APPENDIX G

SURVEYS OF CULTURAL RESOURCES

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D R A F T R E P O R T

PHASE I CULTURAL RESOURCES INVESTIGATION

PROPOSED NRG ENERGY W.A. PARISH POST-COMBUSTION CO_2

CAPTURE AND SEQUESTRATION PROJECT,

FORT BEND, WHARTON, AND JACKSON COUNTIES, TEXAS

Prepared for: **NRG Energy/Petra Nova LLC**
Travis Tower, Suite 6501
1300 Main Street
Houston, TX 77002

and

U.S. Department of Energy
National Energy Technology Laboratory (NETL)
3610 Collins Ferry Road,
Morgantown, WV 26507

Prepared by: **Lauren Poche, Michael Whitehead, Hilary Dafoe, Patricia Hutchins, Mary Sandell, and Martin Handly**

July 2012

File No. 25014860

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URS Group (URS) performed a Phase I archaeological survey between January and May of 2012 for the approximately 80-mile-long (130 km) pipeline corridor for the proposed NRG Energy, Inc. (NRG) W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project. The pipeline would be located in Fort Bend, Wharton, and Jackson Counties, Texas to transport captured CO_2 from the W.A Parish Plant to the West Ranch oil field. Approximately 100 percent of the primary pipeline survey corridor was assessed for cultural resources; additional land permission is currently required to survey a single proposed access road and three additional temporary workspaces. As a result of this investigation, 101.0 miles (162.5 km) of preferred and abandoned pipeline corridor, 75 access roads, measuring 49.7 miles (80.0 km) in length, and 47 additional temporary workspaces, totaling 88.7 acres (35.9 ha) in extent, were evaluated. As part of this investigation, 1,625 shovel tests were excavated, six archaeological sites and 12 historic standing structures were identified, and 1,935 artifacts were analyzed.

The six (6) archaeological sites identified within the project area during the Phase I inventory study were located in Wharton (n=4) and Jackson (n=2) Counties. The artifacts recovered during this investigation identified sites from both the prehistoric (n=2) and historic (n=4) periods. The prehistoric period sites (i.e., 41WH106 and 41JK192) consisted of isolated prehistoric lithic projectile point tips, most probably associated with the Late Archaic Period (ca. 4,000 to 2,200 years ago). The historic period sites (i.e., 41WH103, 41WH104, 41WH105 and 41JK193) were all located in recently tilled agricultural fields and very limited cultural materials were identified below the ground surface. All of these sites generally appear to date from the late nineteenth to mid-twentieth centuries and are comprised of glass, historic ceramic, brick, and metal items that were systematically collected across the surface of the fields. All of the historic period sites appear to represent the remains of historic agricultural farmsteads. None of these sites was considered to be eligible for listing in the National Register and no additional archaeological assessment of these six sites was recommended.

Twelve buildings greater than 45 years of age were identified within the project area during the Phase I inventory study; Fort Bend (n=6); Wharton (n=5); and Jackson (n=1) Counties. The buildings were dominated by six (6) National style structures, two (2) structures of undetermined design (due to parcel inaccessibility and vegetation), and single examples of a barn, Spanish-eclectic structure, railroad bridge, and an I-house. Most of the structures were built between the ca. 1930s and 1950s (10), with single examples noted from the ca. 1890s to 1900s and ca. 1920s to 1930s. All 12 structures lie outside of the proposed project area and will not be affected by its construction. None of these structures were considered to be eligible for listing in the National Register of Historic Places (NRHP) and no additional architectural assessment of these structures was recommended.

Finally, URS recommended that no identified cultural resources (i.e., archaeological sites and/or historic standing structures) would be affected by the proposed pipeline corridor, associated access roads, and additional temporary workspaces affiliated with the currently proposed NRG project. In addition, URS conducted a desktop study of two related proposed project areas within the W. A. Parish Plant and West Ranch oil field, which the DOE delivered to the Texas Historical Commission (THC) on June 19, 2012. On July 11, 2012, the THC concurred with DOE's determination that that no impacts to historic properties listed, or eligible for listing, in the NRHP would be expected from construction or operational activities in these two project areas. The results of the desktop study are also presented in this report.

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1.1 PROJECT DESCRIPTION

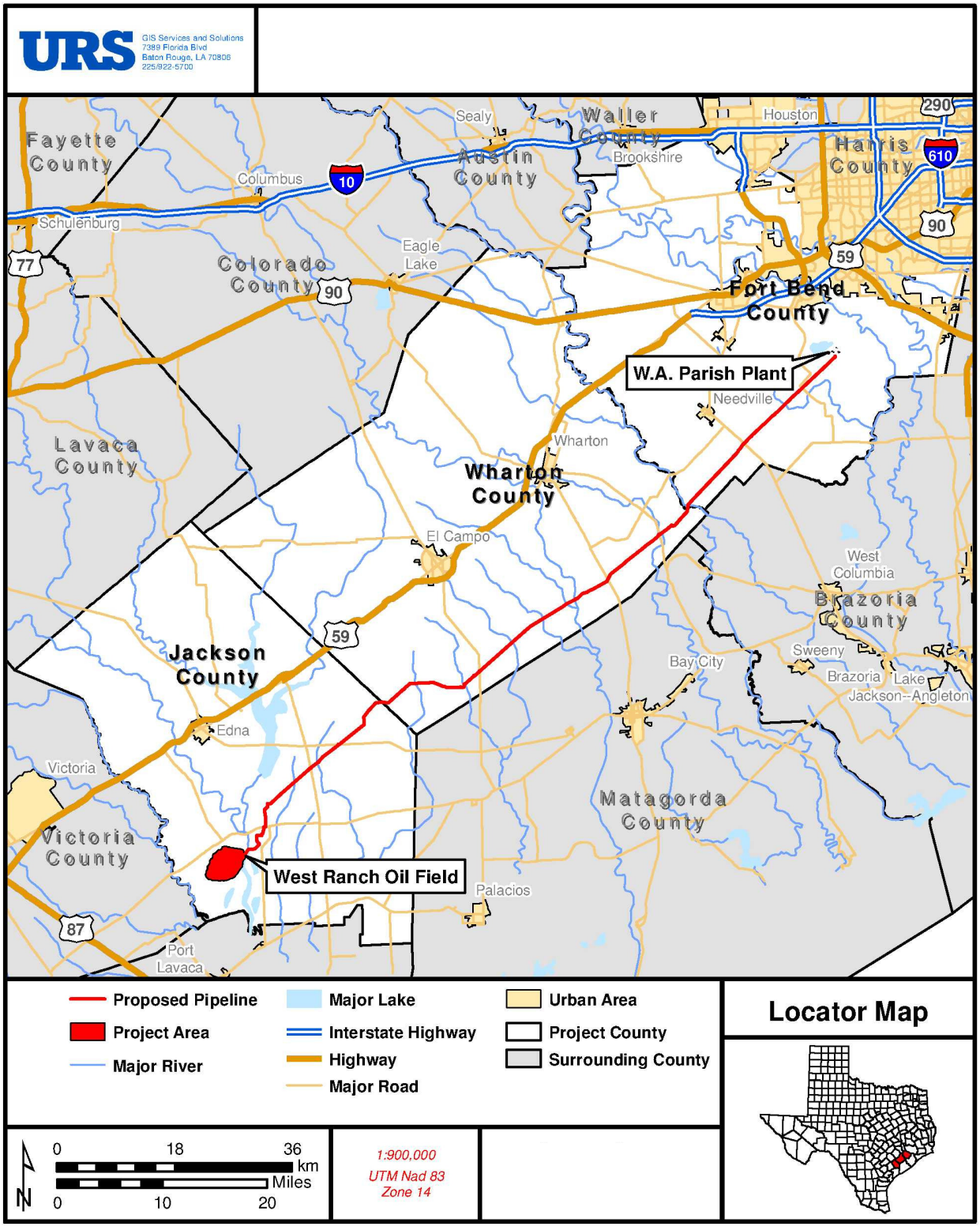
Between January and May 2012, URS conducted a Phase I cultural resource survey and inventory for the NRG Energy, Inc. (NRG) W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project (Figure 1.1). The archaeological Area of Potential Effect (APE) for the approximately 80-mile-long (130 km) pipeline is generally defined as a 100 ft (30 m) wide survey corridor centered on the expected pipeline route. The pipe will normally be buried in a trench approximately 3 to 4 ft (0.9 to 1.2 m) deep. Approximately 85% of the proposed pipeline will be located within or adjacent to existing mowed/maintained utility corridors. In addition, URS conducted a desktop study of two related proposed project areas within the W. A. Parish Plant and West Ranch oil field, which the DOE delivered to the Texas Historical Commission (THC) on June 19, 2012. On July 11, 2012, the THC concurred with DOE's determination that that no impacts to historic properties listed, or eligible for listing, in the National Register of Historic Places (NRHP) would be expected from construction or operational activities in these two project areas. The results of the desktop study are also presented in this report.

Under the American Recovery and Reinvestment Act of 2009, the U.S. Department of Energy (DOE) – National Energy Technology Laboratory (NETL) has made funding available for certain large-scale carbon dioxide (CO_2) capture projects. With the support of the DOE-NETL, NRG proposes to capture CO_2 at NRG's W.A. Parish Plant in Fort Bend County, Texas and deliver the CO_2 via pipeline to the West Ranch oil field in Jackson County, Texas where it would be used for enhanced oil recovery (EOR) and ultimately sequestered. NRG is proposing to design, construct, and operate a commercial-scale CO_2 capture facility at its W.A. Parish Plant and deliver the CO_2 via an approximately 80-mile-long (130 km) pipeline to the West Ranch oil field in Jackson County, Texas. This proposed project would demonstrate an integrated commercial-scale deployment of post-combustion CO_2 capture technology for use in EOR operations and long-term geologic storage. The project would use an advanced amine-based absorption technology to capture approximately 90 percent of CO_2 annually (i.e., approximately 1.6 million tons of CO_2 per year) from a 250-megawatt equivalent (MWe) flue gas slip stream taken from the 650 megawatt (MW) Unit 8 at the W.A. Parish Plant. Up to 5,475 tons per day of captured CO_2 would be dried, compressed, and transported via pipeline to the West Ranch oil field where it would be used in EOR operations. The primary components of the project include the following:

(a) CO_2 Capture Facility

The proposed project would retrofit one of the W.A. Parish Plant's existing coal-fueled units (Unit 8) with a post-combustion CO_2 capture system that would be constructed within the existing 4,880-acre W.A. Parish Plant. A new natural gas-fired cogeneration plant, estimated to be 80 MW in size, would be constructed to produce the auxiliary power needed to drive the proposed CO_2 capture system.

Figure 1.1 Project Overview Map



(b) CO_2 Transport

Captured CO_2 would be transported via a new, approximately 80-mile-long (130 km) pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly rural and sparsely-developed agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. NRG plans to use existing mowed/maintained utility rights-of-way (ROWs) to minimize environmental impacts and avoid sensitive resources to the extent practicable.

(c) EOR Operations

The proposed project would deliver up to 1.6 million tons of CO_2 per year to the existing West Ranch oil field, located in Jackson County, where the CO_2 would be injected through injection wells into the 98-A, 41-A, and Greta sand units of the Frio Formation, which lie approximately 5,000 to 6,300 feet below ground surface (bgs). The oil field has operated since 1938 and the portions of the West Ranch oil field in which EOR operations would be conducted are currently owned or leased by Hilcorp Energy Company (HEC). A joint venture between NRG and HEC, known as Texas Coastal Ventures LLC (TCV) would conduct the EOR operations. TCV would also operate the pipeline.

(d) CO_2 Monitoring Program

TCV would implement a CO_2 monitoring program to monitor the injection and migration of CO_2 within the geologic formations at the West Ranch oil field EOR area. The CO_2 monitoring program may consist of a variety of monitoring and modeling activities.

1.1.1 CO_2 Capture Facility, W.A. Parish Plant, Fort Bend County

The W.A. Parish Plant is located in Thompsons, Texas along the southeast shore of Smithers Lake, a 2,430 ac (983 ha) man-made water body that is used for plant cooling water (Figure 1.1). The CO_2 capture facility includes the following 11 project components, totaling approximately 29 ac (12 ha) in extent: North Laydown Area; South Laydown Area; 80 MW, Natural Gas-Fired Cogeneration Plant; CO_2 Capture Area; Warehouse; Road Relocation; 138kV Switchyard; CO_2 Compressor; Rail Unloading Area; Pipe Rack; and Flue Tank and Dump. All of the above listed project activities are situated within the boundaries of the existing W.A. Parish Plant on lands that have been disturbed by ongoing power generating operations, including leveling, road construction, and building construction.

1.1.2 CO_2 Pipeline, Fort Bend, Wharton, and Jackson Counties

The proposed, approximately 80-mile-long CO_2 pipeline would be located in Fort Bend, Wharton, and Jackson Counties in Texas. Beginning at the W.A. Parish Plant, the proposed pipeline extends generally southwest for 48 miles along the existing CenterPoint high-voltage transmission line (HVTL) corridor to the CenterPoint Hilje substation, located on County Road 403 between State Highway 71 and County Road 401. This route also parallels the proposed Energy Transfer Partners (ETP) 16-inch-diameter Spirit/Justice natural gas liquid (NGL) pipeline, for a distance of approximately 42 miles. From the CenterPoint Hilje

substation, the proposed pipeline corridor extends approximately 24 miles along the existing South Texas Electric Cooperative (STEC) HVTL corridor west to County Road 401, then northwest to County Road 307, then generally southwest toward the West Ranch oil field. Near milepost (MP) 72, the proposed pipeline corridor leaves the STEC ROW and extends south through a greenfield area for approximately four miles until it reaches the Kinder Morgan Tejas Pipeline ROW. The proposed corridor parallels the Kinder Morgan Tejas Pipeline ROW for the remaining approximately four miles to the West Ranch oil field.

1.1.3 EOR Operations/CO_2 Monitoring Program, West Ranch Oil Field, Jackson County

The West Ranch oil field is located roughly 0.5 mi (0.8 km) south of the community of Vanderbilt, between Venado Creek (west) and the Lavaca River (east), within Jackson County (Figure 1.1). HEC currently operates the West Ranch oil field, which was first developed in 1938. The oil field covers approximately 11,500 acres, but only 5,500 acres are currently targeted for EOR operations. The CO_2 generated by the current NRG project is intended to be injected by TCV within the West Ranch oil field. The project will involve a CO_2 monitoring program, which will be carried out by TCV. Numerous unused wells are available for conversion and use as CO_2 monitoring program wells. Existing wells that are unable to accommodate the pressure increase from the CO_2 injection will be remediated by TCV prior to initiating CO_2 injection.

At this time, all of the CO_2 monitoring program activities are expected to be limited to existing drilled well sites and therefore minimal to no new land impacts are expected for this phase of the NRG project. As part of this current project, approximately 130 injection wells and 130 production wells may be utilized, with approximately 10 to 13 monitoring wells being utilized in the CO_2 monitoring program (i.e., one monitoring well for every 10 to 15 injection wells). In general, existing wells would be utilized (i.e., refurbished or deepened as needed) to the extent practicable, so that few new injection, production, or monitoring wells would be needed. New wells, if required, would be installed on existing well pads to the extent practicable. Existing built roads would be used to the extent practicable to access EOR and CO_2 monitoring areas within the West Ranch oil field; therefore, no new road construction is currently anticipated. Finally, any new CO_2 distribution piping would be installed, to the extent practicable, along the existing piping corridors.

URS has been retained to provide environmental permitting and project support services to assist NRG in obtaining the necessary permits and concurrences for the installation of this project. Principal federal authorization for the overall project will be through the U.S. Army Corps of Engineers (USACE), specifically the Galveston District. The DOE will be the lead federal agency for implementing provisions associated with the National Environmental Policy Act (NEPA). As the lead federal agency, DOE is responsible for Section 106 compliance associated with the National Historic Preservation Act (NHPA) (16 U.S. Code [USC] 470). Typically, DOE initiates consultation efforts with the State Historic Preservation Office (SHPO) and any federally-recognized Native American tribal organizations that might have an expressed interest in the project area(s).

The purpose of this investigation was to identify any cultural resources, such as historic and prehistoric archeological sites and/or loci, historic standing structures, and cemeteries that might be located within the boundaries of the proposed undertaking. This investigation followed the guidelines and procedures outlined in the following documents: (1) The Texas Historical Commission's *Preserving Our Heritage: a Statewide Plan for Texas* (THC 2002); (2) Council of Texas Archeologists standards for cultural resources survey (CTA 2012); (3) Antiquities Code of Texas (and the Texas Historical Commission's *Rules of Practice and Procedure for the Antiquities Code of Texas*); (4) National Historic Preservation Act of 1966 (as amended); (5) Archaeological and Historic Preservation Act of 1974; (6) Archaeological Resources Protection Act of 1979, as amended (if required); (7) Title 36 of the Code of Federal Regulations (Parts 60-66 and 800); and (8) *Archeology and Historic Preservation: The Secretary of the Interior's Guidelines* (NPS 2012).

1.2 PROJECT RESULTS

The Phase I cultural resource survey and inventory study for the approximately 80-mile-long (130 km) proposed NRG Energy W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project was conducted within portions of Fort Bend, Wharton, and Jackson Counties, Texas. Fieldwork for this project consisted primarily of systematic pedestrian survey and shovel testing. Approximately 100 percent of the primary pipeline survey corridor was surveyed for cultural resources. As a result of these investigations, 101.0 miles (162.5 km) of preferred and/or abandoned pipeline corridor, 75 access roads, measuring 49.7 miles (80.0 km) in length, and 47 additional temporary workspaces, totaling 88.7 acres (35.9 ha) in extent, were evaluated. In total, 1314.6 ac (532.0 ha) of land was systematically examined for cultural resources. A total of 1,625 shovel tests were excavated, six archaeological sites and 12 historic standing structures were identified, and 1,935 artifacts were analyzed as part of this investigation.

The six (6) archaeological sites were associated with both the prehistoric and historic periods. The prehistoric period sites (i.e., 41WH106 and 41JK192) consisted of isolated prehistoric lithic projectile point proximal tip fragments, while the historic period sites (i.e., 41WH103, 41WH104, 41WH105 and 41JK193) were all located in recently tilled agricultural fields; except for two (2) pieces of brick, no cultural materials were identified below the ground surface at any of the sites. Due to the lack of intact stratigraphy, none of these six (6) sites was considered to be eligible for listing in the National Register and no additional archaeological assessment of these sites was recommended.

Twelve (12) buildings greater than 45 years of age were identified during the Phase I inventory study; all lie outside of the proposed pipeline survey corridor and will not be affected by its construction. Six (6) were located in Fort Bend County, five (5) from Wharton County, and a single structure from Jackson County. The buildings were dominated by six (6) National style structures, two (2) structures of undetermined design (due to parcel inaccessibility and vegetation), and single examples of a barn, Spanish-eclectic structure, railroad bridge, and an I-house. None of these structures were considered to be eligible for listing in the National Register of Historic Places and no additional architectural assessment of these structures was recommended.

URS recommends that no historic properties (i.e., archaeological sites and/or historic standing structures) would be affected by the proposed pipeline corridor, associated access roads, and additional temporary workspaces affiliated with the currently proposed NRG Energy W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project. Furthermore, URS recommends that no additional cultural resources investigations be required for the previously assessed portions of the NRG Energy W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project.

1.3 ORGANIZATION OF THE REPORT

Section 2 of this report presents a brief summary of the natural setting of the project area. The prehistoric and historical cultural development of the study area is presented in Section 3. Previous archeological research completed within a 0.5 mi (0.8 km) radius of the NRG Energy W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project, the methodologies used to implement the field assessment, and the subsequent artifact analysis methods, are described in Section 4. The results and management recommendations for this portion of the project are provided in Section 5, while Section 6 presents the references that are cited within the body of this report. The Scopes of Work prepared for the Texas Historical Commission (THC) are presented in Appendix A, Appendix B contains the project area topographic mapsheets depicting the survey areas, while Appendix C holds the prehistoric and historic period artifact catalogs.

1.4 PROJECT PERSONNEL

Mr. Martin Handly (MA) served as Principal Investigator for this project. He was assisted by Mr. Hilary Dafoe (BA) as the Crew Chief assigned to the project. They were aided in this field effort by Mr. Gary Hawkins (BA), Ms. Patricia Hutchins (BA), Ms. Kristin Kennedy (BA), and Ms. Mary Sandell (BA). Ms. Lauren Poche (MA) conducted the laboratory analysis and cultural material discussions found in Section 5. Mr. Michael Whitehead (MPS) prepared the standing structure presentations for Section 5, while Mr. Shane Poche (BA) prepared all of the report graphics.

1.5 CURATION

Following the review and acceptance of the final cultural resources report, all records, photographs, and field notes will be curated with the Texas Archeological Research Laboratory (TARL), The University of Texas at Austin, 1 University Station R7500, in Austin, Texas (78712-0714). Any recovered artifacts from the cultural resource locations will be offered to the landowners on which the site was located; if the landowners do not wish the cultural material, they will also be curated with TARL. These materials are being curated temporarily at the URS-Baton Rouge cultural resources laboratory, located at 7389 Florida Blvd. Suite 300, Baton Rouge, LA 70806.

A brief discussion of the physiographic, geologic, geomorphologic, soil and climate characteristics associated with the Phase I cultural resources survey of the NRG pipeline in Fort Bend, Wharton, and Jackson Counties, Texas is presented below. The regional landscape influences strongly the preservation and subsequent identification of any archaeological materials that may have been deposited within the proposed project corridor. The following information is designed to provide a context for subsequent discussions focusing on archaeological site distributions within the current project area (Sections 3 and 4).

2.1 LOCAL GEOLOGY AND GEOMORPHOLOGY

Fort Bend, Wharton, and Jackson Counties occupy approximately 2,805 square miles (726,491 ha) in southeastern Texas. The three counties are positioned within the San Bernard, Colorado and Lavaca River drainage basins, which all empty into the Gulf of Mexico. The surface geology of the region is comprised of several different geological formations, including the Beaumont and Lissie formations, as well as barrier island deposits, and Holocene marsh and floodplain sediments (Griffith et al. 2007).

The Beaumont Formation is the oldest exposed landscape in the project area; it first developed during the Late-Pleistocene in a very fluid, deltaic environment. The exposed portions of this formation are largely flat and featureless, except for some relict river channels which indicate a Pleistocene Gulf of Mexico shoreline which has since receded (Mowery et al. 1960:25). The Pleistocene soils of the Lissie Formation are generally featureless and flat, but do contain numerous pimple mounds and shallow depressions within the project area (Moore and Wermund 1993). These alluvial soils consist of sands, silts, and clays that occur beneath the Beaumont formation; this formation appears as a deltaic plain, which parallels the Gulf of Mexico coastline. Wide relict channels, large meander radii, and meander belt scars are also present; these appear to reflect increased rainfall amounts from the Late Pleistocene through the Early Holocene (Moore and Wermund 1993; Mowery et al. 1960:25).

Mid-coastal barrier islands and coastal marshes form the southern boundaries of these three counties; these were created during the Holocene of sands and clay associated with saline tidal flats, brackish, and freshwater marshes with some older Pleistocene soils on barrier islands near the Gulf of Mexico (Griffith et al. 2007). North of the barrier islands, large brackish marshes have developed. Despite their proximity to the salt waters of the Gulf of Mexico, these marshes tend to be brackish due to filtering effects provided by the barrier islands and the inflow of freshwater from the various riverine systems.

The most recent geological landscapes in the project area are associated with the Holocene floodplain sediments surrounding the San Bernard, Colorado, and Lavaca Rivers and their tributaries, including natural levees, point bars, and stream channels. Finally, fill and spoil occurrences consist of man-made sediments deposited during various construction and/or dredging activities associated with levees, canals, and urban settlements.

2.2 GENERAL PHYSIOGRAPHY AND ECOREGIONS

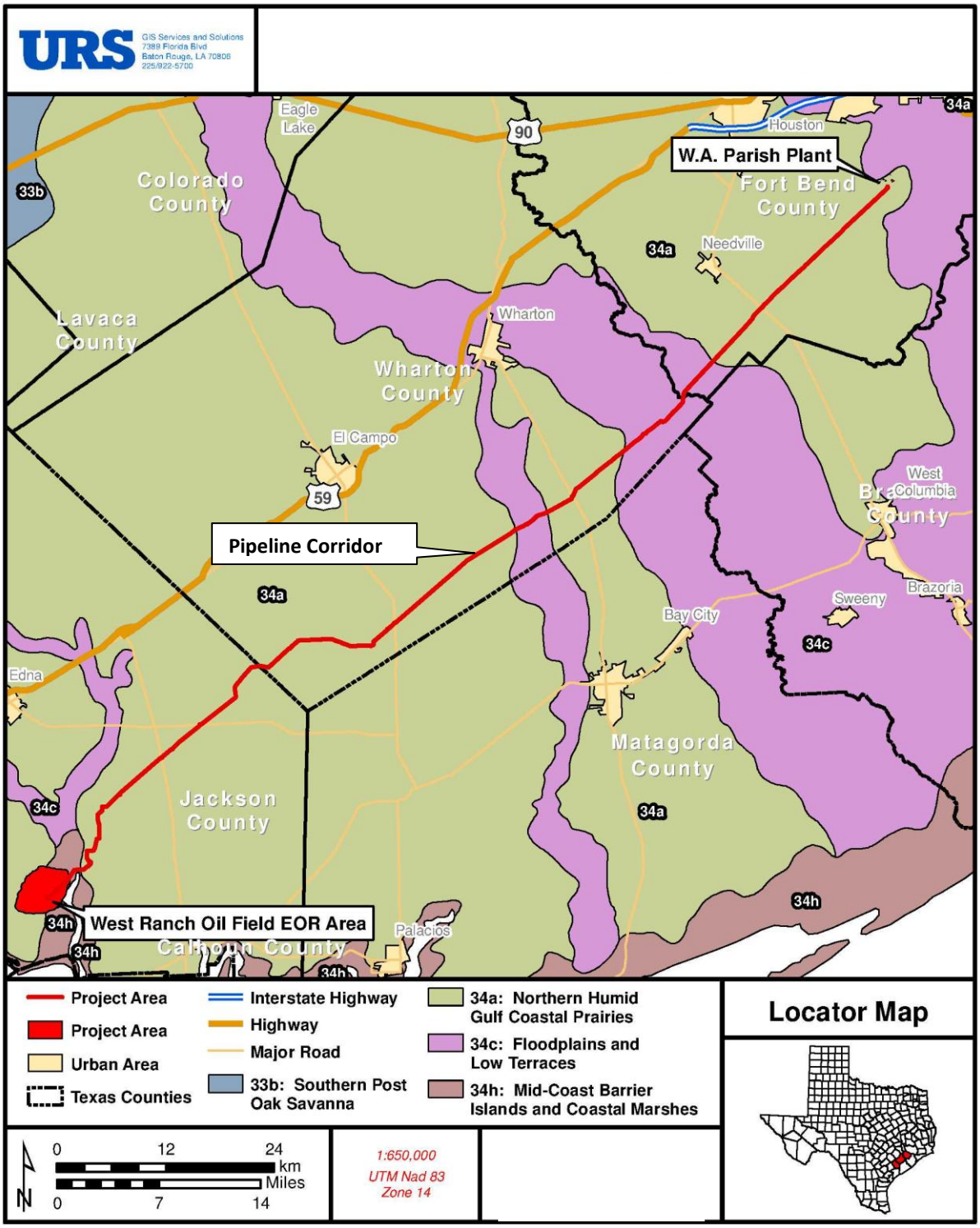
The project area in Fort Bend, Wharton, and Jackson Counties, Texas is located within the Gulf Coastal Plain section of the Coastal Plain Physiographic Province of North America, which is a flat coastal zone that rises very gradually from the coast to the interior (Perttula 1993; Ricklis 2004a; Swanson 2001). The region is characterized by relatively flat to gently undulating terrain which display a primarily grassland ecotone prior to modern development (Griffith et al. 2007). This region extends in a narrow band from the Texas/Mexico border to the Mississippi Alluvial Plain, just west of the confluence of the Red and Mississippi Rivers. In general, this region is characterized by extensive marshes associated with the bays and estuaries that have formed along the Gulf Coast and north-south flowing river drainages. In the past, the hardwood and pine forests to the north provided habitat for white-tailed deer, antelope and bison, as well as a variety of smaller mammals and reptiles (Northern Humid Gulf Coastal Prairie; Perttula 1993:207-208; Ricklis 2004b:182). In the project area, this region also encompasses portions of the San Bernard, Colorado, and Lavaca River drainages, as well as the Jones and Big Creek watersheds. Elevations within these portions of Fort Bend, Wharton, and Jackson Counties range from sea level in the south to 250 ft (76.2 m) above mean sea level (amsl) in the north.

The Northern Humid Gulf Coastal Prairies covers the majority of the proposed pipeline corridor (82.8%) (Figure 2.1). This ecoregion is formed on a flat to gently sloping coastal plain that developed over late Pleistocene alluvial and deltaic deposits (i.e., sand, silt, clay, and gravel) (Griffith et al. 2007). Due to the sloping nature of these soils, drainage in these areas is generally poor and the soils remain wet during most of the year, producing an ideal setting for crops, such as corn, soybeans, and cotton, with open prairies for raising livestock. The surface expressions associated with the alluvial and deltaic deposits consist of low ridges and relict fluvial channels and meanders scars; the major drainages trend northwest-southeast through the project area. Numerous natural circular mounds (pimple mounds) are also located across the surface of the Northern Humid Gulf Coastal Prairie.

In the project area, the Floodplains and Low Terraces subdivision is associated with the San Bernard and Colorado Rivers and their associated drainages; approximately 13.8% of the project corridor crosses this ecoregion (Figure 2.1). Late Pleistocene and Holocene alluvial deposits (i.e., sand, silt, clay, and gravel) underlie the Floodplains and Low Terraces (Griffith et al. 2007); this has produced terrain consisting of low-gradient river floodplains (i.e., natural levees, backswamps, etc.) flanked by low alluvial terraces.

A small portion along the coast of the project area is made up of the Mid-Coast Barrier Islands and Coastal Marshes sub-region (3.4%; Griffith et al. 2007). This ecoregion consists of Holocene deposits of sands and clay found within brackish marshes, barrier islands, and tidal flats (Griffith et al. 2007).

Figure 2.1 Project Area Ecoregion Map



2.3 SOILS AND LANDFORMS

A total of 37 named soils were identified within the project area for Fort Bend, Wharton and Jackson Counties, Texas (Table 2.2). Based on landform characteristics, slope attributes, and drainage classes, these 37 soils were collapsed into the following three (3) general categories in an attempt to capture similar types of soil/landform relationships, which might be useful for predicting archaeological site potential and/or location:

(1) Coastal Plains (n=24; 85.6%);
(2) Floodplains (n=11; 14.0%); and,
(3) Water/Oil-Waste Land (n=2; 0.23%);

The majority of the survey corridor is characterized by the gently sloping Coastal Plain soils found on level terrain within the Northern Humid Gulf Coastal Prairies ecoregion (Table 2.1). These landscapes have not been subject to alluvial deposition during the Holocene period (ca. 10,000 B.C. to present); therefore, archaeological cultural materials should generally be located close to the ground surface and have been subjected to natural and cultural (predominantly agricultural) erosional forces. This, in concert with the shallowness of the archaeological deposits, could effectively destroy the integrity of archaeological sites across this landscape. This would indicate that the Coastal Plains soils should display a lower archaeological site potential (due to these integrity issues). Conversely, the presence of the extensive residential and agricultural developments across this landscape would suggest that there is a higher potential for architectural (i.e., built) resources to be encountered as a result of the cultural resources survey on these soils.

The Floodplain soils (n=11) are associated mainly with the drainages of the San Bernard, Colorado, and Lavaca Rivers, as well as Jones and Big Creeks; these soils account for approximately 14.0% of the proposed pipeline survey corridor (Table 2.1). Buried archaeological deposits are anticipated along the natural levees flanking these drainages, due to seasonal overbank flooding that formerly characterized these waterways. In addition, the slightly elevated and drier terraces overlooking these drainages are also suggested to have higher archaeological site potential. As a result of the above, the Floodplain soils are considered to display higher archaeological site potential.

As will be discussed further in Section 4, seven (7) previously recorded archaeological sites were previously identified within 0.5 mi (0.8 km) of the proposed pipeline corridor. Of this number, six (6) prehistoric period sites were also located along the Lavaca River floodplain within Jackson County; these sites were associated with coastal and brackish marsh soils, specifically the Bernard-Edna Series clay loam, formed within the Mid-Coast Barrier Islands and Coastal Marshes ecoregion. A single historic period site (41WH82) was also previously recorded in Wharton County, within the Colorado River floodplain soils. This would tend to support the inference that the Floodplain deposits crossed by the proposed pipeline corridor generally display a higher archaeological site potential.

