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Cultural Resources Survey for the Proposed Warehouse Center Drive Project located in Harris County, Texas

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Lead Agency:
United States Army Corps
of Engineers (USACE),
Galveston District

Permit Application No. SWG-2017-00360

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GRAY & PAPE
HERITAGE MANAGEMENT

December 14, 2017

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ABSTRACT

In October 2017, Gray & Pape, Inc., of Houston, Texas, performed an intensive pedestrian cultural resources survey of approximately 13.8 hectares (34 acres) of land proposed for development in northeast Harris County, Texas. The Lead Federal Agency for this project has been identified as the United States Army Corps of Engineers, Galveston District.

The goals of the survey were to establish whether previously unidentified buried archaeological resources were located within or immediately adjacent to the project's Area of Potential Effects and if so to provide management recommendations for such resources. The survey was undertaken in accordance with requirements set forth by Section 106 of the National Historic Preservation Act, specifically requirements set forth by 36 CFR 800. The procedures to be followed by the United States Army Corps of Engineers to fulfill the requirements set forth in the National Historic Preservation Act, other applicable historic preservation laws, and Presidential directives as they relate to the regulatory program of the United States Army Corps of Engineers (33 CFR Parts 320-334) are articulated in the Regulatory Program of the United States Army Corps of Engineers, Part 325 - Processing of Department of the Army Permits, Appendix C - Procedures for the Protection of Historic Properties. All fieldwork and reporting activities were completed with reference to State laws and guidelines (the Antiquities Code of Texas). Survey and site identification followed Texas Antiquities Code standards.

Fieldwork took place between October 13 and 17, 2017, and required 48 person hours to complete. Field investigation consisted of intensive pedestrian surface inspection, subsurface shovel testing, photographic documentation, and mapping. A total of 22 shovel tests were excavated. No prehistoric or historic artifacts or cultural features were observed. No new or previously recorded archaeological sites were located within the project boundary.

Based on the results of the survey, Gray & Pape, Inc. recommends that no further cultural resources work be required and that the project be cleared to proceed as currently planned.

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1.0 INTRODUCTION

In October 2017, BIO-WEST, Inc. (BIO-WEST), of Houston, Texas, contracted with Gray & Pape, Inc. (Gray & Pape), of Houston, Texas, to perform an intensive pedestrian cultural resources survey of approximately 13.8 hectares (34 acres) of land proposed for development in northeast Harris County, Texas. The Lead Federal Agency for this project has been identified as the United States Army Corps of Engineers (USACE), Galveston District. The goals of the survey were to determine if the project would affect any previously identified archaeological sites as defined by Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (36 CFR 800), and to establish whether or not previously unidentified buried archaeological resources were located within the project's Area of Potential Effects (APE). The APE for archaeological investigation is defined as all 13.8 hectares (34 acres) of project area. All fieldwork and reporting activities were completed with reference to state (the Antiquities Code of Texas) and federal (NHPA) guidelines.

1.1 Project Overview

The project area is located on the *Humble, Texas*, 7.5-minute United States Geological Survey (USGS) topographic quadrangle map (1999) (Figure 1-1). The proposed project area is located 0.63 kilometers (1.32 miles) west of United States (US) Highway 59/ Interstate 69 and directly south of Betty Joyce Lane. It is approximately 2.26 kilometers (1.40 miles) southwest from Humble, Texas. A pond is located immediately outside of the northwestern boundary of the project tract. Utility poles are located along Leonard Road at the southern end of the project area. The subject tract is surrounded by neighborhoods to the north, business warehouses to the west, and undeveloped areas to the south and east. Two-track roads pass through portions of the project area.

1.2 Report Organization

This report is organized into seven numbered chapters and one lettered appendix. Chapter 1.0 provides an overview of the project. Chapter 2.0 presents an overview of the environmental setting and geomorphology. Chapter 3.0 presents a discussion of the cultural context associated with the project area. Chapter 4.0 presents the methods developed for this investigation. The results of this investigation are presented in Chapter 5.0. Chapter 6.0 presents the investigation summary and provides recommendations based on the results of field survey. A list of literary references cited in the body of the report is provided in Chapter 7.0. A log of all conducted shovel tests is located in Appendix A.

1.3 Acknowledgements

Site file research was conducted by Sr. Principal Investigator Tony Scott prior to fieldwork mobilization. Fieldwork was conducted between October 13 and 17, 2017 by Archaeologists Jacob Hilton and Morgan Wampler. Fieldwork required approximately 48 person hours to complete. Mr. Hilton and Mr. Scott prepared the report. Mr. Scott and Duncan Hughey produced report graphics and the report was edited and produced by Jessica Bludau.

