistoric and historic cultural resources across the survey area. Seven historic archaeological sites (41COL328-330 and 41COL336-339) and four historic isolated objects were recorded during the survey. The sites include large, repeatedly plowed surficial scatters, many of which correspond with mapped structures, and a trash dump. Only five of the 191 shovel tests yielded artifacts. These sites retain little integrity and are not associated with significant persons, events, or architectural styles. The sites do not have the potential to yield new information about past lifeways or environments. Therefore, these sites are recommended as ineligible for listing on the National Register of Historic Places or designation as State Antiquities Landmarks. Given the results of this survey, AR Consultants, Inc. recommends that further cultural resource investigations are unnecessary for this survey area and request that the Texas Historical Commission and the U.S. Army Corps of Engineers concur with these recommendations. Records associated with this project will be curated with the Center for Archaeological Studies at Texas State University, San Marcos.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The North Texas Municipal Water District (NTMWD) is planning to build the Sister Grove Regional Water Resource Recovery Facility (SGRWRRF) on a 932-acre property in New Hope, Collin County, Texas. In total, 370 acres of this property will be impacted by construction. In a cultural resource evaluation dated September 5, 2019, AR Consultants, Inc. (ARC) recommended the survey of four areas, totaling approximately 105 acres, with higher potential for encountering prehistoric and historic archaeology (Figure 1). This survey area is situated at the edge of the rolling uplands along drainages that eventually reach the East Fork of the Trinity River. Two of the proposed high potential areas (HPAs) are located north of High Ridge Drive on the east side of Trail Drive, one northeast of Meadows Drive on FM 1827, and one north of the intersection of Broken Arrow Lane and CR 989. CDM Smith, Inc. is handling the environmental permitting for the project and contracted with ARC to perform the cultural resource survey. Fieldwork, which involved pedestrian survey and shovel testing, was performed by Kathryn Cross, Annie Carter, Nathan Palmer, Dan Simpson, Valerie Vendrick, and Dawson Foster on December 4-5, 2019 and January 7, 2020.

In July 2020, the NTMWD began coordination with the US Army Corps of Engineers (USACE) and proposed a 4.2-mile-long, 96-inch-diameter pipeline to connect the water facility to an 18.2-acre outfall property also surveyed by ARC (Fisher 2018). The proposed pipeline begins at the Parshall Flume structure in the southern portion of the SGRWRRF property. From there the pipeline runs east and northeast for approximately 1.2 miles and across an intermittent tributary of Big Branch before reaching the SGRWRRF property boundary near E. New Hope Road. The pipeline continues east and southeast for approximately 2.14 miles, crossing Ticky Creek, until it reaches FM 75. From FM 75 the pipeline continues east and southeast for approximately 0.93 mile until reaching the outflow property at Stiff Creek. The pipeline corridor is 120-feet-wide and covers approximately 55.3 acres (see Figure 1). ARC submitted a letter to the USACE and Texas Historical Commission (THC) on July 7, 2020 summarizing their previous work at the SGRWRRF and 18.2-acre properties (Davis 2020; Appendix A). The USACE requested that the cultural resources work be completed before the Section 106 process could be closed and the THC concurred with the letter and stated that ARC's previous work fulfilled Section 106 (Appendix B). Thus, ARC's efforts were focused on the 3.8 miles of the 4.2-mile-long pipeline that had not been investigated during the SGRWRRF survey. On behalf of ARC, SWCA Environmental Consultants (SWCA) conducted an intensive cultural resources survey of the pipeline corridor between September 9-12, 2020. The crew included Delise Torres-Ortiz and Delfin Weis. The fieldwork consisted of an intensive pedestrian survey with shovel testing over approximately 1.9 miles of the survey area slated for open cut trenching and pedestrian survey with limited shovel testing (e.g., creek crossings, mapped structure locations, surficial artifacts) on 1.71 miles slated for tunneling. Approximately 0.13 miles of the pipeline route was not surveyed due to landowner access denial; this parcel is in a tunneling area.

A cultural resource investigation was required because the NTMWD is a state entity. The survey was performed in compliance with the Antiquities Code of Texas (ACT) under the authority of Texas Antiquities Permit (TAP) 9182. An addendum to TAP 9182 for the pipeline survey was approved by the THC in July 2020. The purpose of this survey was to locate and identify prehistoric and historic cultural resources within the survey area, establish vertical and horizontal

site boundaries as appropriate with regard to the survey area, and evaluate the significance and eligibility of any site recorded within the property for designation as a State Antiquities Landmark (SAL) or for listing on the National Register of Historic Places (NRHP). The investigations were conducted in accordance with the standards and guidelines set forth by Section 106 of the NHPA and THC (2014) and Council of Texas Archeologists (CTA 2020) standards. Relevant state and federal legislation includes the Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191), National Historic Preservation Act of 1966, as amended (PL-96-515), the National Environmental Policy Act of 1969 (PL-90-190), the Clean Water Act, as amended (PL-92-500), the Rivers and Harbors Act of 1899, the Archeological and Historical Preservation Act of 1974, as amended (PL-93-291), Executive Order No. 11593 "Protection and Enhancement of the Cultural Environment," and Protection of Historic Properties (36 CFR 800). Investigations were conducted as part of NTMWD's compliance with application requirements for a USACE Fort Worth District, Section 404 permit in accordance with 33 Code of Federal Regulations (CFR) 325, Appendix C (Processing Department of Army Permits: Procedures for the Protection of Historic Properties; Final Rule 1990; with current Interim Guidance Document dated April 25, 2005 and January 31, 2007), Section 106 of the National Historic Preservation Act (NHPA) (54 United States Code [USC] 300101 et seq.) and its implementing regulations (36 CFR 800).

This report was written in accordance with the CTA (2018) guidelines and prepared for review by the Archeology Division of the THC and the USACE Fort Worth District. The following report presents a brief description of the natural setting of the project area, followed by a discussion of the culture history and previous investigations within the survey area. A chapter on the research design and methodology employed in the investigation is then followed by the results of the field investigations. The report concludes with recommendations, the references cited, and an appendix.

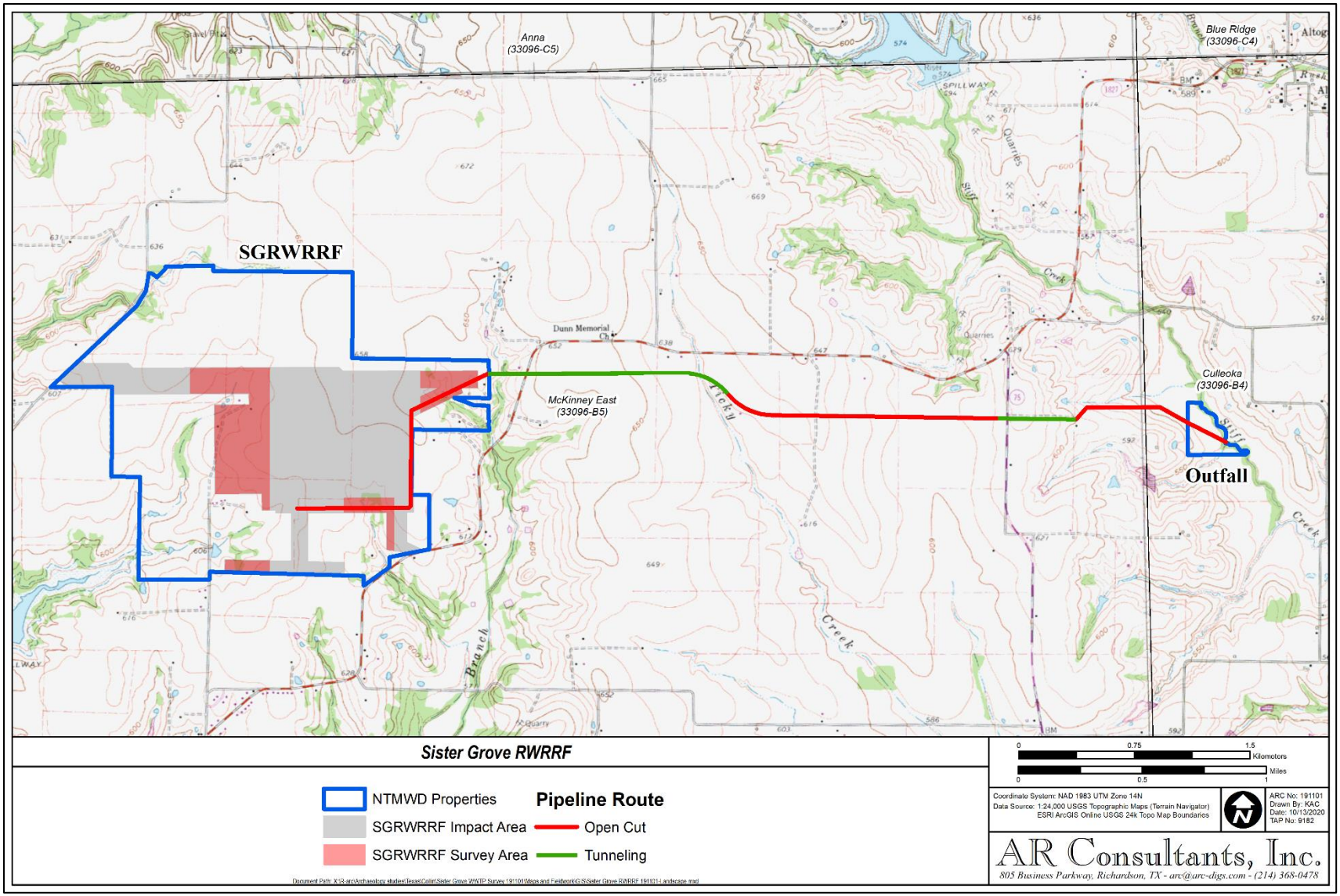

Figure 1. The SGRWRRF property, construction or impact area, HPAs, and pipeline route shown on the photorevised 1969 7.5' McKinney East and Culleoka USGS topographic maps.

Administrative Information:

ARC Project Number:	191101
Sponsor:	North Texas Municipal Water District
Review Agency:	Archeology Division of the Texas Historical Commission and Fort Worth District of the U.S. Army Corps of Engineers
Principal Investigator:	Kathryn A. Cross, MA
Field Date:	December 4-5, 2019
Field Crew:	Annie Carter, Kathryn Cross, Nathan Palmer, Dan Simpson, Valerie Vendrick, and Dawson Foster (ARC); Delise Torres-Ortiz and Deflin Weis (SWCA)
Field Person Days:	14
Acres Surveyed:	approximately 160
Sites Investigated:	7
Historic:	41COL328, 41COL329, 41COL330, 41COL336, 41COL337, 41COL338, 41COL339
Prehistoric:	None
Curation:	Center for Archaeological Studies at Texas State University in San Marcos, TX

NATURAL ENVIRONMENT

The SGRWRRF survey area is situated within the Texas Blackland Prairies of the Northern Blackland Prairie ecoregion in central Collin County, Texas. This region is composed of rolling to nearly level plains that formed over Upper Cretaceous marl, chalk, limestone, and shale (Griffith et al. 2007:61-62; Wermund 2020). Mesquite (*Prosopis spp.*), bois d'arc (*Maclura pomifera*), and eastern red cedar (*Juniperus virginiana*) are often found along fence lines or sloping terrain. The landscape is scattered with oak (*Quercus spp.*), pecan (*Carya illinoinensis*), and cedar elm (*Ulmus crassifolia*) (TPWD 2020). Within the ecoregion, little bluestem (*Schizachyrium scoparium*) is the dominant grass with eastern gamagrass (*Tripsacum dactyloides*) and Indiangrass (*Sorghastrum nutans*) commonly encountered. These grasses grow on the region's deep, fertile, "black waxy" soil, which gives the prairie its name. Little remains of the original prairie as most of the ecoregion is currently under intensive agricultural production.

The rolling uplands of the upper East Fork of the Trinity River Basin are dissected by first order, intermittent drainages. Most are found in the western half of Collin County, where the underlying geology is Austin Chalk (Brune 1981:122). Within the survey area are several drainages. The intermittent drainage in the largest HPA drains into the East Fork of the Trinity River, approximately 1.5 miles to the southwest, while the drainages along the eastern edge of the SGRWRRF property are intermittent tributaries of Big Branch Creek. The pipeline route crosses Ticky Creek and ends at Stiff Creek. Ticky Creek, which is mapped as intermittent, eventually drains into Lavon Lake south of the survey area. Stiff Creek flows into Sister Grove Creek approximately one mile to the southeast. Sister Grove Creek comes to a confluence with Pilot Grove Creek just before reaching Lavon Lake.

The underlying geology in the western portion of the project area consists of Late Cretaceous Austin Chalk Formation (USGS 2020). The Austin Chalk formation consists of limestone interbedded with calcareous clays and is overlain by Holocene-aged alluvial deposits that are approximately 10 meters (m), or 33 feet, thick major drainages The underlying geology in the eastern portion of the project area consists of Late Cretaceous Ozan Formation (USGS 2020). The Ozan formation consists of calcareous shale and is similarly overlain by Holocene-aged alluvial deposits that are approximately 10 m (33 feet) thick along Stiff Creek and other major drainages.

Several soil series and complexes are mapped across the SGRWRRF survey area, including Austin silty clay with 1-3 percent slopes, eroded Eddy gravelly clay loam with 1-3 percent slopes, eroded Heiden clay with 3-5 and 5-8 percent slopes, Houston black clay with 0-1 and 1-3 percent slopes, Stephen silty clay with 1-4 percent slopes, Stephen-Eddy complex with 2-5 percent slopes, and Wilson clay loam with 1-3 percent slopes (NRCS 2020). Houston black clay dominates the survey area, followed by Austin silty clay. Houston black series soils typically have a 20-centimeter (cm)-thick very dark gray clay A horizon underlain by very dark gray clay subsoil. Austin series soils include a 41-cm-thick brown silty clay Ap/A horizon underlain by brown silty clay subsoil. Eddy series soils consist of 25 cm of light brownish gray very to extremely gravelly clay loam (A horizon) underlain by limestone. Heiden series soils typically have a 46-cm-thick dark grayish brown clay Ap/A horizon underlain by dark grayish brown clay subsoil. Stephen series soils consist of a 20-cm-thick brown silty clay Ap horizon underlain by a 10-cm-thick dark brown silty clay with loose and platy chalk fragments. Wilson series soils consist of a 13-cm-thick very dark

gray silt loam A horizon underlain by very dark gray, compact, silty clay subsoil. Occasionally and frequently flooded Frio clay loams are found in and around the 18.2-acre outfall property surveyed (NRCS 2020). Frio series soils consists of a 102-cm-thick dark grayish brown silty clay to silty clay loam A horizon underlain by grayish brown silty clay.

Mammals common within the ecoregion include white-tailed deer (*Odocoileus virginianus*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), opossum (*Didelphis virginiana*), eastern mole (*Scalopus aquaticus*), eastern pipistrellus bat (*Pipistrellus subflavus*), red bat (*Lasiurus carolinensis*), fox squirrel (*Sciurus niger*), gray squirrel (*Sciurus carolinensis*), southern flying squirrel (*Glaucomys volans*), gopher (*Geomys breviceps*), fulvous harvest mouse (*Reithrodontomys fulvescens),* white-footed mouse (*Peromyscus leucopus*), marsh rice rat (*Oryzomys palustris*), cotton rat (*Sigmodon hispidus*), packrat (*Neotoma floridana*), eastern cottontail (*Sylvilagus floridanus*), and swamp rabbit (*Sylvilagus aquaticus*). Historically, red wolf (*Canis rufus*), bison (*Bison bison*), and black bear (*Ursus americanus*) ranged into or near the project area (Burt and Grossenheider 1976; Kricher and Morrison 1998; Sutton and Sutton 1985). Bison constituted one of the major game resources throughout prehistory. However, this resource was intermittently absent from the region (Dillehay 1974). Possibly more than any other resource except cultigens in later prehistory, bison played a profound role in nearly all aspects of some prehistoric society, including technological organization, mobility, population size, political organization, and, to an extent, all others. Common land turtles include the eastern box turtle (*Terrapene Carolina*) and western box turtle (*Terrapene ornate*), while the snapping turtle (*Chelydra serpentina*), river cooter (*Chrysemys concinna*), and diamondback terrapin (*Malaclemys terrapin*) comprise common water turtles. Common lizards include the green anole (*Anolis carolinensis*), eastern fence lizard (*Sceloporus undulates*), broad-headed skink (*Eumeces laticeps*), six-lined racerunner (*Cnemidophorus sexlineatus*), and eastern grass lizard *(Ophisaurus ventralis*). Other reptiles include the racer (*Coluber constrictor*), rat snake (*Elaphe obsoleta*), timber rattlesnake (*Crotalus horridus*), common kingsnake (*Lampropeltis getula*), woodhouse toad (*Bufo woodhousii*), bullfrog (*Rana catesbiana*), northern leopard frog (*Rana pipiens*), eastern box turtle (*Terrapene carolina*), and the Gulf Coast toad (*Bufo valliceps*) (Blair 1950; Brown 1985; Conant and Collins 1998; Sutton and Sutton 1985). Other animals and birds are also present in considerable numbers and diversity.

In addition to the abundant flora and fauna, prehistoric peoples may have been attracted to the area by cobble fields, such as those described by Banks (1990:56-57) and Trask (2005), specifically on high upland ridges. In some areas of nearby Dallas and Tarrant counties, erosion in these settings has deflated and preserved Pliocene gravels on ridge tops (Byrd 1971; McGregor 1995; Menzer and Slaughter 1971; Thomas 1972:23-24). The deposits contain quartzite, chert, and silicified wood pebbles and cobbles. Though no cobble fields have been recorded during cultural resources surveys in northeast Dallas County or adjacent parts of Collin and Rockwall counties, this lack of knowledge may be due to the limited nature of survey in the area. Therefore, it is possible that such cobble fields can be found in the survey area.

CULTURAL HISTORY

The history and prehistory of North Central Texas, in which Collin County lies, is summarized in several reports prepared by the University of North Texas (Brown and Lebo 1991; Ferring and Yates 1998; Lebo and Brown 1990). The most commonly used chronology for the region, which is presented below, was established by Prikryl (1990). It divides the Late Prehistoric into the Late Prehistoric I (AD 750 to 1250) and Late Prehistoric II (AD 1250 to 1700). However, the Late Prehistoric chronology of the East Fork has been refined by Crook and Hughston (2015) and is reflected in the following discussion.

Table 1. Cultural Chronology.

Period	Dates
Historic European	AD 1850 to Present
Historic Native American	AD 1700 to AD 1850
Late Prehistoric II	AD 1250 to AD 1700
Late Prehistoric I	AD 750 to AD 1250
Late Archaic	2000 BC to AD 750
Middle Archaic	4000 to 2000 BC
Early Archaic	6000 to 4000 BC
Paleoindian	ca. 11,000 BC to 6000 BC

Prehistoric Native American settlement in North Central Texas began at least 10,000 years ago as attested to by the presence of distinctively shaped dart points (Crook and Harris 1957) at the Lewisville site and the Aubrey Clovis site (Ferring 2001) in neighboring Denton County. Moreover, artifact collectors report the presence of Clovis, Folsom, Scottsbluff, and other Paleoindian points from the surface of sites in the region. As of 2007, six Clovis points have been reported from nearby Dallas County, though none have been recorded in Collin County (Bever and Meltzer 2007:67-70). The presence of exotic, non-local lithic resources in assemblages from this time indicates that these early people traveled to obtain higher quality lithic materials or were involved in a system of raw material trading. These early people hunted now extinct large game, and probably also foraged off the land.

The subsequent period, the Archaic, lasted from 6000 BC to as late as AD 700. Archaic peoples lived throughout the area, with particular focus along the major and minor stream valleys where they were able to hunt and gather available food resources. Smaller lithic scatters have been recorded in upland areas throughout the county. These sites appear to be Archaic in age, though few have been thoroughly studied. Dart points, grinding stones, fire-cracked rock, and scrapers are common artifacts found in Archaic sites. The earliest Archaic peoples continued using exotic cherts for dart points, but, as time passed, there was a subtle shift toward the use of locally available stone for chipped stone tools (Prikryl 1990:47-65). These materials are described as Uvalde Gravels (Menzer and Slaughter 1971).

Crook and Hughston (2015) propose a Woodland Phase (AD 200-800) for the East Fork that contrasts with the Late Archaic occupations found along the Elm Fork and Trinity River. Sites along the East Fork, they argue, more closely resemble Woodland period sites from East Texas and the Red River and may represent a migration into the area sometime after AD 200 (Cliff 1998;

Schambach 2002). A key characteristic of these sites is the predominance of local quartzite in lithic artifact assemblages as opposed to chert (Crook and Hughston 2015).

Pottery was introduced to East Texas as early as 500 BC, but was not produced locally until after AD 700, signaling the start of the Late Prehistoric I period, and did not become common until ca. AD 1200-1300 around the Late Prehistoric II period (Perttula and Miller 2013). Crook and Hughston (2015) also refer to the Late Prehistoric I as the Wylie Phase, which they date at AD 800-1250. The Wylie Phase concept originated with Stephenson (1952:305-312), who tried to create a chronological sequence for the Upper Trinity River Basin when he defined the Late Prehistoric Wylie Focus. Stephenson (1952) dated the Wylie Focus from AD 1300 to 1600, a range that would now be considered the Late Prehistoric II period, based on shell and clay-grit tempered pottery that he believed was Caddo in origin. The Wylie Focus was characterized by large circular pits, an absence of locally manufactured pottery, flexed burials (both single and multiple and in poorly defined burial pits), maize agriculture, and villages. Bruseth and Martin (1987:280) argued that the concept should be discarded when they dated pits at the Bird Point Island and the Adams Ranch sites to the Late Archaic period. Crook and Hughston (2015) believe that Stephenson (1952) may have lumped characteristics of the Late Prehistoric I and Late Prehistoric II together. While "Wylie Focus" is no longer used, Crook and Hughston (2015:160) propose the use of "Wylie Phase" because of the similarities between the cultural characteristics of Late Prehistoric I East Fork sites and some of the characteristics described by Stephenson in 1952.

In addition to pottery, arrowheads appear around this time, signaling the bow and arrow's introduction to the hunting toolkit. Bone tools, such as beamers, flaking tools, awls, needles, and fishhooks, are common at East Fork sites, including Sister Grove Creek (Crook and Hughston 2015: Figure 75). Houses were found at several sites along the East Fork, and hearth features from several rim-and-pit structures, including along Sister Grove Creek, were dated to the Late Prehistoric I period (Crook and Houghton 2015). Fritz (1993) mentions the use of corn for food in North Central Texas during this time, and Todd (1999) suggests that the presence of mussel shell hoes in North Central Texas indicates the practice of some form of farming. Bison scapula hoes from the Upper Farmersville site may also provide evidence for farming, though they were discovered in burial contexts and may have been considered prestige goods (Crook and Hughston 2015). Prikryl and Perttula (1995:189-190) discuss the appearance of ceramics with similarities to Caddo pottery in North Central Texas ca. AD 1000 to 1300. This similarity is not well understood and may be the result of trade with Caddo to the east, adoption of Caddo ceramic manufacture, Caddo settlement in North Central Texas, or some combination of these possibilities.