Table 2.1 Soil Characteristics

Landform	Soil Name	Symbol	Slope	Drainage	%
Coastal Plain (n=24; 85.6%)	Bacliff clay	Ba	0-1	Poorly Drained	0.06
	Dacosta sandy clay loam	DaA	0-1	Moderately Well Drained	6.33
	Edna fine sandy loam	Ea	0-1	Somewhat Poorly Drained	13.2
	Edna fine sandy loam	Eb	1-4	Somewhat Poorly Drained	0.37
	Edna fine sandy loam	EdA	0-1	Somewhat Poorly Drained	13.7
	Edna soils	Eh	0-1	Somewhat Poorly Drained	0.77
	Edna-Cieno complex	EtA	0-1	Somewhat Poorly Drained	3.23
	Edna-Waller complex	Ec	0-1	Somewhat Poorly Drained	0.12
	Laewest clay	LaA	0-1	Moderately Well Drained	9.75
	Laewest clay	LaB	1-3	Moderately Well Drained	1.10
	Laewest clay, eroded	LaD3	3-8	Moderately Well Drained	0.28
	Lake Charles clay	La	0-1	Moderately Well Drained	3.85
	Lake Charles clay	Lb	1-4	Moderately Well Drained	0.34
	Lake Charles clay	LcA	0-1	Moderately Well Drained	7.02
	Marcado sandy clay loam	MaC	3-8	Well Drained	1.20
	Bernard clay loam	Bb	0-1	Somewhat Poorly Drained	1.57
	Bernard clay loam	BcA	0-1	Somewhat Poorly Drained	5.42
	Bernard loam	Md	0-1	Somewhat Poorly Drained	1.13
	Bernard-Edna clay loam	Bc	1-4	Somewhat Poorly Drained	0.09
	Bernard-Edna complex	Be	0-1	Somewhat Poorly Drained	2.54
	Bernard-Edna complex	Bea	0-1	Somewhat Poorly Drained	2.38
	Telferner fine sandy loam	TfA	0-1	Moderately Well Drained	0.54
	Texana-Cieno complex	TxA	0-1	Moderately Well Drained	10.1
	Waller soils	Wa	NA	Poorly Drained	0.48
Floodplain (n=11; 14.0%)	Aransas clay	Ar	NA	Poorly Drained	2.45
	Asa silty clay loam	As	NA	Well Drained	2.31
	Brazoria clay	Me	0-1	Moderately Well Drained	6.03
	Chicolete clay	Ch	0-1	Moderately Well Drained	0.05
	Clemville-Norwood complex	Cn	NA	Well Drained	0.65
	Kaman clay	Kd	NA	Poorly Drained	0.27
	Katy fine sandy loam	Ka	0-1	Poorly Drained	0.20
	Norwood silt loam	NoB	3-8	Well Drained	0.06
	Pledger clay	Pa	NA	Moderately Well Drained	1.23
	Pledger clay	Pc	NA	Moderately Well Drained	0.74
	Cieno soils	Tp	NA	Poorly Drained	0.01
Water (0.20%)	Water	W	NA	N/A	0.20
Variable (0.03%)	Oil-waste land	Wc	NA	Well Drained	0.03
				Total	**100.00**

Finally, the remaining the two soils encountered in the project area (water and oil-waste lands; 0.54%) are either man-made deposits (oil-waste lands) or inundated watercourses (Table 2.1). They are considered to display lower archaeological site potential.

In general, the poor drainage and general lack of terrain features along the project corridor appear to indicate that the overall archaeological potential along the majority of the proposed route is low. The potential for intact undisturbed historic properties is further diminished, as the proposed pipeline corridor is mainly associated with active agricultural fields and collocated with a cleared transmission line corridor and some built pipelines for its length. Prehistoric archaeological potential is also expected to generally be limited in areas lacking terrain features, where major ground disturbance has occurred, and areas with poor soil drainage. Archaeological site potential is believed highest when in proximity to drainages and defined breaks-in-slope.

2.4 CURRENT LAND USE

The Northern Humid Gulf Coastal Prairies was predominantly a grassland ecotone prior to Euro-American development; however, much of the region is now under extensive corn, cotton, rice agriculture, or being used for hay production and pastureland (Griffith et al. 2007). In addition, extensive oil and gas production occurs throughout the region. Within the bottomlands associated with the Floodplains and Low Terraces, ash, elm, oak, and pecan stands are present; bald cypress may be found closer to the larger drainages (Griffith et al. 2007). These floodplains are typically either forested or used for corn and cotton fields or pecan orchards. The Mid-Coast Barrier Islands and Coastal Marshes are associated with grasses, sedges, and rushes that can survive in the brackish and/or saltwater marshes, including several varieties of cordgrass (Griffith et al. 2007). This area is affiliated mainly with commercial and sport fishing and oil and gas exploration/production.

A variety of mammals, birds, reptiles, amphibians, and fish are found in the project region. These include the red wolf, American alligator, muskrat, nutria, mink, otter, raccoon, white-tailed deer, fox, gray squirrels, coyote, gray fox, and bobcat. Numerous bird species populate the project area, including predators like hawks and owls, game birds like ducks and geese, and a multitude of songbirds and cranes. The most common freshwater fish species near the gulf are largemouth bass, sunfish, catfish, gar, carp, and minnows, while the Gulf of Mexico produces saltwater species like speckled trout, redfish, southern flounder, shrimp and blue crab.

2.5 CLIMATE

Fort Bend, Wharton, and Jackson Counties have subtropical climates with relatively short mild winters and long hot summers. The average daily temperature is 54^{o}F (12^{o}C) in the winter and 82^{o}F (25^{o}C) in the summer (Mowery et al. 1960:2). Annual rainfall is roughly 42 in (107 cm) and it is distributed evenly throughout the year with a long growing season for

crops. The average humidity is high, due to the coastal nature of this area and seasonal winds from the Gulf of Mexico. Tropical storms and hurricanes occasionally make it to these counties bringing heavy rains and winds that damage crops. Snowfall is very rare in this area, with some cold weather bringing sleet or ice in the winter months (Mowery et al. 1960:2-3).

The archaeological stages identified for the West Gulf Coast Plain physiographic province of Texas include the Paleo-Indian (12,000 to 8000 Before Present [BP]), Archaic (ca. 8000 to 2200 BP), Late Prehistoric (ca. 2200 to 500 BP), and Protohistoric (ca. 500 to 300 BP) (Perttula 2004:9). With respect to the historic period, this portion of southeastern Texas is discussed in terms of the Early Exploration to Statehood period, followed by the historical development of the individual counties through which the project passes.

3.1 PALEO-INDIAN STAGE (12,000 TO 8,000 B.P.)

The Pre-Paleo-Indian (or pre-Clovis) stage of prehistory refers to the possible human occupation of North America prior to ca. 12,000 BP. Four sites in the eastern and southeastern United States have been identified by Goodyear (2005) as possibly containing pre-Clovis artifact assemblages (consisting mainly of lithic debitage and microtools): (a) Meadowcroft Rockshelter (36WH297, Pennsylvania); (b) Saltville Site SV-2 (44SM37) and Cactus Hill (44SX202, Virginia); and (c) the Topper Site (38AL23, South Carolina). Currently, no pre-Paleo-Indian occupations have been identified within southeastern Texas.

The Paleo-Indian Stage can be divided into Early (i.e., Clovis and Folsom; ca. 12,000 to 9,500 BP) and Late Periods (i.e., Dalton, San Patrice, Scottsbluff, Wilson, Golondrina-Barber, and St. Mary's Hall; ca. 9,500 to 8,000 BP), based primarily on changing projectile point morphology **(**Perttula 2004:17–18, 118). Defining characteristics of Paleo-Indian lithic assemblages include lanceolate points with straight or inward rounded bases, scrapers, and notched tools and points. These items appear to be associated predominantly with the hunting and butchering of large game (i.e., megafauna) during the late Pleistocene period, although recent analysis suggests that small game and a variety of plants also contributed to the diet of Clovis populations (Perttula 2004:116; Bense 1994:59).

Unlike the more specialized Paleo-Indian groups on the Southern Plains, the earliest inhabitants of coastal Texas are characterized as having "a more generalized or perhaps opportunistic adaptation that emphasized animals over plants" (Story 1990:425). Most of the cultural materials associated with the Paleo-Indian period in the West Gulf Coast Plain are found associated with the major river systems of southeast Texas (Perttula 2004:10). Within the greater West Gulf Coast Plain, diagnostic Paleo-Indian assemblages identified near the project area include Berger Bluff, northwest of the project corridor along the Guadalupe River, and McFaddin Beach, located on the Jefferson County, Texas coastline, southeast of the project corridor (Perttula 2004:10).

3.2 ARCHAIC STAGE (8,000 TO 2,200 B.P.)

In the project area, the Archaic Stage is divided into three periods: (a) Early Archaic (8,000 to 6,000 BP); (b) Middle Archaic (6,000 to 4,000 BP); and (c) Late Archaic (4,000 to 2,200 BP). Changes in tool technology and other material culture appear to have arisen in response

to the need for more intensive hunting and gathering of resources, perhaps due to the climatic changes that were occurring during the early Holocene such as the rising sea level caused by melting of continental glaciation and increasing temperatures and aridity (Bense 1994:65). Both agriculture and ceramics are virtually unknown during the Archaic Stage in the West Gulf Coast Plain (Ricklis 2004b:184). Key archaeological material traits of the Archaic Stage include notched and stemmed triangular points, baskets, containers of stone and pottery, shell, bone, ground and polished stone artifacts, extensive settlements, and identifiable mortuary practices (Bense 1994:62–89). Within the greater West Gulf Coast Plain, significant Archaic assemblages have been identified in and around the project area, including Sites 41JK24 (Jackson County) and 41WH19 (Wharton County) (Perttula 2004:11).

Limited information is currently available concerning Early Archaic occupations on the West Gulf Coast Plain, with full-scale excavations conducted at only a few sites. Material culture remains have been restricted to "sporadic chert debitage and utilized flakes, and occasionally simple shell tools" (Ricklis and Weinstein 2005:117). This appears to be suggestive of repeated, but neither constant nor intensive, occupation of the dynamic Holocene shoreline; shoreline stabilization appears to have peaked during this period from ca. 7500 to 6800 BP (Ricklis and Weinstein 2005:117; Ricklis 2004b:187-188). Expanded-stem projectile point forms, such as the Keithville, Neches River, and Trinity dominate the lithic assemblages (Ricklis 2004b:185). Known Early Archaic sites near the project area include Site 41JK24 (ca. 5600 BP), located along the banks of the Lavaca River (Ricklis 2004a:161).

The Middle Archaic coincides with the peak of the global warming and drying trend known as the Altithermal (Bense 1994:74). As rainfall decreased and river systems stabilized along the West Gulf Coast Plain, the heads of bays become favored locations for human activity during the Middle Archaic. The cultures of the Middle Archaic continued to develop as hunter/gatherer groups, but later organized into what appear to be more sophisticated seasonal rounds that allowed for exploitation of both inland and coastal resources, often simultaneously (Story 1990:258). This pattern would prove resilient, remaining extant on the Texas Gulf Coast until European contact (Gadus 2005:159). Shell middens deposits are seen to expand during this period, reflecting an increasing population focusing on more varied marine resources; additional shoreline stabilization is also suggested between ca. 5900 and 4200 BP (Ricklis 2004b:187; Ricklis and Weinstein 2005:118). Dominant projectile point types include the Yarbrough, Bulverde, and Travis forms (Ricklis 2004b:185). Middle Archaic West Gulf Coast Plain sites include 41NU266, located to the southwest of the project corridor; this site was occupied throughout the Middle and Late Archaic (Ricklis 2004a:158–159).

Beginning toward the end of the Middle Archaic, there is a dearth of dense shell deposits on the East Texas coast between approximately 4200 and 3100 BP (Ricklis 2004a:165; Ricklis 2004b:188). This situation changed by 3100 BP, archaeological sites from that era display deeper middens and a greater differentiation and range of artifact types. During the Late Archaic period, temperatures also cooled and by ca. 3100 BP coastlines had again stabilized

(Ricklis 2004a:157; 2004b:187). Key projectile point forms in the Late Archaic are the Kent and Gary types (Ricklis 2004b:185), and the hunting and gathering of marine, estuarine, and terrestrial resources is well demonstrated (Ricklis 2004b:187). There is a tendency for the use of inferior, local lithic material, which may be suggestive of decreased group mobility with more closely demarcated group boundaries (Ricklis 2004b:185-186). Significant Late Archaic sites on the West Gulf Coast Plain include Eagle's Ridge (Trinity River) and Site 41GV53 (near Galveston) (Ricklis 2004a).

3.3 CERAMIC PERIOD (2,200 TO 500 B.P.)

The Ceramic Period (i.e., Late Prehistoric) in southeast Texas corresponds generally to the Woodland and Mississippian periods positioned to the north and east of the study area (i.e., Louisiana and/or the Lower Mississippi Valley) (Ricklis 2004b:189). The onset of these periods is marked by the introduction of ceramic technology into the Gulf Coastal Plain, the rise of ceremonial complexes such as the Adena and Hopewell elsewhere in North America, and apparent greater social complexity and stratification (Bense 1994:120-123, 176; Ricklis 2004b:189). Early ceramic forms associated with the Tchefuncte Culture are represented by thick-walled, sandy-paste vessels with simple geometric incisions under rim exteriors; grog and limited bone tempering were also introduced (Aten 1983; Ricklis 2004b:189). In comparison, Story (1990) suggests that southeastern coastal Texas developed a distinctive ceramic assemblage comprised of simpler incised geometric motifs, in comparison to their Woodland/Mississippian counterparts (Ricklis 2004b:189-191; Ricklis and Weinstein 2005:120–121). These assemblages were seen as being reflective of the Mossy Grove Tradition, which encompassed the southeastern Texas coast as well as extending from the mouth of the Colorado River, eastward along the lower drainages of the Brazos, San Jacinto, Trinity, Neches, and Sabine Rivers (Story 1990; Ricklis 2004b:190; Figure 6.7).

Aten's (1983) work in and around Galveston Bay provided an initial cultural chronology for the southeast Texas Coast based primarily on ceramic seriation (Ricklis 2004b:191-192). As can be seen, in the initial Clear Lake Phase, Tchefuncte Plain, Tchefuncte Stamped, O'Neal Plain, and Goose Creek Plain were noted in the majority of the assemblages; the presence of the Tchefuncte and Mandeville wares appears to suggest strong cultural ties with coastal Louisiana populations (Ricklis and Weinstein 2005). In the interior, during the initial stage of the Mossy Grove Tradition, evidence is lacking for the Tchefuncte and Mandeville ceramic wares noted from coastal assemblages; in addition, ceramics do not appear in these assemblages until ca. 1,500 BP (Aten 1983; Story 1990). By the following Mayes Island and Turtle Bay Phases (ca. 1,575 to 1,000), only Goose Creek Plain, Incised, and Red-Filmed were identified. In the interior, Caddoan stylistic attributes, reflective possibly of increasing trade and exchange between these two groups, is noted near the northern boundary of the Mossy Grove Tradition (Aten 1983; Story 1990). For a short period from ca. 1,000 to 650 BP, Baytown Plain and San Jacinto Incised displaced the dominant Goose Creek wares, only to be replaced by them in the Old River and Orcoquisac Phases (ca. 650 to 200 BP). Since the

development of this chronology, recovered radiocarbon dates appear to support the ceramic seriation and age estimates proposed by Aten (1983; Ricklis 2004b:192).

Between 900 and 600 BP, the Rockport Phase, comprised of regionally diagnostic, sandy-paste ceramic wares (i.e., Rockport Black-on-White), extended from the mouth of the Colorado River, southwest along the coastline to Baffin Bay (Ricklis and Weinstein 2005:120-122, 127). Characteristic of this phase are asphaltum decorated and/or coated ceramics. Asphaltum is a naturally occurring tar that washes onshore from oil seeping from the Gulf of Mexico. Rockport ceramic wares end to be found within 24 m (40 km) of the Gulf Coast; this geographic distribution suggests a fairly narrow occupation zone focused along the Gulf Coast shoreline and the lower reaches of the major drainages (Ricklis and Weinstein 2005:127).

The use of socketed bone points and small lithic drills appears to extend from the Late Archaic through to the Round Lake/Old River Phases (ca. 3,800 to 500 BP) (Ricklis 2004b:193-194). Gary dart (*atlatl*) points are associated with the Clear Lake and Mayes Island Phases (ca. 2,000 to 1,350 BP), while evidence for bow-and-arrow technology appears in the form of Alba, Catahoula, and Scallorn projectile points at the start of the Turtle Bay Phase (ca. 1,350 BP) (Ricklis 2004b:194; Story 1990). Perdiz projectile points do not appear in the local assemblages until the Round Lake Phase (ca. 750 BP), where they are strongly associated with bison hunting and processing activities (Ricklis 2004b:194).

During the Ceramic Period, shell midden recoveries (i.e., otoliths and oyster valves) suggest that coastal populations were positioned along the bays and estuaries of the coastal zone for the spring and summer (Aten 1983; Ricklis and Weinstein 2005:123). Sixteenth century observations by the Spanish indicate that the coastal barrier islands were occupied during the fall and winter, and that the populations relocated to the mainland estuaries, bays, and river deltas during the spring and summer (Ricklis 2004b:196).

3.4 EARLY EXPLORATION TO STATEHOOD (CA. 1519 TO 1846)

Expeditions into present day Texas began due to political struggles between the major European powers of the sixteenth century, internal colonial conflicts, and the potential gold and silver that was assumed to await the explorers. After prevailing in the Reconquista of the Iberian Peninsula, Spain claimed the entire Gulf Coast by right of discovery in the early 1500s. The Gulf Coast was initially mapped during an expedition lead by the Spanish explorer Alonso Alvarez de Pineda in 1519 (McComb 1989:23). De Pineda sailed from Jamaica and followed the Gulf Coast to the mouth of the Rio Grande, then returned along the same route. The expedition was not successful and shortly thereafter, Spain abandoned the Texas coast in favor of mineral rich central Mexico.

By 1528 the only Spanish in the area were the remnants of Panfilo de Navarez's shipwrecked Florida expedition, who were making their way southwest to Tampico from the Galveston

Bay area (Newcomb 1961:317). The party's ships wrecked off the coast of Texas during their return trip to Mexico; the remaining survivors of the expedition slowly made their way down the Texas coast and finally reached Mexico City. The development of the area was delayed by negative reports by a survivor of the de Navarez expedition, Alvar Nunez Cabeza de Vaca. However, de Vaca spoke of large amounts of gold to be found to the north, which initiated several expeditions into Texas during the 1530s and 1540s. When the Spanish discovered that there was no gold to be found, they abandoned the area for the next 50 years (Campbell 2003:24-35).

Spain's control of Mexico and Florida motivated the French to expand their interests along the Louisiana and Texas Gulf Coast. The French wanted to increase their fur trading territory and gain control of the Mississippi River valley. By 1682, LaSalle was exploring the Mississippi River and claimed all of the lands drained by the river for France. Afterwards, he returned to France and organized a colonization effort to form a settlement at the mouth of the Mississippi River. On his return to the Gulf Coast in 1685, LaSalle landed too far west of the mouth of the Mississippi River, at Matagorda Bay, Texas (Campbell 2003:41-45, 48).

When one of his three ships was deemed damaged beyond repair, LaSalle moved the group further inland and established Fort St. Louis on Garcitas Creek, situated approximately four miles (6.4 km) west of the eastern end of the study area. Fort St. Louis consisted of a single large log cabin, six smaller log cabins, and a stockade surrounding the area. The colonists had a number of factors working against them - sickness, lack of food, and the local Karankawa tribes. Determined to find the Mississippi River, LaSalle continued to search the surrounding areas, but was not successful in his quest. On January 7, 1687, LaSalle set out from Fort St. Louis with all of the able bodied men from the settlement in search of Mississippi River and French outposts in the Illinois Country. Although LaSalle was murdered by members of his own expedition, others eventually found their way to French territory. By 1690, news of the fort's predicament reached Italian-French explorer Henri de Tonty, and he immediately set out to rescue the survivors, but was unsuccessful in locating them (Fehrenbach 2000:39-41).

After LaSalle left for the east in 1687, conditions continued to deteriorate for the remaining settlers left behind under the watchful eye of Sieur Barbier, especially after an outbreak of smallpox struck the settlement. Barbier decided to attempt peace with the local tribes, which proved detrimental to the group. The fort was overtaken by the natives, who murdered almost all of the men and took the women and children as captives. One of few men who survived traveled south to a Spanish presidio in Mexico in 1688, where he spoke with Don Alonso de Léon, the Governor of Coanuila. The Spaniards, extremely sensitive to any incursions into their territory, immediately set off for the fort. When they arrived a year later, they found the fort abandoned. After searching the area, the Spaniards found two men, two young boys, and a woman living among the local tribes, and two men living with tribes along the Brazos River to the east (Fehrenbach 2000:39-41).

The Spanish response to French movements was to conduct a series of overland expeditions in the 1690s to establish missions and presidios at strategic river entrances into interior Texas and prevent future foreign intrusions. Presidios were established at Goliad, Nacogdoches, and Bucarelli on the Trinity (Spanish Fort) River. In addition, they built many temporary Indian missions in southeast Texas throughout the early 1700s, including Rosario and Refugio in south Texas along the curving Gulf Coast (Fehrenbach 2000:49).

In the 1720s, French explorers from New Orleans seeking trade opportunities with local Indians reached Galveston Bay and proceeded to map the area. The explorers along with additional French traders followed the Gulf Coast and ascended the San Jacinto and Trinity rivers. In the 1770s, rumors of English vessels in Sabine Lake and the Brazos River caused the Spanish governor to send a small party to investigate; only a single survivor from Jamaica was found (Bolton 1970).

After the Louisiana Purchase, Spain continued to claim all of Texas and an area in southwest Louisiana bounded by the Red and Rio Hondo (Calcasieu) Rivers as part of New Spain, while the United States claimed all land east of the Sabine River. With the boundary between the two nations undefined, military troops from both sides were sent to protect their supposed interests. In 1806, the Neutral Ground Agreement was struck confining the U.S. troops to Natchitoches (Louisiana) and the Spanish to Nacogdoches (Texas). This created an intervening geographical zone of lawlessness, located roughly east of the Sabine River and south and west of the Red River, where criminals and lawbreakers could easily find refuge (Haley 2006:54).

The Mexican struggle for independence, lasting from 1810 until 1821, attracted a number of sympathizers born in the United States and Europe. The most notable was the pirate Jean Lafitte, who had established a settlement at the eastern end of Galveston Island that included women and children. Mexico achieved independence from Spain in 1821 and soon offered generous land grants to American and European settlers willing to pioneer on its Texas frontier. Newly formed Mexico wanted hardy farmers to develop agriculture and to form a barrier against Native Americans. Despite their desire to create a buffer zone, Mexico banned foreigners from living within 26 mi (41.8 km) of the coast without special executive permission in an effort to prevent a haven for settlers that were not loyal to the new, Mexican Government (Haley 2006).

The lands surrounding the Brazos, Colorado, and San Bernand Rivers were settled in the early nineteenth century under the direction of Stephen F. Austin. Austin's father, Moses, was actually responsible for initiating the settlement, but he passed away before he could see his dreams come to fruition. After his father's death, Austin traveled to San Antonio and received permission from the Spanish governor, Antonio Maria Martinez, to take over his father's work. Three hundred families, or the Old Three Hundred, were given permission to settle in the approved areas. Those families that would cultivate crops received a labor of

land, or 177 ac (71.6 ha), and those that chose to purse ranching received a *sitio*, or league, of land amounting to 4,428 ac (1792 ha; Long 2012).

Between 1823 and 1824, 272 grants were issued; the remaining grants were distributed in 1827. Although family groups were encouraged, grants were dispensed to single men under the condition that they form partnerships. The stipulation of the grants was that the land must be inhabited and improvements begun within two years; only seven grant holders failed to keep these terms. Austin was very selective when choosing his pioneers, who tended to be financially secure and had good social standings. Many of the settlers came from the South, particularly Louisiana, Alabama, Arkansas, Tennessee, and Missouri; they also tended to be of British descent. A large number of the colonists also brought their slaves with them. By the fall of 1825, 443 of the 1790 residents of the region were slaves (25%; Long 2012).

In the early nineteenth century, Americans suffering economic hardships were steadily occupying southeastern Texas. Mexican leaders became increasing uneasy over the expanding number of Anglo-Americans in Texas who failed to observe Mexican law' therefore, they tried to limit immigration in 1830. The gradual change in Mexico from a republic to centralized autocratic government between 1830 and 1835, finally lead to armed resistance by the Anglo-Texans. In October of 1835, armed conflict between the Anglo Texans and the Mexican army ensued at the battle of Gonzales (Fehrenbach 2000). Over the next seven months, a few thousand colonists managed to inflict heavy losses on the better-equipped and trained professional Mexican army. The Mexican army was then routed at the Battle of San Jacinto in April of the following year (Fehrenbach 2000:219-233). In May of 1836, General Santa Anna signed a public treaty with the Republic of Texas in which he swore to never take up arms against Texas. In addition, the Mexican Army would retreat south of the Rio Grande, all hostilities would cease immediately and all American prisoners would be released. Santa Anna also signed a secret treaty pledging to work in Mexico to achieve diplomatic recognition of Texas, establish a treaty of commerce, and recognition of the Rio Grande River as the Texas-Mexico boundary (Fehrenbach 2000:241).

During the years of 1836 to 1845, Texas functioned as the independent Republic of Texas. Texas was not immediately annexed by the United States, as a result of abolitionists objecting strongly to the addition of another slave state to the Union. The Republic of Texas was also struggling financially, as its founding coincided roughly with the worldwide banking panic of 1837, which drained circulation of gold and silver. The United States Congress finally agreed to annex Texas in 1844, when it appeared that Great Britain or France might acquire Texas (Fehrenbach 2000).

3.5 FORT BEND COUNTY

The settlement of Fort Bend began in the early 1820s as a result of Stephen F. Austin's colonization efforts. A group sailed for the Texas Coast from New Orleans in November of 1821, and arrived at the confluence of the Brazos River and the Gulf of Mexico shortly afterwards.

Just after the New Year, a small contingent of settlers ventured upriver approximately 90 mi (14.8 km) to found what became known as Fort Settlement, or Fort Bend. The area became home to 53 of the Old Three Hundred families. Like any other new settlement, the pioneers had issues to overcome, particularly with the local Karankawa Indian tribe. Within thirty years, the Karankawa tribe had migrated south into Mexico (Ott 2012).

The county was formed out of areas pulled from Austin, Brazoria, and Harris Counties, with all but the northern boundary being a waterway. The boundaries were formalized on December 29, 1837, and the following month the newly incorporated town of Richmond was made the county seat. Over the next two decades prior to the Civil War, the area began to flourish, on account of the slave labor available in the county. In 1840, there were 572 slaves in the county; two decades later, on the eve of the Civil War, the slave population was in the majority, with 4,127 slaves to 2,016 whites, and 159 farms cultivating cotton, corn, and sugarcane (Ott 2012).

Secession was so strongly supported in the county that the vote to leave the Union was passed unanimously, 486 to 0, in 1861. It is not surprising that a large amount of able-bodied men in the county enlisted in the Confederate Army; a number of these joined the Eighth Texas Calvary, led by local Sugar Land planter Benjamin Franklin Terry. The county remained physically safe from the war, but like the rest of the South, suffered economically and politically afterwards. As a result of reconstruction, the Republican Party controlled politics in Fort Bend County until tensions within the Democratic Party reached a breaking point and resulted in the Jaybird-Woodpecker War. The Jaybirds (Democrats) and Woodpeckers (Democrats who held office because of the black vote and supported the Republicans) came to a head on August 16, 1889, and a shoot-out ensued. The Jaybirds prevailed, and the Old Democratic Party once again controlled Fort Bend County (Ott 2012; Yelderman 2012).

In the years following Reconstruction, the county slowly rebuilt its economy and returned to its former prosperity. This was aided by the coming of the railroads and the resurrection of the area's agriculture after the loss of slave labor. In 1878, the Gulf, Colorado and Santa Fe Railway passed through the county on its way north from Galveston, and intersected with the Galveston, Harrisburg and San Antonio line just west of Richmond. The town of Rosenberg developed around this interchange, and became the headquarters for the New York, Texas, and Mexican Railway five years later in 1882. The influx of railroads brought a new wave of settlers, primarily Central European in origin, who founded a number of new communities in the county, including Needville (Ott 2012).

Agriculture after the war focused on ranching and a transition from plantation to small farm holdings. In 1890, there were 995 farms in the county with an average of 154 ac (62.3 ha) each; in 10 years this number climbed to 2,365 farms with approximately 183 ac (74.1 ha) each. Additional changes came after many farmers lost everything in the floods of 1899 and the Galveston hurricane of 1900, when they were forced to make the transition to tenancy. Farm ownership did not begin to increase until after World War II (Ott 2012). Sugarcane did

not return to its status as a primary crop until the late nineteenth century; this was supported by the construction of a million dollar refinery and cane mill at Sugar Land, which was then purchased by the Imperial Sugar Company in 1907. Rice was introduced to the area in 1901 and quickly became a staple in the local economy. Cotton, grain sorghums, and cattle also continued to be top income generators for the Fort Bend farmers (Ott 2012).

The discovery of mineral resources in the early twentieth century continued to support the economic growth of the county. Salt domes with oil, gas, sulfur, and salt reserves generated hundreds of jobs in the local economy. The first oil well in the county was drilled at Blue Ridge in 1919, and additional wells were installed in 1922 at Big Creek. Additional mineral supplies were discovered in Orchard in 1926 and Katy in 1935. The prosperity continued in Fort Bend County throughout the rest of the twentieth century, making it one of the swiftest growing counties in the country with its population going from only 130,900 in 1980 to 585,375 as of the 2010 census (Ott 2012; U.S. Census Bureau 2010a).

The community of Fairchilds, located approximately 4.5 mi (7.2 km) north of the study area, was established in 1890 by Charles Blohm, August Bede, and Theo Aderholz, but named after Philo Fairchilds, who settled in the area around 1840. The new settlement quickly attracted a number of German settlers. The land that the community is located on was purchased in 1896 by a group of Mennonites, and an additional 50 families came to the area. The town was greatly affected by the Galveston hurricane of 1900, and almost all of the residents left the area. A post office was established in 1912, but operated for only six years. In 1933, there were a reported 25 residents in the town and three businesses. The population increased to 75 in 1940, and climbed to 125 in 1953. The population has continued to decline and rise since then, with only 150 residents in 1990, but approximately 680 by 2000 (Hardin 2012a).

The town of Needville, situated approximately 4 mi (6.4 km) to the north of the study area and west of Fairchilds, was originally known as Schendeville (Odintz 2012). The town founder, August Schendel arrived in 1891 and constructed a house, store, and cotton gin. The town received its name in 1894, when Schendel applied for a post office and changed the town name to Needmore on the application. Since there already was a Needmore, Texas, the post office changed the name to Needville. Six years after Needville's initial settlement, the first school was established in 1897, and by 1903 there was both a white and black school in town. The town was platted in 1898, and lots were sold soon afterwards. The town grew slowly through the following years, and by 1914 there were 100 people living in Needville, which had three general stores, two cotton gins, and a movie theater. Two years later, phones arrived in the town and by 1918 the Galveston, Harrisburg and San Antonio Railway was built through town.

By 1920s, the population had reached approximately 500 individuals, most likely due to the discovery of natural gas and sulfur in the area, which caused a shift in the reliance on cattle and farming as the area's economic staples. By the end of the decade, natural gas was available in town. The first paved all weather road (Highway 36) was completed in 1932, and in

1944 the town of Needville was incorporated. The population has continued to increase since then, going from 603 in 1950 to 2199 in 1990. Despite the closing of the railroad in the 1980s, the small town continues to grow and prosper with 189 businesses and a population of 2609 (Odintz 2012).

Less than a mile to the south of the study area, situated on Highway 36 is the community of Guy, named after the daughter of the first postmaster. The community was initially settled in 1890 by Philip F. Ward, who was followed to the area by several families in the ensuing years of 1891 to 1894 (Beard 2012). By 1897, a school was constructed in town, and the following year a post office was established. Two decades later, the Galveston, Harrisburg, and San Antonio Railroad laid its railway approximately 2 mi (3.2 km) southwest of town, causing the school and a number of businesses to relocated closer to the railroad. Eventually the post office and remaining businesses relocated to "New" Guy. Highway 36, finished in 1932, lined "New" Guy with the remnants of the old community. Although the nearby Damon Mound salt dome provided jobs for a number of individuals within the community, the population began to steadily decline. In 1940 the population was 200 individuals. By 1950 it had dropped to 150, and by 1972 only 25 people lived in Guy. The population grew slightly by 1988, and held at approximately 60 individuals through the turn of the twenty-first century; the railroad once responsible for moving the entire town closed in the 1980s (Beard 2012).