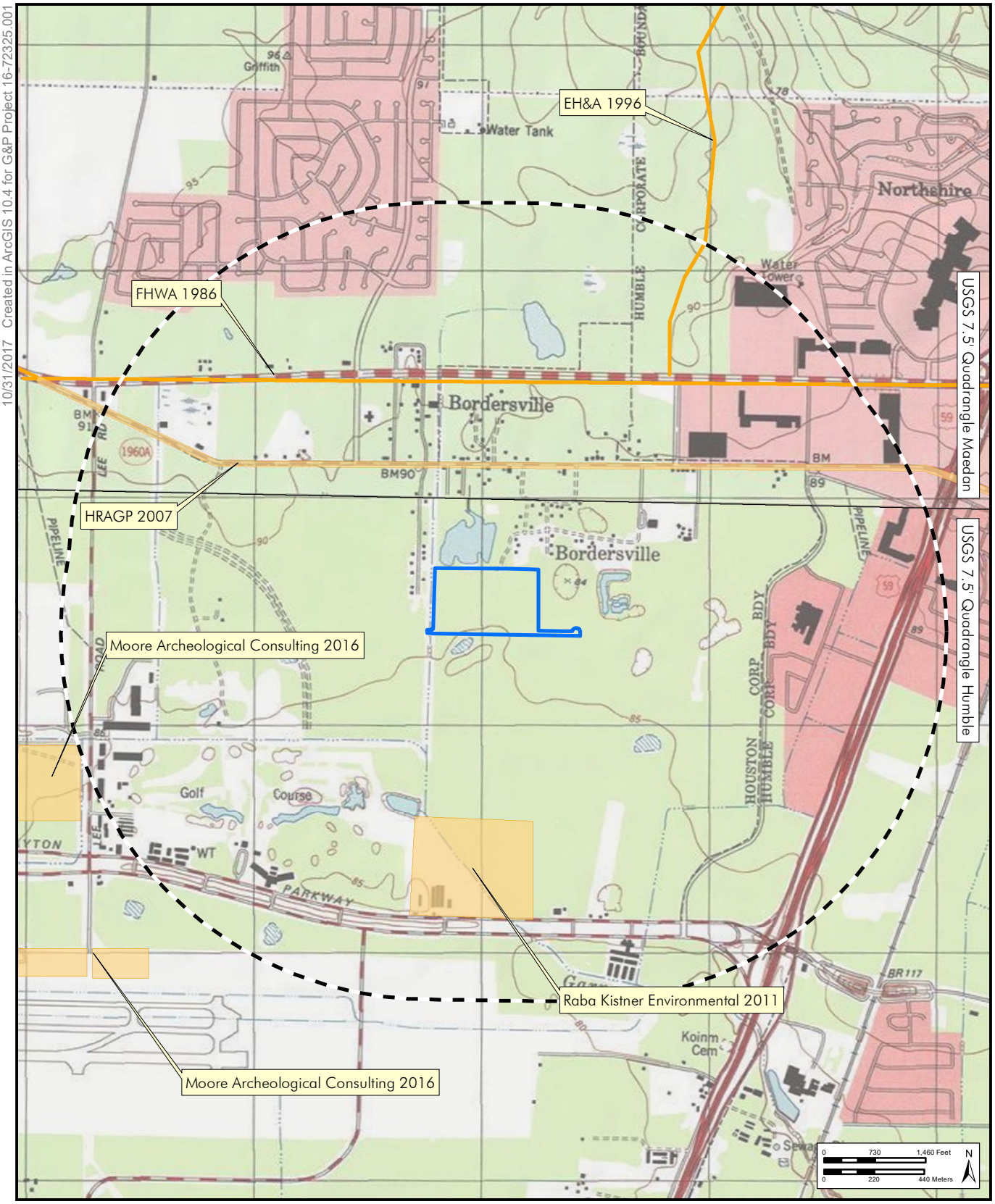

Figure 1-1
Project area location in Harris County, Texas.

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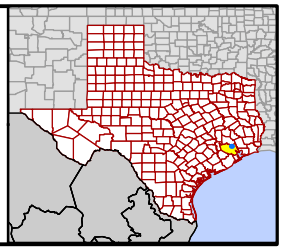
- Project Area
- Study Radius (1.6-km/1-mi.)
- Previously Recorded Area Survey
- Previously Recorded Linear Survey
- USGS Quadrangle Boundary



2.0 ENVIRONMENTAL CONTEXT

2.1 Physiography and Geomorphology

2.2 Surface Geology

The project area is underlain by the Lissie Formation dated to the Late Pleistocene and Early Holocene. The upper part of this stratigraphic unit is composed of clay, silt, and sand with very minor siliceous gravel. Calcium carbonate, iron oxide, and iron-manganese oxide concretions are common in zones of weathering. The surface is fairly flat and featureless except for numerous rounded shallow depressions and pimple mounds. The lower part has a similar composition of clay, silt, and sand with slightly coarser gravel. This part is also noncalcareous with more abundant iron oxide concretions (USGS 2017).

2.3 Soils

Soils within the current project area are mapped as Gessner fine sandy loam, 0-1 percent slopes ponded and Wockley fine sandy loam, 0-1 percent slopes (Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture [SSS NRCS USDA] 2017).

Wockley series soils are somewhat poorly drained and very deep. Wockley soils formed from Willis Formation of late Pleisticene age loamy sediments. The surface layer is dark grayish brown fine sandy loam. Next is a brown fine sandy loam layer. This is followed by a layer of brown sandy clay loam. Beneath that are two light brownish gray sandy clay loam layers (SSS NRCS USDA 2017). Wockley soils typically have a low geoarchaeological potential "or likelihood that the soil could contain buried cultural material in reasonable context" (Abbott 2001:20).

Gessner series soils are poorly drained and very deep. The soils formed from Lissie Formation of Pleistocene age loamy sediments. Gessner soils have a dark grayish brown fine sandy loam surface layer. Next are three layers of grayish brown fine sandy loam. Below this is are two dark grayish brown sandy clay loam layers. This is followed by a layer of light brownish gray sandy clay loam. The final two layers are light gray sandy clay loam (SSS NRCS USDA 2017). Gessner loam is considered to have a low-moderate potential for containing buried resources (Abbott 2001: table 2).

2.4 Natural Environment

2.4.1 Flora and Fauna

Present-day Harris County is located near the western edge of the Austroriparian biotic province, and is situated in the Upland Prairies and Woods subregion of the Gulf Coast Prairies and Marshes Region (Abbott 2001). Evidence from pollen analysis in Central Texas suggests that, at least during the Late Pleistocene, the area may have been populated by vegetative species that were tolerant of a cold weather environment. Climactic fluctuation during the Holocene would eventually result in a gradual trend towards warmer weather, similar to that seen today (Abbott 2001).

Late Pleistocene flora may have included populations of spruce, poplar, maple, and pine (Holloway 1997), in an oak woodland environment that would eventually transition to an oak savanna in the late Holocene (Abbott 2001). Fauna during this time would include currently present species such as white-tailed deer and various smaller game, as well as bison, and, in localized areas, pronghorn sheep and the American alligator (Abbott 2001).

The modern vegetative community associated with this region consists of a diverse collection of primarily deciduous trees and undergrowth (Abbott 2001). Modern land alteration activities, especially those associated with agriculture, have resulted in the removal of native plant species from the area. Identified trees may include water oak, pecan, various elms, cedar, oaks, sweetgum, and mulberry, to name a few. Honeysuckle, dewberry, yaupon, and blackberry are common, as are indiangrass and bluegrasses (Abbott 2001).