In the Late Prehistoric II period, the climate may have been drier. Generally, the culture is characterized by arrow points and ceramics. There is also a marked Plains influence on lithic tool assemblages found in North Central Texas dating to this period (Prikryl 1990:80). Plains arrow point types, such as Fresno, Perdiz, Washita, and Harrell, are common in these assemblages (Crook and Hughston 2015). Also during this time, more bison may have been consumed than in the Late Prehistoric I due to an increase in their abundance in the Southern Great Plains of Texas (Lohse et al. 2014). The presence of bison-scapula hoes, especially in northern North Central Texas, suggests an increase in horticulture. This is corroborated by the presence of sites along sandy terraces instead of floodplain areas where Late Prehistoric I sites are found (Prikryl 1990). Radiocarbon dates from rim-and-pit structures show that pits were still in use during this period (Crook and

Hughston 2015). The presence of exotic materials such as Caddo and Puebloan ceramics, lithic material from the west and Ouachita Mountains to the east, and other items demonstrate that inhabitants of this area engaged in regional exchange (Crook and Hughston 2015).

At the end of the Late Prehistoric, there appears to have been a general abandonment of the North Central Texas area (Skinner 1988). Along the Red River in Montague and Cooke Counties and across the Red River in Oklahoma, there is both archaeological and ethnographic evidence of historic Taovaya, Wichita, and Yscani Indians (Bell et al. 1967; John 1992:204). Since the Spanish could not subdue these tribes, they made them their allies with promises of help against the Osages. There is evidence found on the Trinity River in nearby Dallas County of a possible visit to North Central Texas by Spanish explorer Hernando de Soto (Bruseth 1992). Artifacts found consist of a chain-mail gauntlet, a halberd, and a spur. Current research, however, seems to indicate that Anglo settlers were the first non-Indians to settle the region.

Beginning in the 1830s and continuing into the 1840s, Native American inhabitants played a significant role in the history of the region. Garrett (1972:24) states "Indian hostilities almost depopulated North Texas [of Anglo dwellers] after 1839. It dwindled to less than half." Hostilities continued until the Treaty of 1843 was signed by the State of Texas and ten Native American tribes. This treaty provided the impetus for Anglo settlement of several North Central Texas counties.

The Anglo-American history of the Upper Trinity River Basin has been divided into the Frontier, Initial Cash Crop, Tenant Farming, and Agribusiness periods by Richner and Lee (1976:125-133). The Frontier period lasted from about 1820 to 1850 and was followed by the Initial Cash Crop period which lasted until 1870. Tenant Farming began at 1870 and continued to about 1940. Agribusiness began after the Great Depression and continues to this date. In addition to agribusiness, numerous wartime industries were established in North Central Texas during World War II (McElhaney and Hazel 2015). These industries additionally helped to bolster a diversified and prosperous post-war economy, which had the added effect of increasing the regional population. Today North Central Texas continues to be a growing area.

The town of New Hope, Texas was established in the early 1850s (Minor 2010a). The town served as a rural school and church community for farmers and eventually became a home for those who commuted to McKinney, approximately three miles to the west. Though McKinney has continued to grow, the population of New Hope has remained low.

Previous Investigations

The Texas Archeological Sites Atlas (TASA) was reviewed to determine whether any previous cultural resource surveys, recorded archaeological sites, National Register of Historic Places (NRHP) properties and districts, State Antiquities Landmarks (SAL), historical markers, or cemeteries fall within one mile of the SGRWRRF survey area. None of these cultural resources overlap with the survey area, though several previous surveys, recorded archaeological sites, and a cemetery are located within one mile.

Four archaeological surveys and two archaeological sites have been recorded within one mile of the survey area. In 1974 the Archeology Research Program at Southern Methodist University

conducted a block survey approximately 0.9 miles north of the survey area. The survey occurred in anticipation of a Soil Conservation Service floodwater control dam that would be constructed across an unnamed tributary in the upper Clemons Creek watershed. Two undated prehistoric lithic workshops were recorded outside the dam construction area. No further work was carried out at either archaeological site (Hughston and Lynott 1974). Geo-Marine, Inc. (GMI) performed a survey in 1999 for a proposed City of Irving pipeline (Owens and Gibson 1999). The pipeline route parallels the SGRWRRF property and pipeline, approximately 0.1 miles to the north. No archaeological sites were recorded. In 2018 AmaTerra Environmental, Inc. conducted a survey of the Leonard to McKinney Water Pipeline for NTMWD, recording the two archaeological sites located within a mile of the project area (TASA 2020). Site 41COL307 is an ephemeral mid-20th century artifact scatter consisting of a whiteware sherd, three machine-made brick fragments and a porcelain sherd. It was considered ineligible for listing on the NRHP or designation as a SAL. Site 41COL298 was recorded as a historic site. It was considered ineligible for listing in the NRHP and designation as a SAL. No other information was available on TASA (2020). In 2018, ARC conducted an intensive pedestrian survey of the 18.2-acre outfall property along Stiff Creek under Texas Antiquities Permit No. 8475 (Fisher 2018). The survey involved shovel testing and backhoe trenching throughout the entire tract. No cultural resources were encountered during this survey, which was conducted using older survey standards (Fisher 2018). The eastern end of the current project overlaps the outfall property. This area was included in the current project, so that it could be investigated to current survey standards.

To gain further insight into the archaeology of the region, other large-scale surveys were reviewed. In 2000, GMI surveyed a proposed 1,460-acre landfill site (Clow and Hunt 2000). The pedestrian survey yielded nine historic sites (41COL122-41COL130) and four prehistoric sites (41COL131-41COL134). The historic sites were all historic/modern farmsteads located along, and somewhat set back from area roadways. The sites included standing and collapsed structures such as dwellings, barns, or cellars, subsurface features (i.e., wells and cisterns), and scatters of historic ceramics, glass, and various other artifacts. The prehistoric sites were interpreted as lithic procurement or workshop area. These sites were generally located on the surfaces of eroding terraces sloping down toward Brinlee Branch, a tributary of Sister Grove Creek. The sites included tested cobbles, debitage, and the occasional bifacial or flake tool. None of the sites were recommended as eligible for listing on the NRHP or designation as a SAL (Clow and Hunt 2000).

Another large-scale survey was associated with a road-widening project along FM 545, which was performed by Prewitt and Associates, Inc. in 2008 (McWilliams 2008). Only one site (41COL194), a historic spring house, was recorded during the survey. Though areas along Pilot Grove and Sister Grove creeks were examined as a part of this survey, both areas with high prehistoric archaeological potential, no prehistoric resources were encountered (McWilliams 2008).

In 2012, Integrated Environmental Solutions, LLC performed a large-scale survey for NTMWD (Byers and Eberhart 2012). A block area of 187 acres on the west side of the NTMWD Landfill facilities was surveyed. Three historic archaeological sites (41COL117, 41COL118, and 41COL220) were recorded. All three were farmsteads with cisterns/wells, extensive artifact scatters, and partially or completely collapsed structures. These sites were not recommended as eligible for listing on the NRHP or designation as SALs (Byers and Eberhart 2012).

Finally, previous surveys conducted by ARC in this area of North Central Texas demonstrate that there is little potential for finding prehistoric sites on the upland divides of the Blackland Prairie (Davis et al. 2012; Davis et al. 2016). Archaeologists have found that sites are generally confined to the floodplains or terraces of major drainages such as the East Fork of the Trinity River and Sister Grove Creek. Surveys in the uplands have found few prehistoric sites, which has been attributed to a lack of reliable water sources because upland drainages typically only carry rainwater from the uplands to more significant drainages. Thus, any prehistoric sites are expected near the edges of the uplands near major drainages.

Other cultural resources include the Woodlawn Cemetery, located 0.2 miles west of the survey area. Woodlawn Cemetery is all that remains of the Old Rock Rest Church and School. Most of the headstones date between 1870 and 1900 (TASA 2020).

In addition to TASA (2019), the TxDOT Hybrid Potential Archeological Liability Map (HPALM) for the Dallas District was reviewed (Abbott and Pletka 2014). The HPALM is the result of a GIS-based, geoarchaeological predictive model of landscape conditions throughout the region that maps the apparent potential for those landscapes to preserve prehistoric archaeological sites (Abbott 2011:176-178). The HPALM shows that much of the broader survey area has low potential at all depths. However, the areas around the drainages are mapped with moderate to high potential for containing prehistoric archaeology at shallow depths and rarely in deeper contexts. The 18.2-acre outfall property along Stiff Creek is shown as an area with high deep potential. This area is also mapped as having Frio series soils. Both shovel testing and trenching occurred during ARC's survey of this property (Fisher 2018).

Historic Map & Aerial Review

Several historic maps and aerial images were reviewed to determine the potential for encountering historic sites in the survey area. As part of this review, the 1850, 1862, and 1872 General Land Office maps (GLOs), 1930 Collin County Soil map, 1936 Collin County General Highway Map (GHM), and 1960, 1968, and 1973 McKinney East and Culleoka 1:24,000 USGS topographic maps were reviewed. The 1930 soil map shows one structure along the eastern edge of the largest HPA and several structures along the proposed pipeline route (Figure 2). Several structures are also shown in the vicinity of the survey area on the 1936 Collin County GHM, though it is difficult to know if these are the same structures because of the low resolution. The higher resolution topographic maps show structures in the immediate vicinity of most of the previously mapped structures. Two of these structure locations fall within the boundary of the largest survey area, directly southwest and northeast of the structure visible on the 1930 Collin County Soils Map. One of these structures may be the same as the one shown on the 1930 soil map. Several others can be seen just outside the survey areas (see Figure 1).

Aerial imagery dating from 1952 to present was also reviewed (Google Earth 2020; NETR 2020). The images show that much of the area has been used for farming. Only areas near drainages remained forested. Two of the structures mapped at the location of the largest HPA can be seen on imagery from 1952 (Figure 3). These appear to match the structure locations in the McKinney East topographic maps. More recent imagery reveals that many of the structures observed on these maps and in aerial images have either been removed, collapsed, or are now obscured by tree cover. Several may still be standing.

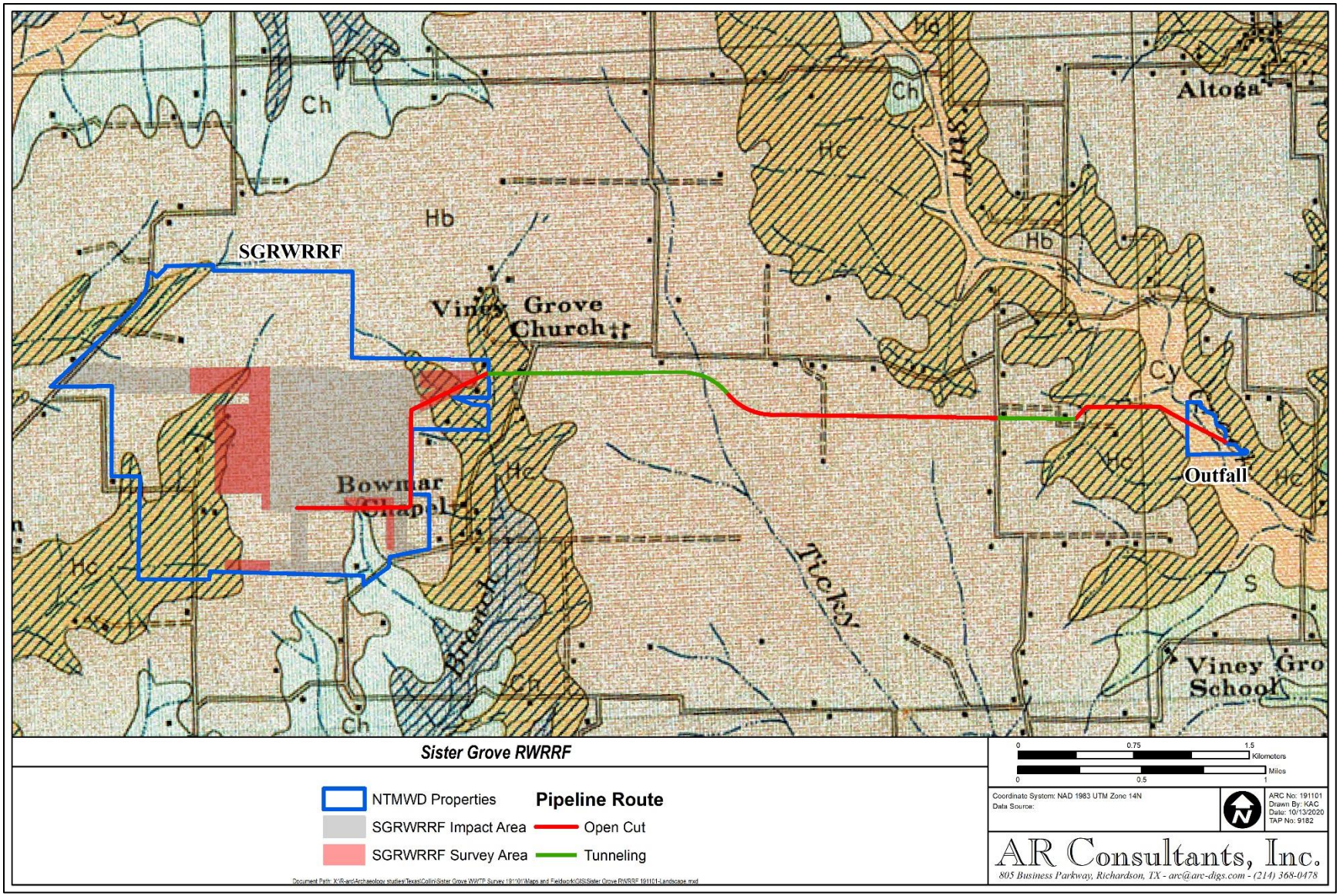

Figure 2. The SGRWRRF survey area shown on the 1930 Collin County Soils Map. Note the structures mapped in and near the HPAs and pipeline route.

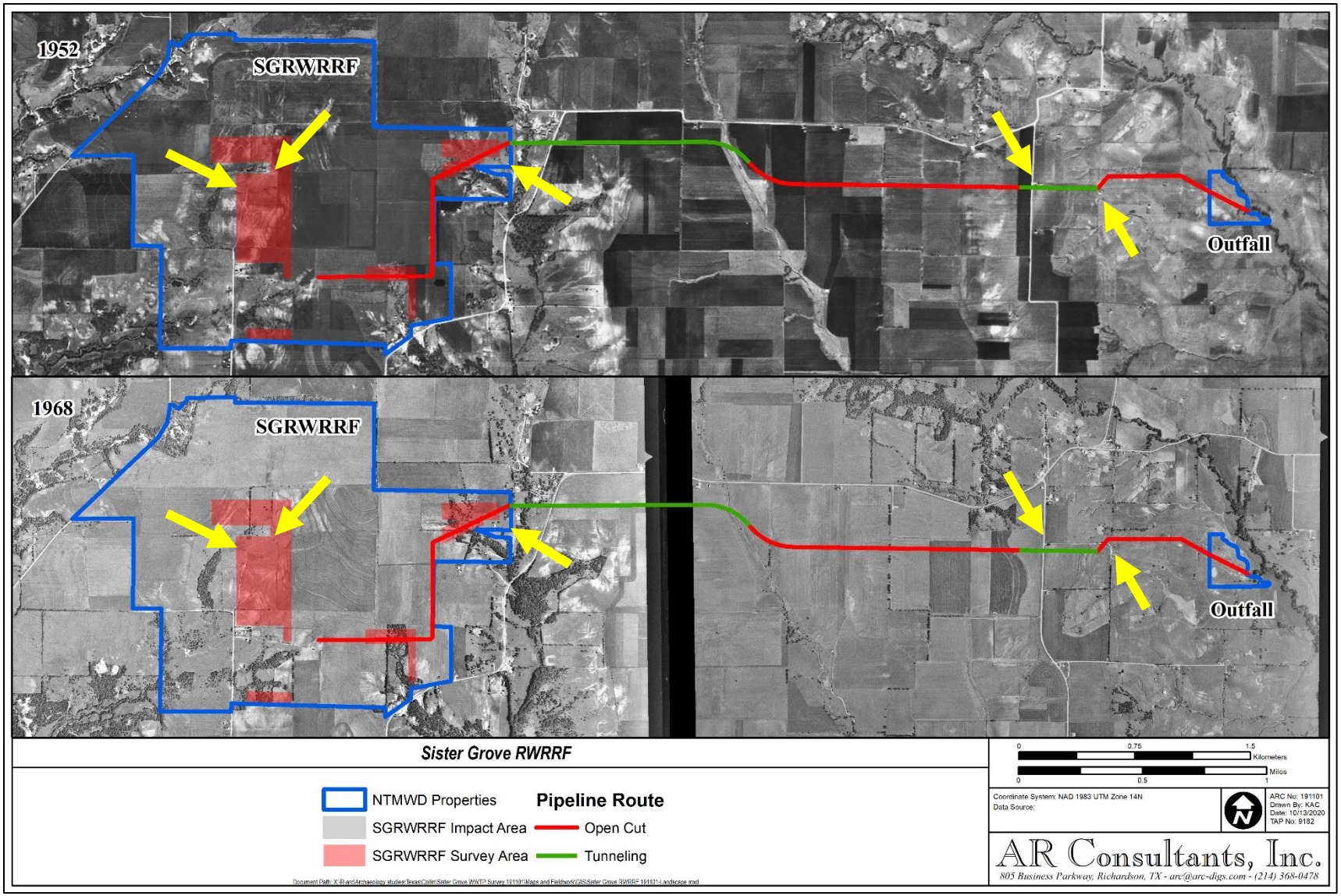

Figure 3. Aerial imagery from 1952 and 1968 showing the structures near the SGRWRRF HPAs and pipeline route. The yellow arrows mark structure locations.

RESEARCH DESIGN AND METHODOLOGY

Research Design

Based on the research conducted prior to survey, two hypotheses were developed. First, it was hypothesized that the potential for encountering intact prehistoric archaeological sites is low. Previous investigations by ARC demonstrate that prehistoric sites are more likely to be found in the floodplains and terraces of major terraces along the East Fork and Sister Grove Creek than on the upland divides of the Blackland Prairie (Davis et al. 2012; Davis et al. 2016). The HPALM shows that there is higher potential for the preservation of deeply buried prehistoric sites in the Frio series soils along Stiff Creek (Abbott and Pletka 2014). When ARC surveyed this area via shovel testing and trenching, no sites were observed (Fisher 2018). The HPALM shows that there is some potential for sites to be preserved along other drainages in the survey area, but these drainages are generally small and intermittent and may not have been conducive to long-term settlement by hunter-gatherers. In particular, the topographic low areas around these drainages would have lacked adequate shelter from flooding. Despite the lack of reliable water, prehistoric peoples may have been drawn to the upland by the cobble fields, if present in the area. Any prehistoric sites that are present in the survey area would likely be found at the edges of the uplands near major drainages and resemble the surficial lithic scatters recorded in the surrounding area.

The second hypothesis stated that there was high potential for encountering historic resources in the survey area. At least two structures were identified in the largest survey area during the historic map and aerial imagery review. Several other structures were observed just outside the survey area. In addition, historic trash scatters could be present along roadways and in the drainages.

Methodology

Intensive pedestrian survey and shovel testing were performed in accordance with standards set forth by the THC. The HPAs on the SGRWRRF property were surveyed before the most recent guidelines were passed and, therefore, followed the older standards (THC 2014). Pedestrian survey was performed via transects spaced at roughly 30-m intervals across the HPAs. As the ARC crew walked each transect, they recorded observations on vegetation, ground exposures, disturbances, soil types, geology, structures, and any artifacts or features encountered in the survey area. Exposed and plowed surfaces were carefully observed to check for the presence of archaeological materials. Photographs were taken using a GPS-equipped, digital camera.

ARC performed shovel testing at a rate of approximately one shovel test (ST) for every three acres, with a focus on drainages. STs were approximately 30 cm in diameter and excavated into subsoil. Sandy sediments were screened through ¼" mesh, while any clay was broken up into small fragments and carefully examined. The composition, texture, and color of the sediments were recorded. The Munsell Soil Color Chart (2010) was used to identify soil colors. A handheld GPS receiver was used to mark the locations of STs and other project elements.

Sites were recorded via surface survey and at least six STs in compliance with THC (2014) standards. Any STs that were positive for cultural materials were delineated with additional STs placed 10-15 m apart in cardinal directions. The ARC crew took detailed notes and photographs of sites and created plan maps. Artifacts were documented and analyzed in the field but not

collected. State of Texas Archeological Site Data Forms were completed for each site and submitted with boundary shapefiles to the Texas Archeological Research Laboratory (TARL).

On behalf of ARC, SWCA performed the pipeline survey in compliance with the new minimum standards, which went into effect on March 30, 2020 (CTA 2020). As discussed in the addendum to the scope of work, SWCA conducted a pedestrian survey augmented with shovel testing over approximately 1.9 miles of the project area in which open cut trenching is the proposed construction method and conducted pedestrian survey with limited shovel testing on approximately 1.71 miles of the project area that is proposed to be tunneled. Approximately 0.13 mile (0.21 km) of the project area was not surveyed due to landowner access denial; this parcel is in a tunneling area. The minimum survey standards for linear surveys require one transect for every 100 feet (30 m) of corridor width and 16 STs per mile with one ST placed at least every 100 feet (30 m). Thorough documentation of any exceptions (e.g., disturbance, slope, and impervious surfaces) was required. The field survey consisted of a team of SWCA archaeologists systematically walking the entire survey area and examining the ground surface and erosional profiles for cultural resources. The utilization of subsurface exploration (i.e., shovel testing) was keyed to the level of disturbance and the nature of the soils, geology, and topography. These investigations were of sufficient intensity to determine the nature, extent, and SAL and NRHP eligibility of all cultural resources located within the survey area.

SWCA archaeologists employed metric (cm and m) and English units of measurement (inches and feet) when conducting investigations within the survey area. In compliance with standard archaeological practices, STs were recorded using metric units. Prehistoric archaeological resources, such as camp sites, features, and artifacts, were also recorded using metric units, while historic resources, such as farmsteads and associated historic features, were recorded using English units.

STs measured approximately 30 cm in diameter and were excavated in arbitrary 20-cm levels to 1 m in depth unless soil characteristics or bedrock precluded reaching that depth. The matrix from each ST was screened through ¼-inch mesh, and the location of each excavation was plotted using a hand-held global positioning system (GPS) receiver. Each ST was recorded on a standardized form to document the excavations.