3.6 WHARTON COUNTY

The colonization of what would eventually become Wharton County began in 1823, when 30 of Stephen F. Austin's Old Three Hundred families settled in the area along the Bernard, Caney, Peach, Mustang, and Colorado waterways. The majority concentrated along Peach and Caney Creeks due to their lower propensity for flooding and these holdings quickly transitioned into plantations growing cotton and sugarcane. In later years, others moved westward into the open prairies and tried their hands at the ranching industry (Hudgins 2012d).

After the Texas Revolution, settlement continued through the years of the Republic. The county was formally established in 1846 after annexation and the Mexican War, and was formed from portions of Colorado, Jackson, and Matagorda Counties. The first county courthouse was constructed in 1848, but had to be rebuilt just four years later in 1852 due to poor workmanship (Hudgins 2012d). Prior to the Civil War, Wharton County was one of the most successful in the state with large plantations, sugar mills, and cattle herds throughout the countryside. The recorded population of 1,752 in 1850 included 1,242 slaves. Eight years later the slave population had risen to 2,181, while the total population in the county was at 2,861. According to the 1858 census, there were 13,665 head of cattle roaming the county's pastures. By 1859, the land value was the highest in the state, and at $10.40 an acre was over five times the average price in the state. Land values rose again by $1.60 the following year to a staggering value of $12 per acre. In 1860, the Buffalo Bayou, Brazos and Colorado Railway crossed the northwest portion of the county, which helped to further drive up land prices (Hudgins 2012d).

Residents of the county strongly supported secession like their neighbors to the east in Fort Bend County, with only two votes against severing ties with the North. Wharton County was home to three Home Guard posts that housed portions of the Twenty-second Brigade; local men joined Terry's Texas Rangers, the Home Guard, or the Wharton Rifles. Like Fort Bend County, fighting did not reach the residents of Wharton County, but they still had to recover economically during Reconstruction (Hudgins 2012d). During Reconstruction, many landowners made the transition from the plantation economy to cattle ranching, due to the lack of field hands and capital. Local ranchers then turned to Mexicans as helpers to replace their former slaves. Wharton County became home to many large cattle ranches; during the late nineteenth century, Abel Head Pierce owned approximately 500,000 ac (202,350 ha) that stretched across three counties with 30,000 ac (12,141 ha) in Wharton County alone. His nephew, A. P. Borden, began importing Brahman cattle in 1906, and the J. D. Hudgins Ranch imported Brazilian bulls from Mexico. In 1910, there were 38,263 head of cattle roaming the county. At one point, Wharton County had the second largest number of cattle in the state and the largest American Grey Brahman herd in the world (Hudgins 2010d).

Cotton, corn, and hay dominated the cultivated field crops until sugar production rebounded towards the end of the nineteenth century. Rice was introduced into the area with the arrival of Japanese immigrants during the late nineteenth century, who settled on the west bank of the Colorado River opposite of the town of Wharton. Rice became such a big part of the county's economy that by the early 1900s, it was home to two of the largest pumping plants in Texas. Within thirty years, Wharton County was the leading producer of rice in the state of Texas. The following two decades saw a decline in the number of farms and the transition to grain sorghums in the late 1950s. As of the 1980s, 94% of the land in the county was devoted to farm and ranches, and 64% of this was under cultivation (Hudgins 2012d).

The railroad was also partially responsible for the recovery of the county's farming. Although the Buffalo Bayou, Brazos, and Colorado Railway did not cause any significant economic increase, the New York, Texas, and Mexican Railway, finished in 1881 did. It eventually became part of the Texas and New Orleans line, and later on the Southern Pacific Railroad. The year 1900 saw the construction of the Cane Belt Railway that ran east/west across the county, which was controlled by the Gulf, Colorado, and Santa Fe Railway, a subsidiary of the Atchison, Topeka, and Santa Fe Railroad that runs parallel to a portion of the study area in Fort Bend and Wharton Counties (Hudgins 2012d).

The exploitation of the county's mineral resources helped to bolster the local economy beginning in the early twentieth century. Oil drilling began as early as 1904 southwest of the town of El Campo. An extremely productive well was located in 1925 near Iago in the Boling Field. Mining began in the same area in 1928 by the Union Sulphur Company, just five years after mineral deposits were identified. The towns of Boling and Newgulf formed as a result of the discoveries. The population in the county has fluctuated over the last 60 years. In 1950 it was at 35,966, rose to 38,152 in 1960, but then fell to 36,729 by 1970. According to the 2010 census, it had risen to 41,280 (Hudgins 2012d; U.S. Census Bureau 2010c).

The community of Newgulf was established in 1928 as a company town by the Texas Gulf Sulphur Company after the discovery of sulfur deposits within the Boling Dome. Initially, the town had 400 houses that Texas Gulf rented to its employees, along with fifteen businesses, a hospital, library, school, post office, golf course, four churches, and a guest lodge (Hudgins 2012a; Hudgins 2012c). A school district was also created with the nearby towns of Boling and Iago; the district's elementary school was located in Newgulf. In 1940, the town's population peaked at approximately 1586 residents. By the end of the next decade, the population started to decline as the demand for sulfur did not meet the production levels at the mines, and layoffs followed shortly. The company began selling houses in town in 1961, and downsizing continued with the introduction of new mining procedures and more efficient machinery. By the beginning of the 1990s, the town's population was down to 963, only 100 houses remained in town, and all of the businesses had left the area. Both the post office and the sulfur plant closed in 1993, thoroughly devastating what little of the small town that remained (Hudgins 2012a; Hudgins 2012c).

The towns of Boling and Iago are approximately 3 and 5 mi (4.8 and 8.0 km) north of the study area, respectively. The area that would become Iago was initially settled during antebellum times, with large plantations along Caney Creek that focused their agricultural pursuits on sugarcane and cotton (Hudgins 2012b). The plantations were abandoned after the war, and settlers did not re-enter the area until 1899 when the New York, Texas and Mexican Railway was constructed, which ran north-south through the county. After Reconstruction, in the late 1880s, a mercantile store was opened by local landowner Clarence Kemp. Kemp also ran the local post office, which was operated from 1891 to 1900. The area's first school was opened in 1902, and in 1911, the land was surveyed and the township of Iago was planned by G. C. Mick who purchased 1,000 ac (404.7 ha) from Kemp. The town's population has declined slowly over the years, with 200 residents in 1920 then down to only 56 residents in 1990 (Hudgins 2012b). Since then, it has essentially been absorbed by nearby Boling.

Boling was also established with the coming of the New York, Texas, and Mexican Railway in 1900 (Hudgins 2012a). The town was named after the daughter of Robert E. Vineyard, who was responsible for surveying the land the town would be built on. Settlers slowly trickled into the area, due to the fact that much of the land was still dominated by large landowners. The town's future changed in 1925, with the discovery of the sulfur, oil, and gas in the Boling Dome. The town's population, only 20 in 1920, had swelled to 800 by 1944. A post office was established in 1926, and the local Chamber of Commerce opened its doors nine years later. The population of the area grew and fell over the years, with only 621 residents by 1972. Numbers began to increase after this, with almost 1,300 by 1990. This changed after the closing of the Newgulf sulfur plant in 1993, and by 2000 there were only 1,271 residents in the Boling-Iago area (Hudgins 2012a).

The Danish settlement of Danevang ("Danish Field") is situated approximately three-quarters of a mile to the north of the study area (Danish Heritage Museum 2012). This community, settled in 1894, is the only colonial Danish settlement in Texas. The land was purchased by

the Dansk Folkesamfund, the Danish People's Society, specifically for the settlement of Danish immigrants. Approximately 70 families arrived in the area within the first year. Although the early years were rough, the town eventually became a center for cotton agriculture. Both a school and post office were established in the town in 1895, a fire insurance company followed two years later, and phones were installed in 1913. In 1920, the Danish Farmer's Co-operative Society was formed, which aided local farmers in the sale of their harvests. In 1923, there were a total of 97 families in the area. The local population began to decline just four years later, when there were just over 500 residents, and has continued to do so. As of 2000, only 61 people remained in the area (Davis 2012). Over the last 125 years, the community of Danevang has kept its Danish heritage strong by teaching Denmark's history and the Danish language in the schools, and speaking Danish in church and the local club meetings up through the early 1970s. Today, the Danish Heritage Preservation Society runs the Danish Heritage Museum of Danevang, which includes a museum and a donated pioneer house (Danish Heritage Museum 2012).

3.7 JACKSON COUNTY

Unlike Fort Bend and Wharton Counties with larger numbers of initial settlers, only six families out of the Old Three Hundred initially colonized Jackson County in the mid-1820s (Hardin 2012b). Many of the colonists that lived in the area were from Alabama, earning the popular name of the "Alabama Settlement." The colonists did not have the same conflicts with the local Indian tribes as settlers in the neighboring counties did. The Lipan Apache and the Tonkawa Indians only conducted night raids for supplies. This was put to an end in 1832 when the local militia attacked the tribes, which ended in the Sandy Creek Skirmish (Hardin 2012b).

During the Texas Revolution, the town of Texana served as a port of entry and training camp for troops (Hardin 2012b). The area was devastated after the Mexican army occupied and burned many of the farmsteads in the municipality. After the Texans successfully overcame the Mexican government in the revolution, Jackson County was formed from the old Mexican municipality of Jackson in 1836. In 1844, the county boundaries were altered when a small narrow portion was divided between Matagorda and Wharton Counties, and a portion of Wharton County was added to land between the Lavaca River and Arenosa Creek. Two years later, the boundaries were again modified when portions in the north, south, and east were taken to form the counties of Calhoun, Lavaca, and Wharton, while the western boundary was extended to Arenosa Creek. The last modifications to the county's boundaries occurred in 1848, when more land was taken and then added to Matagorda County (Hardin 2012b).

Before the Civil War, Jackson County followed in the footsteps of its neighboring counties, relying on cotton and sugarcane cultivation, as well as cattle ranching. In 1850, the total population was 996, with slaves accounted for approximately one-third (n=339). Ten years later, the total population had more than doubled and the slave population had almost tripled. The

residents of the county did not completely follow the same paths of their neighbors when it came to secession, however. The vote to secede was substantially closer with 147 votes for and 77 against. Jackson County men served in Company K of the Texas Infantry, the Twenty-seventh Texas Calvary, Company D of the First Texas Calvary, and the Eighth Texas Calvary. After the war, Jackson County residents were plagued by economic problems as well as widespread violence and crime. The town of Morales became a refuge for criminals, including the well-known Dalton Gang at one time. Order was restored by the mid-1870s, and the economy began to gradually recover (Hardin 2012b).

During the 1870s, the number of farms tripled, and cultivated land increased by more than 50,000 ac (20,235 ha) (Hardin 2012b). Cattle became the main agricultural pursuit in the county, while sugarcane and cotton continued to prosper. Once the New York, Texas, and Mexican Railway was established, ranchers began shipping their cattle via rail rather than making the long drives over land. Beef cattle continued to play an integral role in the economy in the early twentieth century. In 1910, there were 104,937 head of cattle, which fell to 43,154 in 1920 due to overgrazing. Cotton production the increased as a result; cultivated cotton rose from 7,817 to 35,606 ac (3,164 to 14,410 ha). Just ten years later, cotton fell again as a result of droughts, boll weevil infestations, and a drop in prices (Hardin 2012b).

Overall, the economy continued to improve in the 1920s. This was supported by numerous civic improvements including paved roads, new bridges, and the introduction of utilities (Hardin 2012b). Oil was discovered in the county in 1934, driving land prices up, making it extremely difficult for poor whites and blacks to acquire their own land, resulting in increased tenant farming. The agricultural economy began improving, particularly after World War II. Jackson County became a leading contender in the rice and cattle industries, and continued to produce corn and grain sorghums. As of the 1990s, 90% of the county was devoted to farming and ranching, with 30% of this under cultivation. The population of the county has stayed low compared to surrounding counties: in 1910 it was at 6,471 and by 1960 stood at 14,046. The population has varied slightly over the last 50 years, but as of the 2010 census, there were 14,075 residents in Jackson County (Hardin 2012b; U.S. Census Bureau 2010b).

The town of Lolita is immediately east of the study area, and is less than a mile east of the Lavaca River. The area was settled as early as 1840 by pioneer Isaac N. Mitchell (Hardin 2012c). Mitchell's son purchased a league of land from one of the original Old Three Hundred families and a portion of Stephen F. Austin's grant to form the Mitchell spread. The property boasted the first barbed wire fence in Jackson County in 1880. Twenty-nine years later, in 1909, the town of Lolita was established. The fledgling community grew quickly with the construction of a switch for the St. Louis, Brownsville, and Mexico Railway. That same year, a post office, store, and cotton gin opened. By the mid-1940s, there were 200 residents; this grew to 462 by 1969. The population declined to 300 in 1990, and increased again to 548 by 2000 (Hardin 2012c).

The community of Vanderbilt is approximately 3.0 mi (4.8 km) north of the end of the study area on the west side of the Lavaca River. The town developed in 1904 around a new railroad station belonging to the St. Louis, Brownsville, and Mexico Railway. The town's post office was established in 1907, and continued to operate until 1988. Like other small towns in the area, Vanderbilt's population has seen its ups and downs: in 1945 there were 300 residents, which grew by 1962 to approximately 900. However, by 2000 there were only 411 people (Hardin 2012d).

The project area associated with the NRG Energy W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project (NRG) lies within the Eastern (Fort Bend County) and Central and Southern (Wharton and Jackson Counties) Planning Regions (Kenmotsu and Perttula 1993). Background research associated was conducted at the online Archaeological Sites Atlas maintained by the Texas Historical Commission located in Austin, Texas; this database was last accessed on May 22, 2012 to ensure completeness of the review. In addition, a search of the National Register of Historic Places (NRHP) online database was completed for Fort Bend, Wharton, and Jackson Counties. This background review encompassed an approximately 0.5-mi (0.8-km) radius surrounding the proposed pipeline corridor. The Phase I cultural resources survey methods and analytical methods used for the proposed project property follows the background research discussion.

4.1 PIPELINE CORRIDOR

Nine (9) cultural resources surveys have been conducted within a 0.5-mi (0.8 km) radius of the proposed NRG pipeline corridor in Fort Bend, Wharton, and Jackson Counties (Table 4.1; Appendix B – Mapsheets 1 to 31). The proposed pipeline corridor crosses, or lies near to, a number of cultural resources surveys that were conducted between 1973 and 2011. Although none of these studies encompass significant portions of the proposed right-of-way under examination, additional recent projects available to THC staff, but not posted to the Site Atlas, may also be represented. All of these studies appear to be Phase I cultural resources inventory efforts, with most completed for the Galveston and Vicksburg Districts, United States Army Corps of Engineers (USACE; n=4), with single occurrences noted for the Texas Historical Commission (THC), Texas Department of Transportation (TxDOT), the Federal Energy Regulatory Commission (FERCC), the Bureau of Land Management (BLM), and an unnamed agency.

Table 4.1 Cultural Resource Surveys – Pipeline Corridor

County	Agency	Permit Number	Report Date
Fort Bend	USACE- Galveston	5877	2011
Fort Bend	USACE-Vicksburg	N/A	1987
Fort Bend	Bureau of Land Management	N/A	1988
Wharton	Federal Energy Regulatory Commission	N/A	2007
Jackson	USACE-Vicksburg	N/A	1992
Jackson	USACE-Vicksburg	N/A	1992
Jackson	Unstated	N/A	1990
Jackson	Federal Highways Administration/ Texas Department of Transportation	N/A	1995
Jackson	Texas Historical Commission	N/A	1973

Seven (7) archaeological sites have been identified previously within 0.5 mi (0.8 km) of the proposed pipeline centerline (Table 4.2; Appendix B – Mapsheets 1 to 31). All of these sites are prehistoric period lithic scatter sites located along slightly elevated landforms on either the banks of the Lavaca River (n=6) or within the floodplain of the Colorado River (Site 41WH82). None of the site forms provided information on their eligibility for listing in the NRHP. Only site 41JK128 intersects with the proposed NRG pipeline corridor.

Table 4.2 Archaeological Sites – Pipeline Corridor

County	Site Number	Type of Site	Association	NRHP Eligibility
Wharton	41WH82	Aboriginal campsite	Prehistoric	Unstated
Jackson	41JK35	Aboriginal campsite	Prehistoric	Unstated
Jackson	41JK38	Aboriginal campsite	Prehistoric	Unstated
Jackson	41JK39	Aboriginal campsite	Prehistoric	Unstated
Jackson	41JK115	Aboriginal campsite	Prehistoric	Unstated
Jackson	41JK128	Aboriginal campsite	Prehistoric	Unstated
Jackson	41JK136	Aboriginal campsite	Prehistoric	Unstated

Three (3) state historic markers and four (4) historic cemeteries were identified within 0.5 mi (0.8 km) of the proposed pipeline survey corridor (Table 4.3); also, no listed NRHP properties were noted within 0.5 mi (0.8 km) of the current pipeline survey corridor.

Table 4.3 Historic Buildings, markers, and Cemeteries– Pipeline Corridor

County	Name	Number	Feature Type	Additional Information
Fort Bend	Guy Cemetery	FB-C144	Cemetery	Veteran
Jackson	Lolita Cemetery	Unstated	Cemetery	Unstated
Fort Bend	Zemanek Cemetery	FB-C134	Cemetery	Unmarked graves
Wharton	Ansgar Evangelical Lutheran Church	N/A	Cemetery	Contains three former pastors of the church and veterans of wars ranging from the Civil War to WWII.
Wharton	Ansgar Evangelical Lutheran Cemetery	172	Historic Marker	Danish Folk Society helped 93 Danish Lutheran families from the Midwest establish the Danevang Cooperative Settlement in the early 1890s. Erected a meeting hall at the site in 1895 and a sanctuary in 1909.
Wharton	Unknown Cemetery	WH-C016	Cemetery	N/A
Wharton	Danevang	1163	Historic Marker	The first successful Danish community in Texas. Established in 1894 on a portion of 25,000 acres secured through option by Danish Folk Society from Texas Land and Cattle Company.

4.2 CO_2 CAPTURE FACILITY, W.A. PARISH PLANT, FORT BEND COUNTY

The W.A. Parish Plant is located in Thompsons, Texas along the southeast shore of Smithers Lake, a 2,430 ac (983.4 ha) man-made water body that is used for plant cooling water (Figure 4.1). The CO_2 capture facility includes the proposed North and South Laydown Areas, CO_2 Capture Area, Warehouse, Road Relocation, 38kV Switchyard, CO_2 Compressor, Pipe Rack, and Flue Tank and Dump.

A review was conducted by URS on May 17, 2012 of data on file at the THC via the online Texas Archeological Sites Atlas, along with the online records of the NRHP. This research was undertaken to identify previously completed cultural resources surveys and cultural resources recorded within 1.0 mi (1.6 km) of the proposed project area. According to these sources, no previous cultural resources surveys, State Archeological Landmarks, Texas Historic Landmarks, National Register historic buildings, or historic structures have been identified within 1.0 mi (1.6 km) of the W.A. Parish Plant. Three (3) prehistoric lithic artifact scatters (i.e., Sites 41FB225, 41FB226, and 41FB227) are situated within one mile (1.6 km) of the W.A. Parish Plant. They were recorded between 1994 and 1995 by the Fort Bend Archaeological Society and these sites are positioned along the southern shore of Smithers Lake (Site 41FB225) and Dry Creek/Rabbs Bayou (Sites 41FB226 and 41FB227). None of these sites was considered eligible for listing in the NRHP by the recorders. Based on the extent of previous land disturbance and the lack of significant cultural resources found in the area, the DOE stated an opinion in a letter dated June 19, 2012 to the THC that a very low likelihood existed of unrecorded historic properties being situated within the W.A. Parish Plant project areas. On July 11, 2012, the THC responded, concurring with the DOE's determination of No Historic Properties Affected.

4.3 EOR OPERATIONS AND CO_2 MONITORING PROGRAM, WEST RANCH OIL FIELD, JACKSON COUNTY

The West Ranch oil field is located roughly 0.5 mi (0.8 km) south of the community of Vanderbilt, between Venado Creek (west) and the Lavaca River (east), within Jackson County (Figures 4.2 to 4.5). A review of the online Texas Archeological Sites Atlas and NRHP was performed by URS on May 17, 2012. This research was undertaken to identify previously completed surveys and cultural resources in proximity to the proposed project activities. According to these sources, no State Archeological Landmarks, Texas Historic Landmarks, and National Register historic buildings or historic structures have been identified within 1.0 mi (1.6 km) of the West Ranch oil field; however, a single cultural resources survey was undertaken for the USACE along both banks of the Lavaca River.

A total of 14 archaeological sites have been identified within 1.0 mi (1.6 km) of the West Ranch oil field EOR area (i.e., Sites 41JK2, 41JK35, 41JK38, 41JK39, 41JK61 to 41JK63, 41JK114, 41JK115, 41JK126, 41JK127, 41JK129, 41JK138, and 41JK139) (Figures 4.2 to 4.5). The majority of these sites appear to be prehistoric lithic and ceramics scatters situated

along the Lavaca River Bluff (eight sites), Venado Creek (three sites), Menefee Lake (two sites), and Redfish Lake (one site). Four (4) of these sites were considered Not Eligible for listing in the NRHP (i.e., sites 41JK115, 41JK126, 41JK127, and 41JK139) and an additional four (4) sites did not provide any information concerning their eligibility (i.e., 41JK2, 41JK35, 41JK38, and 41JK39). The remaining six (6) sites (i.e., 41JK61, 41JK62, 41JK63, 41JK114, 41JK129, and 41JK138) were recommended for additional testing to determine their eligibility status.

On June 19, 2012, DOE submitted documentation to the THC explaining DOE's determination that no cultural resources eligible for listing on the NRHP would be affected by construction and operations activities in the proposed EOR area of the West Ranch oil field. Based on the proposed project activities and their location within already disturbed lands, it is the opinion of DOE that NRG's proposed project as currently defined has a very low likelihood of impacting historic properties within the West Ranch oil field. As noted previously, project activities that would occur in already disturbed lands (i.e., existing well sites, roadways, and piping corridors) would have little to no potential to effect cultural resources. Activities in previously undisturbed areas are not planned at this time; however, such activities (if they occurred) would have the potential to impact unidentified or unknown cultural resources. On July 11, 2012, the THC responded, concurring with the DOE's determination of No Historic Properties Affected.

Figure 4.1 Previously Recorded Archaeological Sites– Proposed W.A. Parish Plant

FIGURE DELETED TO REMOVE

CONFIDENTIAL INFORMATION

Figure 4.2 Previously Recorded Sites and Surveys – Proposed West Ranch Oil Field EOR Area

FIGURE DELETED TO REMOVE

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Figure 4.3 Previously Recorded Sites and Surveys – Proposed West Ranch Oil Field EOR Area

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Figure 4.4 Previously Recorded Sites and Surveys – Proposed West Ranch Oil Field EOR Area

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Figure 4.5 Previously Recorded Sites and Surveys – Proposed West Ranch Oil Field EOR Area

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CONFIDENTIAL INFORMATION

In addition, a further nine (9) archaeological sites have been identified within the boundary of the West Ranch oil field (i.e., Sites 41JK128 and 41JK130 to 41JK137). Most of these sites (i.e., eight sites) are located along the boundaries of Venado Creek, with a single site associated with Menefee Bayou (i.e., Site 41JK128). All of these sites are identified as prehistoric lithic scatters, except for Site 41JK128, which also contained prehistoric ceramics. None of the site forms provided information on their eligibility for listing in the NRHP.

4.4 GENERAL FIELD SURVEY METHODS

This Phase I cultural resources survey effort was comprised of linear transect survey involving systematic pedestrian survey augmented by shovel testing within the entire project corridor. In general, a single survey transect was placed within the middle of the 100 ft (30 m) wide survey corridor. Transect survey methods allowed for these portions of the proposed survey corridor to be assessed in a systematic and uniform manner and assist with the identification and delineation of any cultural resources encountered as a result of the survey effort. Standardized survey segment forms recorded whether each segment was evaluated using Low, Moderate, or High Potential survey methods (see below).

Shovel tests displayed an average excavated diameter of 12 in (30 cm) and they were excavated to at least 20 in (50 cm) below surface, unless impenetrable subsoils or ground water was encountered. If the soil types encountered indicated the potential for more deeply buried sites, the depth of the shovel test was increased accordingly, up to 39 in (100 cm) below surface. All shovel tests were excavated in natural soil layers at 4-in or 8-in (10 or 20 cm) intervals and all excavated soils were screened through ¼-inch mesh, unless water-saturated or compacted clay, in which case they were hand sorted by trowel. When cultural materials were encountered, the base of the shovel test excavation was extended to at least 16 in (40 cm) beneath the last occurrence of cultural materials.

Munsell© charts were used to describe soil color. Standard soils nomenclature was used in the description of the excavated sediments associated with each shovel test. All of the excavated shovel tests were backfilled immediately upon the completion of the excavation process. Shovel testing was not conducted in areas where the landform slope was greater than 20%; where safety hazards (such as buried utilities) existed and the shovel test could not be offset; or where standing water, impenetrable clays, environmental hazards, or impervious substrates (e.g. asphalt roads) were encountered. The above information concerning each shovel test location was recorded on standardized shovel test forms; any shovel test that could not be excavated due to one or more of the above reasons was identified.

All recovered cultural materials were recorded in the field using electronic standardized field collection techniques using an electronic field data collection device (e.g., Toughbook, Yuma, or similar). GPS data collectors with sub-meter accuracy were used to record the beginning and endpoint of survey transects, pipeline inflexion (PI) points, survey areas, access roads, site and datum locations, and the corners of any standing structures encountered during the course

of this investigation. Digital photographs were taken of all survey areas to document current conditions. Detailed pace-and-compass maps for all encountered cultural resources were also produced.

4.4.1 Photodocumentation

Although limited, portions of the project corridor that crossed wetland and/or agricultural features inundated by water were photodocumented; this was considered sufficient for the purposes of the cultural resources assessment.

4.4.2 Survey Methods in Low Archaeological Potential Areas

Where extensive pastoral or agricultural cultivation is present, ground surface exposures exceed 50 percent, and the likelihood of buried archaeological sites is considered low (based on soil types and topography), systematic pedestrian survey was seen as an adequate survey methodology, augmented with judgmental shovel tests to confirm soil conditions. Each judgmental shovel test was excavated at an interval of 1,320 ft (400 m) (Table 4.4).

4.4.3 Survey Methods in Moderate Archaeological Potential Areas

In areas with poorly draining soils that are located away from defined drainages, but where buried sites are considered possible, shovel tests were excavated at 328 ft (100 m) intervals along the primary survey transect located within the 100 foot (30 m) wide survey corridor (Table 4.4).

4.4.4 Survey Methods in High Archaeological Potential Areas

High archaeological site potential for this project includes all elevated landforms such as ridges or hills, and all landforms close to natural water drainages; in general, this encompassed approximately 1,312 ft (400 m) to either side of a well-defined drainage. In these areas, shovel tests were excavated at 164 ft (50 m) intervals along the primary transect of the proposed pipeline (Table 4.4). Judgmentally placed shovel tests on top of landforms were used if the landform was less than 164 ft (50 m) in width. When cultural materials were encountered within areas defined as having Low or Moderate Archaeological Potential, the survey crew immediately changed to the High Potential shovel testing intervals and the site delineation methods presented further below were also implemented.

Table 4.4 Shovel Test Intervals

Shovel Test Width	Shovel Test Depth	Low Probability Interval	Moderate Probability Interval	High Probability Interval
30 cm (12 in)	50 cm (20 in)	400 m (1312 ft)	100 m (328 ft)	50 m (164 ft)

4.4.5 Site Delineation

All identified archaeological sites were recorded on Texas Archeological Site Data Forms and submitted for a site number. All of the above information, in association with the analysis of the recovered cultural material, was used in support of determining whether the sites should be considered eligible, not eligible, or not assessed using the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Any cultural resources identified by the Phase I cultural resource inventory study were systematically assessed to determine the integrity, association, and research potential of the cultural deposits. If the site location was characterized by a deflated, erosional context (i.e., recently plowed agricultural or pastoral field with sufficient ground visibility), a systematic surface collection was conducted at the shovel test grid locations. Only cultural materials from a 16.4 ft (5 m) wide radius around each point were collected.

Delineation of the cultural resources involved the excavation of shovel tests at approximately 33 foot (10 m) intervals within the proposed pipeline corridor. Shovel tests were oriented in a cruciform (cross) pattern and continued to be excavated until two (2) negative shovel tests were encountered within the established project corridor or workspace. Where possible, landowner permission was requested to extend the evaluation beyond the survey corridor if the site exceeded it, to fully delimit the horizontal boundaries of the site. On those occasions where landowner permission was granted, two (2) delineation transects, spaced 82 ft (25 m) apart, were placed to either side of the proposed survey corridor. Shovel tests were excavated at 82 ft (25 m) intervals along these four (4) transects. This provided an approximately 426 ft (130 m) wide area of systematic shovel testing within the entire length of the identified site. When cultural materials were encountered, the base of the shovel test excavation was extended to at least 16 in (40 cm) beneath the last occurrence of cultural materials; this functioned to define the vertical boundaries of the site.

4.5 ANCILLARY FACILITIES

Additional ancillary facilities may be required for construction or maintenance activities associated with the project, such as horizontal directional drill (HDD) locations, additional temporary workspace (ATWS) locations, and/or meter stations. The survey methods discussed above were

used to assess these ancillary facilities. Standardized survey area forms were used to document all of the cultural resource survey information associated with these additional facilities.

4.5.1 Proposed Deep Testing Methodology

Based on correspondence from the THC, dated February 23, 2012, THC recommended that "backhoe trenching be conducted in areas adjacent to waterways where there is the potential for deeply buried cultural resources. In areas where directional drilling will be utilized to pass underneath waterways backhoe trenching should take place at the location of the bore holes entrance and exit points where deep sediments are observed or suspected" (Appendix A). Currently, five (5) locations have been proposed for horizontal directional drill (HDD) locations for this project: (1) Big Creek; (2) San Bernard River; (3) Colorado River; (4) Jones Creek; and (5) Lavaca River.

The deep testing methodology proposed for the HDD locations would be confined to the approximate boundaries of the proposed entry/exit points. The HDD borehole size is anticipated to be approximately 20 to 24 in (51 to 61 cm) in diameter. During pipeline construction, a pit measuring approximately 10 by 10 ft (2.6 by 2.6 m) in areal extent and approximately 4 ft (1.2 m) in depth would be excavated at each HDD entry and exit point to contain drilling muds. Based on this project design, URS proposes to excavate a 10 ft long (2.6 m), 4 ft (1.2 m) deep trench, oriented perpendicular to the pipeline corridor, within the planned entry/exit pit at each of the eight deep testing locations (i.e., 5 entry pits and 3 exit pits, based on the April 25, 2012 work plan that was approved by THC on May 14, 2012). Trenching would be conducted utilizing a rubber-tired or tracked backhoe, depending upon soil and weather conditions, with a smooth (i.e., clean-up) bucket measuring approximately 3 ft (0.9 m) in width. The trenches would be excavated in approximately 6 in (15 cm) intervals to allow for examination of the exposed trench soils and sidewalls. Any exposed archaeological materials and/or subsurface features would be noted and recorded during this procedure and representative soil profiles would be drawn and photographed for each exposed trench face once the maximum depth of 4 ft (1.2 m) is reached.

Once observations were completed for each trench, excavated soil would be placed back into the trench and the ground surface returned to preexisting contours. Any encountered cultural features and/or materials will be analyzed and assessed as described above. The results of the deep testing at the eight (8) proposed locations would then be summarized in a subsequent addendum report submitted to the THC for their review.

4.6 ACCESS ROADS

Access roads are irregular linear features providing access from an existing built (i.e., paved) road to the project corridor or ancillary facility. If the access road was designated as a public road, was constructed of asphalt, concrete, or built-up, compacted gravel, and no additional

improvements (i.e., straightening) or construction were required during its use for this project, only a visual examination of the road sidewalls for cultural resources was conducted.

For those access roads that required new construction, or were unimproved gravel or dirt roads, or where improvements (i.e., straightening, building up, etc.) were proposed during the course of the project, a systematic cultural resources survey of the access road was conducted. A single lineal survey transect was placed to either side of the proposed access road, approximately 50 ft (15 m) from the access road sidewall; this provided approximately 100 ft (30 m) of survey coverage to either side of the existing access road. Shovel test spacing along each survey transect followed those noted in Table 4.4, above. Information associated with the cultural resources survey of these access roads was collected on standardized access road forms loaded onto the Trimble Geo-XT, Yuma, and/or Toughbook.