2.4.2 Climate

Harris County's close proximity to the Gulf of Mexico tends to influence the temperature, rainfall, and relative humidity of the region. Winds usually trend from the southeast or east, except for in winter months when high-pressure systems can bring in polar air from the north. Average temperatures in the summer can reach well above 30 degrees Celsius (90 degrees Fahrenheit), and are often accompanied by equally high humidity. Although winter temperatures can reach below 0 degrees Celsius (30 degrees Fahrenheit), below freezing temperatures usually occur on only a few days out of every year, and are typically restricted to the early morning hours (Wheeler 1976).

Rainfall is even throughout the year, with an average monthly distribution ranging from between 43 centimeters (17 inches) to trace amounts; rainfall comes primarily from thunderstorms (Wheeler 1976), which tend to be heavy but of short duration

2.5 Land Use

In general, the Gulf Coast Prairies and Marshes are used for agriculture and pastoralism. The APE in particular is currently being used as a stockyard and staging area for heavy machinery.

3.0 CULTURAL CONTEXT

The Southeastern Texas archaeological region includes the Upper Texas Coast from the Sabine River to the Brazos River delta and the adjacent inland prairies and marshes. The coastal zone extending inland from the Gulf Coast approximately 30 to 40 kilometers (19 to 25 miles) is better understood than the inland prairie due to a greater continuity in research goals and perspectives and more isolable temporal components. A general outline of the inland area cultural chronology, however, is still possible. Prehistoric Native American settlement in Southeast Texas is generally divided into three broad chronological categories: the Paleoindian period, the Archaic period, and the Late Prehistoric period.

3.1 Prehistoric Context

Traditionally, Southeast Texas has been viewed as a buffer zone between cultural regions in prehistoric times. Patterson (1995) describes the archaeological record in this area as being an interface between the Southern Plains and the Southeast Woodlands. Along similar lines, both Shafer (1975) and Aten (1984) have categorized the Post-Archaic archaeological record of this region as Woodland. This categorization is not meant to literally invoke the exact cultural patterns and chronology of the Woodlands culture found to the east. Aten (1984:74) summarizes his concept by saying, "it loosely connotes activities by populations on a geographic as well as a cultural periphery of the southeastern Woodlands."

Dee Ann Story (1990) has suggested that the culture of Southeast Texas is distinctive enough so as to merit a separate designation by the Late Prehistoric. The Mossy Grove cultural tradition is a heuristic concept based on technological similarities shared by groups in this region. The primary marker of this technological tradition is the plain, sandy-paste Goose Creek pottery that is found in this region from the Early Ceramic through Early Historic periods.

Ethnic affiliations for the region are not entirely clear. Aten (1983) has defined the Brazos Delta-West Bay, Galveston Bay, and Sabine Lake archaeological areas and suggests that they may correlate with the Historic territories of the Coco, Akokisa, and Atakapa groups, respectively. Similarly, historic reconstructions of the inland subregion suggest a number of possible group affiliations (Story 1990). The historic economic inland/coastal cycle of the Akokisa, which stretched from Galveston Bay to the San Jacinto River basin, may mean that archaeological materials in the Lake Conroe area are affiliated with this group. Alternately, these remains may be associated with the Bidais who occupied territory immediately to the north of the Akokisa groups. At this point in time it is not possible to identify the cultural affiliation of the groups that inhabited the inland subregion. In part, this is a function of the dynamic nature of this region in which a number of cultural traditions met and diffused.

The Southeast Texas region is divided into inland and coastal margin subregions, which have archaeologically distinctive subsistence patterns, settlement patterns, and artifact types. Archaeological and historic evidence suggests that some groups exploited inland resources year-round, while other groups spent parts of the year both inland and on the coast.

Based on aspects of material culture, researchers have identified six archaeological time periods associated with Native Americans in the Southeast Texas region; in general, these include the Paleoindian, Archaic (with Early, Middle, and Late subdivisions), Ceramic, Late Prehistoric, Protohistoric, and Historic Indian. Archaeologists within the region agree on the general framework of cultural time periods, while disagreeing on the temporal boundaries of these periods. Despite these

differences, the chronologies developed by researchers are based primarily on changes in projectile point technologies within the region and the introduction of pottery. It is generally recognized that a broad-based hunting and gathering lifestyle was utilized throughout all time periods. For the purpose of this document, the temporal boundaries of prehistoric periods will be primarily based on Story (1990) and Aten (1983) and this information is merged with the archaeological data here to give a complete picture of life on the Upper Texas Coast.

3.1.1 Paleoindian Period

Along the Upper Texas Coast, the Paleoindian period (termed the Early Cultures by Story) begins around 12,000 Before Present (B.P.) and ends near 9,000 to 8,000 B.P. (Aten 1983; Story 1990). Evidence is sparse for Paleoindian habitation, and much of what is known about the period in the area comes from a compilation of materials gathered from the state of Texas and North America. At the close of the Pleistocene, large game hunters crossed the Bering Strait, and within a few millennia had penetrated into South America (Culberson 1993; Newcomb 1961). The Paleoindian people traveled in small bands (Culberson 1993) and were mega-fauna hunter-gatherers with the bulk of their meat protein derived from mammoths, mastodons, giant bison, and giant sloths. These groups carried with them an easily recognizable stone tool material culture, though admittedly, little is known about their wooden or bone tools and clothing types. The later Folsom Culture developed a very efficient toolkit that was apparently designed to be portable leading to theories that these people were following buffalo herds across the plains. However, the widespread use of Folsom technology suggests that the technology spread beyond the area for which it was initially designed. Isolated Paleoindian artifacts found across southeastern Texas include Clovis, Angostura, Scottsbluff, Meserve, Plainview, and Golondrina point types (Aten 1983).

The Transitional Archaic period begins about 9,000 B.P. and ends around 7,500 B.P. (Aten 1983; Story 1990). This stage is also poorly represented in the archaeological work in the area; however recent data recovery efforts at the Dimond Knoll Site (41HR796) have contributed to the knowledge of the Paleoindian and early Archaic occupation in the area of Harris County in particular (Barrett and Weinstein 2013). Isolated finds of Bell/Calf Creek, Early-Side Notched, and Early Expanding Stemmed dart points are also attributed to this time period.