When encountered, all archaeological sites located within the proposed project area were observed, assessed, and recorded. Additional STs were excavated as appropriate based on field condition and in accordance with CTA (2020) standards at all sites to define horizontal and vertical boundaries. A detailed plan map of each site was produced, and locations were mapped with a GPS unit. When discovered, artifacts were documented through notes and photographs in the field and then left in place. A State of Texas Archeological Site Data Forms was completed for each site discovered during the investigations.

RESULTS

This chapter is divided into three sections. The first describes the results of ARC's general pedestrian survey of the HPAs along with the area's natural setting. This section includes discussions of three newly recorded sites. The second describes the results of SWCA's survey of the pipeline route. This section includes the discussion of an additional four sites. STs are described generally in the text and detailed in tables throughout the chapter. Conclusions derived from the survey close the chapter.

Survey Results: SGRWRRF Property HPAs

Fieldwork in the SGRWRRF property HPAs covered approximately 105 acres. Transects were walked north to south or east to west depending on the shape of the area. The environment and vegetation were relatively consistent throughout these areas. Generally, these areas encompass gently rolling to level plowed fields interspersed with several small, intermittent drainages and few significant drainages. Small to large fragments of chalk were abundant on plowed surfaces throughout. Patches of forest were present along old fence lines and drainages. The woods were generally open and consisted of oak and bois d'arc trees, greenbriar, vines, and grasses. At the time of survey, several of the small, intermittent drainages were filled with flowing water. The survey area was poorly drained and muddy. In many places, the mud was ankle deep despite the lack of significant recent rain.

During the survey, the ARC crew encountered three historic sites, two isolated objects, and two modern dumps (Figure 4). Historic artifacts and features were observed on the surface near the northwest corner of the largest HPA. Upon examination, three clusters were identified and recorded as separate historic sites (41COL328, 41COL329, and 41COL330). These sites and associated STs are discussed in detail below. The first isolated object (IO 1) was encountered south of a ST, and consists of a stockpile of commercially made bricks, lumber, and cinderblocks (Figure 5; Table 3). An examination of historic maps and aerial images reveals that there have been no structures at this location. Thus, the brick and lumber have likely been removed from an early to mid-20th century structure and stockpiled at this location. The second isolated object (IO 2), a historic extract bottle, was discovered in a ST (Figure 6). In addition to the sites and isolated objects, two modern dumps were observed. One includes an abandoned trailer and the other a trash dump with 1980s bottles and cans at the edge of a drainage (Figure 7 and Figure 8).

A total of 76 STs were excavated within the HPAs. Of the 76 STs, 37 were part of the general survey and 39 were associated with site delineations (see Figure 4). STs from the general survey typically revealed a dark gray to brown silty clay loam or silty clay underlain by similar sediments mixed with chalk fragments or impenetrable chalk (Table 2). Only one of the general STs was positive. ST34 yielded a complete colorless glass bottle (IO 2) within 10 cm below surface (cmbs; Figure 6; Table 3). The bottle resembles an extract/pharmaceutical bottle with a plain body, bead finish, and bead around the base of the neck. The base of the bottle is rectangular with rounded sides. It features an Owen's Suction Scar (ca. 1904-1950s), a Diamond-I (ca. 1915-1929) Illinois Glass Company mark, and a sideways "6" (Lockhart et al. 2005). There is a historic house approximately 50 m east of the HPA. The field crew was only able to delineate ST34 on three sides due to the proximity of ST34 to the survey area boundary and all (STs35-37) were negative.

Image omitted by author

Figure 4. General results of the Sister Grove RWRRF cultural resource survey shown on recent aerial imagery.

Table 2. General Shovel Test Descriptions.

ST#	Depth (cm)	Description	Comments/Artifacts
01	0-30	Very dark grayish brown (10YR3/2) and very dark gray (10YR3/1) disturbed clay	No artifacts.
02	0-37 37-40	Dark grayish brown (10YR4/2) silty clay with 30% chalk inclusions Platy chalk	No artifacts.
03	-	-	No dig – inundated.
04	0-30	Dark gray (10YR4/1) disturbed clay	No artifacts.
05	0-30	Very dark grayish brown (10YR3/2) and very dark gray (10YR3/1) disturbed clay	No artifacts.
06	0-24 24-45	Dark grayish brown (10YR4/2) silty clay with 50% chalk inclusions Light gray (10YR7/2) clay	No artifacts.
07	0-31 31-41	Brown (7.5YR4/2) silty clay loam with 5% chalk fragments Chalk	No artifacts.
08	0-30	Dark gray (10YR4/1) disturbed clay	No artifacts.
09	0-30	Very dark gray (10YR3/1) clay	No artifacts.
10	0-60	Dark grayish brown (10YR4/2) silty clay	No artifacts.
11	0-35 35-45	Brown (7.5YR4/2) silty clay loam with 40% chalk fragments Chalk	No artifacts.
12	0-20 20-30	Brown (10YR4/3) silty clay loam White (10YR8/1) with 20% brownish yellow (10YR6/8) and 30% plated chalk	No artifacts.
13	0-12 12-30 30+	Brown (7.5YR4/2) silty clay Dark brown (7.5YR3/3) silty clay with 15% chalk fragments Platy chalk	No artifacts.
14	0-15 15+	Light brownish gray (10YR6/2) clay loam Limestone	No artifacts.
15	0-30 30-40	Brown (7.5YR4/2) silty clay loam with 40% chalk fragments Chalk	No artifacts.
16	0-20 20-30	Dark grayish brown (10YR4/2) silty clay loam Very dark grayish brown (10YR3/2) silty clay	No artifacts.
17	0-16 16-46 46-50	Dark grayish brown (10YR4/2) silty clay Dark grayish brown (10YR4/2) silty clay with 50% chalk inclusions Platy chalk	No artifacts.
18	0-30	Dark grayish brown (10YR4/2) silty clay	No artifacts.
19	0-14 14-60	Brown (7.5YR4/2) clay Pale brown (2.5Y8/2) silty clay mottled with 15% dark grayish brown (10YR4/2) clay and 15% chalk fragments	Water at 60 cmbs. No artifacts.
20	0-30	Very dark gray (10YR3/1) clay	No artifacts.
21	0-30	Dark grayish brown (10YR4/2) clay	No artifacts.
22	0-13 13+	Dark grayish brown (10YR4/2) silty clay Limestone	No artifacts.
23	0-21 21+	Dark grayish brown (10YR4/2) silty clay Limestone	No artifacts.
24	0-28 28-45 45-60	Black (7.5YR2.5/1) silty clay Black (7.5YR2.5/1) silty clay with 40% chalk Forming chalk	No artifacts.
25	0-30	Very dark gray (10YR3/1) clay	No artifacts.

ST#	Depth (cm)	Description	Comments/Artifacts
26	0-30	Very dark gray (10YR3/1) clay	No artifacts.
27	0-30	Very dark gray (10YR3/1) clay	No artifacts.
28	0-30	Very dark gray (10YR3/1) clay	No artifacts.
29	0-15 15-40	Very dark gray (10YR3/1) silty clay Black (10YR2/1) clay with chalk	No artifacts.
30	0-33 33-44	Brown (7.5YR4/2) silty clay loam Brown (7.5YR5/3) silty clay with 20% caliche	No artifacts.
31	0-25 25-45	Brown (10YR5/3) silty clay loam Very dark grayish brown (10YR3/2) silty clay with caliche	No artifacts.
32	0-15 15-45	Very dark gray (10YR3/1) silty clay Black (10YR2/1) silty clay with 10% chalk fragments	No artifacts.
33	0-15 15-40	Very dark gray (10YR3/1) silty clay Black (10YR2/1) clay with chalk	No artifacts.
34 ***IO 2**	0-25 25-40	Brown (10YR5/3) silty clay loam Very dark grayish brown (10YR3/2) silty clay with caliche	0-10cmbs: 1 clear glass bottle.
35	0-20 20-56	Very dark gray (10YR3/1) silty clay Brown (10YR5/3) silty clay	No artifacts.
36	0-35 35-45	Very dark gray (10YR3/1) silty clay loam Black (10YR2/1) silty clay with 50% caliche	No artifacts.
37	0-25 25-35	Dark grayish brown (10YR4/2) silty clay loam Brown (10YR5/3) silty clay	No artifacts.

Figure 5. Isolated object (IO 1) consisting of stockpiled commercially made brick, lumber, and cinder blocks.

Table 3. IOs within the Sister Grove RWRRF Survey Area.

IO	Description	Coordinates
IO 2	Stockpile of commercially made bricks, lumber, and cinderblocks.	**Information omitted by author**
IO 1	Colorless glass pharmaceutical/extract bottle with a plain body, bead finish, bead around the base of the neck, and rectangular base with rounded sides. The base features an Owen's Suction Scar (ca. 1904-1950s) and a "Diamond I" (ca. 1915-1929) Illinois Glass Company maker's mark with a sideways embossed "6" to its right.	

Figure 6. The colorless glass pharmaceutical/extract bottle (IO 2) recovered from ST34. The base features a "Diamond-I" (ca. 1915-1929) Illinois Glass Company mark.

Figure 7. Modern abandoned trailer, facing west.

Figure 8. Modern dump (ca. mid-1980s) at the edge of the drainage, facing east.

41COL328

Site 41COL328 is located on a level to gently sloping agricultural field approximately 300 m north and 50 m east of the bend in Trail Drive, north of its intersection with New Hope Drive (Figure 9). A structure and road are visible near this location on historic maps and aerial imagery (see Figure 3). Based on historic maps and imagery, it is clear that the area has been plowed for decades. The only portion left relatively untouched is a small strip along an ephemeral drainage. This drainage runs north along the east side of the site and then west along the north end of the site. It eventually connects with an unnamed, intermittent tributary of the East Fork of the Trinity River. Today, approximately 75 percent of the site consists of plowed field and the remainder is wooded (Figure 10). Ground visibility nears 100 percent in the plowed field. In the woods, ground visibility is approximately 25-50 percent. A well or groundwater access line has been installed in the center of the field near the north end of the site.

The site measures approximately 100 m north-south by 45 m east-west, or 0.72 acres, and includes several features and a surface artifact scatter. A collapsed structure with a pier and beam foundation is present in the woods at the southeast corner of the site (Figure 11). Part of a brick chimney is standing along the south wall of the structure. The bricks in the chimney are plain and commercially made. Wire nails protrude from the structure's boards. A glazed concrete pipe is located 1-2 m from the northeast corner of the house (Figure 12). The pipe rises 50 cm above the ground surface and is straight-sided. Water and debris were visible inside at the level of the surrounding ground surface. The remnants of an old road were observed east of the structure. Two piles of commercially made bricks are located on either side of the entrance to the agricultural field, approximately 15 m west of the structure. The association of these bricks to the structure is unclear. Each brick pile contained at least 50 whole bricks and fragments. Most of the bricks were plain, though a few are stamped with "CHILDERS", "DALLAS", "FERRIS", and "PALMER" and several others have three holes (Figure 13). Bricks pressed with "FERRIS" coame from the Ferris Press Brick Company established in Ferris, Texas in 1901. In 1923, six brick companies merged under Ferris Brick (Hart 2010; McKnight 2016). The history of "DALLAS" press bricks is complicated. Dallas bricks were registered to Ferris Press Brick Company from 1905 through 1926. However, the Dallas Press Brick Company was established west of Mesquite, Texas in 1904. The plant near Mesquite eventually became Plant No. 7 of Ferris Brick. This plant closed in the early 1950s. Around the same time, Ferris Brick became Crown Brick (Personal communication, Jim Atkinson, 2016). The Palmer Press Brick Company was established in Palmer, Texas in 1902 (Minor 2010b). Thus, Ferris bricks likely date from 1901-1950, Dallas bricks from 1904-1950, and Palmer bricks to sometime after 1902. No information could be found on Childers bricks.

Artifacts were primarily found on the surface of the plowed field (Figure 14). Of the 13 STs placed around the site, only one was positive (Table 4). ST01 yielded a piece of wire and a clear bottle glass fragment in the top 10 cm. The surface deposit was most dense in the southern half of the agricultural field around the woods. The deposit became thinner to the north and west, with artifacts spaced roughly every 3-5 m. Most of the artifacts were fragmentary, having been churned and broken by repeated plowing. The assemblage consists of approximately 24 colorless glass bottle and jar fragments, one colorless bottle base embossed with "ORT", 10 aqua glass bottle fragments, five green glass bottle fragments, five milk glass bottle fragments and canning jar cap fragments, three cobalt glass bottle fragments, one amber glass bottle base fragment, one metal

wire, one blue and white glass marble, one horseshoe, 30 whiteware sherds (plain and decorated), one whiteware teacup handle, 10 brick fragments, and five unidentifiable pieces of metal.

Few distinct or narrowly diagnostic artifacts were observed. One of the milk glass canning jar cap fragments was embossed with "GENUINE". This is possibly part of a Boyd's Genuine Porcelain Line Cap, which were manufactured from 1869 to 1950 (Whitten 2015). Cobalt and amber glass do not have much use diagnostically because shades of these colors have been used for a wide variety of vessel types for hundreds of years. However, some of the pieces were likely produced between the late 1800s and the present. Milk glass was commonly used in cosmetic, ointment, and toiletry bottles from the 1870s to the mid-20th century (Lindsey 2018). One of the whiteware fragments was decorated with a transfer printed blue precise floral or landscape motif. Transfer prints were popular in the United States after 1890 but were being produced for decades prior to that (Majewski and O'Brien 1984). The amber glass bottle base fragment was embossed with "D-9/2642/54", possibly representing a beer or liquor bottle manufactured in 1954. These artifacts and features suggest that the site likely dates to the late-19th to mid-20th century. The site exhibits low integrity and research potential as the structure, features, and artifacts have been disturbed via decades of decay, removal and reuse, and repeated plowing.

Based on archival research, the parcel containing 41COL328 was patented by Samuel Bogart with the State of Texas on May 18, 1858. The Samuel Bogart Survey (Abstract 61), described in Patent No. 607 Volume 17, is 160 acres in size and encompasses sites 41COL328, 41COL329, and 41COL330. Samuel Bogart was born on April 2, 1797 in Carter County, Tennessee (Ballesteros 2016). After serving in several wars, including the War of 1812, and shooting a political opponent in a fight in Missouri (ca. 1839), Bogart, his wife Rachel Hammer, and their children sought refuge in Texas. They relocated to North Texas in 1844. Bogart served on the Texas House of Representatives and eventually on the Senate. After a debacle over the Peters Colony (ca. 1852), Bogart left politics. By the time he reentered politics as a representative in 1859, he owned over 1,500 acres of land and had given some of that land to his daughters. Bogart died only a few months after Texas voted to secede from the Union at the Secession Convention in January 1861. He was one of the few delegates to vote against secession (Ballesteros 2016). All sites discussed in this report date to sometime after the property was owned by Bogart and is not connected to him.

Records indicate that the land was deeded to Margaret E. Bogart, possibly one of Bogart's daughters, in 1855 (CCDB I:131). There is a gap in the records between 1855 and 1893 when the land appears to have been deeded by George A. and Harriet Wilson to their grandson, George M. Wilson (CCDB 57:230). At least some of the land changes hands again in 1894 when an individual and their guardians, Walter, Willie, and Nina Norvell, deed the land to A. M. Wilson (CCDB 64:117, 120). In 1913, portions of the land were sold or loaned by George M. and/or Lula Wilson to George R. Leverett and J. S. and Rachel Heard (CCDB 212:266 and 201:463). In 1935, Edward F. Finch seems to be the owner of at least part of the property (CCDB 301:154). From the 1940s through the early 1970s, parts of the property seem to be owned by the Finch family, W. W. and Inez Grimes, and J.W. and Lorene Miller. After the 1970s, the property's history becomes increasingly complicated as portions of the property were divided and condensed through trust, foundation, investor, and business acquisitions. The NTMWD acquired the property in 2018. With the available resources, no records could be found pertaining to any of the above-mentioned individuals, except for the original owner.

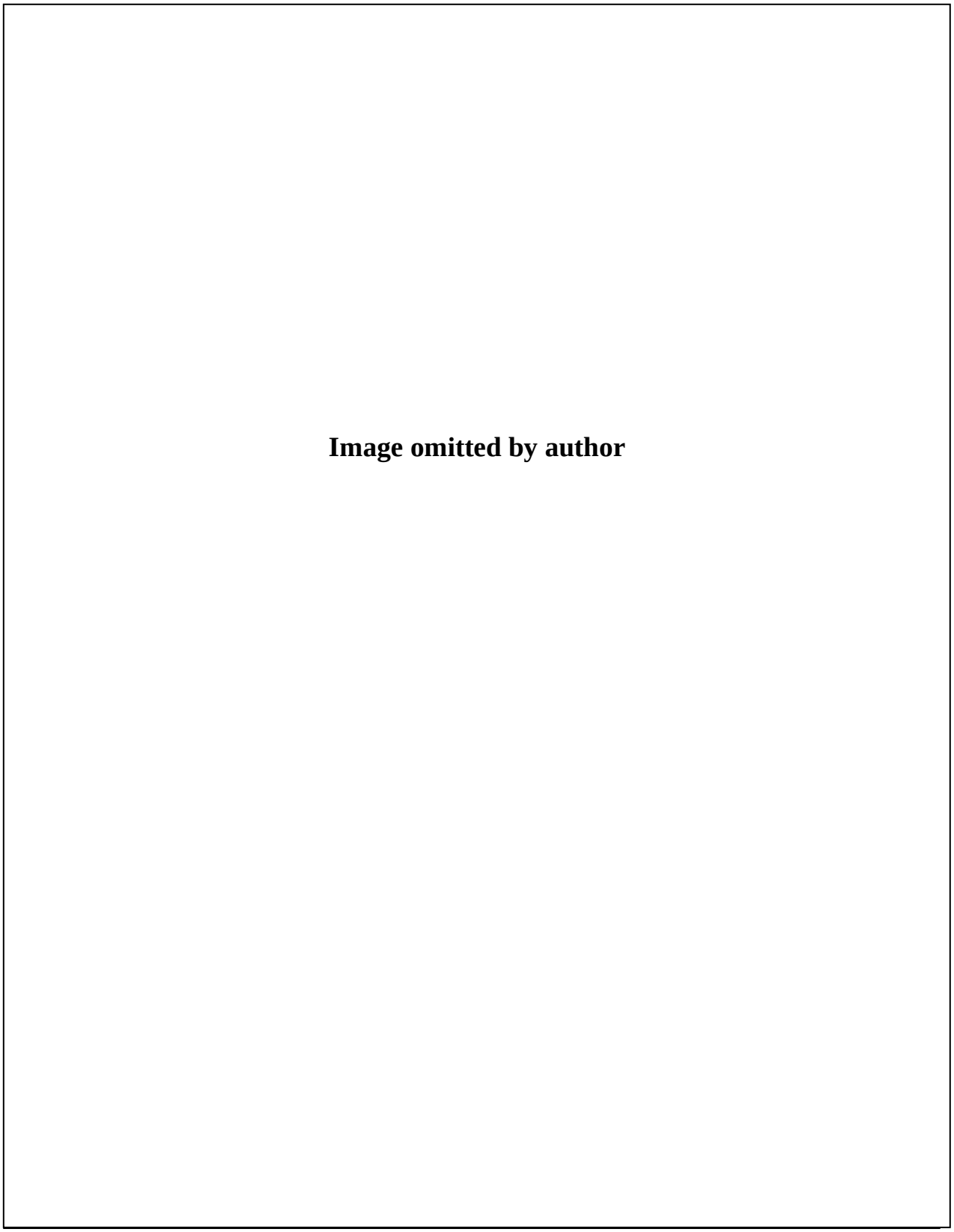

Figure 9. Sites and isolated objects recorded during ARC's survey of the SGRWRRF property HPAs shown on recent aerial imagery.

Figure 10. Overview of 41COL328, facing southwest. The red arrow marks the location of the collapsed structure.

Figure 11. Collapsed pier and beam structure at 41COL328, facing northeast.

Figure 12. Water feature (cistern or well) at the northeast corner of the collapsed structure in 41COL328.

Figure 13. Examples of bricks from 41COL328.

Table 4. 41COL328 Shovel Test Descriptions.

ST#	Depth (cm)	Description	Comments/Artifacts
41COL328-01	0-38 38-48	Brown (7.5YR4/2) silt clay loam with 10% chalk Chalk	0-10cmbs: 1 metal wire, 1 clear glass.
41COL328-02	0-35 35-45	Brown (7.5YR4/2) silt clay loam with 20% chalk Chalk	No artifacts.
41COL328-03	0-22 22-32	Brown (7.5YR4/2) silt clay loam with 15% chalk Chalk	No artifacts.
41COL328-04	0-33 33-43	Brown (7.5YR4/2) silt clay loam with 40% chalk Chalk	No artifacts.
41COL328-05	0-31 31-41	Brown (7.5YR4/2) silt clay loam with 10% chalk Chalk	No artifacts.
41COL328-06	0-32 32-42	Brown (7.5YR4/2) silt clay loam with 40% chalk Chalk	No artifacts.
41COL328-07	0-33 33-43	Brown (7.5YR4/2) silt clay loam with 10% chalk Chalk	No artifacts.
41COL328-08	0-34 34-44	Brown (7.5YR4/2) silt clay loam with 20% chalk Chalk	No artifacts.
41COL328-09	0-15	Dark grayish brown (10YR4/2) sandy loam with 25% chalk fragments	Terminated at solid chalk.
41COL328-10	0-18 18-30	Dark grayish brown (10YR4/2) sandy clay loam with 25% clay fragments Chalk	No artifacts.
41COL328-11	0-38 38-56	Dark grayish brown (10YR4/2) clay loam Dark grayish brown (10YR4/2) clay loam with 25% chalk fragments	No artifacts.
41COL328-12	0-52	Dark grayish brown (10YR4/2) clay loam	Extremely saturated with water seeping in. No artifacts.
41COL328-13	0-42	Dark grayish brown (10YR4/2) clay loam with <5% chalk	Extremely saturated with water seeping in. No artifacts

Figure 14. Sample of surface artifacts from 41COL328. Note their small size. Scale is in cm.

41COL329

Site 41COL329 is located primarily in an agricultural field 35 m east of 41COL328 (see Figure 9). It is possible that these sites are related, and that both are associated with the structure at 41COL328. However, given the lack of artifacts and features between the two, ARC was unable to determine their association. Site 41COL329 could be associated with one of the structures that lies just outside (north) the area. The western and southern portions of the site are gently sloping and saturated because of their proximity to the drainage. The remainder of the site is on a small rise (Figure 15). Ground visibility neared 100 percent in the field. Visibility was much lower (0-25 percent) along the southern edge where tall grasses were present. Chalk fragments were abundant on the surface of the field. In total, the site measures 100 m north-south by 70 m east-west, or 1.45 acres, and includes a surface scatter and a dump.