4.7 STANDING STRUCTURE EVALUATION

The cultural resources staff recorded all standing structures greater than ca. 45 to 50 years in age that were located in, or within 164 ft (50 m) of, the boundaries of the proposed project area. The recording procedures followed the guidelines established in 1995 by the National Park Service bulletin "*National Register Bulletin 24: Guidelines for Local Survey – A Basis for Preservation Planning*" (NPS 1995). Straight-on and corner photographs of all structures were taken and specific information related to building materials, foundation type, structural form, architectural style, associated outbuildings and observed alterations, was collected to assist in assessing whether the property was Eligible, Not Eligible, or Not Assessed for the purposes of the NRHP criteria for evaluation (36 CFR 60.4 [a-d]).

4.8 ANALYSIS

Upon return to the URS laboratory, all recovered cultural materials were cleaned and separated into their basic material categories (i.e., historic [ceramic, glass, metal, etc.] and faunal). Relevant provenience and material culture observations were recorded for each artifact and they were entered into a relational database. This information was then used to support any determinations of eligibility for the purposes of the NRHP criteria for evaluation (36 CFR 60.4 [a-d]).

4.8.1 Historic Material Analysis

Historic cultural material was categorized by material type (e.g., ceramic, glass, or metal). Following this, a functional classification was implemented, following those attributes as generally defined by South (1977); individual diagnostic attributes, specifically those describing a temporal or cultural relationship, were also identified. Standard historic material culture reference works were also utilized for this project (Greer 2005; Hahn and Hahn 2001;

Jones and Sullivan 1989; Leibowitz 1985; Lindsay 2012; Lockhart 2006; Markell et al. 1999; Miller et al. 2000; Miller and McNichol 2002; Ryan 2009; Toulouse 1971).

4.8.2 Prehistoric Material Analysis

The lithic analysis protocol was technological in nature and designed to document lithic reduction strategies and tool function. The first attribute analyzed was lithic raw material type, which was identified through comparisons to known geological descriptions, based on texture, color, and translucence. Artifact types were described according to their general morpho-functional class (i.e., biface, core, debitage, drill, graver, groundstone, manuport, projectile point/knife, scraper, etc.) and degree of intentional shaping (formed vs. unformed). Typological classifications for temporally and/or regionally diagnostic tools used standard references to established regional lithic typologies. All recovered prehistoric cultural materials and identified cultural features were interpreted based upon cultural historical frameworks developed for the prehistory of Southeast Texas, including discussions in Aten (1983), Perttula (1993), and Story (1990), among others.

5.1 FIELDWORK SUMMARY

From January to May 2012, URS conducted a Phase I cultural resource survey and inventory for the proposed NRG Energy W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project (NRG). NRG is proposing to construct a CO_2 pipeline along an approximately 80-mile-long (130 km) corridor through Jackson, Wharton, and Fort Bend Counties, Texas. Fieldwork for this project consisted primarily of visual inspection and systematic pedestrian survey and shovel testing. The field crews systematically surveyed 101.0 miles (162.5 km) of preferred and/or abandoned pipeline corridor, 75 access roads, measuring 49.7 miles (80.0 km) in length, and 47 additional temporary workspaces (ATWS), totaling 88.7 acres (35.9 ha) in extent. Of a proposed 1,750 shovel tests associated with the project area, 1,625 shovel tests were excavated and 125 were not excavated, as the latter fell within areas displaying standing water, paved roadways, or buried utilities. A summary of the survey effort associated with the corridor segments, ATWS locations, and access roads is presented below in subsections 5.1.1 to 5.1.3, respectively. The investigation resulted in the identification of twelve (12) historic standing structures, four (4) historic cultural resources, and two (2) isolated prehistoric finds; these cultural resources are discussed more fully in Sections 5.2 to 5.4, following.

5.1.1 Pipeline Corridor Survey

Fieldwork for this current investigation consisted of visual inspections and systematic shovel testing at low, moderate, and high archaeological potential intervals within the proposed corridor (Table 5.1). During the survey effort, the survey corridor was divided into a total of 164 segments, based upon the type of assessment methodology that was used during the investigation (Table 5.1; Appendix B – Mapsheets 1 to 31). Four (4) segments were assessed visually, either due to the presence of inundated fields/wetlands (Segments 29 and 85) or the presence of buried utilities (Segments 91 and 92). These four (4) segments were assessed visually and subject to photo-documentation; this represented less than 0.50% of the pipeline corridor.

Forty-seven (47) segments displayed ground surface visibility greater than 50% and they were assessed via systematic pedestrian survey (i.e., low probability) along two (2) transects spaced 50 ft (15 m) apart; shovel testing was conducted at 1,320 ft (400 m) intervals. Ground surface exposure was a result of recently plowed and disked agricultural fields or recently cleared and graded collocated pipeline corridors, which paralleled and/or overlapped with the current survey corridor. In total, low potential survey methods were implemented on approximately 39.55% of the corridor.

The remaining 108 segments were located on pastureland or overgrown utility corridors and they were assessed at either moderate or high potential. The 36 segments located within 1,320 ft (400 m) of naturally flowing waterways/drainages were assessed at high archaeological potential with shovel tests excavated at 164 ft (50 m) intervals; this represented 9.01% of the

proposed route. The remaining 72 segments were assessed at moderate potential, with shovel test intervals of 328 ft (100 m); this accounted for the remaining 45.58% of the survey corridor.

Table 5.1 Survey Segment Summary Table

Survey Segment	Length (m)	Survey Methodology	Shovel Tests Excavated	Shovel Tests Not Excavated	Identified Cultural Resources
1	50	HIGH	1	0	0
2	650	MODERATE	8	0	0
3	2225	LOW	6	0	0
4	600	MODERATE	7	0	0
5	1350	HIGH	26	2	0
6	225	HIGH	5	0	0
7	2225	MODERATE	23	0	0
8	225	MODERATE	3	0	0
9	1065	HIGH	22	0	0
10	700	HIGH	14	1	0
11	1225	MODERATE	13	0	0
12	725	MODERATE	8	0	0
13	425	HIGH	8	1	0
14	375	HIGH	6	1	0
15	3600	MODERATE	36	1	0
16	225	MODERATE	3	0	0
17	225	MODERATE	4	0	0
18	800	MODERATE	9	0	0
19	130	MODERATE	2	0	0
20	815	MODERATE	9	0	**HSS-FB-2**
21	400	HIGH	9	0	**0**
22	1325	MODERATE	14	0	**0**
23	1000	MODERATE	10	1	**0**
24	525	MODERATE	5	1	**0**
25	600	HIGH	12	0	**0**
26	625	MODERATE	7	0	**0**
27	325	MODERATE	4	0	**0**
28	475	HIGH	10	0	**0**
29	375	WETLAND	0	0	**0**
30	500	MODERATE	6	0	**0**
31	300	MODERATE	4	0	**0**
32	150	MODERATE	3	0	**0**
33	650	MODERATE	7	1	**0**
34	250	LOW	2	0	**HSS-FB-3**

Survey Segment	Length (m)	Survey Methodology	Shovel Tests Excavated	Shovel Tests Not Excavated	Identified Cultural Resources
					HSS-FB-4
35	225	MODERATE	3	0	**HSS-FB-5**
36	425	HIGH	9	0	0
37	325	MODERATE	4	0	0
38	325	MODERATE	4	0	0
39	115	HIGH	0	3	0
40	4225	MODERATE	43	0	0
41	1000	HIGH	19	1	0
42	1000	MODERATE	11	0	0
43	775	HIGH	15	1	0
44	2125	MODERATE	21	1	0
45	2225	HIGH	44	1	**HSS-FB-6**
46	300	MODERATE	4	0	0
47	525	HIGH	11	0	0
		Subtotal	**494**	**16**	**5**
48	550	HIGH	12	0	0
49	425	HIGH	4	5	0
50	3315	MODERATE	34	0	0
51	380	MODERATE	5	0	0
52	0	HIGH	2	0	0
53	1025	MODERATE	11	0	0
54	1725	HIGH	35	0	0
55	3300	LOW	9	1	0
56	50	HIGH	2	0	0
57	400	MODERATE	3	2	0
58	5150	LOW	8	7	0
59	950	LOW	4	0	0
60	2600	LOW	8	0	0
61	1950	LOW	6	0	0
62	330	LOW	2	0	0
63	675	LOW	3	0	0
64	1035	LOW	2	1	0
65	1550	MODERATE	15	1	0
66	500	HIGH	11	0	0
67	200	HIGH	5	0	0
68	1525	MODERATE	12	4	0
69	225	MODERATE	2	1	0
70	400	HIGH	9	0	0
71	275	HIGH	5	1	0
72	1025	MODERATE	11	0	0

Survey Segment	Length (m)	Survey Methodology	Shovel Tests Excavated	Shovel Tests Not Excavated	Identified Cultural Resources
73	150	HIGH	1	3	0
74	2700	LOW	3	5	0
75	800	HIGH	17	0	0
76	2275	LOW	7	0	0
77	1615	LOW	4	1	0
78	1000	LOW	4	0	0
79	1885	LOW	6	0	0
80	225	HIGH	4	1	0
81	335	HIGH	6	1	0
82	750	LOW	3	0	0
83	1500	MODERATE	15	1	0
84	1100	MODERATE	11	1	0
85	275	WETLAND	0	0	0
86	700	MODERATE	8	0	0
87	725	LOW	3	0	**41WH104**
88	70	LOW	1	0	
89	1715	LOW	6	1	**HSS-WH-3** **41WH103**
90	1275	LOW	4	0	0
91	60	UTILITIES	0	0	0
92	100	UTILITIES	0	0	0
93	950	LOW	4	0	**41WH105** **41WH106**
94	1100	LOW	2	2	0
95	465	HIGH	10	0	0
96	120	HIGH	3	0	0
97	2315	MODERATE	24	0	0
98	2815	MODERATE	28	1	0
99	1015	MODERATE	9	2	0
100	1600	MODERATE	16	1	0
101	3800	LOW	11	1	**HSS-WH-5**
102	300	MODERATE	2	2	0
103	460	MODERATE	5	0	0
104	305	HIGH	6	1	0
105	645	LOW	2	1	0
106	1000	LOW	4	0	0
107	1525	LOW	5	0	0
108	635	LOW	3	0	0
109	845	LOW	3	0	0
110	800	LOW	4	0	0

Survey Segment	Length (m)	Survey Methodology	Shovel Tests Excavated	Shovel Tests Not Excavated	Identified Cultural Resources
111	280	LOW	2	0	0
112	550	LOW	3	0	0
113	915	MODERATE	10	0	0
114	230	MODERATE	3	0	0
115	900	MODERATE	10	0	0
116	1000	LOW	4	0	0
117	465	HIGH	10	0	0
118	1015	MODERATE	11	0	0
119	925	MODERATE	10	0	0
120	500	MODERATE	6	0	0
		Subtotal	**533**	**48**	**5**
121	1525	MODERATE	16	0	0
122	300	LOW	2	0	0
123	1150	MODERATE	13	0	0
124	525	MODERATE	6	0	0
125	1300	MODERATE	14	0	0
126	675	LOW	3	0	0
127	625	MODERATE	7	0	0
128	1965	MODERATE	20	0	0
129	530	MODERATE	6	0	0
130	1080	LOW	4	0	0
131	2215	MODERATE	24	0	0
132	2625	MODERATE	26	0	0
133	755	MODERATE	8	1	0
134	1515	LOW	5	0	0
135	1875	LOW	6	0	0
136	360	MODERATE	4	0	0
137	300	LOW	2	0	0
138	680	MODERATE	8	0	0
139	225	LOW	2	0	0
140	3415	LOW	10	1	0
141	800	LOW	3	0	0
142	2775	LOW	7	0	**41JK192** **41JK193**
143	500	LOW	2	0	0
144	750	LOW	2	1	0
145	1575	LOW	5	0	0
146	705	LOW	3	0	0
147	265	MODERATE	3	0	0
148	275	MODERATE	4	0	0

Survey Segment	Length (m)	Survey Methodology	Shovel Tests Excavated	Shovel Tests Not Excavated	Identified Cultural Resources
149	625	MODERATE	6	1	0
150	1000	MODERATE	11	0	0
151	500	MODERATE	4	2	0
152	50	LOW	2	0	0
153	750	HIGH	13	3	0
154	1715	HIGH	34	1	0
155	1415	MODERATE	15	0	0
156	1125	MODERATE	12	0	0
157	1175	MODERATE	13	0	0
158	810	HIGH	13	4	0
159	200	HIGH	5	0	0
160	2975	LOW	6	0	0
161	1350	HIGH	25	2	0
162	350	HIGH	7	0	0
163	350	HIGH	7	0	0
164	2000	MODERATE	12	8	**HSS-JK-1**
		Subtotal	**400**	**24**	**3**

Of the 1,515 proposed shovel tests along the main corridor, 1,427 were excavated, with 88 not excavated due to standing water, paved roadways, and the presence of buried utilities. A total of thirteen (13) cultural resources were located along the survey segments, comprised of six (6) archaeological sites and seven (7) historic standing structures; they are discussed in Section 5.2 to 5.4, following. Overall, nine (9) of these resources were identified in areas of lower archaeological site potential (i.e., plowed agricultural fields) and three (3) in moderate locations (i.e., pasturelands); only HSS-FB-6 was affiliated with a defined high archaeological potential location. Representative soil profiles associated with shovel tested survey segments are presented in Table 5.2.

Table 5.2 Typical Survey Segment Shovel Test Profiles

Survey Segment	Stratum	Depth (cm)	Munsell	Color	Soil Texture
1	I	0-50	10YR 5/4	Yellowish Brown	Silty Clay
2	I	0-30	10YR 4/3	Brown	Silty Clay Loam
	II	30-50	10YR 6/2	Light Brownish Gray	Silty Clay
3	I	0-50	10YR 4/3	Brown	Silty Loam
4	I	0-50	10YR 4/1	Dark Gray	Clay Loam
5	I	0-50	10YR 4/1	Dark Gray	Clay Loam
6	I	0-20	10YR 4/3	Brown	Sandy Clay Loam
	II	20-50	10YR 4/1	Dark gray	Clay
7	I	0-20	10YR 4/3	Brown	Silty Clay loam

Survey Segment	Stratum	Depth (cm)	Munsell	Color	Soil Texture
	II	20-50	10YR4/1	Dark Gray	Silty Loam
8	I	0-35	10YR 4/3	Brown	Sandy Loam
	II	35-50	10YR 4/3	Brown	Silty Clay
9	I	0-30	10YR 5/4	Yellowish Brown	Sandy loam
	II	30-50	10YR 4/3	Brown	Sandy loam
10	I	0-35	10YR 4/3	Brown	Silty Sand
	II	35-50	10YR 5/6	Yellowish Brown	Silty Clay
11	I	0-30	10YR 4/3	Brown	Sandy loam
	II	30-50	10YR 5/6	Yellowish Brown	Sandy Clay
12	I	0-35	10YR 4/3	Brown	Sandy loam clay
	II	35-50	10YR 4/1	Dark Gray	Clay
13	I	0-50	10YR 4/3	Brown	Silty Loam
14	I	0-50	10YR 4/1	Dark Gray	Clay Loam
15	I	0-50	10YR 2/1	Black	Clay
16	I	0-50	10YR 5/4	Yellowish Brown	Sandy Loam
17	I	0-50	10YR 5/2	Grayish brown	Sandy Clay Loam
18	I	0-35	10YR 4/1	Dark Gray	Sandy Loam
	II	35-50	10YR 6/8	Brownish Yellow	Clay Loam
19	I	0-50	10YR 4/4	Dark Yellowish Brown	Sandy Clay loam
20	I	0-30	10YR 5/4	Yellowish Brown	Silty Clay loam
	II	30-50	10YR 4/2	Dark Grayish Brown	Silty Clay
21	I	0-50	10YR 4/3	Brown	Clay Loam
22	I	0-30	10YR 4/3	Brown	Sandy loam
	II	30-50	10YR 5/6	Yellowish Brown	Silty Clay
23	I	0-50	10YR 4/1	Dark Gray	Sandy Loam
24	I	0-50	10YR 4/3	Brown	Silty Sand
25	I	0-40	10YR 4/3	Brown	Silty Sand
	II	40-50	10YR 5/6	Yellowish Brown	Silty Sand
26	I	0-35	10YR 4/3	Brown	Sandy Loam
	II	35-50	10YR 4/1	Dark Gray	Silty Clay
27	I	0-25	10YR 4/2	Dark Grayish Brown	Sandy Clay Loam
	II	25-50	10YR 4/1	Dark Gray	Sandy Clay
28	I	0-35	10YR 4/4	Dark Yellowish Brown	Sand
	II	35-50	10YR 6/6	Yellowish Brown	Sand
30	I	0-20	10YR 4/4	Dark Yellowish Brown	Sandy Loam
	II	20-50	10YR 6/6	Yellowish Brown	Sand
31	I	0-30	10YR 4/1	Dark Gray	Silty Clay
	II	30-50	10YR 5/1	Gray	Clay
32	I	0-30	10YR 3/1	Very Dark Gray	Silty Loan
	II	30-50	10YR 2/1	Black	Silty Clay

Survey Segment	Stratum	Depth (cm)	Munsell	Color	Soil Texture
33	I	0-25	10YR 4/2	Dark Grayish Brown	Silty Clay Loam
	II	25-50	10YR 2/1	Black	Clay
34	I	0-40	10YR 3/2	Very Dark Gray Brown	Sandy Loam
	II	40-50	10YR 7/2	Light Gray	Sandy Clay Loam
35	I	0-20	10YR 4/3	Brown	Sandy Loam
	II	20-40	Water	NA	NA
36	I	0-30	10YR 4/3	Brown	Silty Clay Loam
	II	30-50	10YR 2/1	Black	Sandy Clay
37	I	0-50	10YR 5/3	Brown	Sandy Clay loam
38	I	0-40	10YR 4/2	Dark Grayish Brown	Silty Clay Loam
	II	40-50	10YR 4/1	Dark Gray	Clay
39	I	0-50	10YR 4/3	Brown	Sandy Loam
40	I	0-25	10YR 4/3	Brown	Silty Clay Loam
	II	25-50	10YR 6/2	Light Brownish Gray	Silty Clay loam
41	I	0-30	10YR 4/3	Brown	Silty Clay Loam
	II	30-50	10YR 4/2	Dark Grayish Brown	Clay
42	I	0-50	10YR 3/2	Very Dark Grayish Brown	Silty Clay Loam
43	I	0-50	10YR 4/3	Brown	Silty Clay Loam
44	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
45	I	0-50	10YR 4/2	Very Dark Grayish Brown	Silty Clay Loam
46	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
47	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
48	I	0-15	10YR 4/3	Brown	Silty Clay Loam
	II	15-35	10YR 4/1	Dark Gray	Clay
49	I	0-50	10YR 4/1	Dark Gray	Clay
50	I	0-50	10YR 4/1	Dark Gray	Clay Loam
51	I	0-50	10YR 4/3	Brown	Silty Clay Loam
52	I	0-50	10YR 4/3	Brown	Silty Clay
53	I	0-50	10YR 4/2	Dark Grayish Brown	Silty Clay Loam
54	I	0-40	10YR 4/3	Brown	Silty Loam
	II	40-50	10YR 5/6	Yellowish Brown	Silty Clay Loam
55	I	0-20	10YR 4/3	Brown	Silty Loam Clay
	II	20-50	10YR 4/6	Dark Yellowish Brown	Silty Clay
56	I	0-50	10YR 4/3	Brown	Clay
57	I	0-35	10YR 4/3	Brown	Sandy Loam
	II	35-50	10YR 5/6	Yellowish brown	Sandy Clay
58	I	0-50	10YR 4/2	Dark grayish Brown	Sandy Clay Loam
59	I	0-50	10YR 4/2	Dark Grayish Brown	Silty Clay
60	I	0-50	10YR 5/3	Brown	Silty Clay loam
61	I	0-25	10YR 5/4	Yellowish Brown	Sandy Loam
	II	25-50	10YR 6/6	Brownish Yellow	Sandy Clay

Survey Segment	Stratum	Depth (cm)	Munsell	Color	Soil Texture
62	I	0-25	10YR 4/2	Dark Grayish Brown	Sandy Clay
	II	25-50	10YR 5/4	Yellowish Brown	Sandy Clay
63	I	0-50	10YR 4/2	Dark Grayish Brown	Sandy Clay
64	I	0-34	10YR 4/1	Dark Gray	Silty Clay Loam
	II	34-50	10YR 2/2	Very Dark Brown	Silty Clay
65	I	0-30	10YR 5/4	Yellowish Brown	Silty Clay
	II	30-50	10YR 6/2	Light Brownish Gray	Clay
66	I	0-25	10YR 4/3	Brown	Silty Clay Loam
	II	25-50	10YR 6/2	Light Brownish Gray	Silty Clay
67	I	0-30	10YR 5/4	Yellowish Brown	Sandy Loam
	II	30-50	10YR 6/6	Brownish Yellow	Sand
68	I	0-30	10YR 4/3	Brown	Silty Clay Loam
	II	30-50	10YR 5/6	Brownish yellow	Clay
69	I	0-35	10YR 4/3	Brown	Silty Clay Loam
	II	35-50	10YR 4/1	Dark Gray	Silty Clay
70	I	0-35	10YR 4/3	Brown	Silty Clay loam
	II	35-50	10RY 4/1	Dark Gray	Silty Clay
71	I	0-50	10YR 4/3	Brown	Clay loam
72	I	0-30	10YR 5/4	Brownish Yellow	Sandy Clay Loam
	II	30-50	10YR 4/1	Dark Gray	Sandy Clay
73	I	0-30	10YR 4/3	Brown	Clay Loam
	II	30-50	10YR 5/6	Yellowish Brown	Silty clay Loam
74	I	0-50	10YR 4/3	Brown	Silty Clay
75	I	0-30	10YR 4/2	Dark Grayish Brown	Sandy Clay
	II	30-50	10YR 4/1	Dark Gray	Clay
76	I	0-50	10YR 4/1	Dark Gray	Silty Clay
77	I	0-25	10YR 5/2	Grayish Brown	Silty Clay Loam
	II	25-50	10YR 4/1	Dark Gray	Clay
78	I	0-50	10YR 4/1	Dark Gray	Clay
79	I	0-50	10YR 4/1	Dark Gray	Silty Clay
80	I	0-25	10YR 4/3	Brown	Silty Clay Loam
	II	25-50	10YR 7/2	Light Gray	Silty Clay
81	I	0-30	10YR 5/2	Grayish Brown	Sandy Clay loam
	II	30-50	10YR 7/2	Light Gray	Sandy clay
82	I	0-50	10YR 6/4	Light Yellowish Brown	Silty Clay loam
83	I	0-30	10YR 6/2	Light Brownish Gray	Sandy Clay Loam
	II	30-50	10YR 5/2	Grayish Brown	Sandy Clay
84	I	0-30	10YR 5/4	Yellowish brown	Sandy Loam
	II	30-50	10YR 7/2	Light Gray	Sandy Clay Loam
86	I	0-30	10YR 4/4	Dark Yellowish Brown	Silty loam

Survey Segment	Stratum	Depth (cm)	Munsell	Color	Soil Texture
	II	30-50	10YR 5/2	Grayish Brown	Silty Clay
87	I	0-50	10YR 5/3	Brown	Silty Clay Loam
88	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
89	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
90	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
93	I	0-50	10YR 5/2	Grayish Brown	Silty Clay Loam
94	I	0-25	10YR 5/2	Grayish Brown	Silty Clay
	II	25-50	10YR 4/2	Dark Grayish Brown	Clay
95	I	0-50	10YR 4/1	Dark Gray	Silty Clay
96	I	0-30	10YR 4/3	Brown	Silty Clay
	II	30-50	10YR 4/2	Dark Grayish Brown	Clay
97	I	0-30	10YR 6/3	Pale Brown	Sandy Clay loam
	II	30-50	10YR 6/1	Gray	Sandy clay
98	I	0-40	10YR 4/3	Brown	Silty Clay
	II	40-50	10YR 6/6	Brownish Yellow	Clay
99	I	0-40	10YR 4/4	Dark Yellowish Brown	Sandy Clay Loam
	II	40-50	10YR 6/6	Yellowish Brown	Sandy Clay
100	I	0-40	10YR 5/4	Yellowish Brown	Sandy Loam
	II	40-50	10YR 5/6	Yellowish Brown	Clay
101	I	0-20	10YR 4/2	Dark Grayish Brown	Sandy Clay Loam
	II	20-50	10YR 5/2	Grayish Brown	Sandy Clay
102	I	0-50	10YR 5/2	Grayish brown	Silty Clay loam
103	I	0-50	10YR 4/1	Dark Gray	Silty Clay Loam
104	I	0-20	10YR 4/1	Dark Gray	Silty Clay Loam
	II	20-50	10YR 5/2	Grayish Brown	Clay
106	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
107	I	0-50	10YR 5/2	Grayish Brown	Silty Clay Loam
108	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
109	I	0-50	10YR 4/1	Dark Gray	Silty Clay
110	I	0-20	10YR 5/2	Grayish Brown	Silty Clay Loam
	II	20-50	10YR 4/1	Dark Gray	Clay
111	I	0-50	10YR 4/1	Dark Gray	Silty Clay
112	I	0-50	10YR 6/2	Light Brownish Gray	Clay Loam
113	I	0-20	10YR 4/3	Brown	Silty Loam
	II	20-30	10YR4/1	Dark Gray	Clay
114	I	0-50	10YR 5/4	Yellowish Brown	Silty Clay
115	I	0-30	10YR 5/2	Grayish Brown	Sandy Loam
	II	30-50	10YR 7/2	Light Gray	Sandy Clay Loam
116	I	0-50	10YR 4/3	Brown	Sandy Clay
117	I	0-50	10YR 4/1	Dark Gray	Sandy Clay

Survey Segment	Stratum	Depth (cm)	Munsell	Color	Soil Texture
118	I	0-30	10YR 5/4	Yellowish Brown	Sandy Loam
	II	30-50	10YR 2/1	Black	Clay
119	I	0-30	10YR 5/4	Yellowish Brown	Sandy Loam Clay
	II	30-50	10YR 4/2	Dark Grayish Brown	Clay
120	I	0-30	10YR 5/2	Grayish Brown	Silty Sand
	II	30-50	10YR 4/2	Dark Grayish Brown	Silty Clay
121	I	0-50	10YR 5/2	Grayish Brown	Sandy Clay
122	I	0-35	10YR 5/2	Grayish brown	Silty Clay
	II	35-50	10YR 7/2	Light Gray	Clay
123	I	0-50	10YR 4/2	Dark Grayish Brown	Sandy Clay
124	I	0-40	10YR 5/4	Yellowish Brown	Sand
	II	40-50	10YR 5/6	Yellowish Brown	Sandy Loam
125	I	0-15	10YR 5/2	Grayish Brown	Sandy Clay Loam
	II	15-50	10YR 4/1	Dark Gray	Clay
126	I	0-35	10YR 5/2	Grayish Brown	Sandy Loam
	II	35-50	10YR 7/2	Light Gray	Sandy Clay Loam
127	I	0-35	10YR 5/2	Grayish Brown	Sandy Loam
	II	35-50	10YR 7/2	Light Gray	Sandy Clay Loam
128	I	0-30	10YR 4/3	Brown	Silty Loam
	II	30-50	10YR 6/1	Gray	Silty Loam
129	I	0-50	10YR 4/2	Dark Grayish Brown	Sandy Clay
130	I	0-50	10YR 4/2	Dark Grayish Brown	Sandy Clay
131	I	0-15	10YR 4/3	Brown	Silty Loam
	II	15-50	10YR 4/1	Dark Gray	Silty Clay
132	I	0-30	10YR 4/4	Dark Yellowish Brown	Sandy Loam
	II	30-50	10YR 6/6	Yellowish brown	Sandy Clay
133	I	0-30	10YR 5/1	Gray	Sand
	II	30-50	10YR 4/1	Dark Gray	Silty Clay
134	I	0-30	10YR 4/2	Very Dark Grayish Brown	Sandy loam
	II	30-50	10YR 5/6	Yellowish Brown	Sandy Clay
135	I	0-50	10YR 4/1	Dark Gray	Silty Clay Loam
136	I	0-15	10YR 4/3	Brown	Silty Clay loam
	II	15-50	10YR 2/2	Very Dark Brown	Silty Clay
137	I	0-5	10YR 6/2	Light Brownish gray	Silt
	II	5-50	10YR 2/2	Very Dark Brown	Silty Clay
138	I	0-15	10YR 4/2	Very Dark Grayish Brown	Silty Clay
	II	15-50	10YR 5/2	Grayish brown	Clay
139	I	0-50	10YR 4/2	Very Dark Grayish Brown	Silty Clay
140	I	0-50	10YR 4/1	Dark Gray	Sandy Clay
141	I	0-50	10YR 4/1	Dark Gray	Sandy Clay
142	I	0-50	10YR 5/2	Grayish brown	Sandy Clay

Survey Segment	Stratum	Depth (cm)	Munsell	Color	Soil Texture
143	I	0-50	10YR 5/2	Grayish brown	Silty Clay
144	I	0-50	10YR 4/2	Very Dark Grayish Brown	Silty Clay
145	I	0-50	10YR 5/2	Grayish brown	Silty Clay
146	I	0-15	10YR 4/1	Dark Gray	Silty Clay
	II	15-50	10YR 4/6	Brownish Yellow	Clay
147	I	0-50	10YR 5/2	Grayish brown	Silty Clay loam
148	I	0-50	10YR 5/2	Grayish brown	Silty Clay loam
149	I	0-30	10YR 5/2	Grayish brown	Sandy loam
	II	30-50	10YR 4/1	Dark Gray	Sandy Clay
150	I	0-50	10YR 4/2	Very Dark Grayish Brown	Sandy Clay
151	I	0-25	10YR 5/4	Yellowish brown	Sandy Loam
	II	25-50	10YR 7/2	Light Gray	Sandy Clay
152	I	0-40	10YR 4/4	Dark Yellowish Brown	Sandy Loam
	II	40-50	10YR 5/2	Grayish Brown	Sandy Clay
153	I	0-50	10YR 4/4	Dark Yellowish Brown	Sandy Clay
154	I	0-40	10YR 5/2	Grayish Brown	Sandy Clay
	II	40-50	10YR7/2	Light Gray	Clay
155	I	0-30	10YR 4/3	Brown	Sandy Clay
	II	30-50	10YR 4/1	Dark Gray	Silty Clay
156	I	0-30	10YR 4/3	Brown	Silty Clay Loam
	II	30-50	10YR 7/2	Light Gray	Clay
157	I	0-30	10YR 4/3	Brown	Silty Loam
	II	30-50	10YR 7/2	Light Gray	Silty Clay
158	I	0-50	10YR 3/1	Very Dark Gray	Silty Clay
159	I	0-15	10YR 5/2	Grayish Brown	Clay
	II	15-50	Water		
160	I	0-50	10YR 4/2	Very Dark Grayish Brown	Silty Clay
161	I	0-50	10YR 4/2	Very Dark Grayish Brown	Silty Clay
162	I	0-50	10YR 4/2	Very Dark Grayish Brown	Silty Clay
163	I	0-50	10YR 4/1	Dark Gray	Silty Clay

5.1.2 Additional Temporary Workspace Survey

Forty-six additional temporary workspaces (ATWS), horizontal directional drill (HDD) locations, and drill pullbacks also were examined for their potential to contain cultural material (Tables 5.3 and 5.4; Appendix B – Mapsheets 1 to 31). Five (5) locations were examined visually, as they were positioned in areas of existing buried pipelines/other utilities or had been extensively disturbed by recent prior pipeline construction activities. For the remaining 41 locations, a total of 111 shovel tests were excavated, with an additional 17 planned shovel tests not excavated due to the presence of standing water or safety hazards

associated with the close proximity of previously emplaced pipelines or other buried utilities. One historic standing structure (HSS-FB-1) was located within a defined high archaeological potential location (see Section 5.2, below). Representative soil profiles associated with shovel tested ATWS locations are presented in Table 5.4, below.