3.1.2 Archaic Period

With the retreat of the glaciers (the Hypsithermal period), the mega-fauna upon which the Paleoindian peoples depended gradually became extinct. This shift in food supply is seen as the pivotal transition point between the Paleo and Archaic periods (Biesaart et al. 1985; Culberson 1993; Newcomb 1961). Though dates often disagree (ranging from 8,000 B.C. marking the beginning of the Early Archaic [Culberson 1993], to Aten [1984] stating that the transition from Late Archaic to Late Prehistoric-Woodland began around A.D. 100), there are three progressive stages recognizable during the Archaic period: the Early, Middle, and Late.

Much of what is known about the Early Archaic peoples indicates that they were small, isolated bands of hunter-gatherers that remained in relatively restricted regions (Aten 1984). With the loss of the mega-fauna as a food source, the Early Archaic peoples adopted the hunting of smaller game such as bison and deer and increased their reliance on foraging (Culberson 1993). The material record fits the transitional makeup of this period because there was a dramatic shift from the large spear points of the Paleoindian period to a reliance on smaller dart-type points. Diagnostic designs for this period are Dalton, San Patrice, Angostura, Golondrina, Merserve, Scottsbluff,

Wells, Hoxie, Gower, Uvalde, Martindale, Bell, Andice, Baird, and Taylor (Turner and Hester 1993). These points are much more crudely made than their Paleo precursors, but remain designed for use on a spear shaft.

The Middle Archaic period saw the largest growth in technology and in the number of stone tools utilized. Specialized tools appeared for the milling of wild plant foodstuffs (Culberson 1993) along with a large assortment of tools for food preparation and procurement. Gravers, scrapers, axes and choppers, knives, drills and polished stone tools, also known as ground stone tools began to appear in large quantities (Newcomb 1961). Diagnostic points such as Gary, Kent, Palmillas, Nolan, Travis, Belvedere, Pedernales, Marshall, Williams, and Lange dominate the spectrum of dart points from the Middle Archaic period (Turner and Hester 1993; see also the Edwards Plateau Aspect [Newcomb 1961]). The advent of the atlatl also seems to be placed within this period (Culberson 1993).

The Late Archaic period saw a dramatic increase in the population densities of Native American groups. Human habitation of areas rich in diverse flora and fauna intensified, as did the variety of materials and artifacts (Culberson 1993; Aten 1984). Late Archaic peoples began relying heavily on foraging tubers, berries, and nuts and hunting small game such as deer, rabbits, and raccoons, as well as fish and shellfish, and birds. Groups became socially more complex than earlier periods and the result was an increasing intercommunication with neighboring groups. Culberson (1993:55) states that a "Lapidary Industry" developed in which stone artifacts were made from exotic materials (jasper, hematite, quartz, shale, slate, etc.) acquired from sources great distances away. These materials were fashioned into an increasingly complex array of household goods such as celts, plummets, banner stones, mortars and pestles, and pendants; also during this period there is an increase in the occurrence of sandstone bowls (Culberson 1993). Diagnostic points of this period are difficult to distinguish from those of the Middle Archaic. Gary and Kent points remain prevalent in southeast Texas, while other points such as Marcos, Montell, San Gabriel, Mahomet, Fairland, and Castroville also appear at times (Turner and Hester 1993).

The Archaic period in southeast Texas ends with the adoption of ceramic technology at the beginning of the Ceramic period. Patterson (1995) places the beginning of the Early Ceramic period on the Texas coast from 100-600 A.D. Aten (1983) placed the appearance of pottery in the Galveston Bay area approximately 100 A.D. The ceramic chronology of the inland areas parallels that of the coast; however, it does not manifest until several centuries later. The inland areas generally lack the earliest ceramic types present in the coastal region as well as some of the later ceramic types (Aten 1983; Story 1990). As a result of trade networks or stylistic/manufacturing influences, it appears that ceramic traits moved from the coast to the inland areas and from the east to the west (Aten 1983).

3.1.3 Late Prehistoric

The transitional period between Late Archaic and Woodland-Late Prehistoric is a period marked by an intensification of group dynamics across Texas. The advent of the bow and arrow is believed by most (Aten 1984; Culberson 1993; Newcomb 1961) to be from this period, though some may place it later. Most importantly for archaeological investigations, the first signs of pottery begin to emerge at sites from this period (Aten 1983). Although the amount and variety of pottery intensifies during the Late Prehistoric, it is an excellent way of determining the terminus post quem of a site. Fishing, bison hunting, and the collection of wild flora intensifies beyond the level of the Late Archaic period during this stage, but there is no sufficient data to demonstrate the initial advent of sedentary

agricultural. The diagnostic points of this period are Catahoula, Friley, Alba, and Bonham (Turner and Hester 1993).

The Late Prehistoric (also known as Woodland and Ceramic periods) continue from the end of the Archaic period to the Historic period ushered in by the Spanish Missions and Anglo-American settlers. During this period, there is a shift to the almost total use of arrow points such as Perdiz and, later, Scallorn, and a wide variety of ceramic types. According to Aten (1984), there are nearly 18 different types of pottery from this period currently identified for the east Texas Coast alone based on temper, paste, and design.

Goose Creek and other sandy paste pottery types are often recovered from Ceramic period and Late Prehistoric sites throughout southeast Texas. Goose Creek appears in Aten's coastal chronology to greater or lesser extents in nearly every period, particularly Mayes Island, Turtle Bay, Round Lake, and the later Orcoquisac periods. Because of the predominance of sandy paste pottery across the region, Story (1990) has suggested the Mossy Grove Tradition as an encompassing cultural tradition for the area. Other ceramic forms that occur in the region include grog-tempered, stamped, and bone-tempered pottery (Patterson 1996).