As with 41COL328, artifacts were primarily observed on the surface of the plowed field. Most were small and highly fragmented having been repeatedly plowed. The assemblage includes approximately 200 colorless, 20 SCA, 100 aqua, 20 cobalt, 20 amber, 20 milk glass, and 20 green bottle glass fragments. At least five milk glass canning jar cap fragments were also observed. Ceramic pieces found at the site include 50 plain whiteware sherds. At least 10 of these were decorated with green and/or blue paint and molding. Other artifacts include approximately two plastic and one shell buttons, one plastic utensil handle, one glass brown and white marble, one decorative piece of metal, 20 wire nails or screws, one square-cut nail, five staples, 10 bricks and brick fragments, 20 slate fragments, 20 miscellaneous metal fragments, 10 window glass shards, one ceramic and metal door knob, one metal buckle, a crown cap, one pair of pliers, and five rubber/plastic fragments. Of the 18 STs placed in and around the surface deposit, only one contained an artifact (
Table 5). The STs generally revealed dark grayish brown to brown silty clay to clay loam sediments with abundant chalk fragments. ST excavation was terminated at sediments containing significant chalk fragments or impenetrable chalk. ST01, which was placed at the center of the artifact concentration, yielded a piece of plastic or rubber in the top 10 cm.

Few of the artifacts found in the field were distinct or definitively diagnostic. One of the whiteware fragments exhibited a light green floral transfer print decoration. Transfer prints were popular in the United States after 1890 but were being produced for decades prior to that (Majewski and O'Brien 1987). SCA glass was commonly used until the end of WWI and aqua glass was common until the 1920s; clear glass replaced these as the dominant type for vessels after 1920 (Lindsey 2018). One colorless bottle base fragment has an embossed Owen's Illinois Diamond-I/O mark. This maker's mark was used by the bottle manufacturer from 1929 to ca. 1960 (Lindsey 2019a). The embossed "12" to the left of the mark indicates that the bottle was produced in Gas City, Indiana (Lockhart and Hoenig 2015). Cobalt and amber glass do not have much use diagnostically because shades of these colors have been used for a wide variety of vessel types for hundreds of years. "True" varieties of these colors were likely produced at some point between the late 1800s and the present (Lindsey 2018). One amber glass bottle fragment appears to be from the base of a snuff bottle embossed with four dots. These dots are thought to represent the strength of the snuff and were present from the 1870s through the mid-1900s (Lindsey 2019b). Milk glass was commonly used in cosmetic, ointment, and toiletry bottles from the 1870s to the mid-20th century (Lindsey 2018). A few of the bottle fragments exhibited crown cap finishes; a crown cap closure

was also found. Crown cap closures were patented in 1892; the manufacture of bottles with crown finishes became widespread in the early 1900s due to automatic bottle machines (Lindsey 2017).

Figure 15. Overview of 41COL329, facing west. The red arrow marks the location of the furniture pile. Site 41COL328 is located to the west and beyond the woods.

Figure 16. Sample of artifacts from 41COL329. Note their small size. Scale is in cm.

Table 5. 41COL329 Shovel Test Descriptions.

ST#	Depth (cm)	Description	Comments/Artifacts
41COL329-01	0-37 37-47	Dark grayish brown (10YR4/2) silt clay loam Brown (10YR5/3) silty clay	0-10cmbs: 1 black plastic/rubber.
41COL329-02	0-42 42-52	Dark grayish brown (10YR4/2) silt clay loam Brown (10YR5/3) silty clay	No artifacts.
41COL329-03	0-34 34-44	Brown (7.5YR4/4) silt clay loam with 10% chalk Chalk	No artifacts.
41COL329-04	0-39 39-50	Dark grayish brown (10YR4/2) silt clay loam Brown (10YR5/3) silty clay	No artifacts.
41COL329-05	0-40 40-50	Dark grayish brown (10YR4/2) silt clay loam Brown (10YR5/3) silty clay	No artifacts.
41COL329-06	0-44 44-54	Dark grayish brown (10YR4/2) silt clay loam Brown (10YR5/3) silty clay	No artifacts.
41COL329-07	0-42	Dark grayish brown (10YR4/2) clay loam	Saturated with water seeping in.
41COL329-08	0-58	Dark grayish brown (10YR4/2) clay loam	Terminated at chalk layer. No artifacts.
41COL329-09	0-19 19-35	Dark grayish brown (10YR4/2) sandy clay loam with 5% chalk Very pale brown (10YR7/4) and yellowish brown (10YR5/8) clay and chalk	No artifacts.
41COL329-10	0-24	Very dark grayish brown (10YR3/2) clay loam with 50% chalk	Terminated at chalk layer. No artifacts.
41COL329-11	0-38 38-48	Brown (10YR4/3) clay loam with 2% chalk fragments Dark grayish brown (10YR4/2) clay loam with 25% chalk fragments	No artifacts.
41COL329-12	0-22 22-60	Very dark grayish brown (10YR3/2) silty clay Dark grayish brown (10YR4/2) clay	No artifacts.
41COL329-13	0-35	Very dark gray (10YR3/1) silty clay	Water at 35cmbs. No artifacts.
41COL329-14	0-30 30-50	Dark grayish brown (10YR4/2) silty clay loam Light brownish gray (10YR6/2) silty clay with chalk	No artifacts.
41COL329-15	0-35 35-54	Dark grayish brown (10YR4/2) silty clay loam Dark grayish brown (10YR4/2) silty clay loam and 75% chalk	No artifacts.
41COL329-16	0-15 15-35	Dark grayish brown (10YR4/2) wet silty clay Very dark grayish brown (10YR3/2) wet clay with caliche	Water at 35cmbs. No artifacts.
41COL329-17	0-30 30-47	Dark grayish brown (10YR4/2) silty clay loam Dark grayish brown (10YR4/2) silty clay loam and 75% chalk	No artifacts.
41COL329-18	0-31 31-41	Brown (7.5YR4/2) with 40% chalk Chalk	No artifacts.

In addition to the artifacts observed in the field, a pile of discarded furniture and household items was encountered in the grasses at the southwest end of the site (Figure 17). Furniture items in the pile include a dresser, china cabinet, tables, upholstered chair, lamp, and two mattresses or box springs. Several pieces of china (plates, saucers, bowls, cups), tea pots and teacups, at least one full china set, a glass goblet, and decorative Depression glass pieces were observed in addition to a Faberware 8-quart pot and skillet, an orange Home Depot bucket, and other modern items.

Several of the china pieces featured maker's marks. One teacup featured a red and green "Theodore Haviland/Limoges/France/Clio" maker's mark superimposed over a green "Theodore Haviland/France/Ivory China" on its base (Figure 18). The body was decorated with a multicolor floral motif with gold and blue trim. David Haviland began purchasing whiteware and porcelain from Limoges factories in Limoges, France and having them decorated for the American market in 1842 (Wiggins 2019). In 1865, David bought his own factory where porcelain blanks were manufactured and decorated under one roof, something considered revolutionary for the time. Haviland is also known for being the first company to use decals, used alone or with hand painting, for decorating china. Theodore Haviland, David's son, began working for the business in 1864 and opened a large factory in Limoges in 1890. He left the company in 1893 to start his own (Haviland Collectors International Foundation 2015). Therefore, this teacup was likely manufactured sometime after 1893. The superimposed maker's mark may indicate that the vessel was manufactured in one place and decorated in another. The "Clio" at the bottom of the maker's mark indicates the pattern, which, according to listings on Ebay and Etsy, may date to ca. 1925. A bowl found in the pile featured a similar maker's mark, stating "Theodore Haviland/Limoges/France". The fact that only one maker's mark is exhibited may indicate that this piece was manufactured and decorated in the same place. Another bowl featured a "Johann Haviland/Bavaria/Germany" maker's mark (Figure 19). Johann Haviland was the grandson of David Haviland (Haviland Collectors International Foundation 2015). He started his own company in Bavaria, Germany in 1907. The business only lasted until 1924 and was subsequently sold to an Italian company. Thus, this bowl likely dates to between 1907 and 1924.

A china pitcher decorated with a pastoral scene and maroon and gold trim was also observed in the furniture pile (Figure 20). The maker's mark states "Imperial/Japan/Design". Based on listings on Ebay and Etsy, this is possibly from a lusterware porcelain tea set manufactured sometime in the 1950s. A large teapot with a hand-painted floral design and blue and gold trim was discovered in the furniture pile (see Figure 20). The maker's mark states "Andrea by Sadek/Made in Thailand". Andrea by Sadek was founded by Charles and Norman Sadek in New Rochelle, New York in 1936 (Distinctive Décor, LLC 2020). This piece is part of the Biltmore Estate Collection "The Vanderbilt Service", which was a special line of replicas based on pieces found in the Oak Sitting Room at the Biltmore House. Andrea by Sadek began manufacturing these and other replicas of famous dinnerware patterns as part of their Historic Museums Collection in 2004. Another relatively modern teapot exhibited a "Bombay/Made in China" maker's mark.

Like 41COL328, the surface artifacts demonstrate that 41COL329 likely dates from the late-19th to mid-20th century. The wide range of dates for pieces found in the discarded furniture pile suggests that these items may have been dumped at this location relatively recently. The association of these materials to 41COL329 is unclear, however, it is included in the site boundary

because of its proximity to the surface artifact deposit. 41COL329 likely represents the remnants of a late-19th to mid-20th century occupation in the area and more recent dumping. The artifacts have been scattered, mixed, and broken by repeated plowing over the past several decades. Because so little is left of the site, and much of it is only present on the surface, the site lacks any further research potential. Site 41COL329 falls within the Samuel Bogart Survey (Abstract 61) with 41COL328, but likely dates to long after Samuel Bogart owned the land. Refer to the previous section for a detailed discussion of the property history.

Figure 17. Pile of discarded furniture and china from 41COL329, facing west.

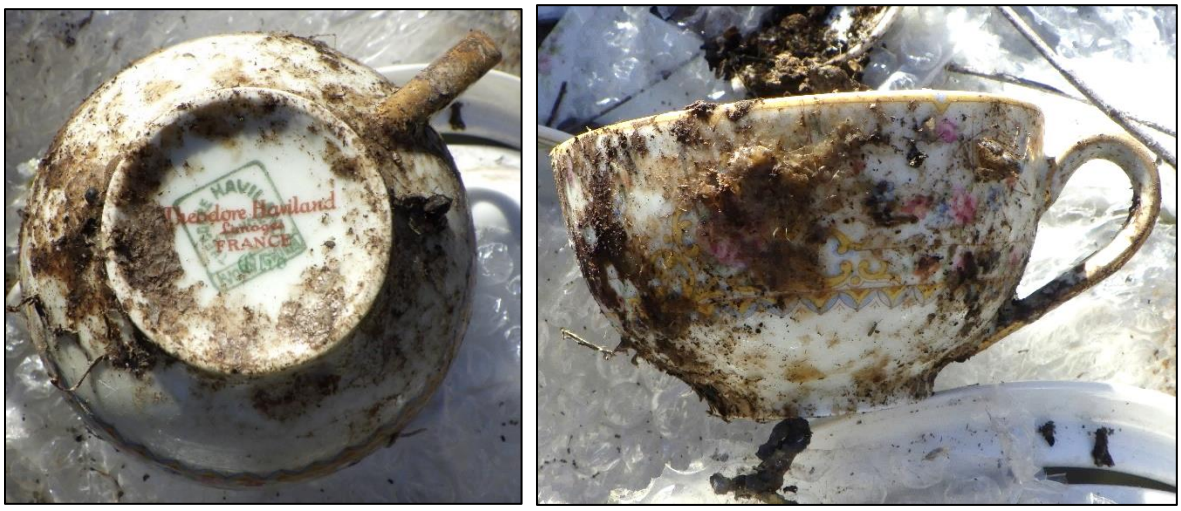

Figure 18. Theodore Haviland Clio teacup from the furniture pile at 41COL328.

Figure 19. Decorated china bowl and goblet from the furniture pile at 41COL329.

Figure 20. Decorated china pitcher and piece from the Andrea by Sadek Biltmore Estate collection found in the furniture pile at 41COL329.

41COL330

Site 41COL330 is located approximately 50 m to the east of 41COL329 (see Figure 9). The site is situated in a relatively flat, open patch of woods between two agricultural fields (Figure 21). The terrain is gently undulating, likely due to erosion from runoff water flowing between the fields. Ground visibility was low, at 0-25%. A structure is visible at this location on aerial imagery from 1952 and 1968. The structure also appears on the photorevised 1968 topographic map. The site was determined to be approximately 100 m north-south by 35 m east-west, or 0.90 acres, and includes several large pieces of farm equipment as well as a sparse artifact scatter.

Most of the artifacts were found on the surface of the site. Only one of the eight STs placed at the site was positive (Table 6). ST03 yielded a single plate rim fragment from a whiteware vessel decorated with a thin dark green line. The surface assemblage included approximately 10 pieces of farm equipment, one whiteware sherd, one brick (plain, commercially made) and cement well collar, one fragment of plain stoneware crockery, one coil of barbed wire, two colorless glass shards, one piece of sheet metal, five miscellaneous metal pieces, one colorless glass Nylon Brite bottle, 10 fragments of a sink or toilet, and one horseshoe. The only possible evidence for a structure at this location was a sparse scatter of approximately 20 plain, commercially made bricks and brick fragments. No intact foundations or other structural elements were observed. The farm equipment includes several items related to plowing as well as a cotton harvester from The Oliver Corporation of Springfield, Ohio, manufacturer of the "Finest Farm Machinery" (Figure 22). A plaque attached to the harvester lists the Model No. as CM 10 and Serial No. as 51-1073. This model resembles a comb type cotton harvester invented by Herman E. Altgelt in the late 1940s and patented by The Oliver Corporation on March 6, 1951 (Patent No. US2544411A). The only other diagnostic item found at the site was a Nylon Brite bottle. The base of the bottle exhibits an embossed Owens-Illinois Glass Company O-I maker's mark, which was in use from 1954 to the present (Lindsey 2019a). Based on these items, the site likely dates to the early to mid-20th century.

Although the site appears to correspond with the location of a mapped structure, no intact structural elements were observed. The only possible remains of a structure include 20 scattered bricks and brick fragments and a well collar, all of which may not have originated in this location. Furthermore, few household items (glass, ceramics, etc.) are associated with the site. Ultimately, because so little is left of the site and much of it is on the surface, there is not much that can be learned from the scatter. Site 41COL330 falls within the same parcel (Samuel Bogart survey) as 41COL328 and 41COL329. The site likely dates to long after the property was owned by Samuel Bogart and his family. See the section on 41COL328 for a detailed discussion of the property history.

Figure 21. Overview of 41COL330, facing west.

Figure 22. Cotton harvester and plaque from 41COL330, facing north.

Table 6. 41COL330 Shovel Test Descriptions.

ST#	Depth (cm)	Description	Comments/Artifacts
41COL330-01	0-25 25+	Very dark gray (10YR3/1) saturated clay loam Limestone and water	No artifacts.
41COL330-02	0-15 15-45	Light brownish gray (10YR6/2) clay loam Platy chalk	No artifacts.
41COL330-03	0-30 30-35	Dark grayish brown (10YR4/2) clay loam with 25% chalk Dark grayish brown (10YR4/2) clay loam with 75% chalk	0-10 cmbs: 1 piece of rim whiteware with a green stripe.
41COL330-04	0-22	Dark grayish brown (10YR4/2) clay loam with 25% chalk	Terminated at chalk layer. No artifacts.
41COL330-05	0-50	Dark grayish brown (10YR4/2) clay loam	Increasing chalk fragments with depth. No artifacts.
41COL330-06	0-28 28-40	Dark grayish brown (10YR4/2) clay loam with 25% chalk Dark grayish brown (10YR4/2) clay loam with 75% chalk	No artifacts.
41COL330-07	0-25	Dark grayish brown (10YR4/2) clay loam with 25% chalk	Terminated at chalk layer. No artifacts.
41COL330-08	0-54	Very dark gray (10YR3/1) clay	No artifacts.

Survey Results: Pipeline Corridor

The pipeline survey area is characterized by gently rolling uplands that are either covered in secondary growth or have been used as agricultural and grazing lands. The survey area demonstrated variable ground surface visibility ranging from 0 to 100 percent dependent on the intensity of agricultural practices (Figure 23 and Figure 24). Visual examination revealed the survey area has been extensively impacted by natural disturbances and modern land use practices. In many cases, modern agricultural practices have hastened erosion due to runoff or altered topographic relief in service of equipment efficiency. These modern disturbances have significantly altered the natural landscape and have minimized the potential for intact buried cultural deposits throughout the proposed project corridor.

SWCA excavated a total of 115 STs within the survey area (Appendix A). Only one was positive for subsurface cultural materials (Appendix B). STs typically encountered a black to dark gray (10YR 2/1 -10YR 4/1) clay. Most STs encountered roots or compaction between 30 and 60 cmbs; however, the western end of the survey area located on the SGRWRRF property predominantly encountered degraded bedrock between 30 and 60 cmbs. Four archaeological sites and two isolated finds were identified within the pipeline survey area.

Four sites and two isolated finds (IF01 and IF02) were encountered during the survey (see Appendix A, Map Sheets 3 and 4). These isolated finds were delineated with STs spaced at 10-m intervals within the survey area. Both IF01 and IF02 were encountered in plowed fields with 100 percent ground surface visibility. IF01 is a single whiteware ceramic fragment (Figure 25) encountered 40 m west of Ticky Creek; no subsurface cultural materials were observed in the five delineation shovel tests. IF02 is a single solarized glass fragment encountered at the surface and 886 m east of Ticky Creek. No subsurface cultural materials were observed in the four delineation shovel tests.

Figure 23. Typical agricultural environment along pipeline route, facing west.

Figure 24. Typical secondary growth environment in survey area, facing west.

Figure 25. IF01 (left), a whiteware sherd, and IF02 (right), a solarized glass fragment.

41COL336

Site 41COL336 consists of a scatter of historic-aged domestic debris in a plowed field directly adjacent FM 989. The site measures 77 by 204 feet (23 by 62 m) and was encountered in a proposed open-cut installation section (Figure 26). The field in which the site resides has been recently plowed. Aerial imagery demonstrates the land has been used for crop production since at least the mid-20th century (Figure 27 and Figure 28; Google Earth 2020; NETR 2020). Plow furrows are aligned generally in a northeast to southwest orientation and likely attribute to the overall orientation of the site. The average ground surface visibility within the site is 100 percent.

Observed site artifacts rest on the surface; however, no discrete or observable concentration was identified. No subsurface cultural materials were observed at the large and widely dispersed historical artifact scatter. The site boundary was delineated based on the presence of artifacts on the surface and confirmed with 10-m (33-foot) interval shovel testing. Artifacts consisted of more than 100 colorless glass bottle fragments, at least 25 amber bottle glass fragments, more than 50 white ceramic fragments, two amethyst glass fragments, one cobalt glass fragment, one blue transfer print ceramic, one hotelware fragment, six aqua bottle fragments, one aqua bottle crown cap finish, one bone button fragment, and two fragments of burned bone (Figure 29). The presence of amethyst glass suggests usage of the site prior to 1920, while the aqua mechanical crown cap finish has the earliest use date of 1904 (Lindsey 2020; Lockhart 2006). The observed cultural materials were of roughly similar size suggesting heavy plow damage.

South of the survey corridor and approximately 60 m (200 feet) south of ST-B-12 is an early- to mid-20th century farmhouse (see Figure 27). This house and its ancillary structures are visible in historical aerial imagery from 1968 and on historic topographic maps.

SWCA excavated nine STs within the site boundary. An additional three STs were excavated outside the site boundary to ensure subsurface artifacts did not extend outside the observed

boundary. All STs were negative for cultural materials. The site was delineated within the survey area and extends south towards the house and ancillary structures. STs typically encountered a very dark grayish brown or black (10YR 3/2 or 7.5YR 2.5/1) clay. STs were predominantly terminated at a depth ranging from 30 to 50 cmbs due to compaction.

Based on archival research, 41COL336 is located on Tract 55 of the Thomas A. Rhodes survey (Abstract 741) patented by James Riley on June 24, 1845, as described in Patent No. 699, Volume 2, page 172 (Fannin Co. Scrip, File No. 85). On August 31, 1852, James Riley deeded the survey, or a portion of the survey, to George A. Wilson for under 394 dollars (Collin County Deed Book [CCDB] F:128). The property stayed in the Wilson family for over 100 years, passing from Harriet Wilson to Wallace Wilson in 1897 (CCDB 87:468) and from Ray W. Wilson and Elizabeth M. Smith to their descendants Alan, Stephen, and Michael Smith in 1987 (CCDB 2718:383, 386, 389). George A. Wilson may have migrated to Texas with other members of the Wilson family from Sumner County, Tennessee in the 1840s (Stambaugh and Stambaugh 1958: 215-216). He subsequently served in the Mexican American War, married Harriet Kincaid, and became the Collin County Sherriff, an office which he held from 1867-1869. Whether Wilson, one of his other family members, or a descendant lived on the property or in the nearby residence is unclear. Sometime between 1987 and 2018, the property was sold to Arizona Lemonade Spring LLLP and other companies, who deeded the property to the NTMWD on March 31, 2018.

Site 41COL336 represents a low-density early-20th century artifact scatter within a plowed field. The integrity of the site has been heavily impacted by natural erosion and plowing. No cultural features were encountered during the survey, and artifacts were restricted to the surface. Therefore, site 41COL336 is recommended as not eligible for the NRHP or as a SAL due to the lack of cultural features, the lack of site integrity due to natural and artificial disturbance, and the resulting limited potential for future research.