Table 5.3 ATWS and HDD Summary – All Counties

Identifier	Survey Methodology	Shovel Tests Excavated	Shovel Tests Not Excavated	Identified Cultural Resources
SA-TX-FB-002.000-01	MODERATE	11	0	0
SA-TX-FB-003.000b	HIGH	8	0	**HSS-FB-1**
SA-TX-FB-021.000a	HIGH	2	0	0
SA-TX-FB-023.000-01	HIGH	2	0	0
SA-TX-FB-023.000b	HIGH	2	0	0
SA-TX-FB-023.000c	HIGH	0	2	0
SA-TX-FB-030.000-01	MODERATE	3	0	0
SA-TX-FB-034.000a	MODERATE	0	2	0
SA-TX-FB-047.000-01	MODERATE	1	1	0
SA-TX-FB-051.000-01	HIGH	2	0	0
SA-TX-FB-057.000-01	MODERATE	2	0	0
SA-TX-FB-058.000-01	MODERATE	2	2	0
SA-TX-FB-059.000a	MODERATE	3	0	0
SA-TX-FB-061.000a	MODERATE	2	0	0
SA-TX-FB-069.000-01	HIGH	2	0	0
SA-TX-FB-069.000c	HIGH	1	0	0
SA-TX-WH-001.000-01	HIGH	3	0	0
SA-TX-WH-001.000-02	HIGH	2	0	0
SA-TX-WH-014.000a	LOW	1	0	0
SA-TX-WH-015.000-01	HIGH	2	0	0
SA-TX-WH-024.000-01	HIGH	3	0	0
SA-TX-WH-024.000-02	HIGH	1	1	0
SA-TX-WH-024.000-03	HIGH	2	0	0
SA-TX-WH-024.000c	LOW	0	1	0
SA-TX-WH-024.000d	HIGH	1	0	0
SA-TX-WH-025.000-01	HIGH	2	0	0
SA-TX-WH-025.000b	HIGH	0	3	0
SA-TX-WH-025.000c	HIGH	1	0	0
SA-TX-WH-026.000-01	VISUAL	0	0	0
SA-TX-WH-026.000-02	LOW	2	0	0
SA-TX-WH-026.000c	LOW	0	1	0
SA-TX-WH-026.000d	HIGH	1	0	0
SA-TX-WH-074.000-01	HIGH	1	0	0

Identifier	Survey Methodology	Shovel Tests Excavated	Shovel Tests Not Excavated	Identified Cultural Resources
SA-TX-WH-074.000-02	HIGH	1	0	0
SA-TX-WH-077.000-01	HIGH	1	0	0
SA-TX-WH-077.000-02	HIGH	1	0	0
SA-TX-WH-089.000-01	HIGH	1	0	0
SA-TX-WH-092.000-01	HIGH	1	0	0
SA-TX-JK-031.000-01	MODERATE	0	0	0
SA-TX-JK-031.000-02	MODERATE	0	0	0
SA-TX-JK-034.000-03	MODERATE	1	0	0
SA-TX-JK-034.525-01	LOW	1	0	0
SA-TX-JK-034.570-01	MODERATE	9	0	0
SA-TX-JK-034.570-02	HIGH	3	0	0
SA-TX-JK-039.550	LOW	6	2	0
SA-TX-JK-050.110-01	HIGH	21	2	0
	Total	**134**	**35**	**1**

Table 5.4 Typical Survey Area Shovel Test Profiles – All Counties

Identifier	Stratum	Depth (cm)	Munsell	Color	Soil Texture
SA-TX-FB-002.000-01	I	0-20	10YR 5/4	Yellowish Brown	Sandy Loam
	II	20-50	10YR 5/6	Yellowish Brown	Sand
SA-TX-FB-003.000b	I	0-50	10YR 5/2	Grayish brown	Sandy Clay Loam
SA-TX-FB-021.000a	I	0-50	10YR 5/2	Grayish brown	Sandy Clay
SA-TX-FB-023.000-01	I	0-50	10YR 4/3	Brown	Sandy Clay Loam
SA-TX-FB-023.000b	I	0-50	10YR 5/4	Yellowish Brown	Sandy Loam
SA-TX-FB-030.000-01	I	0-50	10YR 4/2	Very Dark Grayish Brown	Sandy Clay Loam
SA-TX-FB-047.000-01	I	0-50	10YR 7/2	Light Gray	Clay
SA-TX-FB-051.000-01	I	0-50	10YR 4/3	Brown	Sandy Loam
SA-TX-FB-057.000-01	I	0-25	10YR 5/2	Grayish brown	Silty Clay Loam
	II	25-50	10YR 2/1	Black	Clay
SA-TX-FB-058.000-01	I	0-20	10YR 4/1	Dark Gray	Sandy Clay
	II	20-50	10YR 5/1	Gray	Clay
SA-TX-FB-059.000a	I	0-15	10YR 3/1	Very Dark Gray	Silty Gravel
	II	15-50	Road Base	NA	NA
SA-TX-FB-061.000a	I	0-15	10YR 2/1	Black	Silty Clay
	II	15-50	Water	NA	NA
SA-TX-FB-069.000-01	I	0-10	10YR 4/3	Brown	Silty Clay Loam
	II	10-50	10YR 7/2	Light Gray	Silty Clay Loam
SA-TX-FB-069.000c	I	0-50	10YR 5/2	Grayish brown	Silty Clay

Identifier	Stratum	Depth (cm)	Munsell	Color	Soil Texture
SA-TX-WH-001.000-01	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
SA-TX-WH-001.000-02	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
SA-TX-WH-014.000a	I	0-50	10YR 5/2	Grayish Brown	Silty Clay
SA-TX-WH-015.000-01	I	0-25	10YR 5/2	Grayish Brown	Sandy Clay Loam
	II	25-50	10YR 4/1	Dark gray	Sandy Clay
SA-TX-WH-024.000-01	I	0-25	10YR 4/4	Dark Yellowish Brown	Silty Clay
	II	25-50	10YR 5/6	Yellowish Brown	Silty Clay
SA-TX-WH-024.000-02	I	0-20	10YR 2/1	Black	Clay
	II	20-50	10YR 6/3	Pale Brown	Sand
SA-TX-WH-024.000-03	I	0-20	10YR 4/4	Dark Yellowish Brown	Silty Clay
	II	20-50	10YR 6/2	Light Brownish Gray	Clay
SA-TX-WH-024.000d	I	0-30	10YR 4/3	Brown	Sandy Loam
	II	30-50	10YR 5/6	Yellowish Brown	Sandy Clay
SA-TX-WH-025.000-01	I	0-25	10YR 5/4	Yellowish Brown	Silty Clay Loam
	II	25-50	10YR 6/3	Pale Brown	Silty Clay Loam
SA-TX-WH-025.000c	I	0-50	10YR 5/2	Grayish brown	Clay
SA-TX-WH-026.000-02	I	0-30	10YR 5/4	Yellowish Brown	Sandy Clay
	II	30-50	10YR 6/3	Pale Brown	Sandy Clay Loam
SA-TX-WH-026.000d	I	0-30	10YR 4/4	Dark Yellowish Brown	Silty Loam
	II	30-50	10YR 5/6	Yellowish Brown	Silty Clay
SA-TX-WH-074.000-01	I	0-50	10YR 5/1	Gray	Clay
SA-TX-WH-074.000-02	I	0-50	10YR 5/1	Gray	Clay
SA-TX-WH-077.000-01	I	0-50	10YR 5/2	Grayish Brown	Silty Clay Loam
SA-TX-WH-077.000-02	I	0-20	10YR 4/3	Brown	Silty Clay Loam
	II	20-50	10YR 6/3	Pale Brown	Silty Clay
SA-TX-WH-089.000-01	I	0-50	10YR 5/2	Grayish Brown	Silty Clay Loam
SA-TX-WH-092.000-01	I	0-50	10YR 5/2	Grayish Brown	Silty Clay Loam
SA-TX-JK-031.000-01	I	0-50	10YR 5/2	Grayish brown	Silty Clay
SA-TX-JK-031.000-02	I	0-50	10YR 5/2	Grayish brown	Silty Clay
SA-TX-JK-034.000-03	I	0-40	10YR 5/2	Grayish brown	Sandy Clay
	II	40-50	10YR 4/1	Dark Gray	Sandy Clay
SA-TX-JK-034.525-01	I	0-25	10YR 5/4	Yellowish Brown	Silty Sand
	II	25-50	10YR 7/2	Light Gray	Silty Clay Loam
SA-TX-JK-034.570-01	I	0-20	10YR 4/2	Dark Grayish Brown	Silty Clay Loam
	II	20-50	10YR 4/1	Dark gray	Silty Clay
SA-TX-JK-034.570-02	I	0-35	10YR 4/3	Brown	Silty Clay
	II	35-50	10YR 5/6	Yellowish Brown	Clay
SA-TX-JK-039.550	I	0-20	10YR 5/3	Brown	Sandy Clay
	II	20-50	10YR 7/2	Light Gray	Clay
SA-TX-JK-050.110-01	I	0-50	10YR 4/2	Dark Grayish Brown	Silty Clay

5.1.3 Access Road Survey

Seventy-four (74) access roads, measuring 49.7 mi (79.995 km) in total length, were assessed for their potential to impact cultural resources (Tables 5.5 and 5.6; Appendix B – Mapsheets 1 to 31). The majority of these roads (n=56) were comprised of built-up, compacted gravel roads where no additional improvements (i.e., straightening) or construction would be required during this project or they were constructed on top of dredged (bermed) substrate. These roads were only subjected to pedestrian examination of the road sidewalls and adjacent lands for cultural resources. Shovel testing was initiated along portions of 19 access roads which had not been previously built-up. With respect to access roads TAR-03.06 and TAR-56.93, they were both mostly built-up access roads that only required shovel testing in areas where water or damage from agricultural activity had eroded away the built road; it was assumed that they would require widening and upgrading prior to project use. The remaining 17 access roads were all along two-track paths or located in open fields. These access roads were assessed at low, moderate, and/or high archaeological site potential, based on the landforms that they crossed. A total of 64 shovel tests were excavated along these proposed access roads and three (3) historic standing structures were identified as a result of these investigations; these structures (HSS-WH-1, HSS-WH-2, and HSS-WH-4) are discussed more fully within Section 5.4, below. Representative soil profiles associated with shovel tested access roads are presented in Table 5.6, following.

Table 5.5 Access Road Summary – All Counties

Access Road Name	Length (mi)	Length (m)	Survey Method	Shovel Tests Excavated	Shovel Tests Not Excavated	Cultural Resources
TAR-03.06	1.90	3050	LOW	4	0	0
TAR-03.10	0.58	925	VISUAL	0	0	0
TAR-03.36	0.45	725	LOW	2	0	0
TAR-03.94	0.38	615	LOW	1	0	0
TAR-04.33	0.36	575	LOW	2	0	0
TAR-04.73	0.96	1550	VISUAL	10	0	0
TAR-05.49	0.26	415	VISUAL	0	0	0
TAR-05.93	0.22	360	VISUAL	0	0	0
TAR-06.62	0.14	230	HIGH	5	0	0
TAR-07.26	0.08	130	MODERATE	2	0	0
TAR-08.56	0.14	225	LOW	2	0	0
TAR-08.65	0.07	120	VISUAL	0	0	0
TAR-09.03	0.11	180	VISUAL	0	0	0
TAR-12.85	0.43	700	VISUAL	0	0	0
TAR-12-90	0.09	150	VISUAL	0	0	0
TAR-15.25	0.36	575	VISUAL	0	0	0

Access Road Name	Length (mi)	Length (m)	Survey Method	Shovel Tests Excavated	Shovel Tests Not Excavated	Cultural Resources
TAR-15.34	6.00	9650	VISUAL	0	0	0
AR-16.04	0.01	20	VISUAL	0	0	0
TAR-17.87	0.08	125	HIGH	2	2	0
TAR-18.90	0.01	15	VISUAL	0	0	0
TAR-20.48	0.02	25	VISUAL	0	0	0
TAR-20.56	0.01	20	VISUAL	0	0	0
TAR-20.60	0.31	500	VISUAL	0	0	0
TAR-20.81	0.05	75	VISUAL	0	0	0
TAR-20.85	0.05	85	VISUAL	0	0	0
TAR-20.95	0.04	60	VISUAL	0	0	0
TAR-21.71	0.70	1125	VISUAL	0	0	0
TAR-27.1	2.70	4350	VISUAL	0	0	0
TAR-29.62	1.34	2150	VISUAL	0	0	0
TAR-30.26	0.03	50	VISUAL	0	0	0
TAR-30.58	0.19	300	VISUAL	0	0	0
TAR-30.83	0.01	10	VISUAL	0	0	0
TAR-32.50	0.57	915	VISUAL	0	0	0
TAR-32.90	0.39	630	VISUAL	0	0	0
TAR-33.14	1.70	2735	VISUAL	0	0	0
TAR-33.52	0.58	940	VISUAL	0	0	0
TAR-33.80	0.12	185	VISUAL	0	0	0
TAR-34.12	0.09	140	VISUAL	0	0	0
TAR-34.30	1.59	2560	VISUAL	0	0	**HSS-WH-1 HSS-WH-2**
AR-34.43b	0.01	15	VISUAL	0	0	**0**
TAR-34.67	0.87	1400	VISUAL	0	0	**0**
TAR-34.80	0.12	200	VISUAL	0	0	**0**
TAR-35.06	0.51	825	VISUAL	0	0	**0**
TAR-36.32	1.60	2575	VISUAL	0	0	**0**
TAR-36.90	0.29	460	VISUAL	0	0	**0**
TAR-37.49	0.87	1400	VISUAL	0	0	**0**
TAR-38.05	1.37	2200	VISUAL	0	0	**0**
TAR-38.9	0.11	175	MODERATE	3	0	**0**
TAR-39.14	0.11	175	MODERATE	3	0	**0**
TAR-41.93	0.50	800	LOW	3	0	**0**
TAR-42.08	0.11	180	LOW	2	0	**0**
TAR-42.85	0.34	550	VISUAL	0	0	**0**

Access Road Name	Length (mi)	Length (m)	Survey Method	Shovel Tests Excavated	Shovel Tests Not Excavated	Cultural Resources
TAR-45.80	0.35	560	HIGH	10	0	**0**
TAR-46.09	0.14	225	LOW	2	0	**HSS-WH-4**
TAR-47.74	0.70	1125	LOW	4	0	0
TAR-48.15	0.30	475	LOW	2	0	0
TAR-48.25	0.31	500	LOW	2	0	0
TAR-50.47	0.99	1600	VISUAL	0	0	0
TAR-50.66	0.22	350	VISUAL	0	0	0
TAR-55.9	0.06	100	VISUAL	0	0	0
TAR-56.93	0.78	1250	LOW	3	0	0
TAR-69.00	0.43	700	VISUAL	0	0	0
TAR-69.45	0.43	700	VISUAL	0	0	0
TAR-77.9	0.87924	1415	VISUAL	0	0	0
TAR-78.4	4.47	7200	VISUAL	0	0	0
TAR-78.8	0.56	900	VISUAL	0	0	0
TAR-79.40	1.72	2775	VISUAL	0	0	0
AR-79.68	0.54	875	VISUAL	0	0	0
AR-79.9	0.12	200	VISUAL	0	0	0
TAR-79.95	1.40	2250	VISUAL	0	0	0
TAR-80.00	3.23	5200	VISUAL	0	0	0
TAR-80.10	0.65	1050	VISUAL	0	0	0
AR-80.34b	0.47	750	VISUAL	0	0	0
AR-80.34a	0.59	950	VISUAL	0	0	0
TOTAL	**49.7 mi**	**79995m**	**TOTAL**	**64**	**2**	**3**

Table 5.6 Typical Access Road Shovel Test Profile – All Counties

Access Road	Stratum	Depth (cm)	Munsell	Color	Soil Texture
TAR-03.06	I	0-50	10YR 5/6	Yellowish Brown	Silty Loam
TAR-03.36	I	0-25	10YR 5/3	Brown	Silty Loam
	II	25-50	10YR 7/2	Light Gray	Silty Clay Loam
TAR-03.94	I	0-30	10YR 5/3	Brown	Silty Clay Loam
	II	30-50	10YR 4/4	Dark yellowish Brown	Sandy clay Loam
TAR-04.33	I	0-50	10YR 6/2	Light Brownish Gray	Sandy clay loam
TAR-04.73	I	0-50	10YR 5/4	Yellowish Brown	Sandy Loam
TAR-06.62	I	0-50	10YR 4/2	Very Dark Grayish brown	Silty Clay Loam
TAR-07.26	I	0-50	10YR 4/2	Very Dark Grayish brown	Silty Clay Loam
TAR-08.56	I	0-25	10YR 5/3	Brown	Sandy Clay
	II	25-50	10YR 5/3	Brown	Silty Clay Loam

Access Road	Stratum	Depth (cm)	Munsell	Color	Soil Texture
TAR-17.87	I	0-50	10YR 4/2	Very Dark Grayish Brown	Clay
TAR-38.9	I	0-50	10YR 4/1	Dark Gray	Sandy clay Loam
TAR-39.14	I	0-50	10YR 4/1	Dark Gray	Sandy clay Loam
TAR-41.93	I	0-50	10YR 5/2	Grayish brown	Sandy Clay
TAR-42.08	I	0-20	10YR 4/3	Brown	Silty Clay
	II	20-50	10YR 2/1	Black	Clay
TAR-45.80	I	0-50	10YR 4/2	Very Dark Grayish Brown	Sandy Clay
TAR-46.09	I	0-50	10YR 4/1	Dark Gray	Silty Clay loam
TAR-47.74	I	0-30	10YR 5/2	Grayish brown	Sandy Clay Loam
	II	30-50	10YR 4/1	Dark Gray	Clay
TAR-48.15	I	0-50	10YR 5/2	Grayish brown	Silty Clay
TAR-48.25	I	0-50	10YR 4/1	Dark Gray	Silty Clay
TAR-56.93	I	0-30	10YR 4/3	Brown	Sandy Loam
	II	30-50	10YR 6/3	Pale Brown	Sand

5.2 IDENTIFIED CULTURAL RESOURCES – FORT BEND COUNTY

5.2.1 HSS-FB-1, MP 0.0

Site Type: Historic Standing Structure (Residential)
Style: National
Temporal Period: ca. 1930s-1940s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-FB-1 is located approximately 140 ft (42.6 m) west of Rabbs Prairie Road and approximately 2,311 ft (704.3 m) southeast of Smithers Lake Road, near the community of Thompsons, in Fort Bend County (Figures 5.1 and 5.2). The building is located approximately 231 ft (70.4 m) east of a proposed ATWS location on Rabbs Prairie Road, near MP 0.0 of the proposed pipeline corridor; it is positioned near ATWS SA-TX-FB-003.000b (Appendix B - Mapsheet 1).

The abandoned residential building appears to have been constructed between the ca. 1930s and 1940s in the National style (Figure 5.3). Characteristic features of the National style are present in the form of a gabled massed plan and simple details. The one story building is wood framed and sits on brick piers raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The cross gabled roof is clad in asphalt shingles, while the exterior is clad in board and batten wood siding. No windows are present and the building is in ruins and partially collapsed. All facades of the building could not be surveyed due to inaccessibility of the parcel. A partially

collapsed transverse crib barn is also present on the property (Figure 5.4). The roof of the barn is partially clad in rusted metal, while the exterior is sheathed in vertical wood planking.

Figure 5.1 Fort Bend County – Overview Map

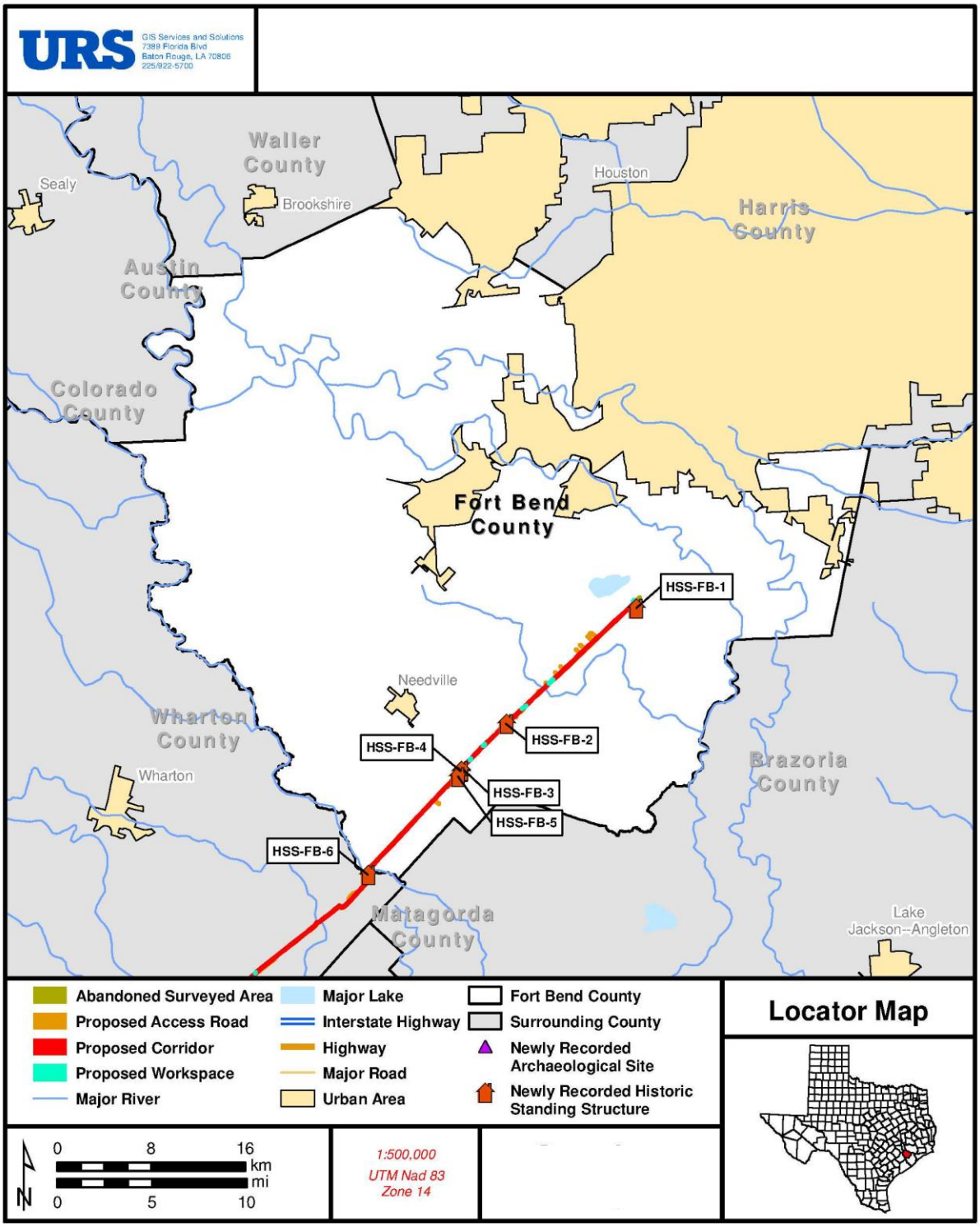


Figure 5.2 HSS-FB-1 Planview

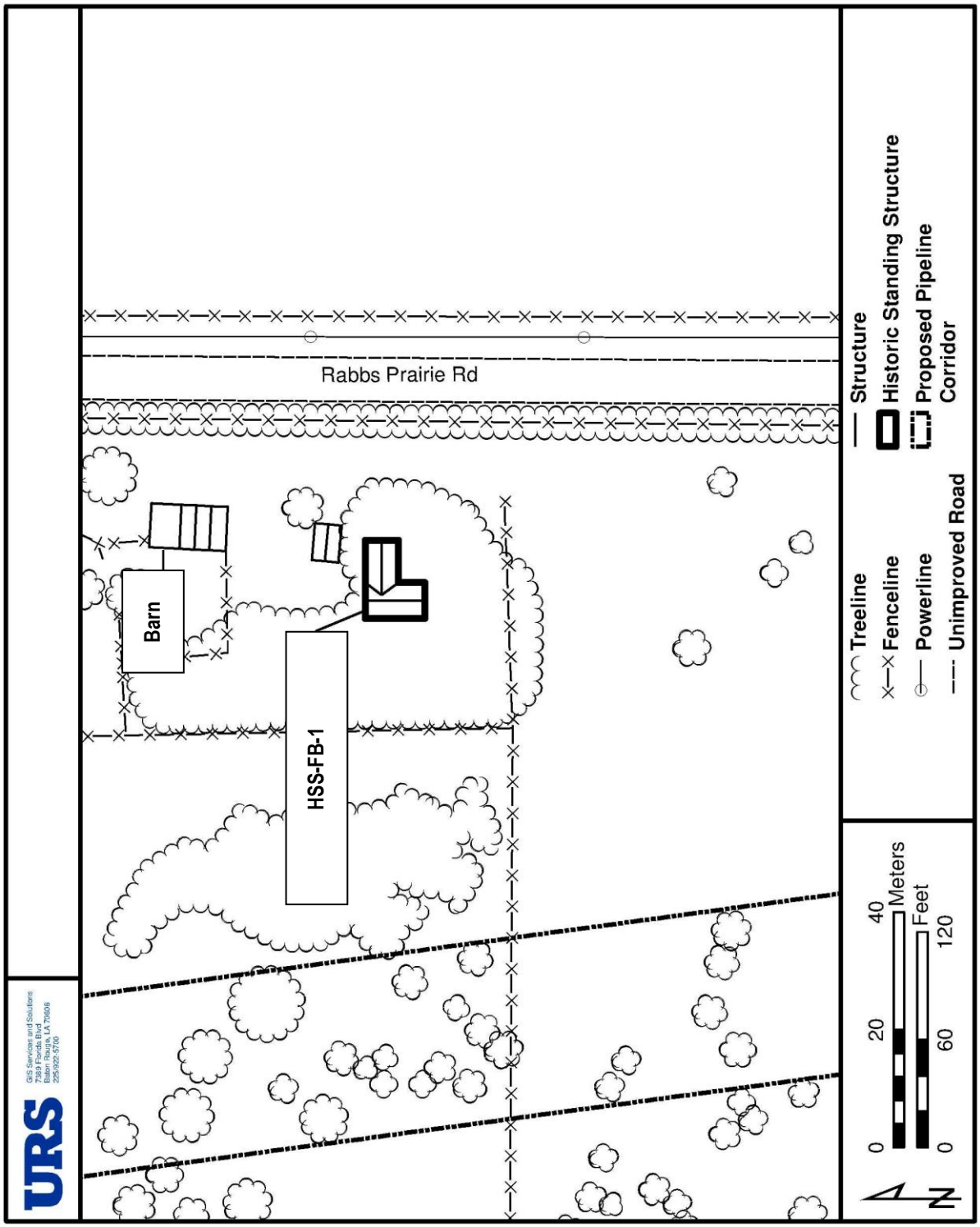


Figure 5.3 Historic standing structure HSS-FB-1 looking east

Figure 5.4 Associated barn at Historic standing structure HSS-FB-1 looking east

Historic standing structure HSS-FB-1 retains the integrity of location, setting, feeling or association, and materials. It does not retain integrity of design or workmanship. The structure does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. Historic standing structure HSS-FB-1 also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-FB-1 (and the associated partially collapsed barn) does not appear eligible for listing in the National Register of Historic Places. No additional architectural assessment of these structures is warranted.

5.2.2 HSS-FB-2, MP 9.4

Site Type: Historic Standing Structure (Agricultural)
Style: Barn
Temporal Period: ca. 1930s-1940s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-FB-2 is located approximately 1,056 ft (322 m) northwest of FM 1994 and approximately 2,126 ft (648 m) southwest of Zemanek Road, near the community of Guy, in Fort Bend County (Figures 5.1 and 5.5). The building is located along Zemanek Road, approximately 76 ft (23 m) northwest of the proposed pipeline survey corridor near Survey Segment-020, MP 9.4 (Appendix B – Mapsheet 4).

The agricultural structure appears to have been constructed between the ca. 1930s and 1940s as a transverse crib barn with a shed addition (Figures 5.6 and 5.7). The one story building is wood framed and sits directly on the ground. This appears to be the building's historic height of elevation. The hipped roof is clad in metal, while the exterior is clad in horizontal metal siding. The building is in very poor condition with damage including a rusted metal roof and rusted and missing shingles. The primary façade faces southeast and is two bays wide, which includes one double entryway door and an entryway on the shed addition. The southwest façade contains a full width shed addition that is unclad and open on the southwest side. The northwest facade is two bays wide, which includes one double entryway door and an entryway on the shed addition. The northeast façade is clad in metal siding.

Historic standing structure HSS-FB-2 retains the integrity of location, setting, feeling or association, and materials; however, it does not retain integrity of design or workmanship. Historic standing structure HSS-FB-2 does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. The structure also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-FB-2 does not appear eligible for listing in the National Register of Historic Places and no additional architectural assessment of this structure is considered warranted.

Figure 5.5 HSS-FB-2 Planview

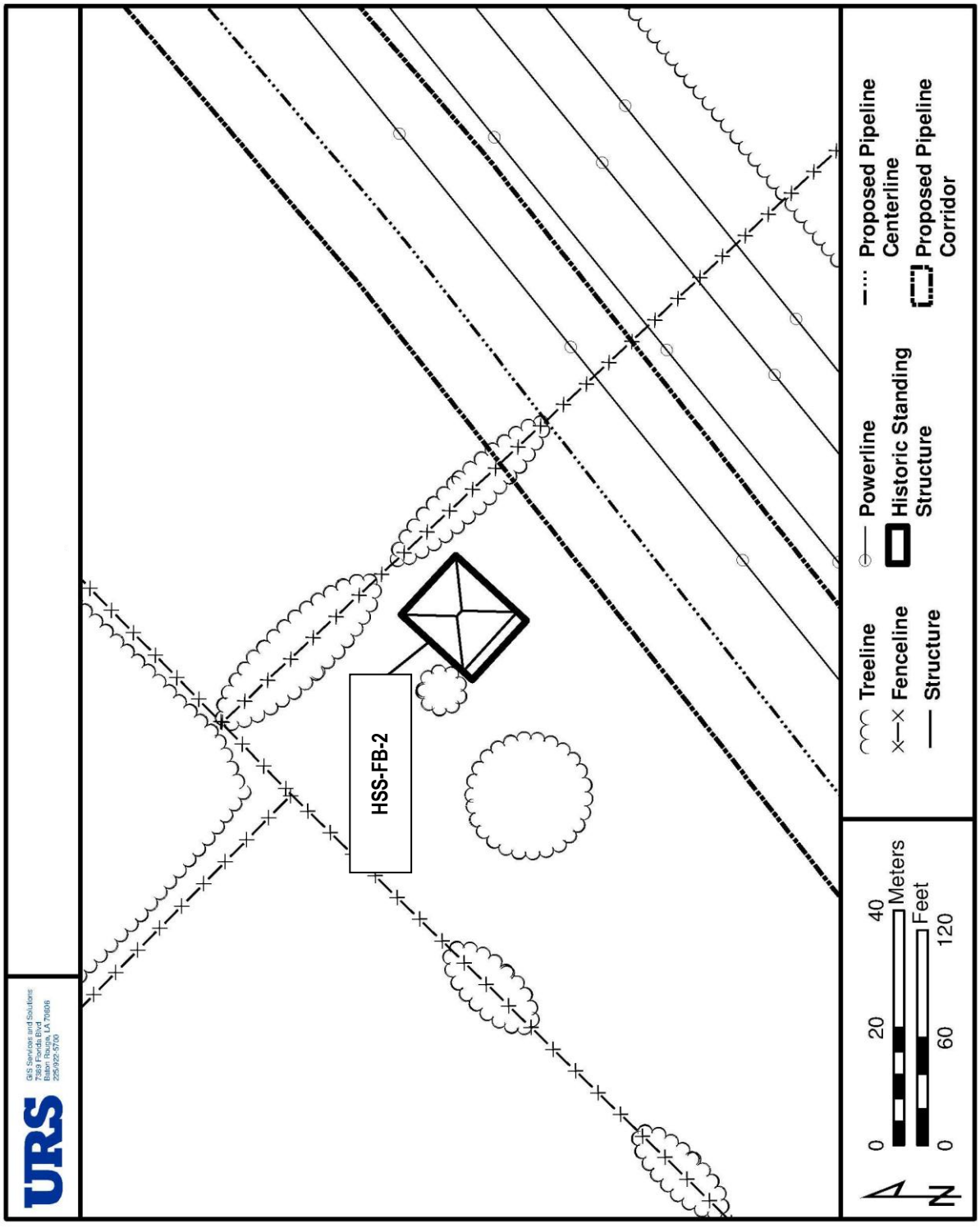


Figure 5.6 Historic standing structure HSS-FB-2 looking east

Figure 5.7 Historic standing structure HSS-FB-2 looking northeast

5.2.3 HSS-FB-3, MP 12.8

Site Type: Historic Standing Structure (Residential)
Style: National
Temporal Period: ca. 1940s-1950s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-FB-3 is located approximately 1,088 ft (331 m) northeast of Kruger Road and approximately 1,730 ft (527 m) northwest of FM 1994, near the community of Guy in Fort Bend County (Figures 5.1 and 5.8). The building is located approximately 380 ft (115 m) northwest of the proposed survey corridor off of Kruger Road; the structure is positioned adjacent to Survey Segment 034, near MP 12.8 along the proposed pipeline corridor (Appendix B – Mapsheet 5).