3.1.4 Protohistoric Period to the Post-Contact

It is during this period that peoples known today as the Caddo, Attakapans, and Bidai, to name a few, are identifiable both culturally and materially. This is mostly due to the historical sources of the seventeenth through the nineteenth centuries that aid in the reconstruction of the past cultures in the area. In order to better understand the complexity of the region's cultures, researchers turn to historical sources to get an understanding of the peoples who first occupied the southeast Texas. Hernando De Soto encountered the Native Americans of the region during his expedition in 1542 (Hudson 1976); it was the first recorded meeting with the Caddo peoples. The first expeditions by La Salle in 1687 and the subsequent settlement in the eighteenth century by Europeans continued to document the presence of Native American groups in the area (Aten 1984). French traders and Spanish missionaries encountered the Hasinai, also known as the Neches Angelina, who became allies of the Spanish against the western Apache tribes (Newcomb 1961). The later historical sources identify the Hasinai as one of the two main groups in the area of eastern Texas that fall under the Caddo culture (the primary culture that dominated the Piney Woods area), the other of which is the Kadohadacho (La Vere 1998; Gregory 1986).

The loose cultural group, known as the Attakapans, dominated the majority of the land north of present-day Harris County in what is now Montgomery County. Their language group extended from the Gulf coast to the Trinity and San Jacinto Rivers and they had much in common with the coastal group known as the Karankawa (Aten 1984). The Attakapans were subdivided into regional groups. The Akokisas dwelled primarily on the shores of the Trinity and San Jacinto Rivers. The Patiris group occupied the land north of the San Jacinto valley. The Bidai group dominated the Trinity Valley and to their north was the small group known as the Deadoso. Most of what is known about the Attakapans culture comes from the early accounts of the French explorer DeBellise. They are described as primarily hunter-gather groups who relied somewhat on agriculture and fishing (Sjoberg 1951).

In the seventeenth and eighteenth centuries, the Spanish and French used the Native American groups as pawns in the two nations' quest to settle the area (Newcomb 1961). Most destructive for all native groups in the region was the influx of European diseases. When Anglo-American settlers began moving into the area in mass around the 1850s,

disease and warfare had decimated the groups to near extinction.

3.2 Historical Context

Harris County was formed as Harrisburg County on December 22, 1836. The county was renamed Harris in December 1839 to honor John Richardson Harris, an early pioneer who had established Harrisburg in 1826, the first town site in the county. Harrisburg was established at the confluence of Buffalo Bayou and Brays Bayou and by the 1830s had become the major port of entry for the region and a transportation hub. Roads ran northwest to the Brazos communities of San Felipe and Washington, east to the ferry landing that crossed the San Jacinto, and west paralleling Brays Bayou to the Oyster Creek Community near present day Stafford in Fort Bend County (Henson 2017).

Under Mexican rule, the area surrounding Harrisburg was known as the San Jacinto District. The district stretched east from Lynchburg on the San Jacinto River, west to the location of present day Richmond, and from Clear Creek in the south to Spring Creek in the north. Harrisburg County encompassed this same territory with the addition of Galveston Island. The modern boundaries of Harris County were established in 1838 (Henson 2017).

The lands that would become Harris County comprised the southeastern border of Austin's Colony. In July of 1824, 29 titles were granted to lands in future Harris County, with an additional 23 grants made between 1828 and 1833. These original grants concentrated mainly on the watercourses of the region (Henson 2017). The early settlers in the region were mostly from the southern United States who brought with them their African slaves. In the 1840s, large numbers of German and French immigrants settled in Harris County. The Hispanic presence in the region was relatively sparse prior to an influx of immigrants following the Mexican Revolution reflecting the ephemeral nature of Spanish and Mexican colonization.

The founding of the city of Houston by Augustus and John Allen was announced in a newspaper advertisement in August 1836. The brothers managed to convince the delegates of the first Texas Congress to establish the yet-to-be-built Houston as the first, albeit temporary (1837-1840), capital of Texas. In 1837, Houston also became the seat of Harrisburg County. The town was laid out on a grid plan with streets running parallel and perpendicular to Buffalo Bayou near the confluence of White Oak Bayou. The town grew rapidly from 12 inhabitants and one log cabin in January 1837 to 1500 people and 100 houses four months later (Henson 2017).

Initially, the city was not segregated and slaves lived scattered throughout the city's neighborhoods. There was a separate social structure for the whites and subordinate blacks which, continued beyond the Civil War and Emancipation. Schools, churches, and businesses continued to be segregated and by the end of the nineteenth century residential segregation was also present. Separate white, black, and later on Hispanic neighborhoods divided the city.

The immigrants that came to the area following the Civil War founded settlements along the rail lines that bisected the county. The Houston communities of Pasadena, Deer Park, Houston Heights, Bellaire, Webster, La Porte, South Houston, and Genoa developed in this manner and were eventually annexed into the city of Houston. By the 1930s, Harris County was the largest county and Houston was the largest city in Texas (Henson 2017).

By the mid-nineteenth century, Houston and Harris County had become a center of commerce. Products were imported into the Texas hinterland through Houston after being offloaded from ocean going ships in Galveston. Exports included agricultural products such as cotton, corn, and cow hides.

The town became a railroad hub with six railways spreading from 80.5 to 160.9 kilometers (50 to 100 miles) to the northwest, east, west, south, and southeast. In 1873, Houston joined the national rail network when the Houston and Texas Central reached Denison (Henson 2017).

The expansion of Buffalo Bayou was essential to the commercial life of Houston and a number of private ventures were undertaken over the years to widen and deepen the channel. The Army Corps of Engineers took control of the project in 1881, eventually creating the 15.2-meter (50-foot) deep Houston Ship Channel from Galveston Bay to a turning basin above Brays Bayou. Additional public works projects included the creation of the Lake Houston reservoir in 1954 to reduce the dependence on subsurface water, the use of which had caused up to 3 meters (9 feet) of subsidence surrounding the confluence of Buffalo Bayou and the San Jacinto River. In 1935, the Harris County Flood Control District was established and infrastructures such as the Addicks and Barker dams in western Harris County were constructed. Since this time, channelization projects completed along Houston area bayous have disturbed many archaeological sites in their path. However, isolated and undisturbed areas along these watercourses may still contain intact deposits (Abbott 2001:101).

The discovery of oil at Spindletop made Houston an important center for the petroleum industry. The Ship Channel's inland location made it safe from Gulf storms and refineries began lining the banks in 1918. By 1929, 40 oil companies had offices in Houston. The outbreak of World War II created a demand for products made of petrochemicals. The city has gone on to become one of the two largest petrochemical concentrations in the United States (Henson 2017).