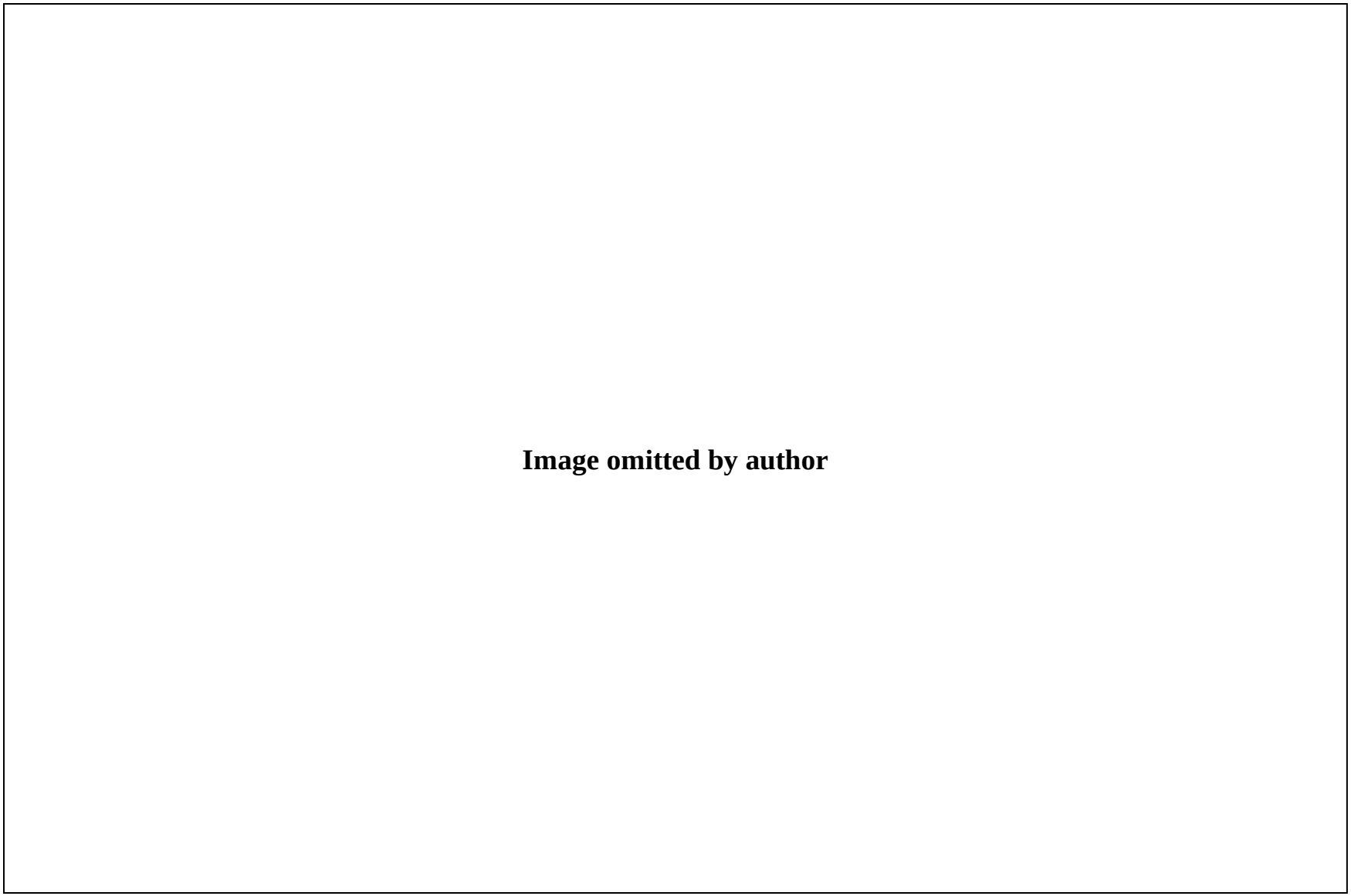

Figure 26. 41COL336 site map and pipeline survey area shown on recent aerial imagery.

Figure 27. Overview of 41COL336, facing south. Note the structure, located outside of the pipeline survey area.

Figure 28. Overview of 41COL366, facing east.

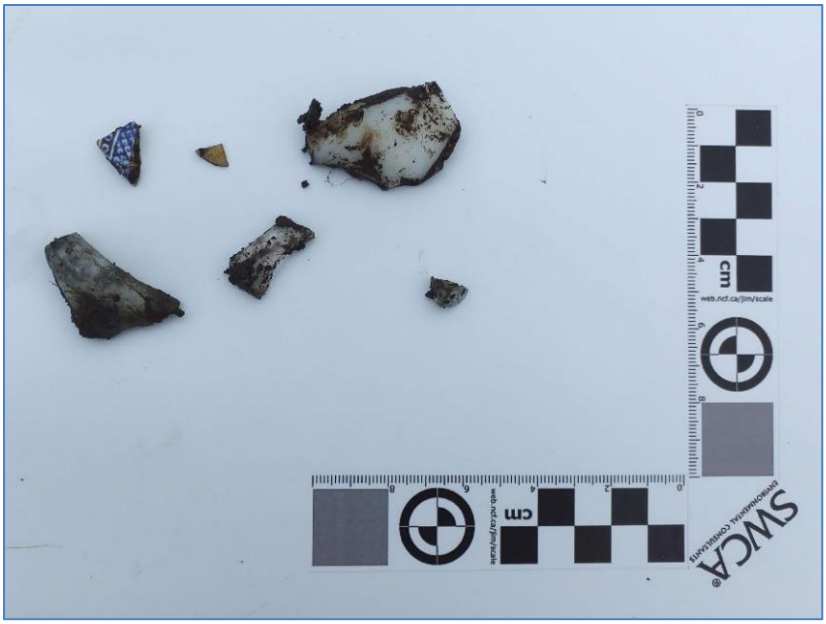

Figure 29. Sample collection of ceramics and glass near ST-B-014 at 41COL366.

41COL337

Site 41COL337 consists of a high density mid- to late-20th century trash pile of domestic materials that measures 36 by 64 feet (11 by 19 m) in extent and is located in a proposed open-cut installation section (Figure 30). The site is confined within a small drainage along the northern boundary of the pipeline survey area. The trash pile is likely intended to prevent further erosion of the wash channel and is visible on aerial imagery as early as 1995 (Figure 31). Large juniper and oak trees surround the site and the drainage slopes down towards the east.

Observed site artifacts rest on the surface. No subsurface cultural materials were observed at the trash pile. The site boundary was delineated based on the presence of artifacts on the surface and confirmed with 10-m (33-foot) interval shovel testing. Artifacts consisted of a cast iron bed frame with casters (twin size), a wooden screen door, one car bench seat, three car batteries (1 Duralast), 10 fragments of window glass, two electrical cords, three 5-gallon MYCO Mycobrite wood floor treatment cans, an aluminum pot with plastic handle, two aluminum screen doors, one sheet metal floor heater, two plastic appliance faces, one chrome sink drainpipe, a manual typewriter with plastic keys, a pullout projector screen, two CRT televisions, a wire frame desk fan, at least 20 pieces of concrete rubble, 10 aluminum cans, one small amber bottle, one 50-gallon drum, 10+ rubber hosing, three rebar, five cut lumber posts, a 2.5-gallon metal gas can, one plastic remote control, 10+ corrugated sheet metal pieces, three aluminum framed window panes, 10+ PVC pipes, one hammer head, one garden hoe head, one jump lead, one lead pipe, one tire, and three copper pipes (Figure 32). No diagnostic markings were observed on glass artifacts. The presence of a mechanical typewriter with plastic keys suggests a date prior to 1970, whereas the Mycobrite trademark (Trademark No. 0371700) was filed in 1939 (British Telecommunications 2019). The observed cultural materials did not demonstrate significant alteration, suggesting limited taphonomic modification.

SWCA excavated two STs within the site boundary. An additional five STs were excavated outside the site boundary to ensure subsurface artifacts did not extend outside of the observed boundary. All STs were negative for cultural materials. STs typically encountered a grayish brown or dark gray (10YR 5/2 or 10YR 4/1) clay and were predominantly terminated from 30 to 50 cmbs due to root impasses.

Based on archival research, 41COL337 and 41COL338 are located on Tract 185 of the Carter T. Clifft Survey (Abstract 162) patented on November 27, 1845, as described in Patent No. 468, Volume 4, page 160 (Fannin Co. Scrip, File No. 167). This tract covers approximately 14 acres of the 4,605.5-acre survey. An examination of the land records reveals that John Fitzhugh may have been one of the first landowners. It is possible that this John Fitzhugh is the same man who migrated to Peter's Colony with his family in July of 1845 (Gough 2020). Fitzhugh owned tracts of the Carter T. Clifft Survey into the 1870s (CCDB 198:448). Ownership between the 1870s and early 20th century is unclear. However, between 1912-1923, several landowners in the area between Longneck Road and Stiff Creek sold their properties to Walter B. Wilson. The landowners include Tom W. and Sallie Perkins (CCDB 196:274), J.W. Parsons (CCDB 211:589), R. G. and Minnie Welsh (CCDB 242:447), H.G. and Nannie Gibbs (CCDB 222:119), and L.D. and Daisy Cameron (CCDB 233:35). Eventually, the land came into the possession of the Union Central Life Insurance Company who sold it to H.D. and A.D. Florence in 1939 (CCDB 324:335). In 1980, the land was sold by Iva Cook, Austin D. Florence, Gladys G. Purviance, John A. Yeager, and Robert P. Yeager to Ernest B. and Floretta F. Collins (CCDB 1241:175). The Collins sold their property to the current landowner, Azre LLC (CCDB 6008:1654).

Site 41COL337 represents a high-density historical and modern trash dump within a small drainage. The site is largely intact but impacted by natural erosion and animal trampling. No evidence of cultural features was encountered during the survey and artifacts were restricted to the surface. Therefore, site 41COL337 is recommended as ineligible for the NRHP or as a SAL due to the lack of cultural features and the resulting limited potential for future research.

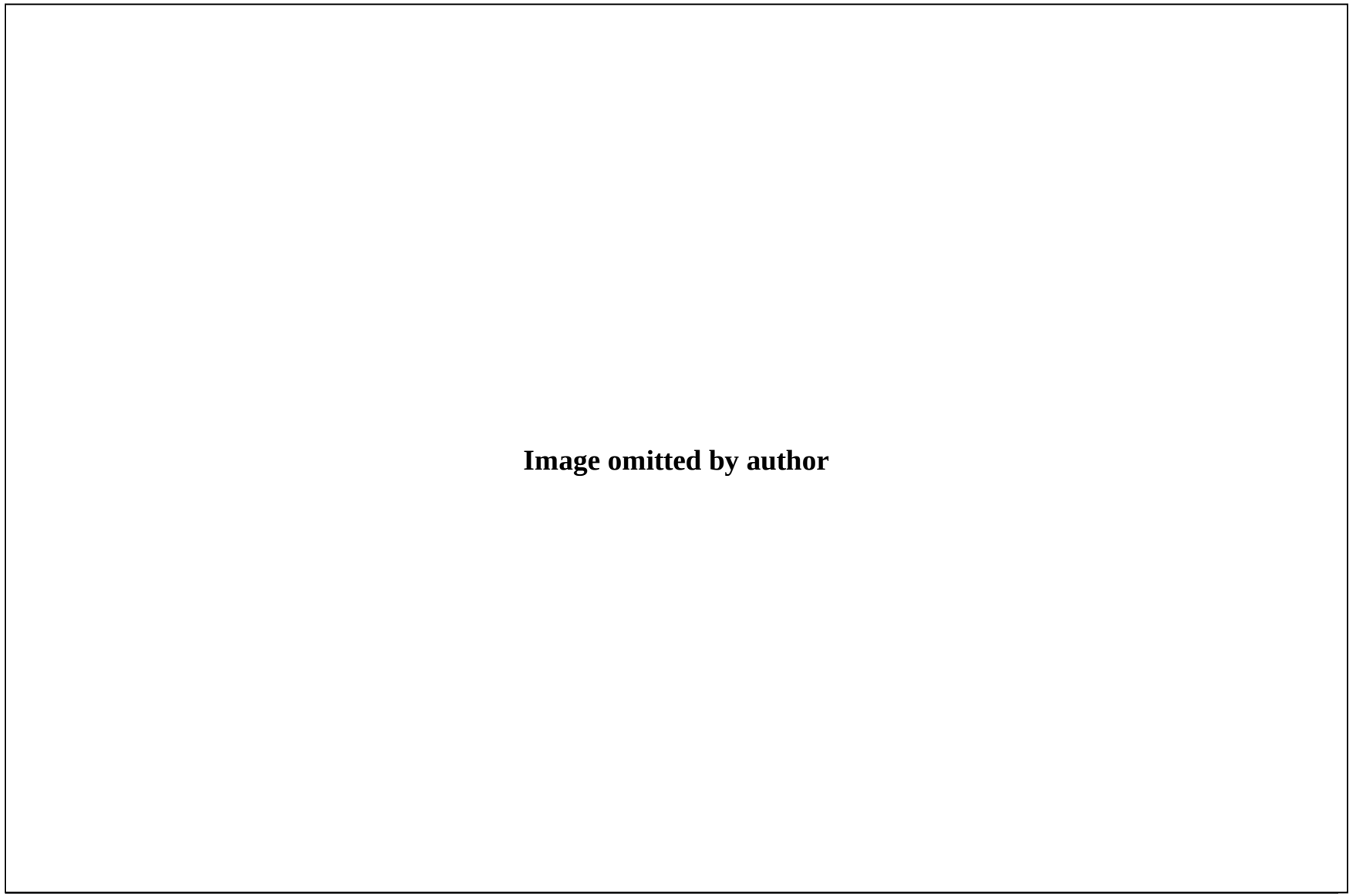

Figure 30. 41COL337 site map and pipeline survey area shown on recent aerial imagery.

Figure 31. Overview of 41COL337, facing east.

Figure 32. Detail of cultural materials including manual typewriter, facing south.

41COL338

Site 41COL338 consists of a historic-aged domestic debris scatter and a standing structure located within a thick grove of bois d'arc, juniper, acacia, and oak trees. The site measures 206 by 283 feet (62 by 86 m) and is in a proposed open-cut installation section (Figure 33). The field in which the site resides is currently wooded pasture. Aerial imagery demonstrates the land has been used for agriculture and pastureland since at least 1959 (Figure 34). Ground surface visibility ranged from 0-50 percent due to heavy leaf litter and poison ivy.

Observed site artifacts rest on the surface. A single observable artifact concentration (i.e., Feature 1) was identified towards the southern portion of the survey area (Figure 35). Feature 1 is a bottle concentration consisting of five painted Dr. Pepper bottles with crown caps, two small medicine bottles (one amber and one colorless), one colorless glass Gatorade bottle with a metal cap, two small milk glass jars, one olive glass bottle with twist cap, and 50+ amber beer bottles (crown and twist cap finishes) with brands including Pearl and Schlitz. Feature 1 measures 87 by 114 feet (26 by 34 m). The centerline of the survey area bisects the northern portion of the feature. The painted Dr. Pepper bottles and milk glass pots suggest a mid-20th century occupation and usage (Lockhart 2010; Figure 36). No subsurface cultural materials were observed in the five STs excavated within Feature 1.

South of Feature 1, and largely south of the boundary of the current survey, is Structure 1. The structure is a single story barn or workshop that measures 10 by 20 feet (3 by 6 m) and is currently in a state of decay and abandonment (Figure 37). The wood-framed structure is built on wood pilings and has vertically flush wood walls. No evidence of wallpaper or insulation was observed at the structure. The northern façade has fallen northwards into the survey area. Due to the ruined state of the structure, an evaluation by an architectural historian was not required. Artifacts observed in association with the structure include more than 100 colorless glass fragments, more than 100 whiteware fragments, at least 22 bricks with Standard Brick Co. Palmer, Texas stamps, two car doors, a metal toolbox, six sheet metal fragments, two 50-gallon drums, two graphite battery cores, two pull tabs, two refrigerators including one GE Coldspot, and more than 10 miscellaneous iron fragments (Figure 38). SWCA excavated two STs adjacent to Structure 1. One ST was positive (A-062), which encountered a metal fragment between 0–10 cmbs that was likely a result of animal trampling. Structure 1 is visible on aerial imagery as early as 1959 and on historical maps as early as 1961.

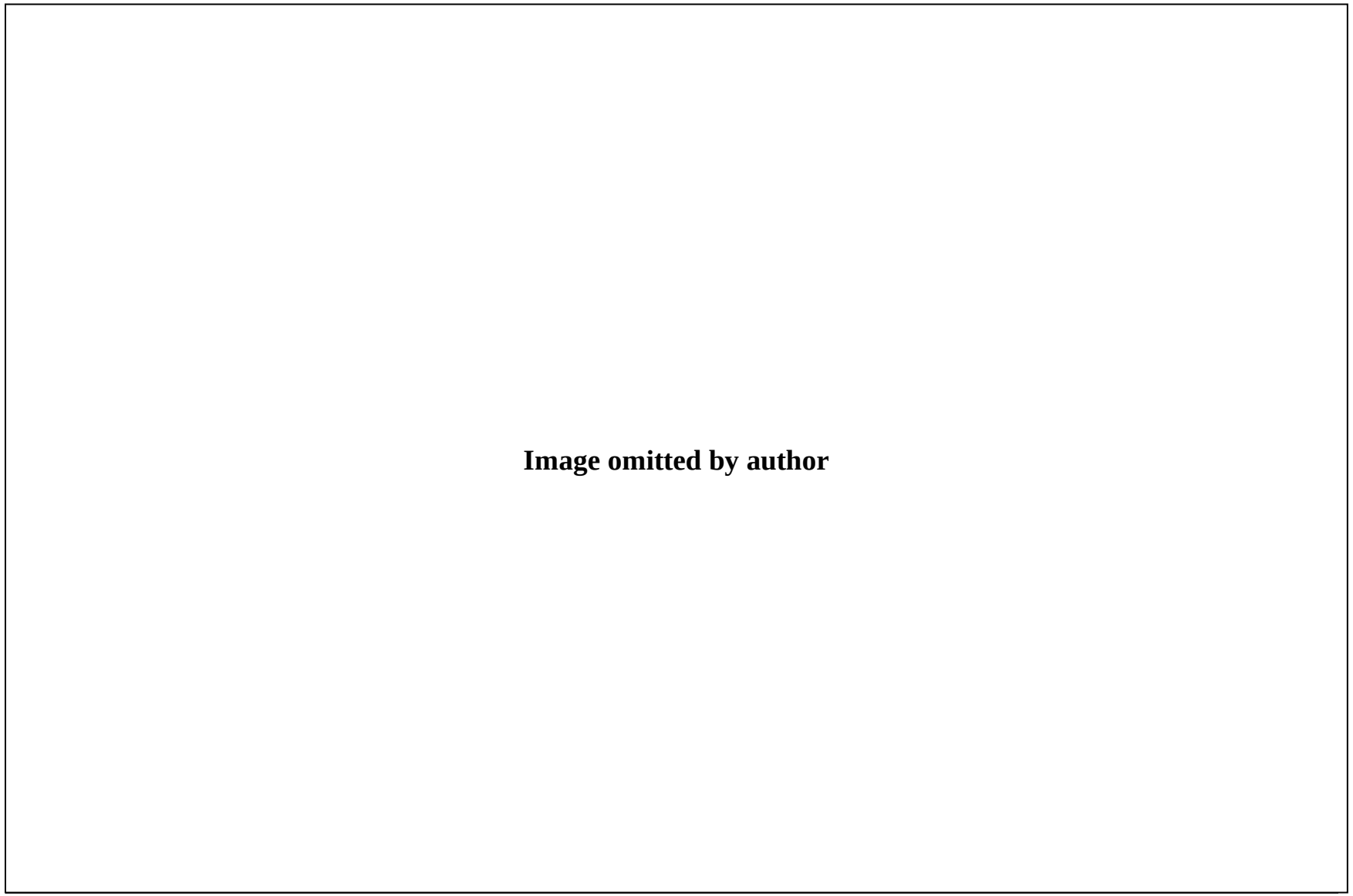

Figure 33. 41COL338 site map and pipeline survey area shown on recent aerial imagery.

Figure 34. Site overview of 41COL338 from Structure 1, facing north.

Figure 35. Overview of Feature 1 at 41COL338, facing west.

Figure 36. Detail of painted Dr. Pepper bottles from 41COL338.

Figure 37. Detail of Structure 1 at 41COL338, facing south.

Figure 38. Brick stamped with "Standard Brick Co Palmer Texas" from 41COL338.

The site boundary was delineated based on the presence of surface artifacts and confirmed with 10-m (33-foot) interval shovel testing. Artifacts not enumerated in the descriptions of Feature 1 or Structure 1 include more than 100 colorless glass bottle fragments, more than 20 large ceramic water pipe fragments, three crock fragments, one high temperature fired porcelain fragment, two amethyst glass fragments, one low-fired porcelain fragment, a white stoneware sherd with British Unicorn mark, a cobalt Vick's Vapor Rub pot base (triangle mark), more than 25 aqua glass fragments, and numerous small brick and concrete fragments (Figure 39). SWCA excavated 17 STs within the site boundary. An additional ST was excavated outside the site boundary to ensure subsurface artifacts did not extend outside the observed boundary. Of the 17 STs excavated within the site, only one was positive for subsurface cultural material adjacent Structure 1. This test recovered an unidentifiable fragment of metal scrap in the upper 10 cm. The site extends north and south beyond the boundaries of the current survey. STs typically encountered a dark gray (10YR 4/1) clay. STs were predominantly terminated at 30 to 43 cmbs due to root impasses.

Site 41COL338 is predominantly a surface scatter of early- to mid-20th century domestic and agricultural materials with limited deposition. Several diagnostic artifacts, including the Standard Brick Company bricks produced in Palmer and Vick's Vapor Rub cobalt pot, suggest the earliest date of site occupation is approximately 1910 (Houston Post 1910; Lindsey 2020). While amethyst glass is present and possibly suggests a late-nineteenth-century usage of the site, manganese glass was used into the 1930s, which complements the earliest date of usage of 1910 (Lockhart 2006). The presence of a GE Coldspot refrigerator with a body style from the 1930s to late-1940s and painted Dr. Pepper soda bottles suggest continued usage into the mid-20th century (Lindsey 2020). The glass Gatorade bottle, however, postdates 1967 (Harry 2015). The site is largely intact but impacted by both natural erosion and animal trampling. Artifacts observed were largely restricted to the surface and Structure 1 has limited additional research potential beyond the recorded information. Therefore, site 41COL338 is recommended as not eligible for the NRHP or as a SAL due to the resulting limited potential for future research. A discussion of the deeds research on this site can be found under the discussion for site 41COL337.

Figure 39. Representative sample of ceramics and Vick's Vapor rub base from 41COL338.

41COL339

Site 41COL339 consists of a diffuse scatter of historic-aged domestic debris and a modern standing structure located within a thick grove of juniper, acacia, and oak trees. The site measures 189 by 1,354 feet (58 by 413 m) and is in a proposed tunneling installation section (Figure 40). The site is located within a plowed field and directly adjacent FM 75. The field in which the site resides has been recently plowed. Aerial imagery demonstrates the land has been used for crop production since at least the mid-20th century. The average ground surface visibility within the site ranged from 0-100 percent dependent upon plowing and vegetation.

Structure 1 is a modern "L" shaped single-story house with vertical and horizontal wood lapping that is located on the project centerline. Pressed concrete block and post foundations were observed (Figure 41). The roof is composed of asphalt shingles. The structure measures approximately 40 by 50 feet (12 by16 m). Structure 1 was encountered in a thick grove of trees and tall herbaceous plants. Visibility of the structure is significantly limited by thick secondary growth. The area has clearly been avoided by agricultural endeavors. The structure is currently in a state of decay and abandonment. No diagnostic artifacts were observed in the surrounding grove. A structure is not shown at this location in aerial imagery from 1959–1981 but is visible in 1995 aerial imagery. The structure is not older than 45 years, though it could be an old structure that was placed at this location after 1981. Therefore, it did not require evaluation by an architectural historian.