The single-family residence appears to have been constructed between the ca. 1940s and 1950s in the National style (Figures 5.9 and 5.10). Characteristic features of the National style are present in the form of a gabled massed plan and simple details. The one story building is wood framed and sits on concrete slab raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The front gabled roof is clad in asphalt shingles. The exterior is clad in clapboard siding. The windows are double-hung with metal sashes. Damage includes mold growth on the clapboard shingles. The primary façade faces northwest and is two bays wide, which includes one sliding metal window and an entryway door. The primary façade contains a partial width inset porch with wooden posts. The northeast façade is five bays wide, which includes five double hung windows. The southeast and southwest facades could not be surveyed due to the inaccessibility of the parcel.

Historic standing structure HSS-FB-3 retains the integrity of location, setting, feeling or association, and materials, but it does not retain integrity of design or workmanship. Historic standing structure HSS-FB-3 does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. The structure also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-FB-3 does not appear eligible for listing in the National Register of Historic Places. No further architectural assessment of this structure is recommended.

Figure 5.8 HSS-FB-3 Planview

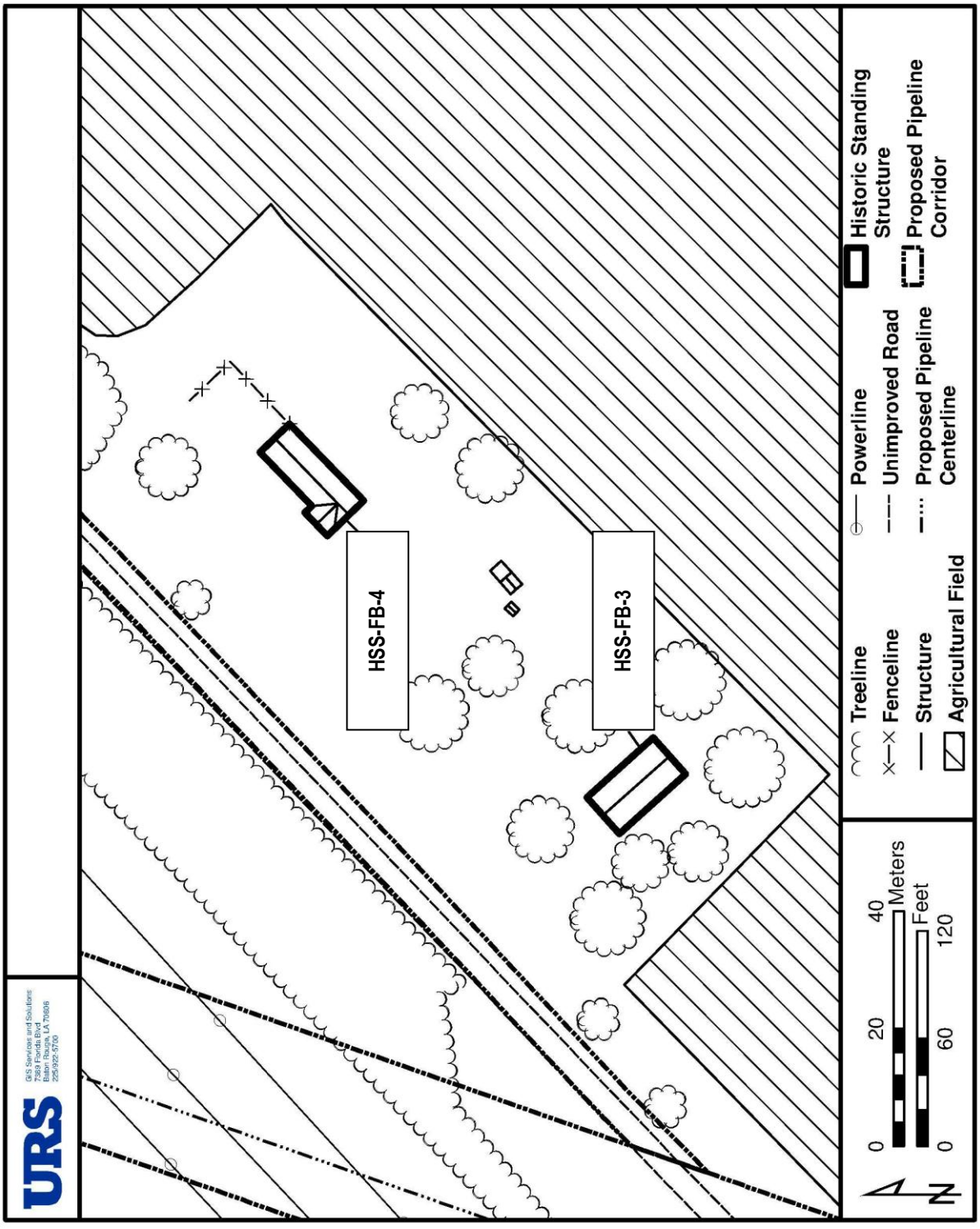


Figure 5.9 Historic standing structure HSS-FB-3 looking southeast

Figure 5.10 Historic standing structure HSS-FB-3 looking east

5.2.4 HSS-FB-4, MP 12.8

Site Type: Historic Standing Structure (Residential)
Style: National
Temporal Period: ca. 1940s-1950s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-FB-4 is located approximately 1,368 ft (417 m) northeast of Kruger Road and approximately 1,725 ft (525 m) northwest of FM 1994, near the community of Guy, Fort Bend County (Figures 5.1 and 5.8). The building is located approximately 366 ft (111 m) northwest of the proposed survey corridor off of Kruger Road; it is situated adjacent to Survey Segment-034 (abandoned corridor) near MP 12.8 (Appendix B – Mapsheet 5).

The single-family residence appears to have been constructed between the ca. 1940s and 1950s in the Spanish Eclectic style (Figures 5.11 and 5.12). Characteristic features of the Spanish Eclectic style are present in the form of exposed rafter tails, stucco façade, and terra cotta shingles that run along the roof ridges. The one story building is wood framed and sits on a concrete slab raised approximately 1 ft (0.3 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The cross gabled roof is clad in asbestos shingles, with terra cotta shingles running along the roof ridges. The exterior is clad in stucco. Damage includes missing roof shingles, cracked stucco and broken or missing windows. The gable front and wing primary façade faces northwest and double hung window on the gable and an inset porch along the wing. The southwest façade is two bays wide, which consists of two double hung windows. The southeast and northeast facades could not be recorded due to the inaccessibility of the parcel.

Historic standing structure HSS-FB-4 retains the integrity of location, setting, feeling or association, and materials; however, it does not retain integrity of design or workmanship. The structure does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. Historic standing structure HSS-FB-4 also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-FB-4 does not appear eligible for listing in the National Register of Historic Places and no additional architectural assessment of this structure is warranted.

Figure 5.11 Historic standing structure HSS-FB-4 looking east

Figure 5.12 Historic standing structure HSS-FB-4 looking northeast

5.2.5 HSS-FB-5, MP 13.2

Site Type: Historic Standing Structure (Residential)
Style: National
Temporal Period: ca. 1930s-1940s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-FB-5 is located approximately 781 ft (238 m) southwest of Krueger Road and approximately 1,362 ft (415 m) northwest of FM 1994, near the community of Guy, Fort Bend County (Figures 5.1 and 5.13). The building is located near abandoned Survey Segment-035 (MP 13.2), approximately 341 ft (104 m) northwest of the proposed survey corridor (Appendix B – Mapsheet 6).

The single-family residence appears to have been constructed between the ca. 1930s and 1940s in the side gabled National style (Figures 5.14 and 5.15). Characteristic features of the side gabled National style are present in the form of a side gables and a massed plan. The two-story building is wood framed and sits on concrete pylons raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The side gabled roof is clad in metal, while the exterior is clad in faux brick. The windows are double-hung with wooden sashes. The building is in irreparable condition, with damage including broken or missing windows, missing siding and a rusting metal roof. The primary façade faces southeast and contains an extended full width porch. The southwest façade is three bays wide, which includes two paired double hung windows and one additional window on the rear extension. A partial width drop porch runs the length of the rear extension. The northwest façade is two bays wide, which includes a gabled rear addition with a boarded window and a boarded window on the main portion of the house. The northeast façade is two bays wide, which include two paired window openings.

Historic standing structure HSS-FB-5 retains the integrity of location, setting, feeling or association, and materials, but does not retain integrity of design or workmanship. Historic standing structure HSS-FB-5 does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. This structure does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-FB-5 does not appear eligible for listing in the National Register of Historic Places; no additional architectural assessment of this structure is considered necessary.

Figure 5.13 HSS-FB-5 Planview

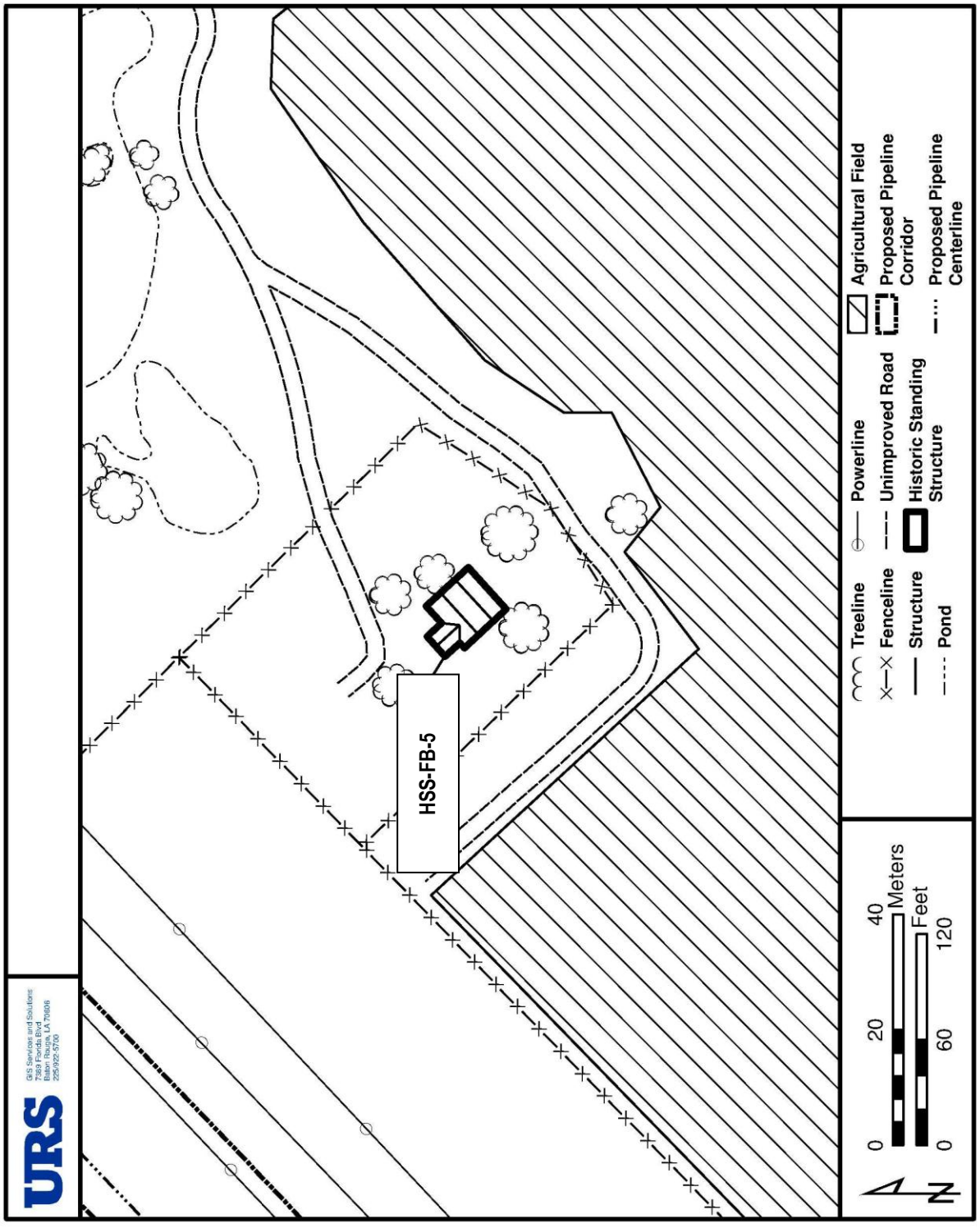


Figure 5.14 Historic standing structure HSS-FB-5 looking south

Figure 5.15 Historic standing structure HSS-FB-5 looking northeast

5.2.6 HSS-FB-6, MP 20.3

Site Type: Historic Standing Structure (Industrial)
Style: Railroad Bridge
Temporal Period: ca. 1930s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-FB-6 is located approximately 4,407 ft (1,343 m) northwest of Caldwell Road and approximately 7,820 ft (2,383 m) northeast of Avenue A, near the community of Wharton; the abandoned railroad bridge spans the San Bernard River (Figures 5.1 and 5.16 to 5.18). The bridge is located approximately 104 ft (31 m) west of the proposed survey corridor, near MP 20.3 (Survey Segment-045) (Appendix B – Mapsheet 8).

This bridge appears to be constructed around approximately ca. 1930 as a subdivided Warren through truss type railroad bridge (Figures 5.17 and 5.18). Characteristic features of a subdivided Warren through truss are alternating diagonal supports with vertical supports at each connection. The substructure contains two concrete piers. Damage includes rusted steel beams. The bridge appears to be a former railway bridge along the Burlington Northern Santa Fe line. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-FB-6 does not appear eligible for listing in the National Register of Historic Places and no additional architectural assessment of this structure is considered warranted.

Figure 5.16 Historic standing structure HSS-FB-6 looking north

Figure 5.17 HSS-FB-6 Planview

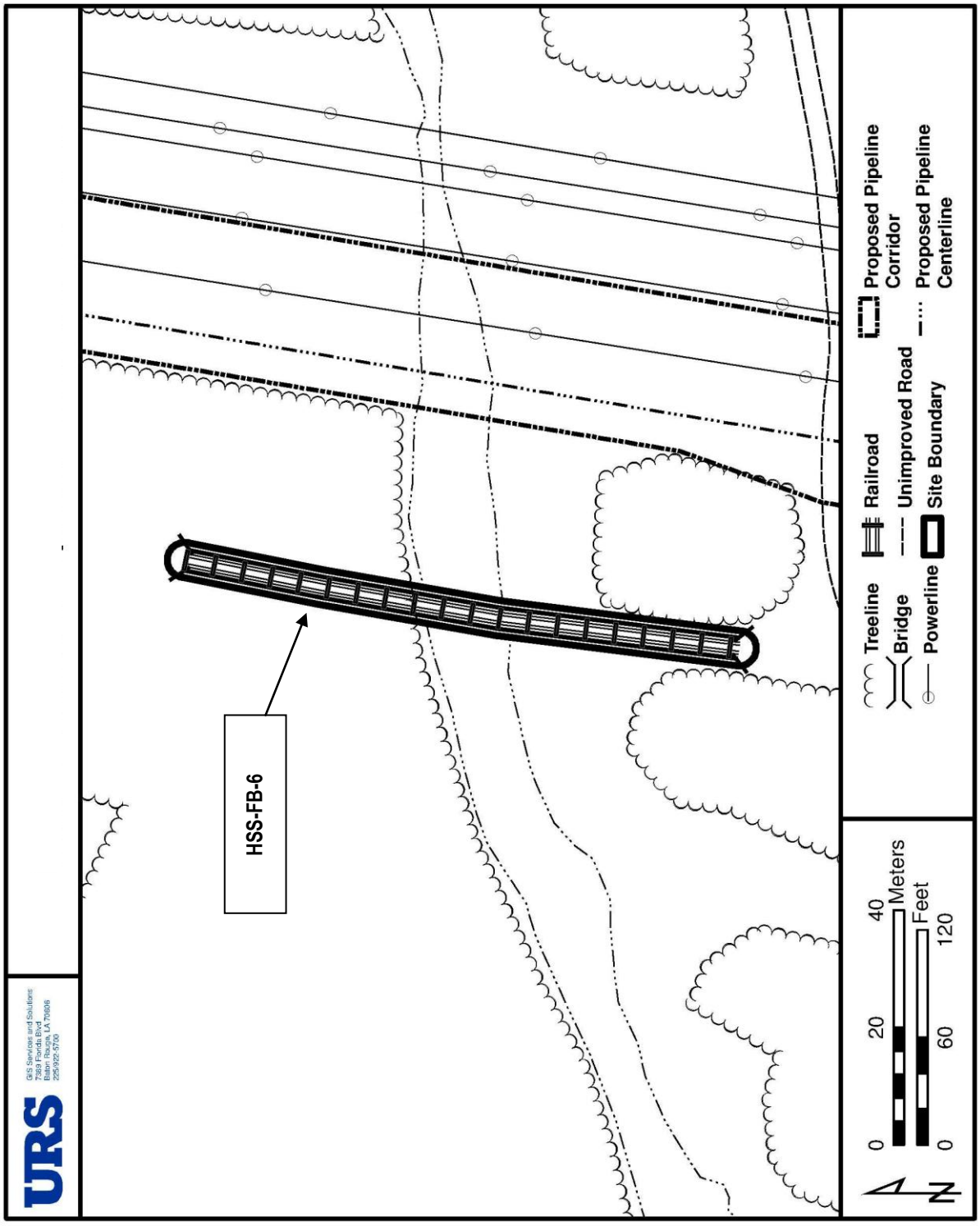


Figure 5.18 Historic standing structure HSS-FB-6 looking west

5.3 IDENTIFIED CULTURAL RESOURCES – WHARTON COUNTY

5.3.1 HSS-WH-1, TAR-34.3

Site Type: Historic Standing Structure (Residential)
Style: National
Temporal Period: ca. 1920s-1930s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-WH-1 is located approximately 817 ft (249 m) southeast of Country Road 444 and approximately 2,306 ft (703 m) northwest of the Colorado River; it is situated about 12.0 mi (19.3 km) south of the community of Wharton, in Wharton County (Figures 5.19 to 5.22). The building is located approximately 68.3 ft (20.8 m) southeast of the proposed survey corridor on Country Road 444 (TAR-34.3) (Appendix B – Mapsheet 13).

Figure 5.19 Project Overview Map – Wharton County

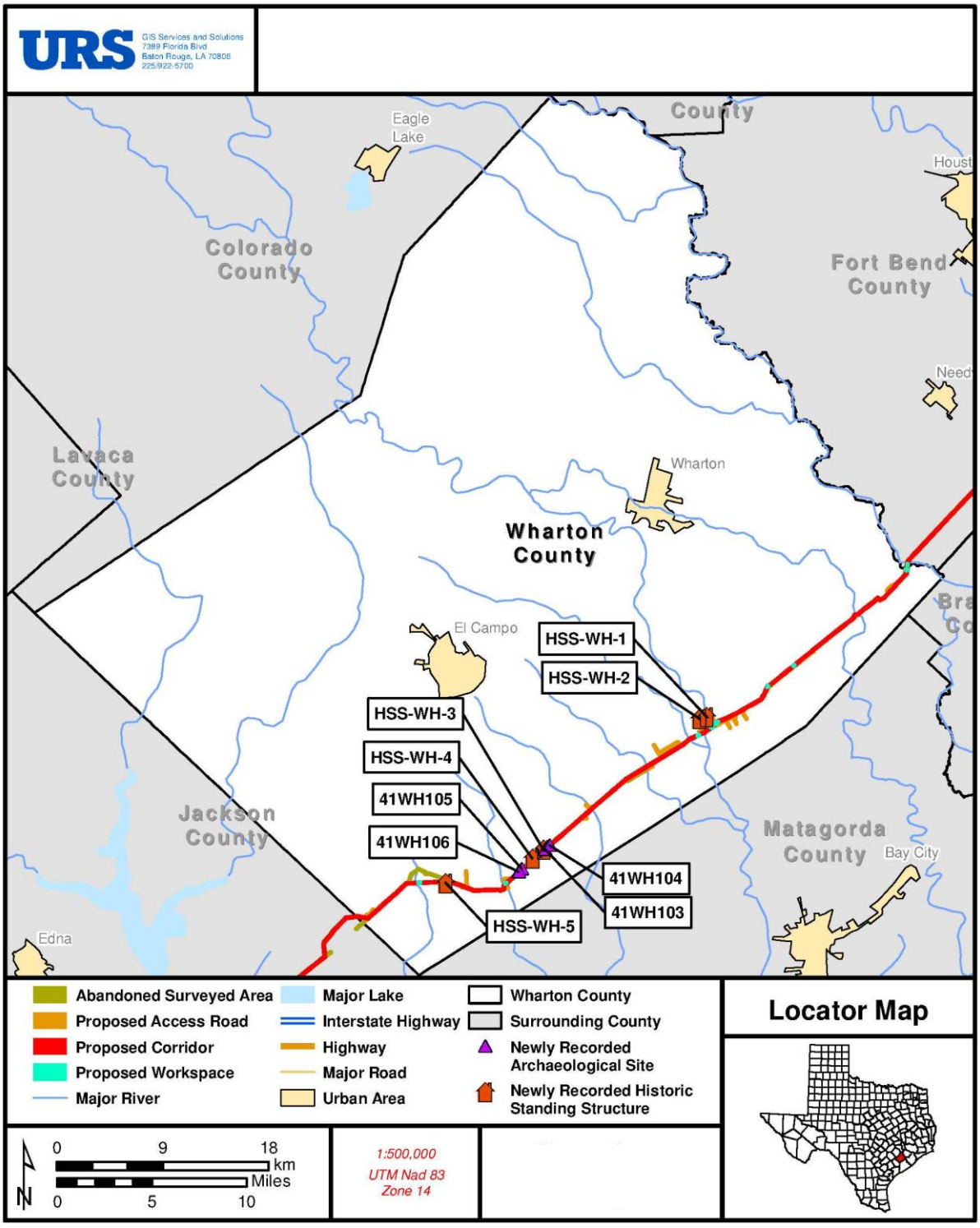
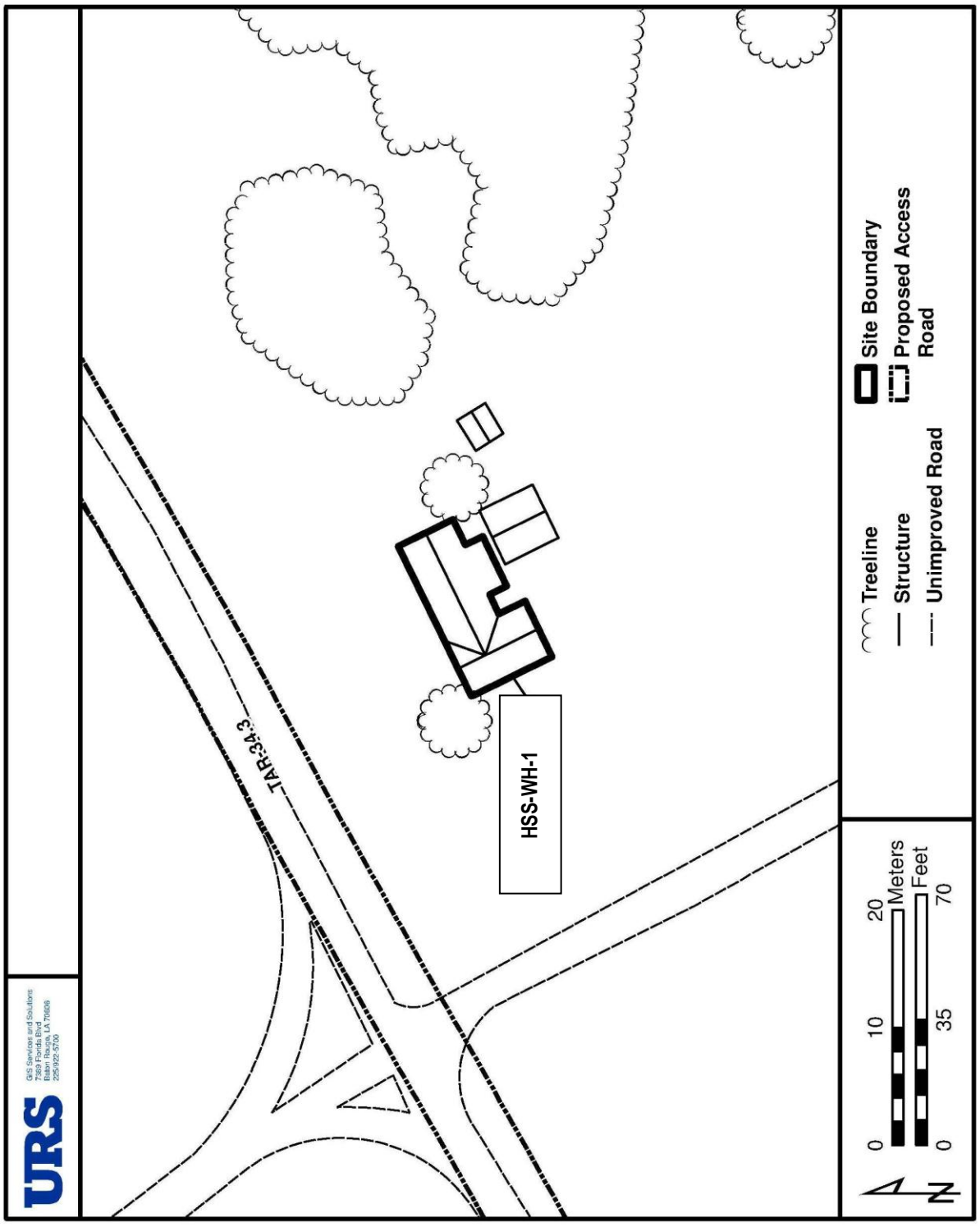


Figure 5.20 HSS-WH-1 Planview



The abandoned residential building appears to have been constructed between 1920 and 1930 in the crossed-gable National style (Figures 5.21 and 5.22). Characteristic features of the National style are present in the form of a cross-gabled massed plan and simple details. The one story building is wood framed and sits on brick piers raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The cross-gabled roof is clad in metal, while the exterior is clad in wooden clapboard. The windows are double-hung with wooden sashes. Several windows are missing or damaged. The primary façade faces southwest and is five bays wide, which includes contains four double hung windows and an entryway door. The northwest façade is five bays wide, including one paired double hung window, three single double hung windows, and a smaller double hung window. The northeast and southeast façades were not surveyed due to inaccessibility.

Figure 5.21 Historic standing structure HSS-WH-1 looking north

Historic standing structure HSS-WH-1 retains the integrity of location, setting, feeling or association, and materials. It does not retain integrity of design or workmanship. The structure does not retain sufficient integrity to relate to its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. Historic standing structure HSS-WH-1 also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-WH-1 does not appear eligible for listing in the National Register of Historic Places. No additional architectural assessment of this structure is recommended.

Figure 5.22 Historic standing structure HSS-WH-1 looking east

5.3.2 HSS-WH-2, TAR-34.3

Site Type: Historic Standing Structure (Residential)
Style: Undefined
Temporal Period: ca. 1930s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-WH-2 is located approximately 223 ft (68 m) southeast of Country Road 444 and approximately 4,448 ft (1,356 m) northwest of the Colorado River; it also situated about 12.0 mi (19.3 km) south of the community of Wharton, in Wharton County (Figures 5.19 and 5.23). The building is located approximately 87 ft (26.5 m) northeast of proposed access road TAR-34.3 (Appendix B – Mapsheet 13).

The abandoned residential building appears to have been constructed pre-1940 (Figures 5.24 and 5.25). The exact date range and building style cannot be determined, due to overgrowth and inaccessibility of the parcel. The one story building is wood framed and sits on brick piers raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The front gabled roof is clad in asphalt shingles, while the exterior is clad in vertical wood plank. The many windows are missing or damaged. The building is in ruins, and partially collapsed. The entire building could not be

surveyed due to inaccessibility of the parcel. There is also a single crib storage building on the property clad in metal.

Figure 5.23 HSS-WH-2 Planview

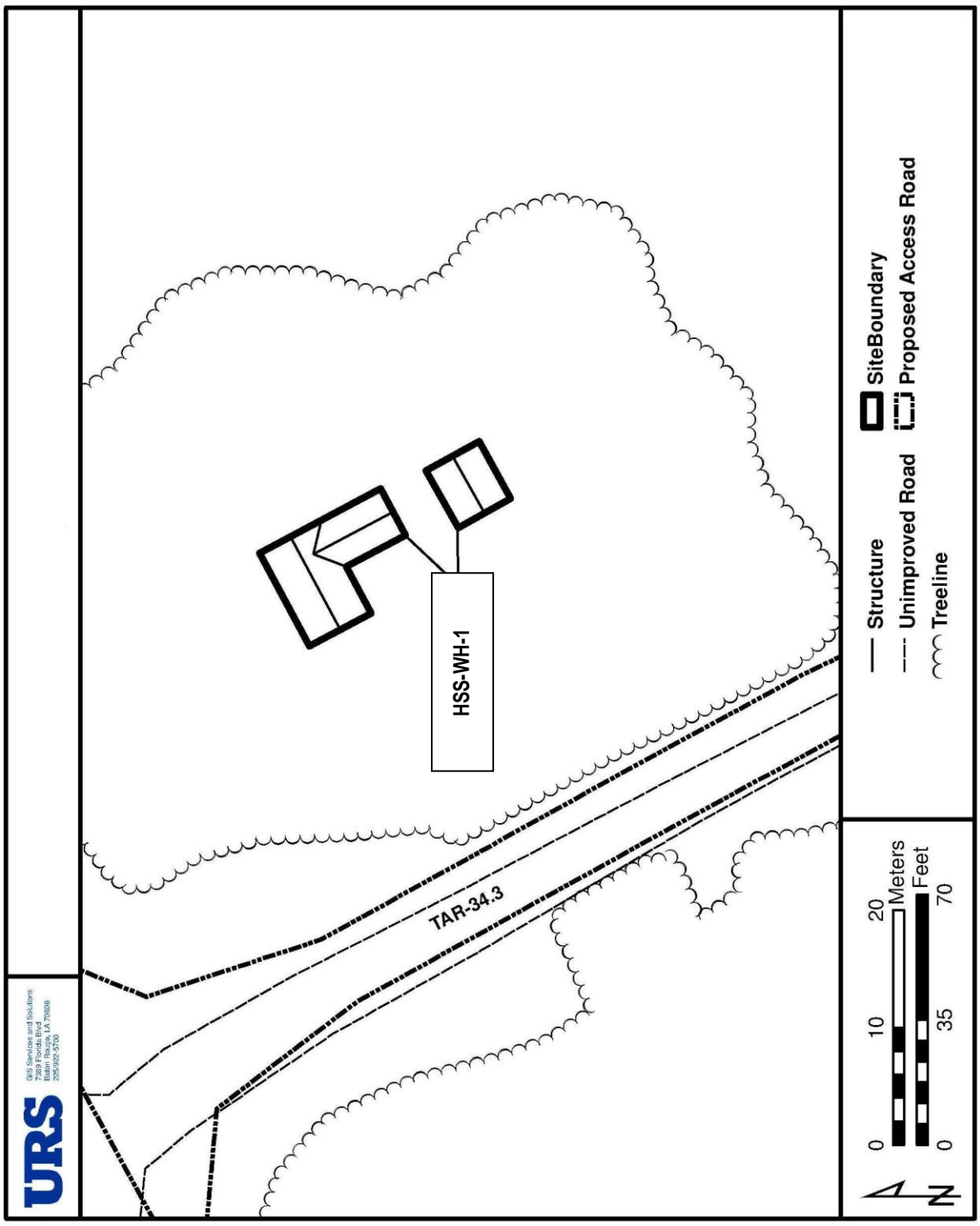


Figure 5.24 Historic standing structure HSS-WH-2 looking northeast

Figure 5.25 Historic standing structure HSS-WH-2 looking north

Historic standing structure HSS-WH-2 retains the integrity of location, setting, feeling or association, and materials. It does not retain integrity of design or workmanship. Historic standing structure HSS-WH-2 does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. Historic standing structure HSS-WH-2 also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). These structures do not appear eligible for listing in the National Register of Historic Places. No additional architectural assessment of this structure is warranted.