4.0 FIELD METHODOLOGY

This cultural resources investigation was designed to identify and assess new and already recorded cultural resources that may be impacted by the proposed project. Desktop assessment and modeling were performed prior to initiating field investigations in order to better understand cultural, environmental, and geological settings. Results of the desktop assessment then were used to develop the field methodology.

4.1 Site File and Literature Review

Site file and literature research was conducted prior to fieldwork mobilization. The background literature search included a review of previously conducted cultural resource surveys in the vicinity of the proposed project area, and of any historic document pertaining to the history of the area. Site file research was performed in order to identify all previously recorded archaeological sites within a 1.6-kilometer (1-mile) study radius of the project area (Figure 1-1), and any recorded historic structures eligible for the National Register of Historic Places (NRHP) listing located adjacent to the project area. Site file research was done by reviewing records maintained by the Texas Archeological Research Laboratory (TARL) in Austin, Texas, and by consulting on-line research archives maintained by the THC, as well as an online database of the NRHP (2017). Historic maps maintained by the Texas General Land Office (TxGLO) (2017) were also consulted.

Historic topographic and aerial maps were reviewed in order to identify any historic structures that might be located close to or within the project area. Topographic maps were downloaded from the University of North Texas online library collection, and aerial imagery was provided by National Environmental Title Research (NETR). Historic maps of Texas and Texas counties were reviewed in order to better understand the history of the region and to identify any potential historic trails and important historic sites located or crossing the project area.

4.2 Field Methods

4.2.1 Intensive Pedestrian Survey

Gray & Pape field personnel completed the intensive pedestrian survey through pedestrian reconnaissance and shovel testing. In order to satisfy the minimum survey standards of 1 shovel test for every 0.81 hectares (2 acres) established by the THC for an area approximately 14 hectares (34 acres) in size, a total of 22 shovel tests were excavated. Surface inspection and shovel testing was conducted along five parallel transects approximately 270 meters (886 feet) long, 3 meters (10 feet) wide and 100 meters (328 feet) apart. Two additional transects, F and G, consisted of a single shovel test each.

Shovel tests measured approximately 30 centimeters (12 inches) in diameter and were excavated to a maximum depth of 100 centimeters (39 inches) below ground surface and no less than 50 centimeters (20 inches) below ground surface or 10 centimeters (4 inches) into B-horizon subsoils. Vertical control of each shovel test was maintained by excavating in arbitrary 10-centimeter (4-inch) levels with reference to the parent soil stratum. The profile of each shovel test was inspected for color and texture change potentially associated with the presence of cultural features. Descriptions of soil texture and color followed standard terminology and soil color charts (Munsell 2005). Additional information such as mottling, evidence of disturbance, and moisture level was also recorded. Field personnel screened excavated soils through 0.64-centimeter (0.25-inch) hardware cloth, while soils with high clay content were hand

sorted. All shovel test data were recorded on standardized forms for analysis.

The locations of all shovel tests excavated during the survey were recorded with a sub-meter accurate global positioning system (GPS) data collector and recorded on field maps. Digital photography aided documentation of the existing conditions of the project area and fieldwork methods, with photograph locations recorded on field maps and logged with a GPS unit.

5.0 RESULTS OF INVESTIGATIONS

5.1 Result of Site File and Literature Review

Site file and literature review resulted in the identification of five previously recorded area and linear surveys (Table 5-1) located within 1.6 kilometers (1 mile) of the proposed project area. No previously recorded archaeological sites were located within the same study radius.

5.1.1 Previously Recorded Surveys

Five archaeological surveys have been conducted within 1.6 kilometers (1 mile) of the project area between 1986 and 2016. In February 1986, the Federal Highway Administration (FHWA) had a linear survey conducted along Farm-to-Market (FM) 1960, north of the subject area. In June 1996, Espey, Huston, & Associates (EH&A) investigated a linear area north of the parcel. No cultural resources were encountered and the project was recommended to proceed (Galan 1996). In August 2007, HRA Gray & Pape, LLC. performed a linear survey north of the tract of land, along FM 1960A. No new sites were discovered during the survey. No further work was recommended for this project (Foradas and Sick 2007). Raba Kistner Environmental examined a parcel in January 2011, south of the proposed project area. Moore Archeological Consulting, Inc. assessed a tract of land, southwest of the project area in July 2016.

5.1.2 Previously Recorded Archaeological Sites

The nearest previously recorded archaeological site is located 2.10 kilometers (1.30 miles) of the subject tract. This site was described as an early residence of the eighteenth or nineteenth century. This historic site consisted of brick fragments, a porcelain figurine of a standing figure in military dress with a head of a dog, and a wine bottle base. This site was noted as having the potential for being a State Antiquities Landmark or on the NRHP. Further investigation was recommended for this site (Fullen 1982).

Table 5-1. Previously Recorded Area and Linear Surveys within 1.6 kilometers of the Proposed Project Area, Harris County, Texas.

Project Type	Investigating Agency	Field Work Date	TAC Permit Number	Report Author	Sponsoring Agency	THC Review
Linear Survey	N/A	08/1986	N/A	N/A	FHWA	n/a
Linear Survey	EH&A	06/1996	1711	N/A	N/A	n/a
Linear Survey	HRA Gray & Pape, LLC.	08/2007	4286	Foradas and Sick	Texas Department of Transportation	08/2007
Area Survey	Raba Kistner Environmental	01/2011	n/a	Murray, Chris	USACE – Fort Worth District	02/2012
Area Survey	Moore Archeological Consulting, Inc.	07/2016	7339	Stoddart, Eleanor	City of Houston	11/2015

Table 5-2. Nearest Previously Recorded Archaeological Site to the Proposed Project Area, Harris County, Texas.