The site boundary was delineated based on the presence of surface artifacts. The depth of cultural materials was determined through shovel testing. The site extends north and south beyond the boundaries of the current survey. Artifacts include more than 100 colorless glass fragments, 100 amber bottle fragments, 100 glazed ceramic pipe fragments, 100 whiteware fragments, 100 aqua glass fragments, 100 wire nail fragments, and 100 pane fragments. Additionally, amethyst glass, porcelain fragments, cobalt glass, and milk glass were observed, but in lower quantities (50–100). Although no diagnostic markings were observed on glass artifacts, the quantities of amethyst, cobalt, and milk glass suggest significant usage of the site prior to 1930 (Lindsey 2020; Lockhart 2006). Additional usage of the site into the present is indicated by the observed amber bottle glass fragments, including a bottle with a paper label.

SWCA excavated six STs within the site boundary and all were negative for subsurface cultural materials. STs typically encountered a dark gray (10YR 4/1) clay. STs were predominantly terminated at a depth ranging from 30 to 45 cmbs due to compaction.

Based on archival research, 41COL339 is located on Tract 7 of the Rufus Sewall survey (Abstract 873) patented on May 19, 1848, as described in Patent No. 136, Volume 2, page 174 (Fannin Co. Scrip, File No. 77). This tract is 320 acres in size. Who owned the property from 1848 to the early 20th century is unclear. However, in December of 1918, W.E. West sold the property to A.F. Boyer (CCDB 233:13). After only two years, A.F. and Maggie Boyer sold the property to Walter B. Wilson. As discussed previously, Wilson also acquired the land on which sites 41COL337 and 41COL338 were recorded around this time. From this point, the chain of ownership follows the same trajectory discussed under the section for site 41COL337.

Site 41COL339 is predominantly a surface scatter of early- to mid-20th century domestic and agricultural materials. Depositional and contextual integrity had been significantly impacted by plowing. This process has effectively uniformly distributed artifacts across the entirety of the field. Within a sample 1×1-m area of the site, one porcelain fragment, two whiteware fragments, one cobalt glass fragment, one wire nail, two aqua glass fragments, one burned bone fragment, and one amber glass fragment were observed (Figure 42). The entirety of the site within the survey boundary and plowed field is comparable in density. Artifacts observed were largely restricted to the surface and Structure 1 has limited additional research potential beyond the recorded information. Therefore, site 41COL339 is recommended as ineligible for the NRHP or as a SAL due to the limited potential for future research.

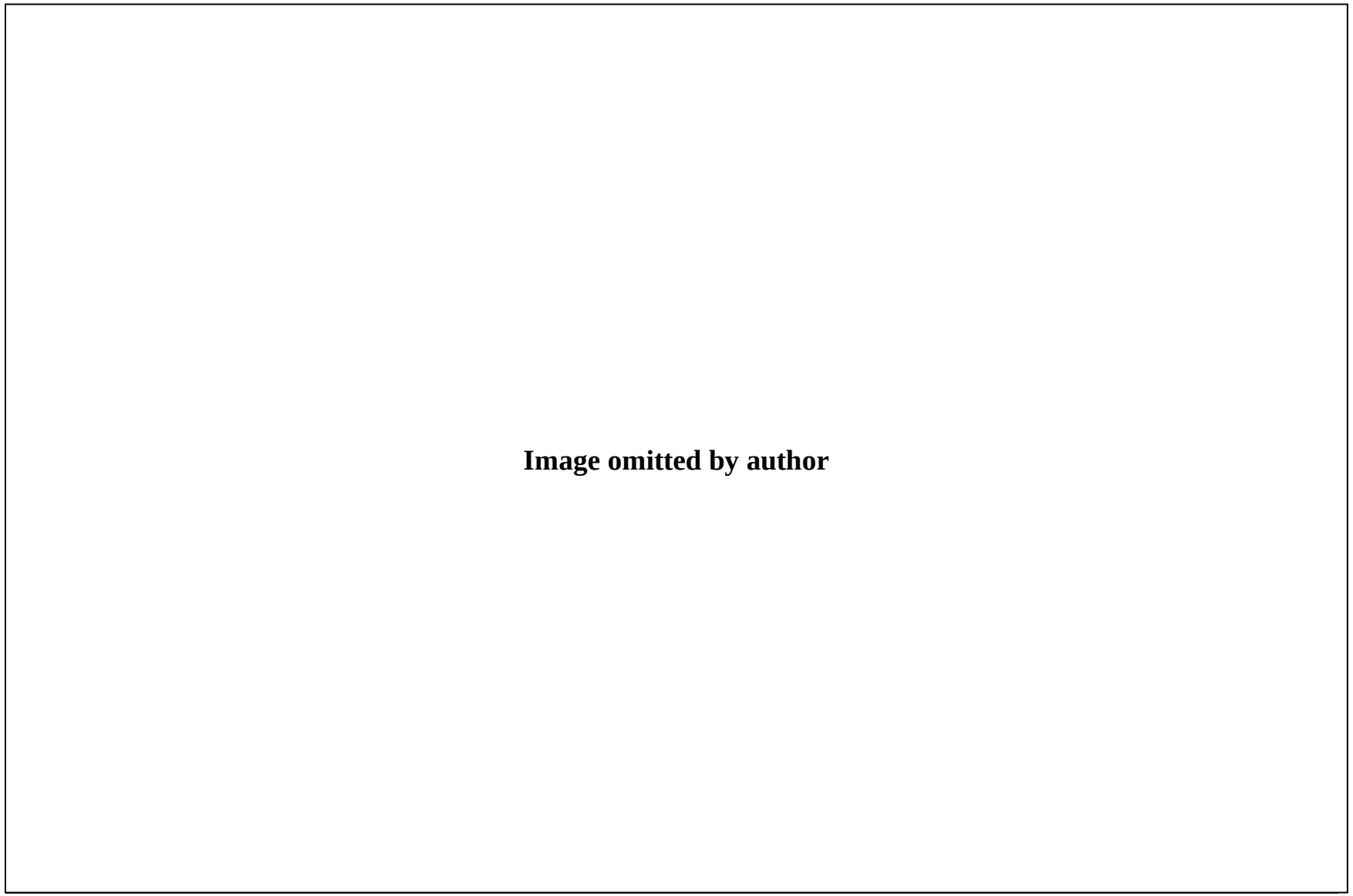

Figure 40. 41COL339 site map and pipeline survey area shown on recent aerial imagery.

Figure 41. Structure 1 from 41COL339 within thick vegetation.

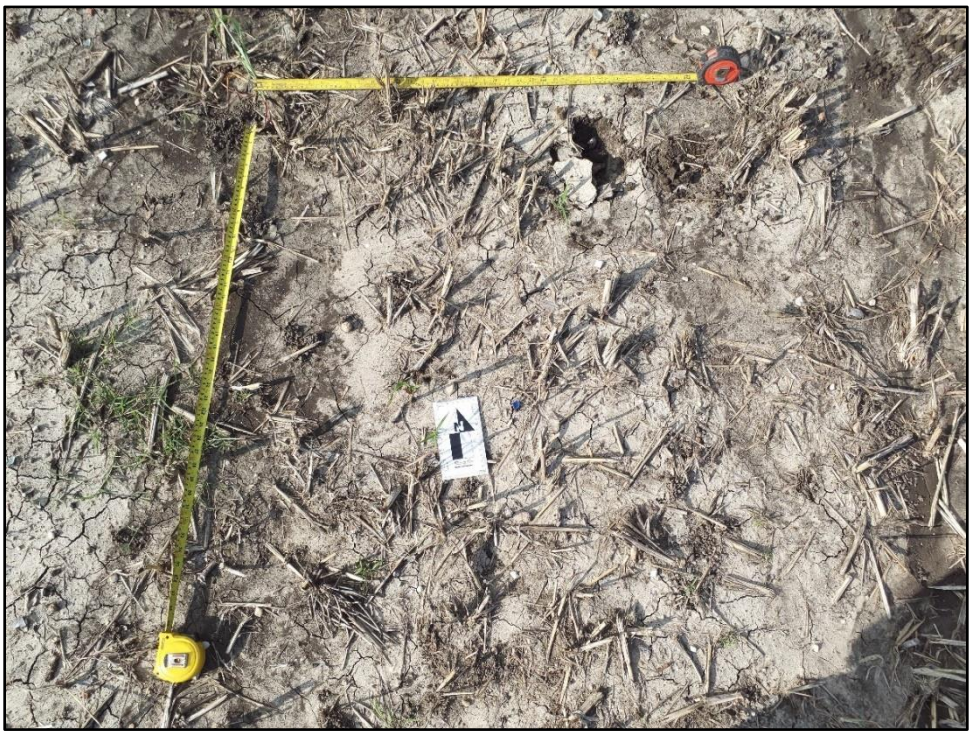

Figure 42. Sample 1×1-meter area with nine observed artifacts from 41COL339, facing north.

Conclusions

Prior to conducting fieldwork, ARC hypothesized that the potential for finding prehistoric cultural resources across the SGRWRRF HPAs and pipeline route was low. This hypothesis was based on an evaluation of the local environment and geology, previous investigations, and Dallas District HPALM (Abbott 2011; Abbott and Pletka 2014). No prehistoric cultural resources were observed during this survey. ARC also hypothesized that the potential for encountering historic cultural resources was high. Several structures were observed in and near the HPAs and pipeline route on historic maps and in aerial images. Ultimately three historic archaeological sites (41COL328, 41COL329, and 41COL330) and two historic isolated objects (IO 1 and IO 2) were recorded during ARC's survey of the SGRWRRF HPAs. An additional four historic sites (41COL336, 41COL337, 41COL338, 41COL339) and two historic isolated finds (IF01 and IF02) were recorded by SWCA during their survey of the pipeline route on behalf of ARC. These sites consist of surficial artifact scatters and trash dumps, most of which were found near structure locations observed in historic maps and aerial images. Artifacts and features at these sites suggest that they date from the late-19th to mid-20th century, except for the trash dump (41COL337), which yielded artifacts from the mid- to late-20th century. A collapsed structure, which corresponds with a mapped structure location, was encountered at 41COL328. Additional structures were encountered at 41COL338 and 41COL339. Like the structure at 41COL328, the structure at 41COL338 was partially collapsed and in a state of decay. This structure was located on the southern border of the pipeline survey area. The structure at 41COL339 was located in a patch of dense vegetation near the center of the site. A review of historic and recent aerial images reveals that this structure was likely placed at this location after 1981 and, therefore, may not be historic. Due to their lack of integrity and age, an assessment of these structures by an architectural historian was unnecessary. An examination of the Collin County Deed Books revealed that these sites cannot be tied to any significant individuals or events. No unique or characteristic forms of construction are represented at the sites (36 CFR 60.4a-c). It is also unlikely that the sites hold any further potential to provide insight into past lifeways or environments (36 CFR 60.4d).

RECOMMENDATIONS

The purpose of this investigation was to determine if significant cultural resources were present in the SGRWRRF property HPAs and pipeline corridor near New Hope, Collin County, Texas. In accordance with the ACT; 33 CFR 325, Appendix C; the Archaeological Resources Protection Act; and Section 106 of the NHPA (36 CFR 800.4), ARC and SWCA made a reasonable and good faith effort to identify cultural resources within the survey area. Seven historic sites (41COL328-330 and 41COL336-339) and four historic isolated objects were recorded during the survey. The proposed project is predominantly situated in a highly modified agricultural landscape, and as such, there has been a significant amount of disturbance throughout the survey area. Each of the sites has been disturbed by repeated plowing, animal trampling, and in some cases the removal and reuse of structural features. None of the sites meet the criteria of eligibility for listing on the NRHP or designation as a SAL, per 13 Texas Administrative Code 26.12 (Table 7). Based on the results of the current effort, ARC and SWCA recommend a determination of no historic properties affected (36 CFR 800.4[d][1]). Further archaeological investigation of the survey area is unwarranted, and the project should be allowed to proceed. However, if buried cultural materials are discovered during construction, the Archeology Division of the THC should be notified.

Table 7. Sites Recorded and Recommendations

Trinomial	Site Type	NRHP/SAL Eligibility	Recommendations
41COL328	Late 19th-20th century farmstead, artifact scatter	Not eligible	No further work
41COL329	Late 19th-20th century farmstead, artifact scatter	Not eligible	No further work
41COL330	Late 19th-20th century farmstead, artifact scatter	Not eligible	No further work
41COL336	Late 19th-20th century farmstead, artifact scatter	Not eligible	No further work
41COL337	Mid-20th century trash dump	Not eligible	No further work
41COL338	Late 19th-20th century farmstead, artifact scatter	Not eligible	No further work
41COL339	Late 19th-20th century farmstead, artifact scatter	Not eligible	No further work

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APPENDIX A

Summary of Previous Work Prepared for the USACE Fort Worth District

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Wednesday, July 8, 2020

Mr. Jimmy Barrera
Regulatory Archeologist/Project Manager
U.S. Army Corps of Engineers Ft. Worth District
819 Taylor Street, Room 3A37
Fort Worth, Texas 76102

RE: SWF-2020-00035

Dear Mr. Barrera:

It has come to our attention that two projects AR Consultants, Inc. (ARC) conducted on behalf of North Texas Municipal Water District (NTMWD) are now being coordinated with the Fort Worth District of the U.S. Army Corps of Engineers (USACE) in conjunction with a new proposed pipeline route that will connect the two project areas (Attachments 1 and 2). The two projects, the Sister Grove Regional Water Resource Recovery Facility (RWRRF; Cross and Crater Gershtein 2020) and an outfall property (Fisher 2018) in Collin County, Texas, were both surveyed under approved Texas Antiquities Permits (TAP) issued by the Texas Historical Commission (THC). Survey and shovel testing for both projects were performed in accordance with the standards set forth by the THC (2014). They are part of the overall NTMWD SGRWRRF Phases I and II Project (TWDB Project Number 73855).

In 2018, ARC conducted an intensive pedestrian archaeological survey of the outfall property with shovel testing and backhoe trenching of the entire 18.2-acre tract along Stiff Creek under TAP 8475 (Fisher 2018). Nine shovel tests (per the state standards at the time) were excavated within the project area during systematic field inspection. Additionally, three backhoe trenches were placed perpendicular to the west bank of Stiff Creek. The archaeological potential for prehistoric and historic cultural resources was considered low based on previous investigations in the area. During survey, no cultural resources were identified in the shovel tests or found on the surface and trenching near Stiff Creek did not identify any deeply buried prehistoric or historic cultural resources in the floodplain. The report was concurred with and approved by the THC in 2018.

In 2019, ARC evaluated a 932-acre property for NTMWD Sister Grove RWRRF of which only 372-acres will be impacted (Crater Gershtein 2019). The THC reviewed and concurred with the evaluation in 2019. ARC recommended survey of four areas considered to have potential for encountering prehistoric and historic archaeology, totaling 105 acres (TAP 9182; Cross and Crater

Gershtein 2020). The potential for encountering prehistoric cultural resources was predicted to be moderate, specifically near drainages. Based on a review of historic maps and aerial imagery, the potential for encountering historic resources was predicted to be high. Three historic archaeological sites (41COL328, 41COL329, and 41COL330) and two historic isolated objects (IO 2) were recorded during the survey. The sites primarily consist of repeatedly plowed surface scatters. Four of the 76 shovel tests excavated yielded artifacts associated with these sites. Some of these sites may correspond with the mapped structures. All, however, are artifact scatters with little integrity and no association with significant persons, events, or architectural styles. These sites were recommended as ineligible for listing on the National Register of Historic Places or designation as a State Antiquities Landmark. THC concurred with these recommendations in 2020.

The proposed pipeline route is the only portion of the project that has not undergone an archaeological evaluation or survey. Since NTMWD is an entity of the state and this project requires federal permits, ARC recommends that the proposed pipeline route undergo a thorough background evaluation for prehistoric and historic potential. Based on the outcome of that evaluation, a Scope of Work for a TAP application should then be submitted to the USACE and THC for approval to conduct any necessary archaeological survey according to the current survey standards (THC 2020).

Sincerely,

Cody S Davis, MA, RPA
Principal Investigator
AR Consultants, Inc.

References Cited

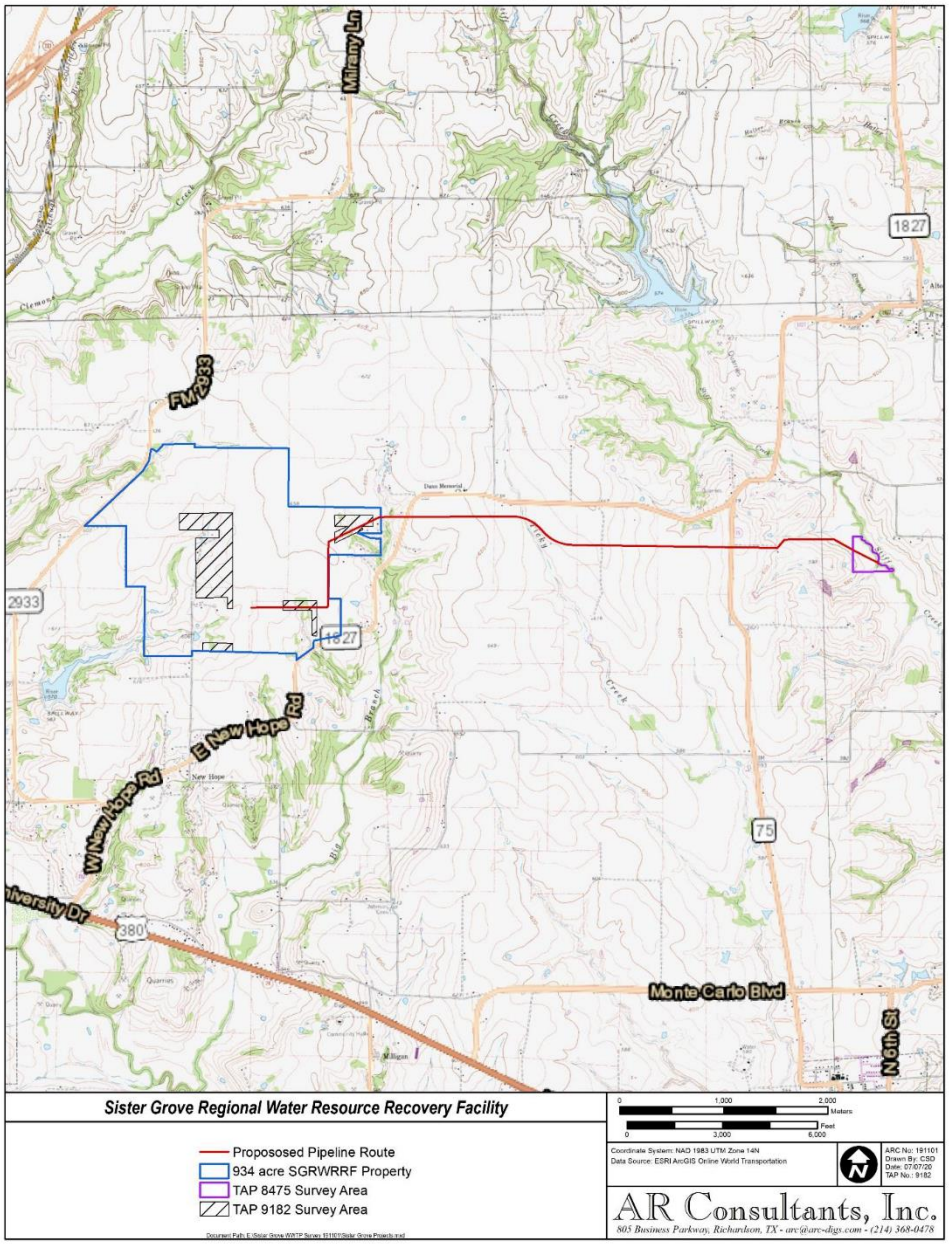
Fisher, Phil R.
2018 *Archaeological Survey of the Proposed 18-Acre NTMWD Property, Collin County, Texas*. Cultural Resources Report 2018-40. AR Consultants, Inc., Richardson.

Crater Gershtein, Kathryn M.
2019 *Sister Grove Waste Water Treatment Plant Evaluation, Collin County, TX*. AR Consultants, Inc., Richardson.

Cross, Kathryn A. and Kathryn M. Crater Gershtein
2020 *Archaeological Survey of the Sister Grove RWRRF, Collin County, Texas*. Cultural Resources Report 2020-02. AR Consultants, Inc., Richardson.

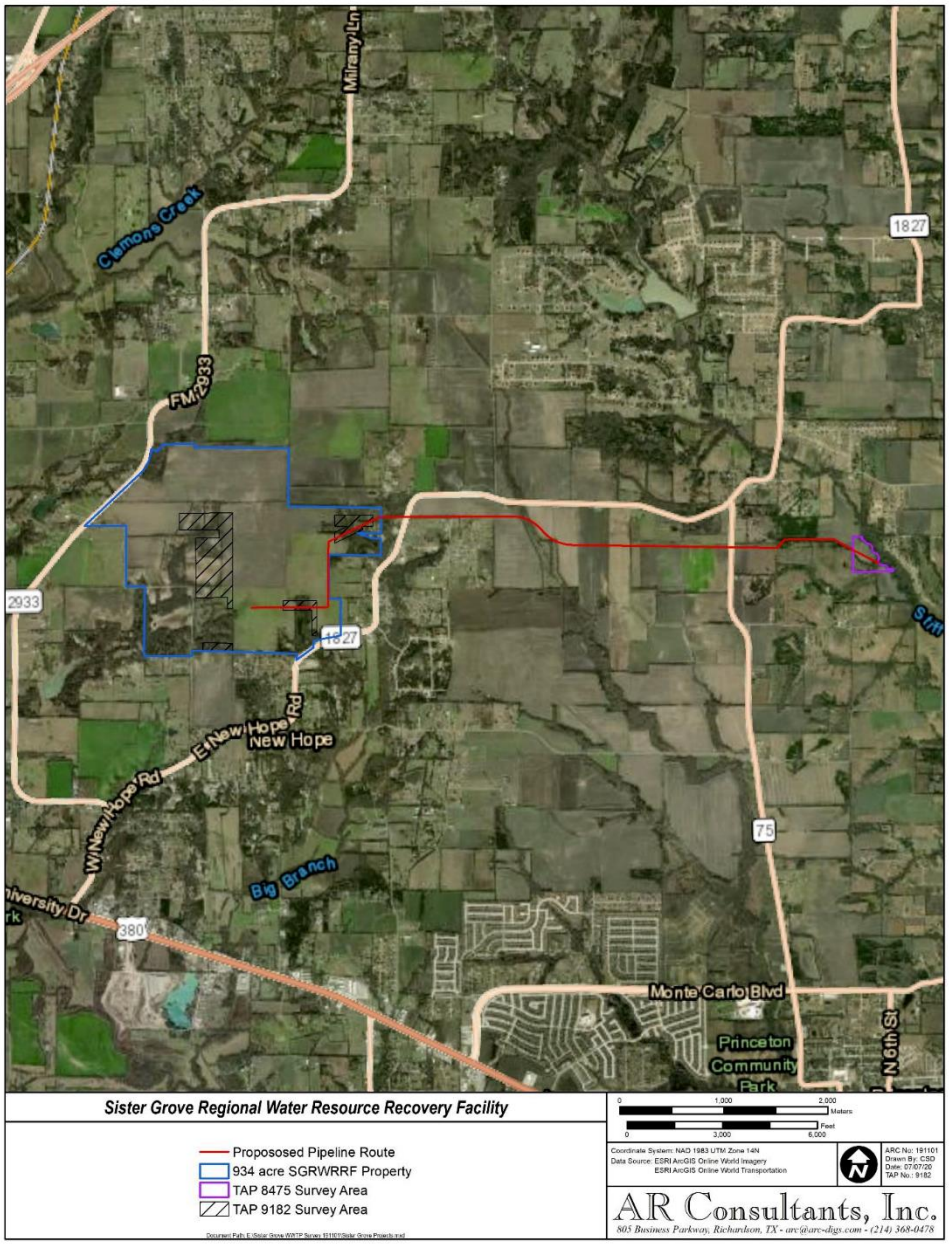
Texas Historical Commission (THC)
2014 Archeological Survey Standards for Texas. http://www.thc.texas.gov/public/upload/publications/THC_SurveyStandards_2014.pdf.
2020 Archeological Survey Standards for Texas. https://www.thc.texas.gov/public/upload/publications/CTA-Intensive-Survey-Standards-2020.pdf, accessed July 8, 2020.