5.3.3 SITE 41WH104, MP 44.7

Site Type: Historic Artifact Scatter
Temporal Period: Late Nineteenth to Mid-Twentieth Centuries
NRHP Status: Recommended Not Eligible

Site 41WH104 is situated in a plowed and disked corn field directly west of Wharton County Road 409 and 820 ft (250 m) north of Wharton County Road 424 (Figures 5.19 and 5.26). The center of the site is positioned at MP 44.7 (Survey Segment-087) along the proposed pipeline centerline, east of the historic community of Danevang (Appendix B – Mapsheet 17). The site is at an elevation of 70 ft (21.3 m) amsl and it is associated with the Bernard-Edna soil complex (0 to 1 percent slope). The site displayed moderate to extensive ground surface disturbance resulting from corn and cotton agricultural practices.

The site displays an irregular planview and delineation of the site is considered complete. The site covers approximately 538 ft (164 m) east-west by 420 ft (128 m) north-south. Thirty-eight (38) shovel tests were excavated, accompanied by a 16.4 (5 m) radius surface collection around the individual shovel tests. Shovel tests were excavated at 82 ft (25 m) intervals and none were positive for subsurface cultural materials; however the systematic surface collection recovered cultural materials at 20 individual shovel test locations. A typical shovel test excavated at this site was comprised of two strata in profile. Stratum I extended to a depth of 12 inches below surface (inbs) (30 centimeters below surface [cmbs]) and it was characterized by a dark yellowish brown (10YR 4/4) silty loam. Beneath this was Stratum II, a greyish brown (10YR 5/2) silty clay; this was present from the base of Stratum I to 20 inbs (50 cmbs).

One hundred and eighty-one (181) artifacts were recovered from the systematic surface collection at Site 41WH104 (Table 5.7). The grid locations on the N950 line at E1025 and E1000 displayed the highest artifact densities (n=31 and 39 artifacts, respectively). The artifacts were sorted by material type as ceramics (n=95), glass (n=75), hard mud brick fragments (n=10), and a single iron fragment from an indeterminate piece of farm machinery. By function, the collection was placed into the categories of kitchen (n=109), indeterminate domestic (n=51), architectural (n=14), personal (n=6), and activities (n=1).

Figure 5.26 Site 41WH104 Planview

FIGURE DELETED TO REMOVE

CONFIDENTIAL INFORMATION

Table 5.7 Historic Artifacts - Site 41WH104

North	East	Ceramic	Construction	Glass	Metal	TOTAL
1025	975	2	-	3	-	**5**
1000	1000	1	-	-	-	**1**
	975	5	1	5	-	**11**
	950	2	2	2	-	**6**
975	1050	1	-	2	-	**3**
	1025	4	1	6	-	**11**
	1000	2	1	1	-	**4**
	975	1	-	1	-	**2**
	950	4	-	3	-	**7**
950	1025	20	-	11	-	**31**
	1000	22	2	15	-	**39**
	975	2	-	-	-	**2**
	950	2	-	1	-	**3**
925	1025	3	-	5	1	**9**
	1000	6	-	5	-	**11**
	975	5	1	2	-	**8**
900	1025	3	-	3	-	**6**
	1000	3	-	5	-	**8**
	975	3	2	3	-	**8**
875	1000	4	-	2	-	**6**
TOTAL		**95**	**10**	**75**	**1**	**181**

Earthenware (n=69), stoneware (n=13), porcelain (n=11), and porcelaneous stoneware sherds (n=2) comprised the ceramic assemblage. Earthenware types consisted of single counts of molded refined white-bodied earthenware and annular whiteware sherds, as well as 67 ironstone fragments. Decorative styles on the ironstone sherds were plain (n=55), molded (n=3), blue-tinted glaze (n=2), plain with partial stamped maker's marks (n=2), blue (n=1) and green transfer print (n=1), and single counts of decalomania, scallop edged and molded, and an indeterminate decorative style. Stoneware decorative styles were Bristol glaze (n=8), Bristol glaze with stamped letters (n=3), Bristol glaze and Albany slip (n=1), and yellow glazed (n=1). The porcelain sherds consisted of a Prosser button, a porcelain bisque figurine piece (n=1), and hard-paste porcelain fragments with decalomania (n=1), molding (n=1), painted decoration (n=1), plain (n=2), and indeterminate decorative styles (n=4). Finally, the porcelaneous stoneware sherds were plain (n=1) and had blue-tinted glaze (n=1). Several pieces of ironstone can be seen in Figure 5.27, while Figure 5.28 illustrates a piece of Bristol glazed stoneware with stamped letters, annular yellow ware, and a porcelain bisque doll leg.

The glass collection was sorted by manufacture into the categories of blown in mold (n=6), machine made (n=53), indeterminate manufacture (n=16). The mold types for the blown in mold shards were not identifiable; however, the vessel colors included single counts of aqua, colorless, light aqua, light blue, and milk glass. Four (4) of these were identified as being from bottles, while the other two (2) fragments were from indeterminate forms. One of the bottle shards was a tooled double ring finish in solarized manganese.

Figure 5.27 Site 41WH104 – Historic Ceramics #1
Selected ironstone sherds recovered from Site 41WH104 include two with partial indeterminate maker's marks in green script, and transfer printed fragments in green and blue.

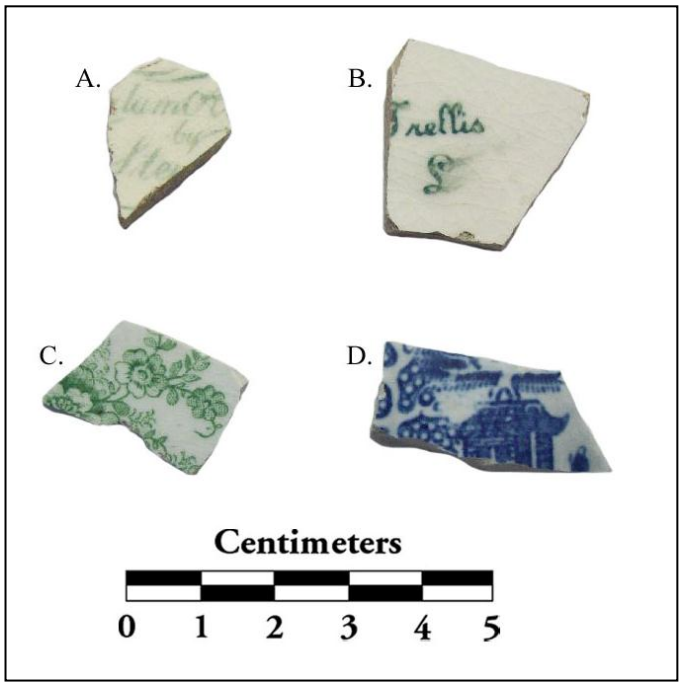
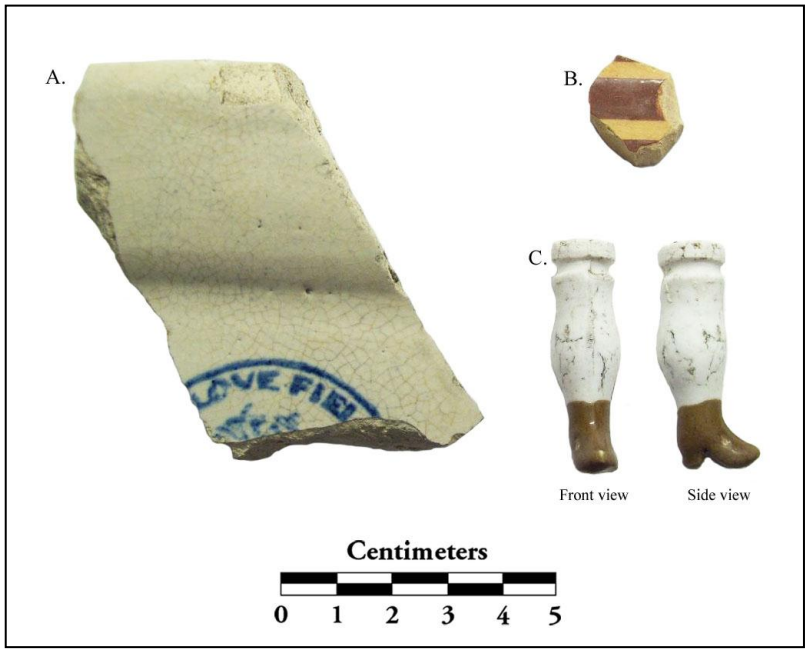


Figure 5.28 Site 41WH104 – Historic Ceramics #2
Additional ceramic artifacts from Site 41WH104 included Bristol glazed stoneware with blue stamped letters, annular yellow ware, and a porcelain doll leg.



The machine made shards were further defined as basic machine made (n=48), made with a valve mark (n=3), and single counts of non-Owens and Owens machine made fragments. The machine made shards were present in a variety of colors; colorless, milk glass, white, light aqua, amber, cobalt blue, solarized manganese, light green, aqua, light blue, and solarized selenium. By form, these were from bottles (n=15), jars (n=7), lid liners (n=5), tableware (n=4), windows (n=4), hollow ware (n=1), plates (n=1), and indeterminate forms (n=16). The indeterminate manufacture shards were sorted by form as indeterminate (n=9), bottle (n=6), and a jar (n=1); by color, they were colorless, solarized manganese, cobalt blue, grayish blue, light aqua, milk glass, and white.

Approximately 81.8% (n=148) of the artifact assemblage possessed temporally diagnostic attributes (Table 5.8). Just under half of these (n=61) of these had open-ended production dates to the present day (vertical grey hachure; Table 5.8). The artifacts with terminal end dates had initial production dates ranging from the ca. 1810s to 1940s and end dates ranging from 1895 to 1982. Overall, the majority of the artifacts suggest an occupation dating from the late nineteenth to early twentieth century.

Table 5.8 Temporally Diagnostic Artifact Recoveries - Site 41WH104

North	East	ca. 1810 - ca. 1920	1840 - 1900	ca. 1842 - 1930	1850 - 1895	Common ca. 1850s - Early 20th Century	ca. 1875 - 1920	1880 - Present	ca. 1890 - 1900	1890 - 1920	1890 - Present	1893 - 1920	1893 - Present	ca. 1898 - 1920	ca. 1898 - 1950	ca. 1898 - Present	1905 - 1982	ca. 1915 - 1950s	1920 - Present	ca. 1940 - Present	TOTAL
1025	975	1	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	**5**
1000	1000	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
	975	-	-	3	-	-	-	-	-	-	1	-	4	-	-	-	-	-	1	1	**10**
	950	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	**5**
975	1050	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2**
	1025	-	-	4	-	-	-	-	-	-	1	-	3	-	-	-	-	-	-	-	**8**
	1000	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	**3**
	975	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	**2**
	950	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	**3**
950	1025	1	-	14	1	-	1	1	1	-	-	-	6	-	-	-	-	-	1	2	**28**
	1000	1	1	13	-	-	2	1	-	1	2	-	8	-	-	-	-	-	3	1	**33**
	975	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
	950	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	**2**
925	1025	1	-	1	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	**5**
	1000	-	-	4	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-	**8**
	975	-	-	5	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	**8**
900	1025	-	-	2	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1	-	**5**
	1000	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	1	1	-	**6**
	975	-	-	3	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	**7**
875	1000	-	-	1	1	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-	**6**
TOTAL		**5**	**1**	**64**	**2**	**1**	**4**	**2**	**1**	**1**	**10**	**2**	**34**	**1**	**1**	**1**	**1**	**1**	**11**	**5**	**148**

Site 41WH104 appears to be associated mainly with a residential/agricultural occupation from the mid nineteenth to early twentieth century. The period of occupation appears to roughly correspond to the height of occupation associated with the community of Danevang (Danish Field), between ca. 1894 and 1927 (Danish Heritage Museum 2012). However, all of the artifact recoveries were from the ground surface; this strongly suggests that there is limited site integrity remaining at this location. The site appears to represent the remnants of a residential location that has been subsequently impacted by agricultural practices. Based on this, the site does not appear to possess those qualities of significance as defined by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). No further assessment of Site 41WH104 is recommended.

5.3.4 SITE 41WH103, MP 45.0

Site Type: Historic Artifact Scatter
Temporal Period: Late Nineteenth to Early Twentieth Centuries
NRHP Status: Recommended Not Eligible

Site 41WH103 is located in a plowed and disked corn field directly south of Wharton County Road 424 and 1,394 ft (425 m) west of Wharton County Road 409 (Figures 5.19 and 5.29). The center of the site is positioned at MP 45.0 (Survey Segment-089) along the proposed pipeline corridor and east of the historic community of Danevang (Appendix B – Mapsheet 17). The site is situated at an elevation of 70.0 ft (21.3 m) amsl and it sits on the Lake Charles clay (0 to 1 percent slope). Moderate to extensive ground surface disturbance is present at the site, as a result of ongoing corn and cotton agricultural practices.

Site 41WH103 displays an irregular plan view and delineation of the site is considered complete (Figure 5.29). The site covers approximately 623 ft (190 m) east-west by 344 ft (105 m) north-south. Sixty-four (64) shovel tests were excavated, accompanied with a 16.4 ft (5 m) radius surface collection around each shovel test location. Shovel tests were excavated at 33 ft (10 m) intervals within the corridor and 82 ft (25 m) intervals outside the proposed corridor limits to delimit the site boundary. No shovel tests were positive for subsurface cultural materials; however, the systematic surface collection did recover cultural materials at 38 shovel test locations. A typical shovel test excavated at this site was comprised of a single stratum in profile. Stratum I extended to a depth of 20 inbs (50 cmbs) and it was characterized by a grayish brown (10YR 5/2) silty clay.

Eight hundred and six (806) artifacts were recovered as a result of the delineation efforts conducted at Site 16WH103 (Table 5.9). Approximately 82.6% (n=665) of the artifacts were recovered from 13 grid locations within the survey corridor, all falling between the N1000 and N940 lines. The highest concentrations of surface collected artifacts (i.e., from 52 to 94 artifacts) were identified in the northeast corner of the site within the proposed survey corridor.

Figure 5.29 Site 41WH103 Planview

FIGURE DELETED TO REMOVE

CONFIDENTIAL INFORMATION

Table 5.9 Historic Artifacts - Site 41WH103

North	East	Ceramic	Construction	Glass	Metal	TOTAL
1000	1040	-	2	2	-	4
	1010	11	12	54	-	77
	1000	12	14	68	-	94
	990	4	2	8	-	14
	960	4	1	-	-	5
990	1010	13	7	53	-	73
	1000	9	8	19	3	39
	990	3	-	8	-	11
980	1010	13	7	31	1	52
	1000	3	-	30	-	33
	990	1	-	6	-	7
975	1065	5	2	4	-	11
	1040	5	6	9	-	20
	960	1	-	1	2	4
	935	5	2	1	2	10
970	1010	3	5	16	1	25
	1000	11	5	30	1	47
	990	5	-	8	1	14
960	1010	10	3	23	-	36
	1000	19	3	17	3	42
	990	12	-	14	1	27
950	1065	-	-	1	-	1
	1040	-	1	5	-	6
	1010	8	2	36	-	46
	1000	6	3	19	2	30
	990	6	1	3	-	10
	960	-	2	3	-	5
	935	1	-	2	1	4
940	1010	6	2	15	1	24
	1000	5	1	2	-	8
930	1010	-	-	1	-	1
	1000	1	1	7	1	10
	990	1	1	-	-	2
925	960	1	-	-	1	2
	935	-	1	3	-	4
900	935	1	-	2	-	3
875	935	2	1	2	-	5
TOTAL		**187**	**95**	**503**	**21**	**806**

The artifacts were sorted by material type as glass (n=503), ceramics (n=187), construction material (n=95), and metal (n=21). These were categorized by function as indeterminate domestic (n=331), kitchen (n=223), architectural (n=181), personal (n=22), indeterminate hardware (n=12), activities (n=2), and miscellaneous (n=35).

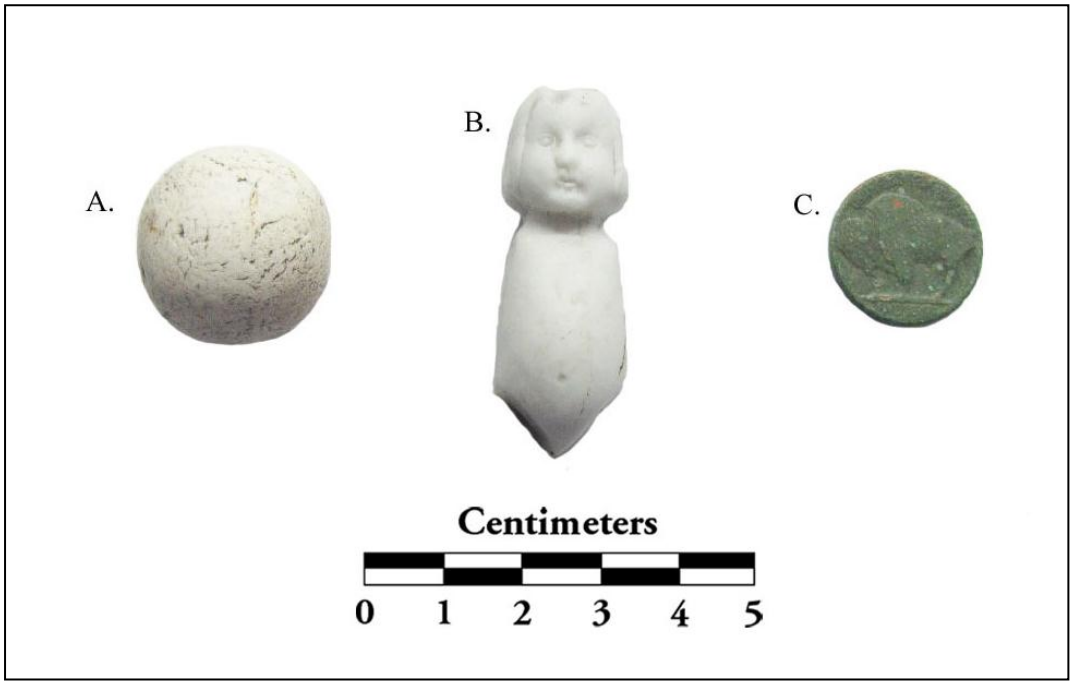
Glass artifacts were sorted into three (3) categories: blown in mold (n=4), machine made (n=388), and made by an indeterminate process (n=111). The mold type was not discernible for any of the blown in mold shards, however they were sorted by color as single counts from aqua, cobalt blue, colorless, and sapphire blue bottles. The machine made fragments were further sorted as basic machine made (n=375), Owens machine made (n=10), made with a valve mark (n=2), and non-Owens machine made (n=1). Basic machine made finishes consisted of a single bead finish, two (2) crown finishes, five (5) double ring finishes, and six (6) small mouth threaded finishes. By form, these consisted of window glass (n=82), bottles (n=70), jars (n=39), lid liners (n=15), flatware (n=2), a cup (n=1), an insulator (n=1), tableware (n=1), and indeterminate forms (n=177). Also present among the basic machine made artifacts were fragments from a Ball jar, a Ponds jar, and a Vicks jar. Four (4) of the container bases with Owens suction scars also had maker's marks consisting of diamonds with numbers possibly from the Illinois Glass Company (n=2), one with "Duraglas", and the last had "Duraglas" and the Owens Illinois Glass Company maker's mark of an I in an O superimposed over a diamond.

The machine made artifacts were present in a variety of colors, including colorless, light aqua, milk glass, light green, aqua, cobalt blue, light blue, solarized selenium, white, solarized manganese, sapphire blue, bright green, amber, and forest green. In regards to those fragments from vessels made by indeterminate manufacturing processes, two (2) were indeterminate finish types; vessels forms were bottles (n=19), a jar (n=1), a marble (n=1), tableware (n=1), and window glass (n=1), but a majority were from indeterminate forms (n=88). These came from a variety of colored vessels as well; colorless, solarized manganese, light blue, light green, light aqua, cobalt blue, milk glass, amber, and white.

The ceramic collection had four (4) types present: earthenware (n=138), Bristol glazed buff-bodied stoneware (n=25), porcelain (n=17), and plain porcelaneous stoneware (n=7). Earthenware varieties included green glazed coarse earthenware (n=1), a kaolin marble (n=1), glazed redware (n=1), and plain yellow ware (n=1). Whiteware sherds were plain (n=2) and molded (n=1), while refined white-bodied earthenware sherds were plain (n=1) or had an indeterminate decorative style (n=1). The ironstone shards were plain (n=96), molded (n=10), scallop edged and molded (n=9), blue-tinted (n=7), decorated with decalomania (n=3), glazed (n=2), stamped (n=1), or had indeterminate decorative styles (n=1). The porcelain consisted of two (2) doll fragments, and hard-paste fragments that are plain (n=11), decorated with decalomania (n=1), molded (n=1), or decorated with an indeterminate style (n=2). Figure 5.30 depicts a large kaolin shooter marble, the head and torso from a small porcelain doll, and a buffalo nickel.

The construction material consisted of soft mud (n=13) and hard mud brick fragments (n=72), coarse earthenware drain pipe fragments (n=9), and a single piece of mortar. The metal items consisted of a Buffalo nickel manufactured between 1913 and 1938, indeterminate forms (n=16), and single counts of a large hinge, cut nail, wire nail, and an indeterminate nail.

Figure 5.30 Site 41WH103 – Historic Ceramics and Coin
Personal items recovered from the surface of Site 41WH103 included a handmade clay marble, the torso from a small figurine and Buffalo nickel.



Approximately 70.1% (n=565) of the artifact assemblage possessed temporally diagnostic attributes (Table 5.10). Over half of these (n=373) of these had open ended production dates extending to the present day (vertical grey hachure; Table 5.10). The artifacts with terminal end dates had initial production dates ranging from 1790 to 1940 and end dates ranging from 1890 to 1982; the majority of the artifacts had an overlapping production date range from the late nineteenth to the early twentieth century. The period of occupation corresponds to the initial development of the community of Danevang (ca. 1894 and 1927) (Danish Heritage Museum 2012).

Site 41WH103 appears to be a residential/agricultural occupation from the late nineteenth to early twentieth century; as with Site 41WH104, below, all the artifact recoveries were from the ground surface. This suggests that there is very limited site integrity remaining at this location. The site appears to represent the remnants of a residential location that has been significantly impacted by agricultural practices. Based on the above, the site does not appear to possess those qualities of significance as defined by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). No further assessment of Site 41WH103 is recommended.

Table 5.10 Temporally Diagnostic Artifact Recoveries - Site 41WH103

North	East	1790 - 1900	ca. 1810 - ca. 1920	ca. 1820 - Present	1828 - 1900 (1940+)	ca. 1842 - 1930	1845 - 1880	1850 - 1895	ca. 1875 - 1920	1880 - Present	Before 1890	ca. 1890 - 1900	1890 - 1920	1890 - Present	1893 - 1920	1893 - Present	1905 - 1920	1905 - 1982	1913 - 1938	ca. 1915 - 1950s	1920 - Present	1940 - 1954	ca. 1940 - Present	TOTAL
1000	1040	-	-	-	-	-	-	-	1	-	-	-	-	2	-	1	-	-	-	-	-	-	-	**4**
	1010	-	-	-	-	5	-	1	1	1	2	1	-	10	-	27	1	-	-	-	1	-	-	**50**
	1000	-	-	1	-	6	-	-	4	2	-	-	-	14	-	37	-	-	-	-	2	-	-	**66**
	990	-	-	-	-	1	1	-	-	-	-	-	-	2	-	8	-	-	-	-	2	-	-	**14**
	960	-	-	-	-	3	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	**5**
990	1010	-	-	-	-	10	-	-	2	1	-	-	2	7	1	38	-	-	-	-	-	-	-	**61**
	1000	-	-	-	1	4	-	1	-	-	-	-	2	9	-	15	-	-	-	-	1	-	-	**33**
	990	-	-	1	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	2	1	-	1	**9**
980	1010	-	-	-	-	8	-	-	1	-	1	-	2	6	-	19	-	-	-	-	1	-	1	**39**
	1000	-	-	-	-	2	-	-	1	-	-	-	-	-	1	20	-	-	-	-	-	-	4	**28**
	990	-	-	-	-	-	-	1	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	**5**
975	1065	-	-	-	-	4	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	**7**
	1040	-	1	-	-	3	-	-	-	-	-	-	-	6	1	4	-	-	-	-	2	1	-	**18**
	960	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
	935	-	-	-	-	4	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	**6**
970	1010	1	-	-	-	3	-	-	-	-	2	-	-	2	-	11	-	-	-	-	-	-	-	**19**
	1000	-	-	-	-	7	-	-	-	-	3	1	-	1	-	21	-	1	-	-	-	-	-	**34**
	990	-	-	-	-	5	-	-	1	-	-	-	-	-	-	3	-	-	-	-	-	-	-	**9**
960	1010	-	1	-	-	9	-	-	2	-	-	-	-	3	1	6	-	-	-	-	-	-	-	**22**
	1000	-	-	-	-	8	-	2	1	1	-	-	-	1	1	8	-	-	-	-	1	-	1	**24**
	990	-	-	-	-	10	-	-	-	-	-	1	-	-	-	5	-	1	-	-	1	-	-	**18**
950	1040	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	**2**
	1010	-	-	-	-	6	-	-	1	-	-	-	-	1	-	12	-	2	-	1	1	-	-	**24**
	1000	-	1	-	-	3	-	-	-	-	2	-	-	-	-	4	-	-	-	-	1	-	-	**11**
	990	-	-	-	-	2	-	1	-	-	-	-	2	1	-	3	-	-	-	-	1	-	-	**10**
	960	-	-	-	-	-	-	-	-	-	1	-	-	1	-	2	-	-	-	-	-	-	-	**4**
	935	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
940	1010	-	-	-	-	5	-	-	-	-	-	-	-	1	-	8	-	-	-	-	1	-	-	**15**
	1000	-	-	-	-	4	-	1	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	**8**
930	1010	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
	1000	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	**2**
	990	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	**2**
925	960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	**1**
	935	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1	**4**
900	935	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	**3**
875	935	-	-	-	-	2	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	**5**
TOTAL		**1**	**4**	**2**	**1**	**119**	**1**	**7**	**17**	**6**	**13**	**3**	**8**	**73**	**5**	**269**	**2**	**4**	**1**	**3**	**17**	**1**	**8**	**565**

5.3.5 HSS-WH-3, MP 45.0

Site Type: Historic Standing Structure (Residential)
Style: I-House
Temporal Period: ca. 1890s to 1900s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-WH-3 is located approximately 200 ft (61 m) south of County Road 424 and approximately 2,139 ft (652 m) west of County Road 409, west of the historic community of Danevang, Wharton County (Figures 5.19, 5.29, and 5.31 to 5.33). The building is located approximately 364 ft (111 m) southeast of the proposed survey corridor on County Road 424, near MP 45.0 (adjacent to Survey Segment-089) (Appendix B – Mapsheet 17).

The single-family residence appears to have been constructed between the ca. 1890s and 1900s in the I-house form (Figures 5.32 and 5.33). This construction date appears to correspond to the emergence of the community of Danevang ("Danish Field"), between ca. 1894 and 1927 (Danish Heritage Museum 2012). Characteristic features of the I-house are present in the form of a massed plan one room deep and two rooms wide. The rearward extension and covered porches convey a later period in this style. The two-story building is wood framed and sits on concrete pylons raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The cross gabled roof is clad in asphalt shingles, while the exterior is clad in clapboard siding. The windows are double-hung with wooden sashes. The primary façade faces west and is three bays wide, which includes two double-hung windows and one entryway door. The primary façade contains a partial width dropped hipped roof porch. The north façade is four bays wide on the ground floor, which include one paired set of double hung windows, three double hung windows on the rearward extension and one smaller window on the shed addition. The east façade contains a shed addition and an inset covered porch. The south facade is four bays wide on the ground floor, which contains on set of paired double hung window, two double hung windows and an entryway door. There is a front gabled outbuilding that lies directly east of the main house.

Historic standing structure HSS-WH-3 retains the integrity of location, setting, feeling or association, and materials, but does not retain integrity of design or workmanship. Historic standing structure HSS-WH-3 does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. The structure also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-WH-3 does not appear eligible for listing in the National Register of Historic Places. No additional architectural assessment of this structure is recommended.

Figure 5.31 HSS-WH-3 Planview

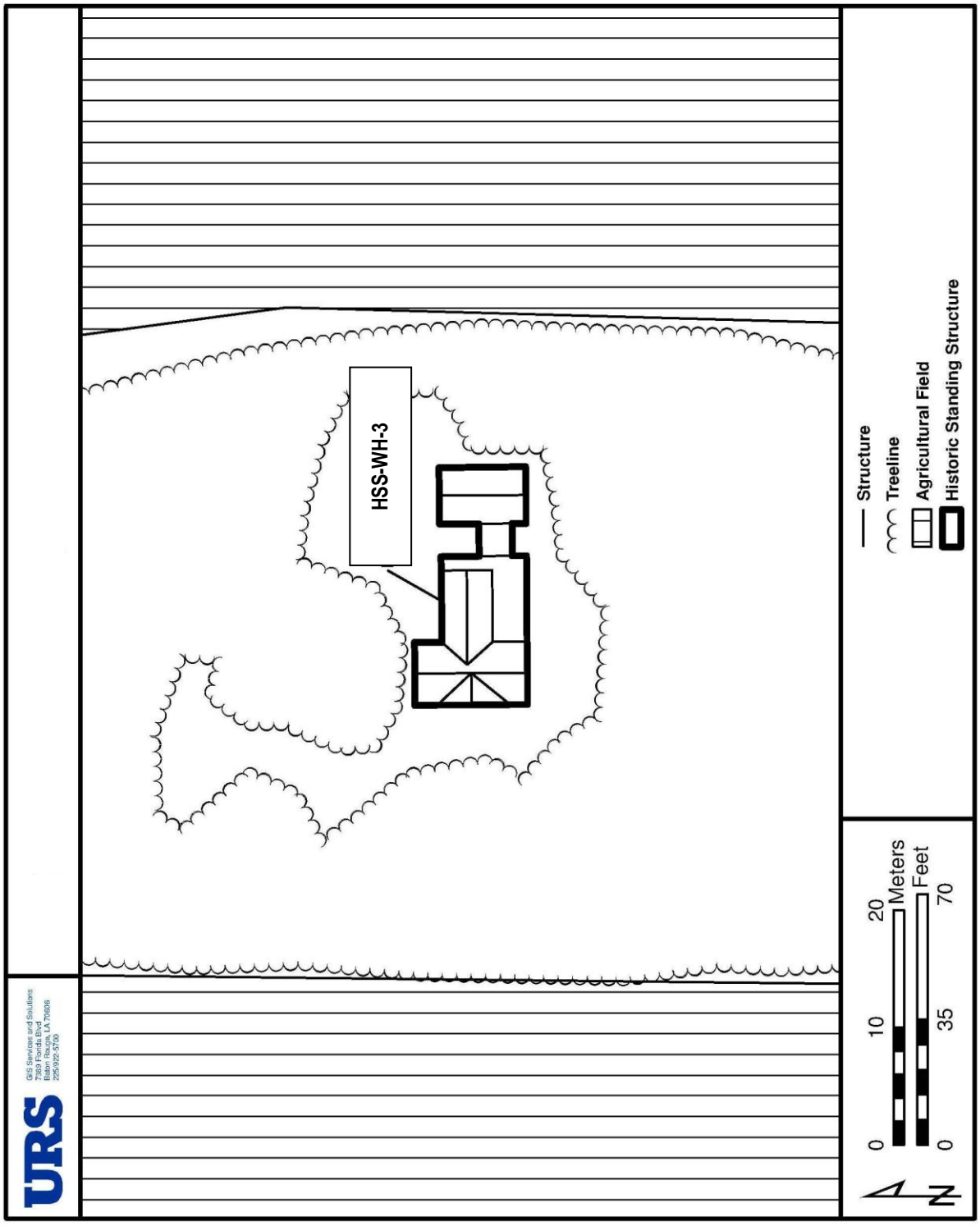


Figure 5.32 Historic standing structure HSS-WH-3 looking northeast

Figure 5.33 Historic standing structure HSS-WH-3 looking north

5.3.6 HSS-WH-4, TAR-46.09

Site Type: Historic Standing Structure (Residential)
Style: Undefined
Temporal Period: ca. 1940s to 1950s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-WH-4 is located approximately 178 ft (54 m) east of State Highway 71 and approximately 3,178 ft (969 m) north of Country Road 426, and just south of the historic community of Danevang, Wharton County (Figures 5.19 and 5.34). The building is located approximately 482 ft (147 m) northwest of the proposed survey corridor on State Highway 71; the structure is situated adjacent to proposed access road TAR-46.09 (Appendix B - Mapsheet 17).