Trinomial	Temporal Affiliation	Site Type	Size (meters)	Depth of Deposit (centimeters)	Artifacts and Features	NRHP Status /Recommendations
41HR413	Historic – 18th or 19th century	Early Residence	9 x 9	Content	Brick fragments, wine bottle base and porcelain figurine	Not listed/Further investigation

5.1.3 Historic Maps and Aerials

A review of historic and recent topographic maps and aerial photographs indicates that the area around the project tract encountered a steady development of neighborhoods beginning sometime prior to 1978 (Google Inc. 1943-2016; NETR 2017; USGS 2017). No pipelines or other energy resources cross the property according to the TxGLO GIS Viewer (2017). Alternating sections of the property appear to have been periodically logged according to the earliest aerial imagery dating to 1943 (Google, Inc. 2017; NETR 2017). What appears to have been a natural drainage also crosses the property as shown on topographic maps dating to 1916, 1919, 1933, 1946, and 1949 (NETR 2017).

5.1.4 Cemeteries

The Koinm Cemetery, is located 1.49 kilometers (92 miles) southeast of the subject area. It is located near United States Highway 59/69 and Jetero Boulevard. It is a fenced family cemetery with nine to eleven headstones dating from 1899 to 1965 (www.Find-A-Grave.com).

5.2 Results of Field Investigations

Gray & Pape conducted an intensive pedestrian cultural resources survey of property subsuming a total of approximately 14 hectares (34 acres) (Figure 5-1). A total of 22 shovel tests were excavated and the results from the survey are discussed below. No prehistoric or historic artifacts or cultural features were encountered during the survey. No new archaeological sites were identified.

The crew began surface inspection and shovel testing near the western entrance of the APE. Shovel testing and surface inspection was conducted along five parallel transects, A through E, measuring approximately 3 meters (10 feet) wide, 270 meters (886 feet) long and 100 meters (328 feet) apart. Two additional transects, F and G, consisted of a single shovel test each.

The landscape is predominately mixed pine and hardwood forest. A dilapidated deer blind was located between Shovel Tests C2 and C3 inside the woodland. Tall grasses and sedges are common in the eastern quarter of the APE. This area was recently cleared and scraped. At the time of survey, a backhoe was staged here beside a trash pit and a surface scatter of modern refuse (Figure 5-1A). A two-track road runs east-west from Warehouse Center Drive along the south. The southwestern portion of the APE is currently being used as a staging area for construction materials and heavy machinery (Figure 5-1B).

Soils encountered generally resembled the Gessner and Wockly Series mapped for the area. Shallow subsurface disturbances were evident in areas impacted by clearing, scraping and vehicular traffic. A representative soil profile of intact soils from Shovel Test D4 contained four strata (Figure 5-2). Stratum I

A. Modern trash dump. View is to the southwest.

B. Staging area and two-track road near Shovel Test A1 and gate entrance. View is to the northeast.

Project

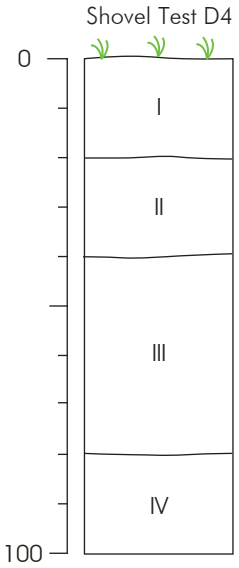
Negative Shovel

Photo Location and Camera DIrection

0 60 120 Feet
0 20 40 Meters
N

Figure 5-1
Project area
with field survey results
and representative photos.

GRAY & PAPE
HERITAGE MANAGEMENT



I (0-20 cmbs)
(7.5YR 4/2) dry single grain sand;

II (20-40 cmbs)
(7.5YR 5/2) damp weak granular sand;

III (40-80 cmbs)
(7.5YR 6/3) damp weak granular sand with few fine to medium gravels at the base of the horizon;

IV (80-100 cmbs)
(7.5YR 6/2) mottled with (7.5YR 5/8) damp moderate granular sandy clay;

Shovel Test D4 soil profile.

from 0 to 20 centimeters (0 to 8 inches) was (7.5YR 4/2) dry single grain sand. Stratum II from 20 to 40 centimeters (8 to 16 inches) was (7.5YR 5/2) damp weak granular sand. Stratum III from 40 to 80 centimeters (16 to 32 inches) was (7.5YR 6/3) damp weak granular sand with few fine to medium gravels at the base of the horizon. Stratum IV from 80 to 100 centimeters (32 to 39 inches) was (7.5YR 6/2) mottled with (7.5YR 5/8) damp moderate granular sandy clay.

6.0 CONCLUSIONS AND RECOMMENDATIONS

In October 2017, BIO-WEST contracted with Gray & Pape to perform an intensive pedestrian cultural resources survey of approximately 13.8 hectares (34 acres) of land proposed for development in northeast Harris County, Texas. The Lead Federal Agency for this project has been identified as the USACE, Galveston District.

The goals of the survey were to establish whether previously unidentified buried archaeological resources were located within or immediately adjacent to the project's APE and if so to provide management recommendations for such resources. The survey was undertaken in accordance with requirements set forth by Section 106 of the NHPA, specifically requirements set forth by 36 CFR 800. The procedures to be followed by the USACE to fulfill the requirements set forth in the NHPA, other applicable historic preservation laws, and Presidential directives as they relate to the regulatory program of the USACE (33 CFR Parts 320-334) are articulated in the Regulatory Program of the USACE, Part 325 - Processing of Department of the Army Permits, Appendix C - Procedures for the Protection of Historic Properties. All fieldwork and reporting activities were completed with reference to State laws and guidelines (the Antiquities Code of Texas). Survey and site identification followed Texas Antiquities Code standards.

Fieldwork took place between October 13 and 17, 2017 and required 48 person hours to complete. Field investigation consisted of intensive pedestrian surface inspection, subsurface shovel testing, photographic documentation, and mapping. A total of 22 shovel tests were excavated. No prehistoric or historic artifacts or cultural features were observed. No new or previously recorded archaeological sites were located within the project boundary.

Based on the results of the survey, Gray & Pape recommends that no further cultural resources work be required and that the project be cleared to proceed as currently planned.