Attachment 1. Proposed pipeline route with previous project areas shown on portions of the McKinney East and Culleoka, TX 1:24,000 USGS topographic maps.



HISTORIC BUILDINGS ARCHAEOLOGY NATURAL SCIENCES

Attachment 2. Proposed pipeline route with previous project areas shown on an 2019 aerial photograph.



HISTORIC BUILDINGS ARCHAEOLOGY NATURAL SCIENCES

APPENDIX B

THC Concurrence on Summary Letter

Gmail **Katie Cross <kathrynamcross@gmail.com>**

Project Review: 202015324

AR Consultants, Inc. <arc@arc-digs.com> Fri, Aug 7, 2020 at 6:20 PM
To: Katie Cross <katie@arc-digs.com>, Rachel Hearn <rachel@arc-digs.com>

From: <noreply@thc.state.tx.us>
Date: Fri, Aug 7, 2020, 4:34 PM
Subject: Project Review: 202015324
To: <arc@arc-digs.com>, <reviews@thc.state.tx.us>, <james.e.barrera@usace.army.mil>

TEXAS HISTORICAL COMMISSION
real places telling real stories

Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas
Permit 9182
THC Tracking #202015324
NTMWD SGRWRRF Phases I and II Project
Co Rd 336
McKinney,TX 75071

Dear S. Alan Skinner:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The review staff led by Arlo McKee and Caitlin Brashear has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

&#8226 THC/SHPO concurs with information provided.

Archeology Comments

&#8226 THC/SHPO concurs with information provided.
&#8226 An archeological survey is required. You may obtain lists of archeologists in Texas through the Council of Texas Archeologists and the Register of Professional Archaeologists. Please note that other qualified archeologists not included on these lists may be used. If this work will occur on land owned or controlled by a state agency or political subdivision of the state, a Texas Antiquities Permit must be obtained from this office prior to initiation of fieldwork. All fieldwork should meet the Archeological Survey Standards for Texas. A report of investigations is required and should be produced in conformance with the Secretary of the Interior's Guidelines for Archaeology and Historic Preservation and submitted to this office for review. Reports for a Texas Antiquities Permit should also meet the Council of Texas Archeologists Guidelines for Cultural Resources Management Reports and the Texas Administrative Code. In addition, any buildings 45 years old or older that are located on or adjacent to the tract should be documented with photographs and included in the report. To facilitate review and make project information available through the Texas Archeological Sites Atlas, we appreciate emailing survey area shapefiles to archeological_projects@thc.texas.gov concurrently with submission of the draft report. Please note that this is required for projects conducted under a Texas Antiquities Permit.

We have the following comments: We concur that the proposed pipeline route is the only portion of this project that has not been previously reviewed by this office. We recommend a survey of the pipeline route.

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

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit http://thc.texas.gov/etrac-system.

Sincerely,

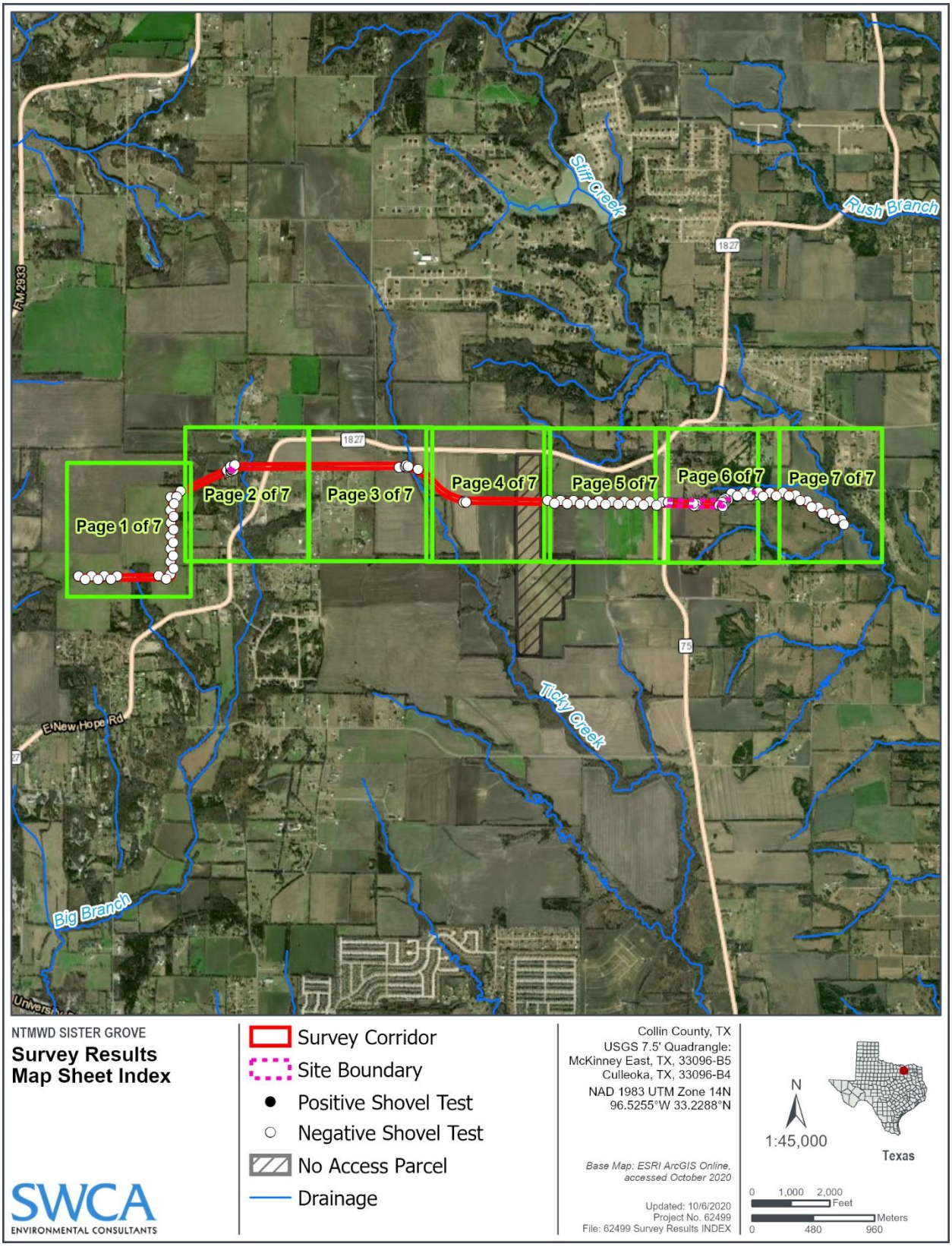
For Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

cc: james.e.barrera@usace.army.mil

APPENDIX C

Pipeline Survey Results Maps


Stiff Creek
Rush Branch
1827
AM2933
Page 1 of 7
Page 2 of 7
Page 3 of 7
Page 4 of 7
Page 5 of 7
Page 6 of 7
Page 7 of 7
75
Ticky Creek
E New Hope Rd
Big Branch
NTMWD SISTER GROVE
Survey Results
Map Sheet Index
Survey Corridor
Site Boundary
Positive Shovel Test
Negative Shovel Test
No Access Parcel
Drainage
Collin County, TX
USGS 7.5' Quadrangle:
McKinney East, TX, 33096-B5
Culleoka, TX, 33096-B4
NAD 1983 UTM Zone 14N
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Base Map: ESRI ArcGIS Online, accessed October 2020
Updated: 10/6/2020
Project No. 62499
File: 62499 Survey Results INDEX
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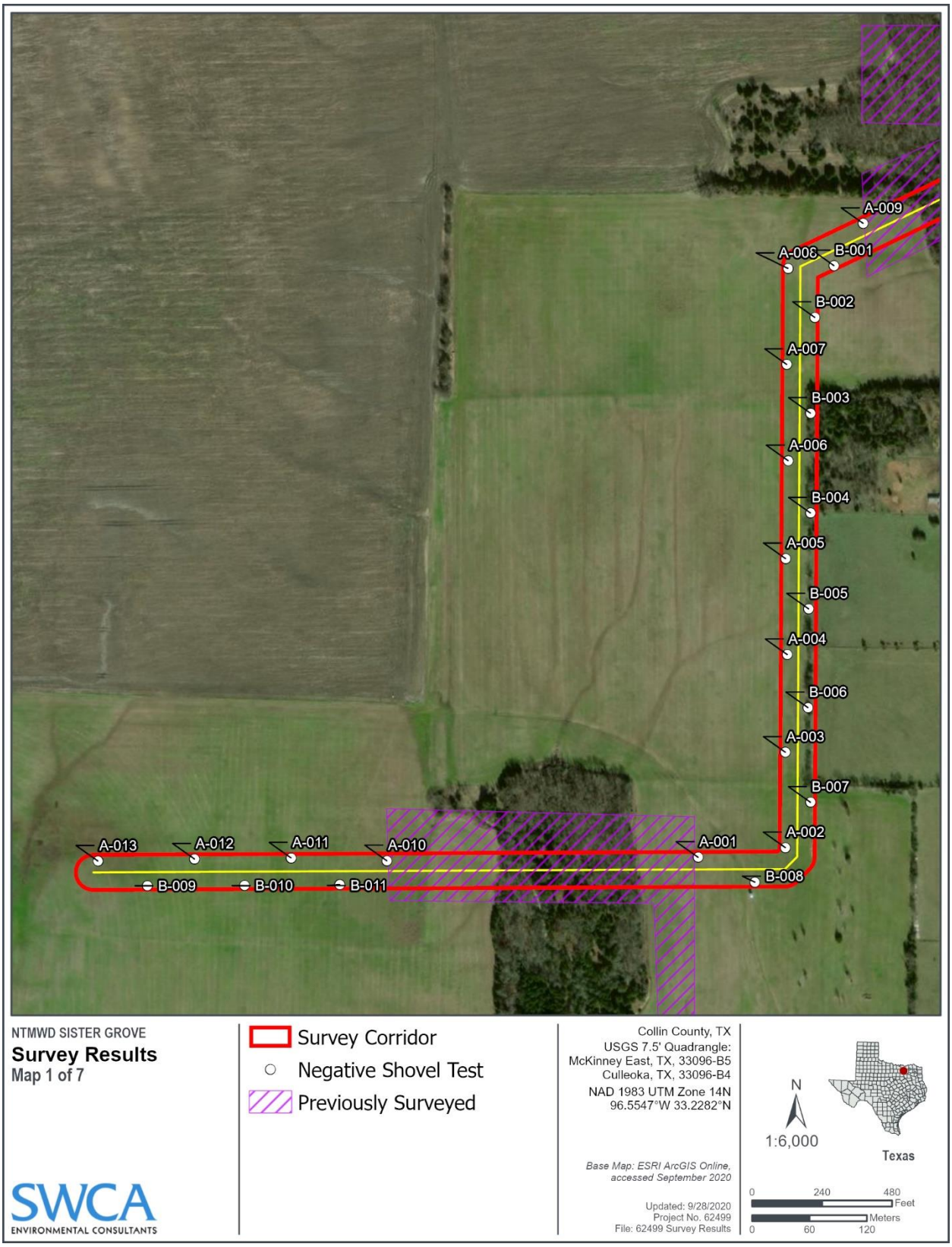
ENVIRONMENTAL CONSULTANTS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B-008
A-013
A-012
A-011
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B-010
B-011
NTMWD SISTER GROVE
Survey Results
Map 1 of 7
Survey Corridor
Negative Shovel Test
Previously Surveyed
Collin County, TX
USGS 7.5' Quadrangle:
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Culleoka, TX, 33096-B4
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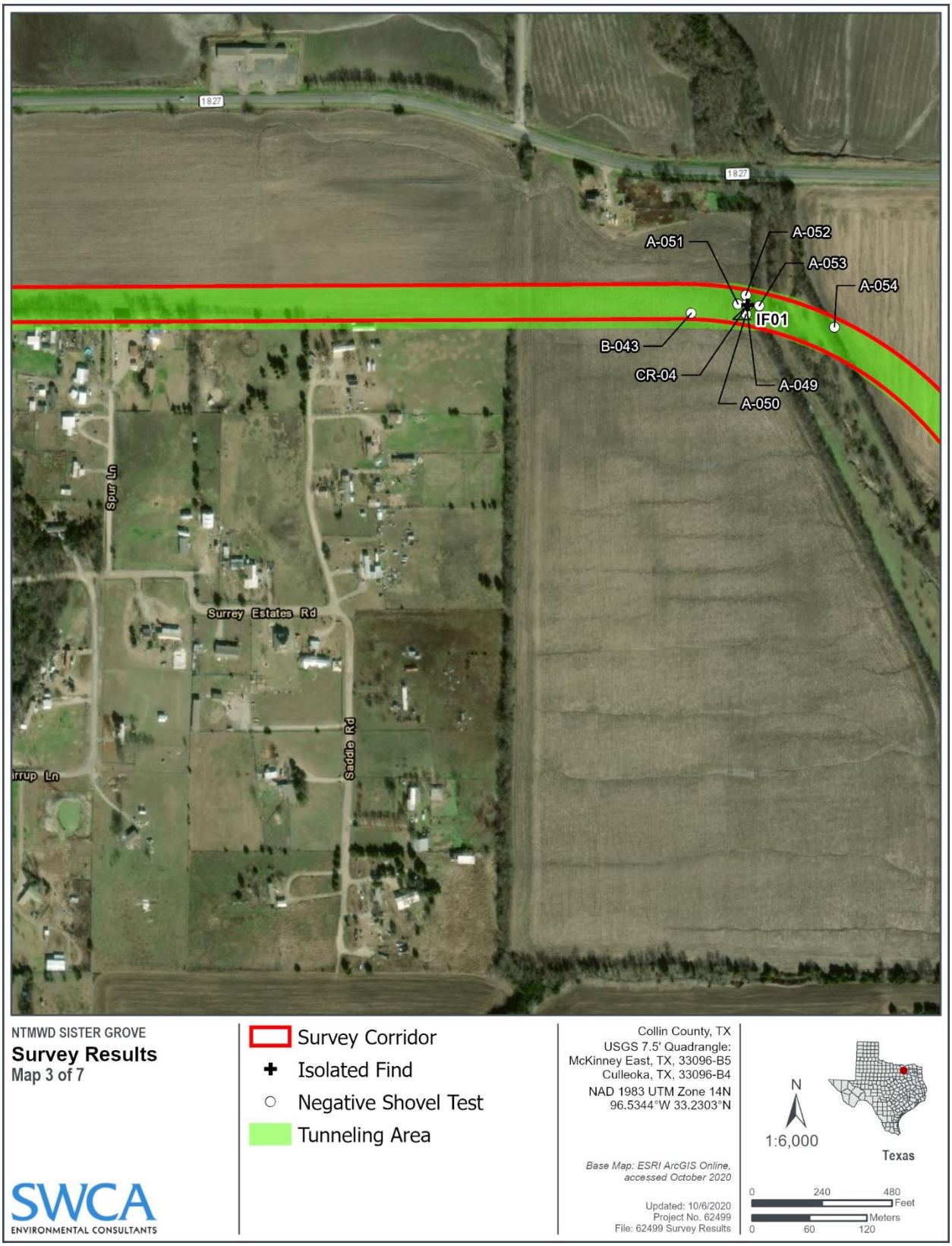
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1827
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A-052
A-053
A-054
IF01
B-043
CR-04
A-049
A-050
Surrey Estates Rd
Saddle Rd
NTMWD SISTER GROVE
Survey Results
Map 3 of 7
Survey Corridor
Isolated Find
Negative Shovel Test
Tunneling Area
Collin County, TX
USGS 7.5' Quadrangle:
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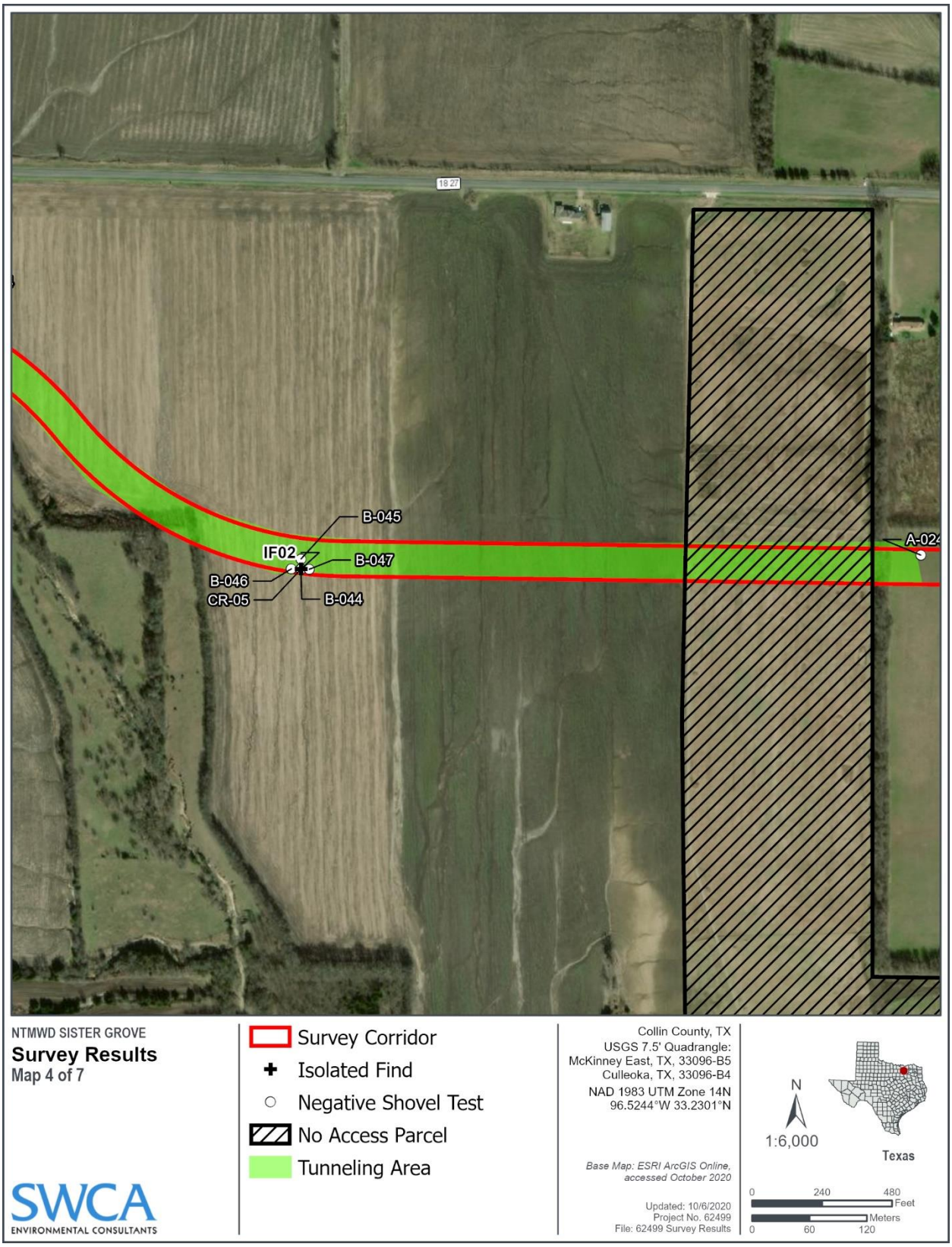
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IF02
B-047
B-046
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B-044
A-024
NTMWD SISTER GROVE
Survey Results
Map 4 of 7
Survey Corridor
Isolated Find
Negative Shovel Test
No Access Parcel
Tunneling Area
Collin County, TX
USGS 7.5' Quadrangle:
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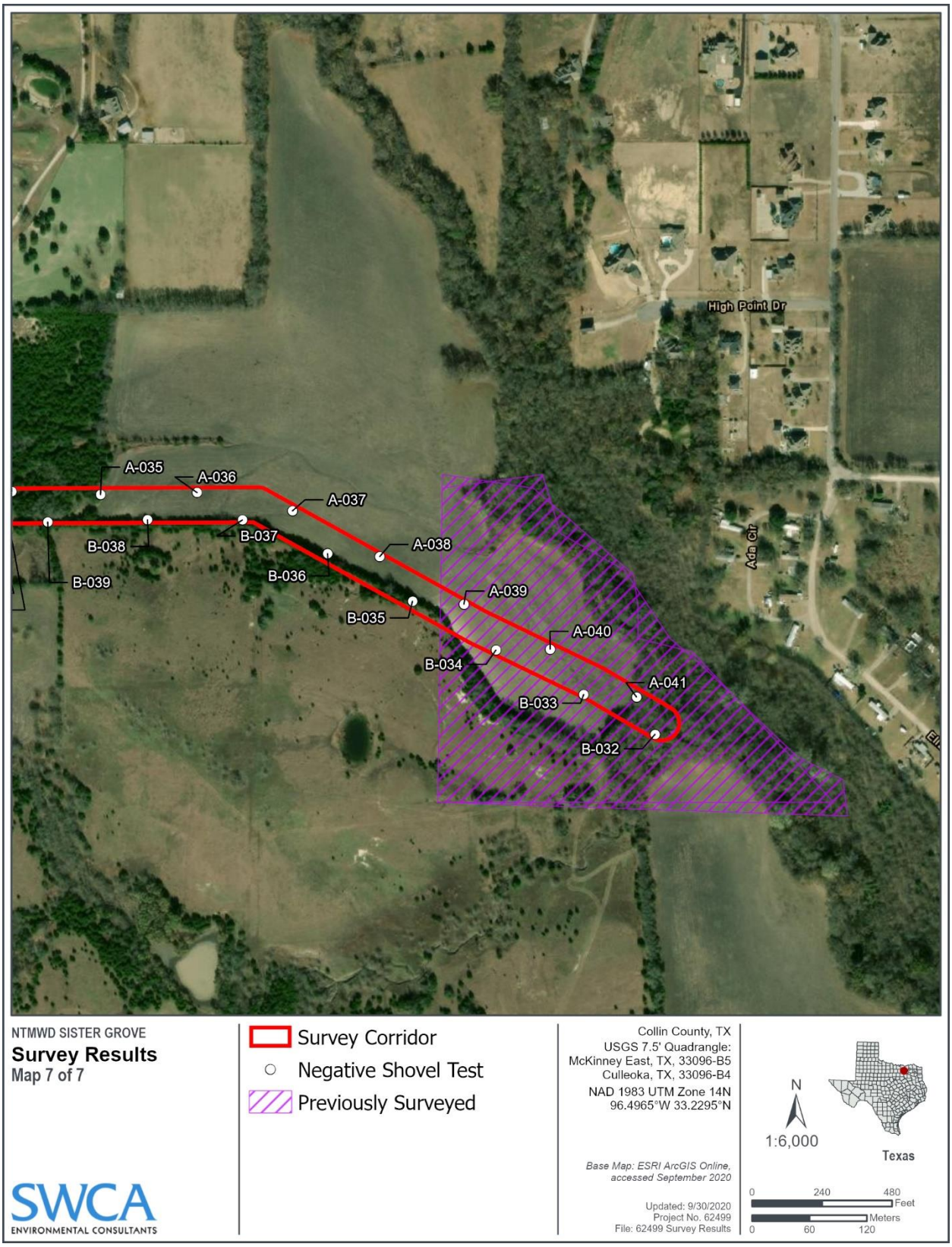
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B-039
NTMWD SISTER GROVE
Survey Results
Map 7 of 7
Survey Corridor
Negative Shovel Test
Previously Surveyed
Collin County, TX
USGS 7.5' Quadrangle:
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Culleoka, TX, 33096-B4
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File: 62499 Survey Results
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APPENDIX D

Pipeline Survey Shovel Test Data

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
A-001	-	1	0-21	10YR 4/1	Dark Gray	Clay	Negative	Gravel Impasse	Open field, hay pasture, cultivated field, ground surface visibility (GSV) 5%
		2	21-40	10YR 6/3	Pale Brown	Clay	Negative		Small gravels
		3	40-45	10YR 7/3	Very Pale Brown	Clay	Negative		Gravels
A-002	-	1	0-50	10YR 2/1	Black	Clay	Negative	Gravel Impasse	In grassy pasture, 5% gravels, compact, GSV 0%
		2	50-60	2.5YR 6/6	Light Red	Clay	Negative		Highly compact, 80% gravels
A-003	-	1	0-50	10YR 5/3	Brown	Clay	Negative	Gravel Impasse	Open field, hay pasture, cultivated field, 5-10% gravels and roots, GSV 5%
A-004	-	1	0-30	2.5YR 3/2	Dusty Red	Clay	Negative	Gravel Impasse	In grassy pasture, 5-10% gravels, GSV 5%
		2	30-60	10YR 4/2	Dark Grayish Brown	Clay	Negative		Increasing gravel with depth
A-005	-	1	0-80	10YR 5/2	Grayish Brown	Clay	Negative	Depth	Open field, grasses, cultivated field, 5-10% gravels and roots, GSV 5%
A-006	-	1	0-70	7.5YR 2.5/1	Black	Clay	Negative	Gravel Impasse	5-10% gravels, compact, GSV 5%
A-007	-	1	0-43	7.5YR 2.5/2	Very Dark Brown	Clay	Negative	Gravel Impasse	Open field, tall grass, hay field, 10-20% gravels, compact, sticky clay, GSV 0%
A-008	-	1	0-10	7.5YR 4/1	Dark Gray	Clay	Negative	Gravel Impasse	In grassy pasture, 10% gravels, GSV 5%
		2	10-30	7.5YR 7/3	Pink	Clay	Negative		80% gravels
A-009	-	1	0-47	7.5YR 5/2	Brown	Clay	Negative	Gravel Impasse	Open field, hay pasture, coniferous trees, 5-10% gravels
		2	47-53	7.5YR 7/2	Pinkish Gray	Clay	Negative		80% gravels
A-010	-	1	0-60	7.5YR 2.5/1	Black	Clay	Negative	Compact Soil	In grassy pasture, GSV 0%
A-011	-	1	0-65	7.5YR 2.5/2	Very Dark Brown	Clay	Negative	Gravel Impasse	Open field, hay pasture, 10% gravels, 10% roots, GSV 0%
A-012	-	1	0-30	7.5YR 5/2	Brown	Clay	Negative	Gravel Impasse	In grassy field, gravel increasing from 10% to impasse, GSV 0%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
A-013	-	1	0-30	7.5YR 2.5/1	Black	Clay	Negative	Gravel Impasse	Grassy field, 60% gravels, GSV 0%
A-014	-	1	0-42	10YR 3/2	Brown	Clay	Negative	Water table	In open plowed field, very wet, 5% gravels, GSV 100%
A-015	-	1	0-50	10YR 2/1	Black	Clay	Negative	Compact Soil	Open plowed field, deciduous trees, sticky clay-broken up by hand, GSV 100%
A-016	-	1	0-42	10YR 4/2	Dark Grayish Brown	Clay	Negative	Water table	In open plowed field, very wet, 5% gravels, GSV 100%
A-017	-	1	0-40	10YR 2/1	Black	Clay	Negative	Water table	Open plowed field with trees and grasses at a distance, compact stick clay, GSV 100%
A-018	-	1	0-50	10YR 4/2	Dark Grayish Brown	Clay	Negative	Water table	In muddy field, very wet, 5% rounded and subrounded gravels, GSV 100%
A-019	-	1	0-30	10YR 2/1	Black	Clay	Negative	Compact Soil	Down slope; open plowed field with deciduous and coniferous trees at a distance, compact soil-saturated/sticky, GSV 100%
A-020	-	1	0-45	10YR 5/2	Grayish Brown	Clay	Negative	Compact Soil	In muddy field, very wet, 5% small calcareous inclusions, grasses 10m north, GSV 100%
A-021	-	1	0-25	10YR 2/1	Black	Clay	Negative	Water table	Up slope; open plowed field with deciduous and coniferous trees at a distance, saturated soil, GSV 95%
A-022	-	1	0-50	10YR 6/2	Light Brownish Gray	Clay	Negative	Water table	In plowed muddy field, very wet, grasses, 5% calcareous inclusions
A-023	-	1	0-40	10YR 4/1	Dark Gray	Clay	Negative	Water table	Open plowed field, some grasses, deciduous and coniferous trees at a distance, saturated soil, 5% pebbles, GSV 100%
A-024	-	1	0-20	10YR 4/2	Dark Grayish Brown	Clay	Negative	Compact Soil	Grassy pasture, some bioturbation, 10% roots, GSV 0%
		2	20-53	10YR 6/6	Brownish Yellow	Clay	Negative		Large and prominent CaCO3

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
A-025	-	1	0-35	10YR 4/2	Dark Grayish Brown	Clay	Negative	Compact Soil	In grassy and wooded area, 10% gravels, 30% roots, rutting and roadway, relocated 2X, GSV 0%
A-026	-	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Coniferous trees, dense vegetation, sticky and compact soils, GSV 60%
A-027	-	1	0-45	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Thick juniper and oak, some snail shells, erosion, 10% roots, GSV 50%
A-028	41COL337	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Coniferous trees, tall grasses, south of trash pile, GSV 20%
A-029	41COL337	1	0-45	10YR 5/2	Grayish Brown	Clay	Negative	Root Impasse	Thick juniper, oak, and poison ivy, some bioturbation, roots 20%, GSV 50%
A-030	41COL337	1	0-50	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Coniferous trees, grasses, 20% roots, GSV 10%
A-031	41COL337	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Coniferous trees, tall grasses, dense vegetation, modern trash close by, GSV 0%
A-032	41COL337	1	0-31	10YR 6/2	Light Brownish Gray	Clay	Negative	Root Impasse	In juniper brush, grasses, some CaCO3, 20% roots, erosion, GSV 0%
A-033	41COL337	1	0-35	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Coniferous trees, poison oak and ivy, GSV 15%
A-034	41COL337	1	0-43	10YR 5/2	Grayish Brown	Clay	Negative	Root Impasse	Thick juniper and oak, erosion, 20% roots, 10% pebbles GSV 50%
A-035	-	1	0-35	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Deciduous/coniferous tress, open field, dense vegetation, tall grasses, close to modern trash N, GSV 50%
A-036	-	1	0-65	10YR 3/2	Brown	clay	Negative	Compact Soil	In open grassy field, erosion, 5% roots, 5% snail shells, increasing compaction with depth, GSV 10%
A-037	-	1	0-25	10YR 4/1	Dark Gray	Clay	Negative	Water table	In open field with tall grasses and sunflowers, coniferous trees at a distance, sticky/saturated soil, GSV 15%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
A-038	-	1	0-50	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	In pasture with sunflower and gravel, 5% roots, increasing compaction with depth, moist soil, GSV 0%
A-039	-	1	0-50	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	In open field with tall grasses and sunflowers, coniferous trees at a distance, sticky soil, GSV 15%
A-040	-	1	0-33	10YR 5/2	Grayish Brown	Clay	Negative	Water table	In boggy field with waist high herbaceous plants, 5% roots, very wet, GSV 0%
A-041	-	1	0-40	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Close to tree line, deciduous trees, tall grasses and brush, GSV 5%
A-042	41COL338	1	0-45	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Surface finds-large water pipe fragments(4), crock(1), high temp fired porcelain fragment(1), milk glass fragment(1) whiteware fragment(1), clear glass fragment(1), amethyst glass fragment(1), iron fragment(1), in bois d'arc and cedar, roots throughout, erosion, GSV 50%
A-043	41COL338	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Surface find 5m from ST-cobalt glass base with manufacture symbol of a triangle inside a triangle (Vicks VapoRub 1910-1930), side of the road with tall grasses and deciduous trees, GSV 0%
A-044	41COL338	1	0-35	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	With 2.5Y 7/8, coniferous trees, tall grasses, close to dirt road, GSV 0%
A-045	41COL338	1	0-35	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Adjacent two-track, thick deciduous, bioturbation, roots, erosion, GSV 0%
A-046	41COL338	1	0-25	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Surface finds- glazed pipe(3), possible brick(1), cement fragment(1), colorless glass(3), aqua glass(1), glazed ceramic(1), dense vegetation with deciduous and coniferous trees, GSV 0%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
A-047	41COL338	1	0-45	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Adjacent two-track, thick deciduous, bioturbation, roots, GSV 0%
A-048	41COL338	1	0-20	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Surface finds-large iron bracket(1), low fired porcelain(1), whiteware ceramic base(1), crock fragments(2), stoneware with British unicorn fragment(1), amethyst glass fragment(1), small amber bottle 1oz), whiteware body fragment(1), in thick juniper and oak, massive amounts of large roots, erosion, GSV 50%
A-049	IF01	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Surface find- whiteware(1), open plowed field close to drainage, sticky soil, 5% calcium carbonate, deciduous trees, GSV 100%
A-050	IF01	1	0-40	10YR 4/2	Dark Grayish Brown	Clay	Negative	Compact Soil	In muddy field, 10% CaCO3 (small but strong), erosion, GSV 100%
A-051	IF01	1	0-40	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Open plowed field with deciduous trees in the distance, 10% calcium carbonate west 10m from IF
A-052	IF01	1	0-40	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	In muddy field, deciduous trees near, north of IF, 10% calcium carbonate, GSV 10%
A-053	IF01	1	0-10	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Close to fence line and tree line, creek 10-20m away, sticky soil, 5% roots, GSV 100%
A-054	-	1	0-35	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Open plowed field, adjacent to tree line, 35% roots, GSV 100%
A-055	41COL338	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Surface find- amber bottle base(1), in thick juniper, oak, and ivy, erosion, 10% gravels, 20% roots, GSV 0%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
A-056	41COL338	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Surface finds-aqua Dr. Pepper bottles(5), pearl amber bottle(2), small amber bottles(3), milk glass(1), patinated clear glass(1), dense vegetation uphill with deciduous trees, GSV 5%
A-057	41COL338	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Surface finds- amber bottle fragments (10), clear glass fragments(40+),oil can lids(2) , erosion, some snail shell, 20% roots, GSV 0%
A-058	41COL338	1	0-10	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Dense vegetation, deciduous trees, 70% roots, GSV 40%
A-059	41COL338	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Surface finds- amber beer bottles (3), thick brush, 20% roots, erosion, GSV 0%
A-060	41COL338	1	0-25	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Surface find- milk glass canning jar lid(1), thick brush, poison ivy, erosion, 40% roots, GSV 0%
A-061	41COL338	1	0-43	10YR 4/2	Dark Grayish Brown	Clay	Negative	Compact Soil	In plowed corn field, GSV 60%
A-062	41COL338	1	0-30	10YR 4/1	Dark Gray	Clay	Positive	Root Impasse	Surface finds-fridge(1), bricks (Standard Brick Co. Palmer Texas, metal toolbox(1), collapsing structure(1), NW of structure, 30% roots, GSV 0%, metal flag stake(1) subsurface
A-063	41COL338	1	0-36	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Surface find- metal fragments, cow pasture, deciduous trees, NE of structure GSV 25%
A-064	41COL339	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Near entrance to muddy field, deciduous trees, erosion, 20% gravel, brick fragment(1) 0-10cmbs
B-001	-	1	0-40	7.5YR 4/1	Dark Gray	Clay	Negative	Compact Soil	In grassy pasture, 10% gravels, GSV 0%
		2	40-63	10YR 5/2	Grayish Brown	Clay	Negative		40-50% gravels
B-002	-	1	0-45	7.5YR 4/2	Brown	Clay	Negative	Gravel Impasse	Open field, pasture, tall grasses, hay field, GSV 5%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
B-003	-	1	0-45	7.5YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Grassy field and thick brush, expanded unit due to roots, GSV 0%
B-004	-	1	0-44	7.5YR 4/2	Brown	Clay	Negative	Compact Soil	Open pasture, close to two-track road, grasses, deciduous/coniferous trees, close to fence, GSV 0%
B-005	-	1	0-40	7.5YR 2.5/1	Black	Clay	Negative	Compact Soil	In grassy pasture, adjacent fence line, GSV 10%
		2	40-63	7.5YR 4/1	Dark Gray	Clay	Negative		20% gravels
B-006	-	1	0-52	7.5YR 4/2	Brown	Clay	Negative	Gravel Impasse	Open field with grasses and coniferous and deciduous trees, hay field, side of two-track road and fence, GSV 10%
		2	52-64	10YR 4/6	Dark Yellowish Brown	Clay	Negative		Gravels 20-70%
B-007	-	1	0-75	7.5YR 2.5/1	Black	Clay	Negative	Compact Soil	In grassy pasture, GSV 0%
B-008	-	1	0-50	7.5YR 2.5/1	Black	Clay	Negative	Gravel Impasse	Open field, pasture, 5% roots, GSV 0%
B-009	-	1	0-20	7.5YR 4/1	Dark Gray	Clay	Negative	Gravel Impasse	Open field, hay pasture, 20-80% gravels, GSV 0%
B-010	-	1	0-25	7.5YR 2.5/1	Black	Clay	Negative	Gravel Impasse	Grassy pasture, 10% gravels, GSV 0%
		2	25-50	7.5YR 7/4	Pink	Clay	Negative		-
B-011	-	1	0-65	7.5YR 4/1	Dark Gray	Clay	Negative	Gravel Impasse	Open field, hay pasture, compact, GSV 0%
B-012	-	1	0-25	10YR 4/1	Dark Gray	Clay	Negative	Water table	Plowed field close to tree line, coniferous/deciduous trees, saturated soil-trowel sorted, GSV 100%
B-013	41COL336	1	0-30	7.5YR 2.5/1	Black	Clay	Negative	Water table	Surface find-ceramic whiteware(1), open plowed field, saturated soil-trowel sorted, GSV 100%
B-014	41COL336	1	0-50	10YR 3/2	Brown	Clay	Negative	Water table	In open plowed field, very wet, 5% gravels, GSV 100%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
B-015	41COL336	1	0-35	10YR 3/2	Brown	Clay	Negative	Root Impasse	In open plowed field, very wet, 5% gravels, GSV 100%
B-016	41COL336	1	0-25	7.5YR 2.5/1	Black	Clay	Negative	Root Impasse	Plowed field, deciduous and coniferous trees, 10% roots, trowel sorted, GSV 100%
		2	25-36	10YR 4/2	Dark Grayish Brown	Clay	Negative		20-80% gravel
B-017	41COL336	1	0-50	10YR 3/2	Brown	Clay	Negative	Compact Soil	In open plowed field, very wet, 5% gravels, GSV 100%
B-018	41COL336	1	0-18	7.5YR 2.5/1	Black	Clay	Negative	Compact Soil	Surface finds-clear glass(1), amethyst glass(1), ceramic whiteware(1), open plowed field, deciduous and coniferous trees, NW from abandoned house outside corridor, GSV 100%
		2	18-50	10YR 4/2	Dark Grayish Brown	Clay	Negative		50-60% gravels
B-019	41COL336	1	0-35	10YR 3/2	Brown	Clay	Negative	Water table	Plowed field, house located 60m south, very wet, 5% gravels, GSV 100%
B-020	41COL336	1	0-50	10YR 3/2	Brown	Clay	Negative	Compact Soil	Plowed field, very wet, 5% gravels
B-021	41COL336	1	0-30	7.5YR 2.5/1	Black	Clay	Negative	Water table	Open plowed field, trees at a distance, saturated soil- trowel sorted, GSV 100%
B-022	41COL336	1	0-50	7.5YR 2.5/1	Black	Clay	Negative	Compact Soil	Open plowed field, trees at a distance, saturated soil- trowel sorted, GSV 100%
B-023	-	1	0-25	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Open plowed field, close to tree line with deciduous trees and poison oak, 15% roots, GSV 50%
B-024	-	1	0-35	10YR 4/2	Dark Grayish Brown	Clay	Negative	Water table	In muddy pasture, 5% gravels, 5% roots, GSV 100%
B-025	-	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Water table	Open plowed field, saturated, GSV 100%
B-026	-	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Water table	In muddy grassy pasture, 0-5% gravels, GSV 100%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
B-027	-	1	0-30	10YR 3/2	Brown	Clay	Negative	Water table	In boggy and grassy drainage, 10% roots, GSV 0%
B-028	-	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Water table	In muddy open field, 10% pebbles, GSV 100%
B-029	-	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Water table	Open plowed field, close to drainage and tall grasses, compact soil-saturated/sticky, GSV 100%
B-030	-	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Water table	Muddy field, grasses 5m west, 10% pebbles, GSV 100%
B-031	-	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Water table	In muddy field, 10% pebbles
B-032	-	1	0-35	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	On creek bank, thick deciduous, erosion, thick roots throughout, some snail shell, GSV 20%
B-033	-	1	0-50	10YR 5/2	Grayish Brown	Clay	Negative	Compact Soil	In grassy field with herbaceous plants, snail shell, 10% roots, GSV 0%
B-034	-	1	0-44	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Open field with tall grasses and sunflowers, deciduous and coniferous trees at a distance, GSV 0%
B-035	-	1	0-35	10YR 6/4	Light Yellowish Brown	Clay	Negative	Root Impasse	Adjacent fence line and two-track, cedar and poison ivy, shell fragments, 30% roots, erosion, GSV 30%
B-036	-	1	0-66	10YR 7/3	Very Pale Brown	Clay	Negative	Compact Soil	Mottled with 10YR 7/8, close to two-track road and side of coniferous trees, tall grasses and sunflowers, sticky soil, GSV 100%
B-037	-	1	0-65	10YR 5/2	Grayish Brown	Clay	Negative	Compact Soil	Cedar, poison ivy, grasses, some small gravels, 20% roots, GSV 80%
B-038	-	1	0-35	10YR 5/3	Brown	Clay	Negative	Root Impasse	Between two-track road and coniferous/deciduous tree line, sunflowers, grasses, roots, GSV 100%

Shovel Test No.	Site	Level	Depth	Munsell Value	Munsell Color	Soil Texture	Positive/Negative	Reason for Termination	Inclusions and comments
B-039	-	1	0-25	10YR 7/4	Very Pale Brown	Clay	Negative	Bedrock	Near erosion, juniper, grasses, poison ivy, 70% gravels, GSV 100%
B-040	-	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Dense vegetation with juniper trees and bushes, roots, GSV 100%
B-041	-	1	0-35	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Thick juniper and oak, erosion, 30% roots, GSV 0%
B-042	-	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Root Impasse	Mesquite, tall grasses, juniper and coniferous and deciduous trees, close to dirt road, GSV 15%
B-043	-	1	0-25	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	In muddy open field, very wet, 10% CaCO3, GSV 100%
		2	25-50	10YR 7/4	Very Pale Brown	Clay	Negative		-
B-044	IF02	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Compact Soil	Surface find-amethyst glass(1), in muddy field, 10% gravels, erosion, GSV 100%
B-045	IF02	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Open plowed field, deciduous and coniferous trees N 10m, GSV 100%
B-046	IF02	1	0-30	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	In muddy field, 10% gravels, W 10m of IF, GSV 100%
B-047	IF02	1	0-30	10YR 4/2	Dark Grayish Brown	Clay	Negative	Compact Soil	Open plowed field , sticky soil, E 10m of IF
B-048	41COL339	1	0-35	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Close to plowed field, NE corner of structure(house), GSV 0%
B-049	41COL339	1	0-45	10YR 4/3	Brown	Clay	Negative	Root Impasse	In thick herbaceous plants, deciduous trees, roots throughout, SE corner of structure, GSV 0%
B-050	41COL339	1	0-35	10YR 4/1	Dark Gray	Clay	Negative	Root Impasse	Open plowed field, deciduous trees, SW corner of structure, GSV 60%
B-051	41COL339	1	0-40	10YR 4/1	Dark Gray	Clay	Negative	Compact Soil	Between plowed field and deciduous trees, NW corner of structure, GSV 45%