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APPENDIX A

SHOVEL TEST LOG

Shovel Test	Depth	Soil Characteristics	Artifacts Recovered
A1	0-70 cmbs	10YR 4/2 sandy loam	N
	70-100 cmbs	10YR 7/3 sandy loam	
A2	0-60 cmbs	10YR 4/2 sandy loam	N
	60-80 cmbs	10YR 7/3 sandy loam	
A3	0-30 cmbs	10YR 4/3 sandy loam	N
	30-80 cmbs	10YR 4/6 sandy loam	
	80-90 cmbs	7.5YR 5/8 sandy clay	
A4	0-30 cmbs	10YR 4/3 sandy loam	N
	30-60 cmbs	10YR 4/6 sandy loam	
	60-80 cmbs	7.5YR 5/8 sandy clay	
B1	0-15 cmbs	10YR 6/2, 10YR 8/3 dry mottled semi-compact massive sand	N
	15-40 cmbs	10YR 7/3 dry compact massive sand	
	40-75 cmbs	10YR 7/4, 10YR 6/8 dry mottled angular blocky sandy clay with common medium to coarse angular Fe concretions	
B2	0-25 cmbs	7.5YR 5/2 loose dry single grain sand	N
	25-50 cmbs	7.5YR 6/3 dry semi-compact massive sand	
	50-65 cmbs	7.5YR 6/4, 7.5YR 7/3 dry mottled semi-compact massive sand	
	65-100 cmbs	7.5YR 5/3, 7.5YR 6/4 dry mottled compact massive loamy sand	
B3	0-35 cmbs	7.5YR 3/2 dry weak granular loamy sand	N
	35-50 cmbs	7.5YR 5/3, 7.5YR 6/3 dry mottled semi-compact massive sand	
	50-75 cmbs	7.5YR 6/4 dry semi-compact massive sand	
	75-100 cmbs	7.5YR 4/1, 7.5YR 7/3, 7.5YR 5/8 dry mottled compact massive sandy clay	
B4	0-35 cmbs	7.5YR 3/2 dry weak granular loamy sand	N
	35-50 cmbs	7.5YR 5/3, 7.5YR 6/3 dry mottled semi-compact massive sand	
	50-75 cmbs	7.5YR 6/4 dry semi-compact massive sand	
	75-100 cmbs	7.5YR 4/1, 7.5YR 7/3, 7.5YR 5/8 dry mottled compact massive sandy clay	
C1	0-10 cmbs	10YR 5/4 sandy loam	N
	10-25 cmbs	10YR 6/3 sandy loam	
	25-70 cmbs	10YR 7/3 sand	
	70-90 cmbs	10YR 7/8, 10YR 7/1 mottled sandy clay	
C2	0-20 cmbs	10YR 5/4 sandy loam	N
	20-45 cmbs	10YR 6/3 sandy loam	

Shovel Test	Depth	Soil Characteristics	Artifacts Recovered
	45-80 cmbs	10YR 7/3 sand	
	80-100 cmbs	10YR 7/8, 10YR 7/1 mottled sandy clay	
C3	0-20 cmbs	10YR 4/3 sandy loam	N
	20-80 cmbs	10YR 4/6 sandy loam	
	80-90 cmbs	7.5YR 5/8 sandy clay	
C4	0-20 cmbs	10YR 4/3 sandy loam	N
	20-80 cmbs	10YR 4/6 sandy loam	
	80-90 cmbs	7.5YR 5/8 sandy clay	
D1	0-20 cmbs	10YR 6/1 dry loose single grain silt	N
	20-45 dmbs	10YR 6/2, 10YR 6/8 dry mottled semi-compact weak granular silt loam	
	45-70 cmbs	10YR 5/1, 10YR 5/8 damp mottled compact moderate granular sandy clay loam	
D2	0-10 cmbs	7.5YR 4/2 dry loose single grain sand	N
	10-30 cmbs	10YR 5/3 dry loose single grain sand	
	30-85 cmbs	7.5YR 7/3 dry weak granular sand	
	85-100 cmbs	7.5YR 6/3, 7.5YR 6/6 damp mottled moderate granular sandy clay	
D3	0-20 cmbs	7.5YR 4/2 dry single grain sand	N
	20-40 cmbs	10YR 5/3 dry single grain sand	
	40-90 cmbs	7.5YR 7/3 dry weak granular sand with common medium to coarse gravels at base of horizon	
	90-100 cmbs	7.5YR 6/2, 7.5YR 5/8 damp mottled moderate granular sandy clay	
D4	0-20 cmbs	7.5YR 4/2 dry single grain sand	N
	20-40 cmbs	10YR 5/2 dry single grain sand	
	40-80 cmbs	7.5YR 6/3 dry weak granular sand with common medium to coarse gravels at base of horizon	
	80-100 cmbs	7.5YR 6/2, 7.5YR 5/8 damp mottled moderate granular sandy clay	
E1	0-10 cmbs	10YR 4/7 sandy loam	N
	10-20 cmbs	10YR 4/6 sandy loam	
	20-40 cmbs	10YR 4/3 sandy loam with common ferric streaks	
	40-60 cmbs	7.5YR 5/8 sandy clay	
E2	0-45 cmbs	7.5YR 6/3 damp single grain to weak granular sand with few medium to coarse gravels	N
	45-80 cmbs	10YR 7/2, 10YR 6/8 damp mottled moderate granular sandy clay	
E3	0-10 cmbs	7.5YR 6/3, 10YR 7/2, 10YR 6/8, mottled sandy loam mixed with sandy clay	N

Shovel Test	Depth	Soil Characteristics	Artifacts Recovered
	10-40 cmbs	10YR 6/8, 7.5YR 6/3 mottled sandy clay	
	40-50 cmbs	10YR 7/2, 10YR 6/8 mottled sandy clay	
E4	0-30 cmbs	7.5YR 5/2 damp single grain sand	N
	30-70 cmbs	7.5YR 7/4 damp single grain sand with few fine to medium gravels	
	70-100 cmbs	7.5YR 5/2, 7.5YR 6/6 damp mottled weak granular sandy clay	
F1	0-10 cmbs	7.5YR 5/2 dry compact platy silt	N
	10-30 cmbs	7.5YR 6/2 dry compact platy silt	
	30-50 cmbs	7.5YR 6/1, 7.5YR 6/8 dry mottled very compact silty clay	
G1	0-60 cmbs	10YR 4/3, 10YR 5/1mottled sandy loam mixed with sandy clay	N
	60-70 cmbs	7.5YR 5/8 sandy clay	

*cmbs – centimeters below surface