The residential building appears to have been originally constructed between the ca. 1940s and 1950s, but contains significant modern additions. The one story building is wood framed and sits on concrete blocks raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The cross gabled roof is clad in asphalt shingles, while the exterior is clad in wood clapboard. The windows are double-hung with metal sashes. The primary façade faces south and is four bays wide, which contains two paired double hung windows, a single double hung window and an entryway door. An inset porch covers the entryway door and one paired double hung window. The east façade is four bays wide, which contains one paired double hung window, two single double hung windows and a large plate glass window surrounded by two double hung windows. The north and west façades could not be surveyed due to the inaccessibility of the parcel.

Historic standing structure HSS-WH-4 retains the integrity of location, setting, feeling or association, and materials. It does not retain integrity of design or workmanship. The structure does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. Historic standing structure HSS-WH-4 also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-WH-4 does not appear eligible for listing in the National Register of Historic Places. No additional architectural assessment of this structure is considered necessary.

Figure 5.34 HSS-WH-4 Planview

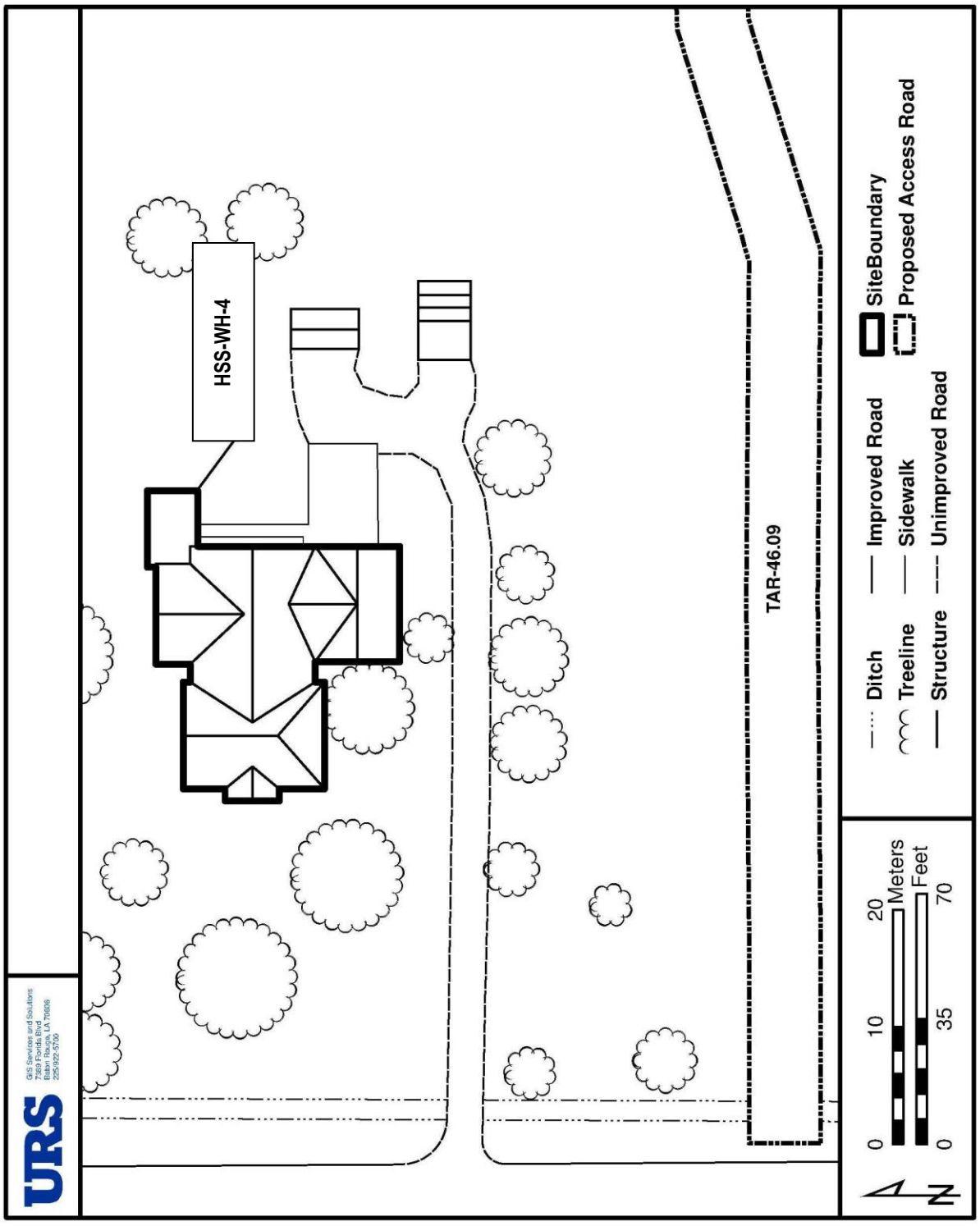


Figure 5.35 Historic standing structure HSS-WH-4 looking north

Figure 5.36 Historic standing structure HSS-WH-4 looking northeast

5.3.7 SITE 41WH105, MP 46.65

Site Type: Historic Artifact Scatter
Temporal Period: Late Nineteenth to Early Twentieth Centuries
NRHP Status: Recommended Not Eligible

Site 41WH105 is located in a plowed and disked corn field directly south of Texas Farm to Market Road 411 and 3.034 ft (925 m) west of Texas Highway 71 (Figures 5.19 and 5.37). The center of the site is positioned at MP 46.65 along the proposed pipeline corridor and west of the historic community of Danevang (Survey Segment-093) (Appendix B – Mapsheet 18). The site is at an elevation of 65 ft (19.8 m) amsl and is associated with Lake Charles clay (0 to 1 percent slope). Moderate to extensive ground surface disturbance is present as a result of ongoing agricultural practices.

The site displays an irregular planview and delineation of the site is considered complete. The site covers approximately 354 ft (108 m) east-west by 321 ft (98 m) north-south. Thirty (30) shovel tests were excavated, accompanied by a 16.4 ft (5 m) radius surface collection around each shovel test location. Shovel tests were excavated at 82 ft (25 m) intervals, while extra surface collections were completed within the proposed pipeline corridor at 33 ft (10 m) intervals. Only two (2) brick fragments were recovered from the shovel tests, but the systematic surface collection recovered cultural materials at 28 shovel test locations. A typical shovel test excavated at this site was comprised of one stratum in profile. Stratum I extended to a depth of 20 inbs (50 cmbs) and it was characterized by a grayish brown (10YR 5/2) silty clay loam.

A total of 578 artifacts were collected as a result of the delineation efforts conducted at Site 16WH105 (Table 5.11). Almost all of the artifacts were recovered from the surface of the site; only two (2) hard mud brick fragments were collected subsurface from Stratum I at the site datum (N1000/E1000). The surface collections from grid locations at N980/E1000 and N970/E1000 contained 133 and 134 artifacts, respectively. Seventy percent (n=405) of the artifacts were glass shards; the remaining artifacts were construction material (n=76), ceramics (n=59), metal (n=23), synthetics (n=12), and a single stone item. These were also classified by function as indeterminate domestics (n=328), architectural (n=117), kitchen (n=98), personal (n=14), activities (n=8), indeterminate hardware (n=3), and miscellaneous (n=10).

The glass artifacts were placed into three (3) manufacturing categories: blown in mold (n=6), machine made (n=379), or made by an indeterminate method (n=22). The mold types for the blown in mold shards were not identifiable. These fragments were from bottles (n=2) and indeterminate forms (n=4) in colorless (n=3), cobalt blue (n=2), and sapphire blue (n=1). Several varieties of machine made manufacturing methods were present including basic machine made (n=368), made with a valve mark (n=4), made with an applied color label (n=3), non-Owens machine made (n=2), and Owens machine made (n=2). These were sorted by form as bottles (n=132), windows fragments (n=29), jar fragments (n=16), hollow ware shards (n=8),

table ware fragments (n=5), a drinking glass shard (n=1), a flatware fragment (n=1), a marble, and indeterminate form (n=186).

Figure 5.37 Site 41WH105 Planview

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CONFIDENTIAL INFORMATION

Table 5.11 Historic Artifacts - Site 41WH105

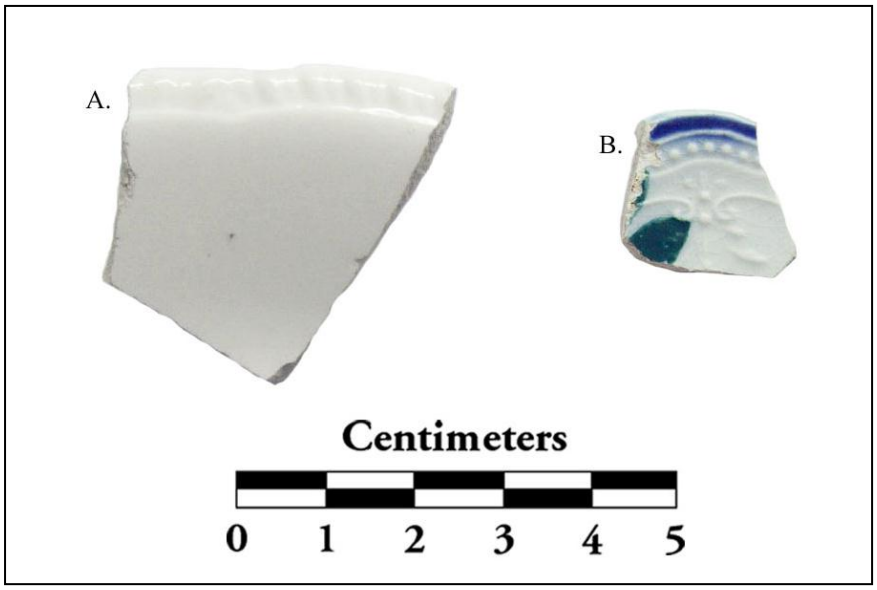
Stratum	North	East	Ceramic	Construction	Glass	Metal	Stone	Synthetics	TOTAL
Surface	1000	1025	-	2	3	-	-	-	**5**
		1020	-	9	4	1	-	-	**14**
		1010	2	1	1	-	-	-	**4**
		1000	1	8	15	-	-	-	**24**
		975	-	5	-	-	-	-	**5**
		950	-	5	-	-	-	-	**5**
	990	1020	1	2	1	-	-	-	**4**
		1010	-	2	-	-	-	-	**2**
		1000	1	5	26	1	-	-	**33**
	980	1020	-	1	1	-	-	-	**2**
		1010	1	5	13	-	-	-	**19**
		1000	6	6	105	10	-	6	**133**
	975	1025	-	2	2	-	-	-	**4**
		1000	12	2	7	-	-	-	**21**
		975	-	2	1	-	-	-	**3**
	970	1020	-	1	1	-	-	-	**2**
		1010	4	2	12	1	-	-	**19**
		1000	9	2	116	7	-	-	**134**
	960	1010	3	-	10	1	1	4	**19**
		1000	2	8	38	1	-	1	**50**
	950	1010	1	-	3	-	-	-	**4**
		1000	3	2	6	1	-	-	**12**
	940	1010	1	-	-	-	-	-	**1**
		1000	4	-	20	-	-	1	**25**
		990	3	-	9	-	-	-	**12**
	930	1000	2	1	7	-	-	-	**10**
		990	3	1	3	-	-	-	**7**
	920	990	-	-	3	-	-	-	**3**
Surface Total			**59**	**74**	**407**	**23**	**1**	**12**	**576**
I	1000	1000	-	2	-	-	-	-	**2**
Stratum I Total			**-**	**2**	**-**	**-**	**-**	**-**	**2**
TOTAL			**59**	**76**	**407**	**23**	**1**	**12**	**578**

Six bottle finishes were present in the collection. These were single counts of bead, capseat, collared ring, crown, small mouth threaded, and indeterminate finish types. A very wide variety of colors comprised the collection, but over half were classified as colorless (n=256). The remaining colors consisted of light aqua, light green, milk glass, amber, solarized selenium, 7-Up green, white, light blue, green, peach Depression glass, solarized manganese, cobalt blue, grayish blue, teal, polychrome, red, and tinted milk glass. Finally, the fragments from forms made by indeterminate manufacturing methods were present in a variety of colors including colorless, cobalt blue, light green, and single counts of bright green, light blue, milk glass, sapphire blue, and yellowish amber.

Four types of ceramics were collected: earthenware (n=50), porcelain (n=3), porcelaneous stoneware (n=3), and stoneware (n=3). The earthenware collection was dominated by ironstone varieties (n=41), but other subtypes were refined white-bodied earthenware sherds, plain whiteware (n=2), and unglazed terra cotta (n=1). The refined white-bodied earthenware fragments were glazed in a number of colors including blue (n=1), dark blue (n=1), green (n=1), mint green (n=1), and yellow (n=2). One of the yellow glazed fragments also had molded decoration present. Ironstone decorative styles were plain (n=26), glazed (n=7), molded (n=3), scallop edged and molded (n=2), decalomania (n=1), scallop edged, and indeterminate (n=1). The porcelain fragments were sorted porcelain bisque (n=1), and soft-paste fragments that were plain (n=1) or molded (n=1). Porcelaneous stoneware artifacts were two (2) spark plugs and part of a brown glazed insulator. Finally, the stoneware fragments were buff-bodied with Bristol glazes (n=3). Figure 5.38 shows two pieces of scallop edged and molded ironstone, one of which had polychrome painting as well.

Figure 5.38 Site 41WH105 – Historic Ceramics

Decorated ironstone sherds collected at Site 41WH105 included scallop edged ironstone with a molded rope edge, and hand-painted scallop edged ironstone with molding on the marley.



The remaining artifact types collected from the surface of the site were hard mud brick fragments (n=74), metal items (n=23), synthetic items (n=12), and a whetstone. Two types of metal artifacts were present: four were cupreous and the remaining 19 were iron. The cupreous items were a buckle (n=1), a hinge (n=1), metal sheeting (n=1), and a zipper pull (n=1). The iron items were wire nail (n=6), a single cut nail, bolts (n=2), fence staples (n=2), and single counts of an axle mount, a pipe, a screw, a wire, indeterminate hardware, and indeterminate forms (n=3). The synthetic items were plastic buttons (n=4), a piece of plastic tubing (n=1), a plastic gaming die (n=1), two indeterminate plastic fragments, part of a rubber shoe sole, and three (3) pieces of rubber from indeterminate forms.

Approximately 83.9% (n=485) of the artifact assemblage possessed temporally diagnostic attributes (Table 5.12). Almost all (n=424) these artifacts had open ended production dates that extended to the present day (vertical grey hachure; Table 5.12). The artifacts with terminal end dates (n=61) had initial production dates ranging from the ca. 1790 to 1940s, with end dates ranging from the ca. 1900s to the 1950s; however, the majority of the artifacts had an overlapping date range from the late nineteenth to the early twentieth century.

Table 5.12 Temporally Diagnostic Artifact Recoveries - Site 41WH105

North	East	1790 - 1900	1795 (1850) - Present	ca. 1810 - ca. 1920	ca. 1820 - Present	ca. 1842 - 1930	ca. 1890 - 1900	1890 - Present	1893 - 1920	1893 - Present	ca. 1898 - 1950	1900 - Present	ca. 1915 - 1950s	1920 - Present	ca. 1926 - Present	1935 - Present	ca. 1940 - 1950s	ca. 1940 - Present	TOTAL
1000	1025	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	**3**
	1020	-	-	-	-	-	-	9	-	1	-	-	-	-	-	1	-	-	**11**
	1010	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	**3**
	1000	-	-	-	-	1	-	10	-	13	-	1	-	-	-	-	-	-	**25**
	975	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	**5**
	950	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	**5**
990	1020	-	-	-	-	1	-	2	-	1	-	-	-	-	-	-	-	-	**4**
	1010	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	**2**
	1000	-	-	-	-	-	-	5	-	22	-	-	-	-	-	-	-	2	**29**
980	1020	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	**2**
	1010	-	-	1	-	1	-	5	-	9	-	-	-	-	-	-	-	-	**16**
	1000	1	1	3	-	1	-	8	-	83	2	-	2	1	-	1	-	4	**107**
975	1025	-	-	-	-		-	2	-	1	-	-	-	-	-	-	-	-	**3**
	1000	-	-	-	-	10	-	2	-	6	-	-	-	2	-	-	-	1	**21**
	975	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	**2**
970	1020	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	**1**
	1010	-	-	1	1	3	-	2	-	8	-	-	-	-	-	-	-	1	**16**
	1000	-	1	-	-	6	-	6	3	82	-	-	3	-	-	-	-	11	**112**
960	1010	-	-	1	1	1	1	-	-	3	-	-	1	-	-	-	-	3	**11**
	1000	-	-	-	-	2	-	8	-	30	-	-	-	-	-	1	-	3	**44**
950	1010	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	**2**
	1000	-	-	-	-	2	-	2	-	5	-	-	-	-	-	-	-	-	**9**
940	1010	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	**1**
	1000	-	-	-	-	4	-	-	-	16	1	-	-	-	-	-	-	1	**22**
	990	-	-	-	-	1	-	-	-	7	-	-	-	-	1	-	-	-	**9**
930	1000	-	-	-	-	2	-	1	-	3	-	1	-	-	-	-	1	2	**10**
	990	-	-	-	-	3	-	1	-	3	-	-	-	-	-	-	-	-	**7**
920	990	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	**3**
TOTAL		**1**	**2**	**6**	**2**	**40**	**1**	**82**	**3**	**301**	**3**	**2**	**6**	**3**	**1**	**3**	**1**	**28**	**485**

Site 41WH105 appears to be a residential/agricultural occupation from the late nineteenth to early twentieth century; as with historic Sites 41WH103 and 41WH104, this period of occupation roughly corresponds to the initial occupation of the community of Danevang ("Danish Field"), between ca. 1894 and 1927 (Danish Heritage Museum 2012). Except for two (2) brick fragments, all the artifact recoveries were from the ground surface. Again, this suggests that there is very limited site integrity remaining at this location. The site appears to represent the remnants of a residential location that has been significantly impacted by ongoing agricultural practices. The site does not appear to possess those qualities of significance as defined by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). No further assessment of Site 41WH105 is recommended.

5.3.8 SITE 41WH106, MP 46.82

Site Type: Isolated Prehistoric Lithic
Temporal Period: Late Archaic Period
NRHP Status: Recommended Not Eligible

Site 41WH106 is located in a plowed and disked corn field 902 ft (275 m) south of Texas Farm to Market Road 441 (Figures 5.19 and 5.39). The isolated lithic was identified only 1,320 ft (400 m) southwest of Site 41WH105, in the same agricultural field. The center of the site is positioned at MP 46.82 along the proposed pipeline centerline, to the west of the historic community of Danevang (Survey Segment-093) (Appendix B – Mapsheet 18). The site is positioned at an elevation of 65 ft (19.8 m) amsl on the Lake Charles clay (0 to 1 percent slope). The site displays moderate to extensive ground surface disturbance resulting from ongoing agricultural practices.

Site 41WH106 was identified on the ground surface and displays a circular planview; the site covers approximately 33 ft (10 m) east-west by 33 ft (10 m) north-south. Delineation of the site is considered complete. Nine (9) shovel tests were excavated at 33 ft (10 m) intervals; in addition, 16.4 ft (5 m) radius surface collections were conducted around each shovel test. No shovel tests were positive for subsurface cultural materials and no additional surface collections were noted. A typical shovel test excavated at this site was comprised of one stratum in profile. Stratum I extended to a depth of 20 inbs (50 cmbs) and it was characterized by a grayish brown (10YR 5/2) silty clay loam. The systematic surface collection recovered only the proximal portion of a large projectile point at the site datum.

The brown chert, proximal projectile point fragment is likely from Late Archaic period, based on the blade element outline; no evidence of basal fluting (associated with earlier Paleo-Indian types) was observed (Figure 5.40). The lack of the basal hafting element precludes a definitive assignment as to type; however, it does appear to be similar in size and morphology to the Godley forms illustrated in Ricklis (2004:168; Figure 5.13d) and associated with the Late Archaic on the central and lower Texas Gulf Coast. The isolated lithic find spot does not

appear to possess those qualities of significance as defined by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). No further assessment of Site 41WH106 is recommended.

Figure 5.39 Site 41WH106 Planview

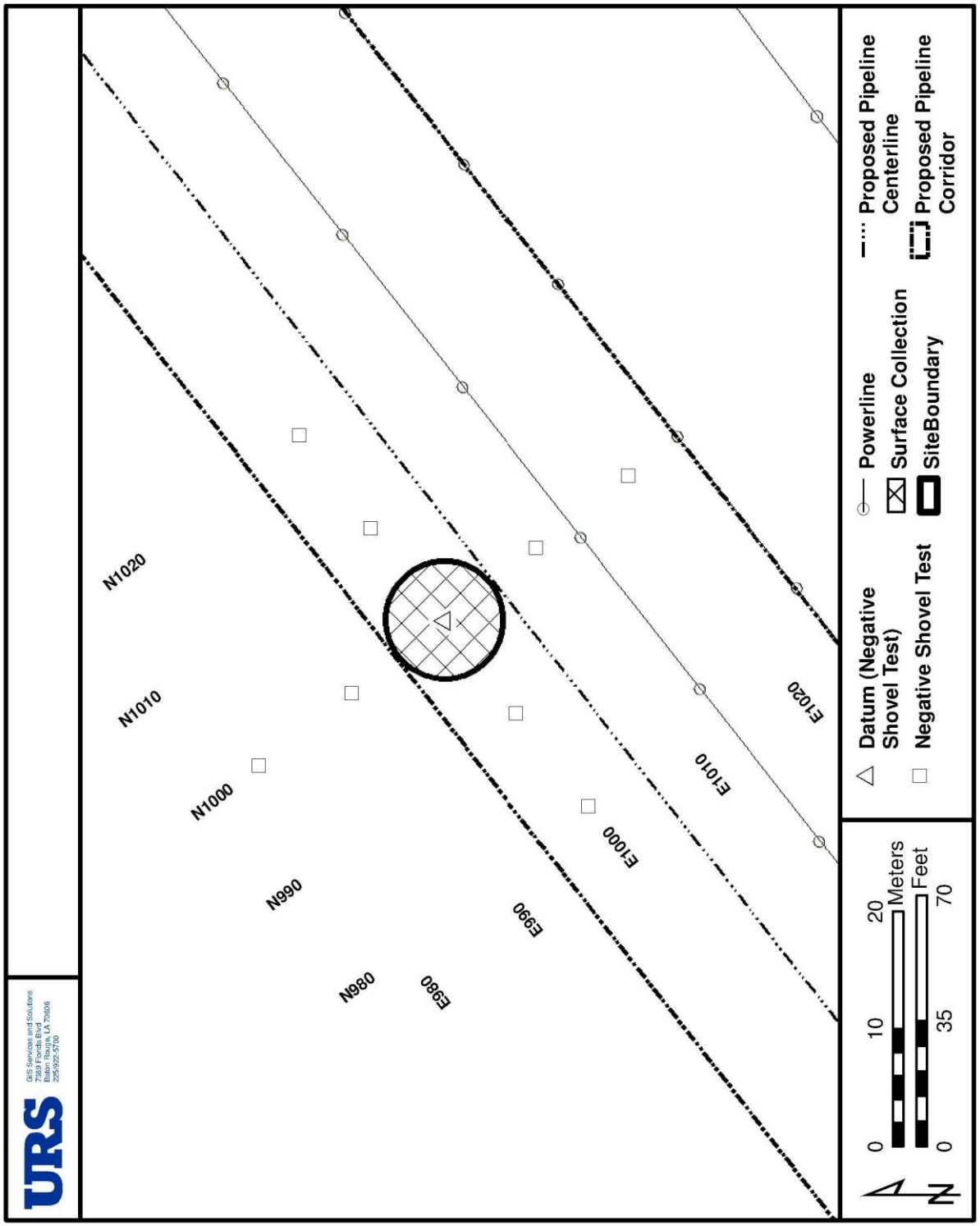
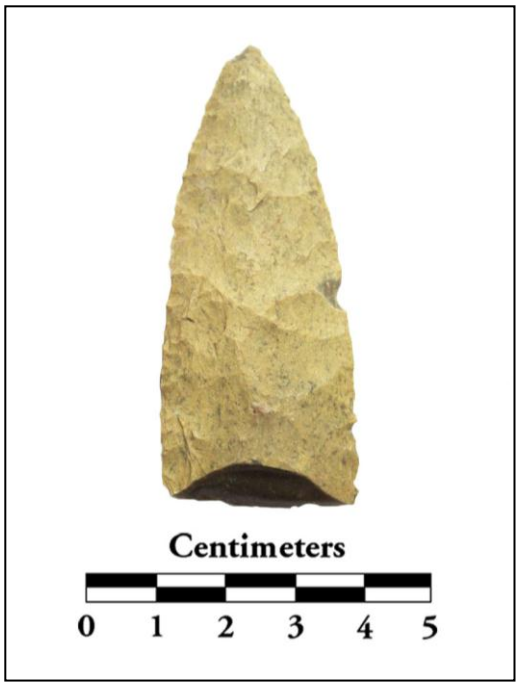


Figure 5.40 Site 41WH106 – Prehistoric Lithic
The proximal portion of a brown chert Archaic projectile point recovered from the surface at the datum of Site 41WH106.



5.3.9 HSS-WH-5, MP 51.4

Site Type: Historic Standing Structure (Residential)
Style: National
Temporal Period: ca. 1930s to 1940s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-WH-5 is located approximately 2,352 ft (717 m) east of Highway 3068 and approximately 3,306 ft (1008 m) south of FM 441 Road, near the community of Wharton, Wharton County (Figures 5.19 and 5.41). The building is located approximately 364 ft (111 m) south of the proposed survey corridor on Highway 3068, near MP 51.4 (Survey Segment-101) (Appendix B – Mapsheet 20).

The single family home appears to have been constructed between the ca. 1930s and 1940s in the massed plan National style (Figure 5.42). Characteristic features of the National style are present in the form of a gabled massed plan and simple details. The one story building is wood framed and sits on concrete block piers raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The side gabled roof is clad in asphalt shingles, while the exterior is clad in asbestos siding. The windows are boarded and their type cannot be determined. The primary façade faces south and contains three windows and a screened entryway. The east façade is two bays wide,

which includes two windows. The north and west façades are both four bays, which includes four windows on each façade. There are two outbuildings on the property; both buildings are front gabled with metal roofs and clad in metal siding (Figure 5.43).

Figure 5.41 HSS-WH-5 Planview

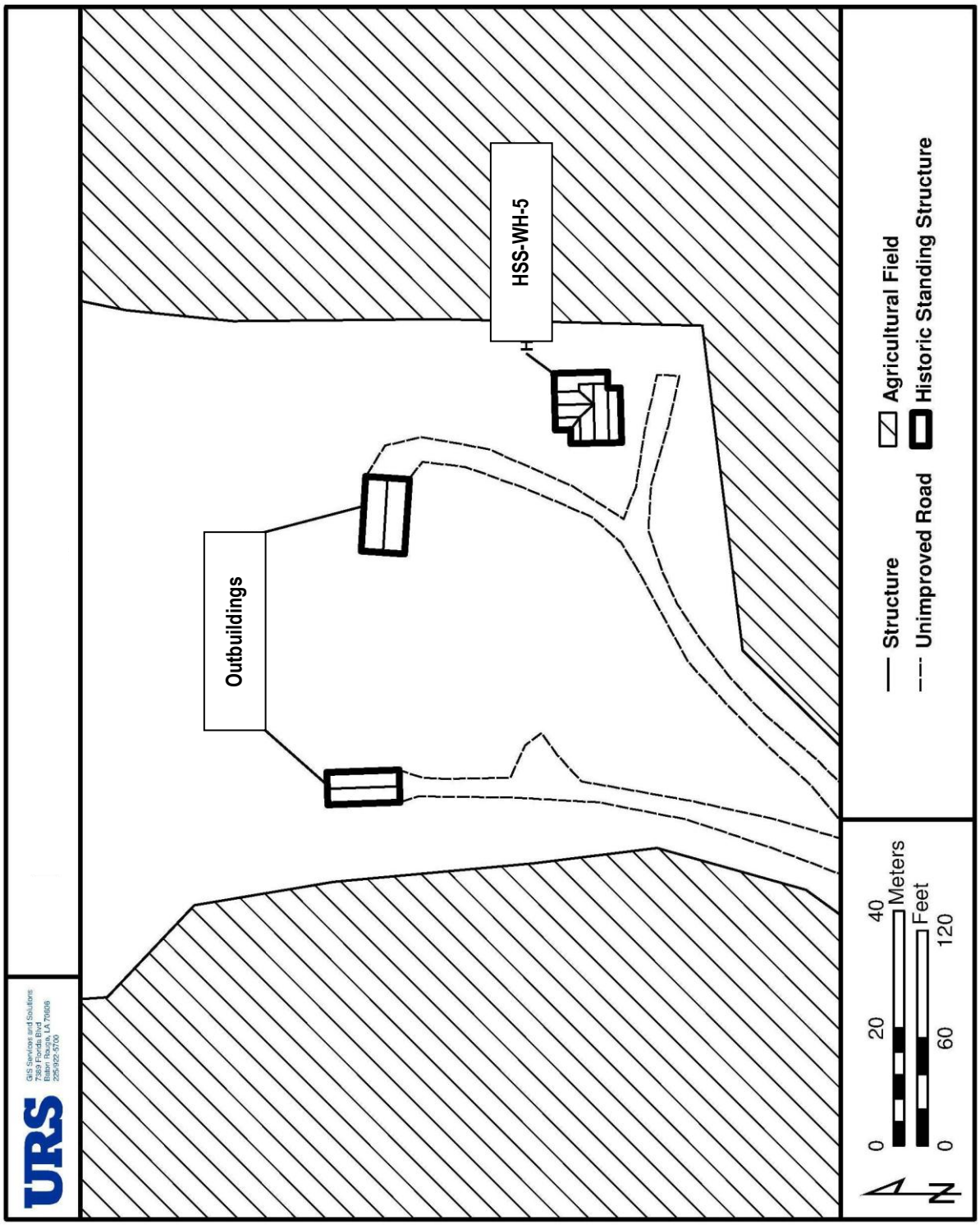


Figure 5.42 Historic standing structure HSS-WH-5 looking north

Figure 5.43 Historic standing structure HSS-WH-5 (outbuilding) looking northeast

Historic standing structure HSS-WH-5 retains the integrity of location, setting, feeling or association, and materials, but does not retain integrity of design or workmanship. The structure does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. Historic standing structure HSS-WH-5 also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-WH-5 (and the associated outbuildings) does not appear eligible for listing in the National Register of Historic Places. No additional architectural assessment of this structure is considered warranted.

5.4 IDENTIFIED CULTURAL RESOURCES – JACKSON COUNTY

5.4.1 SITE 41JK192, MP 70.2

Site Type: Isolated Prehistoric Lithic
Temporal Period: Late Archaic Period
NRHP Status: Recommended Not Eligible

Site 41JK192 is located in a plowed and disked corn and cotton field 328 ft (100 m) south of Texas Farm to Market Road 3131 and 1394 ft (425 m) east of Jackson County Road 426 (Figures 5.44 and 5.45). The center of the site is positioned at MP 70.2 (Survey Segment-141) along the proposed pipeline centerline, approximately 3.7 mi (5.9 km) northeast of the community of Lolita, Jackson County (Appendix B – Mapsheet 26). The site is situated at an elevation of 45 ft (13.7 m) amsl on the Laewest clay (0 to 1 percent slope). Moderate to extensive ground surface disturbance is displayed at the site, resulting from ongoing agricultural practices.

Site 41JK192 displays a circular planview that covers approximately 33 ft (10 m) east-west by 33 ft (10 m) north-south. Nine (9) shovel tests were excavated at 33 ft (10 m) intervals and delineation of the site is considered complete. Surface collections were conducted around each shovel test, which encompassed a 16.4 ft (5 m) radius. No shovel tests were positive for subsurface cultural materials and no additional surface collections were noted. A typical shovel test excavated at this site was comprised of one stratum in profile. Stratum I extended to a depth of 20 inbs (50 cmbs) and it was characterized by a grayish brown (10YR 5/2) silty clay loam.

The systematic surface collection recovered only the proximal portion of a large projectile point at the site datum. Based on the blade element outline, the brown chert, proximal projectile point fragment is likely from Late Archaic period. No evidence of basal fluting (associated with the earlier Paleo-Indian types) was observed (Figure 5.46). Although the lack of the basal hafting element hampers a definitive identification, the lithic also appears to be similar in size and morphology to the Godley forms illustrated in Ricklis (2004a:168; Figure 5.13d). These point forms are associated with the Late Archaic on the central and lower Texas Gulf

Coast. The isolated lithic find spot does not appear to possess those qualities of significance as defined by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]); no further assessment of Site 41JK192 is warranted.

Figure 5.44 Project Overview Map – Jackson County

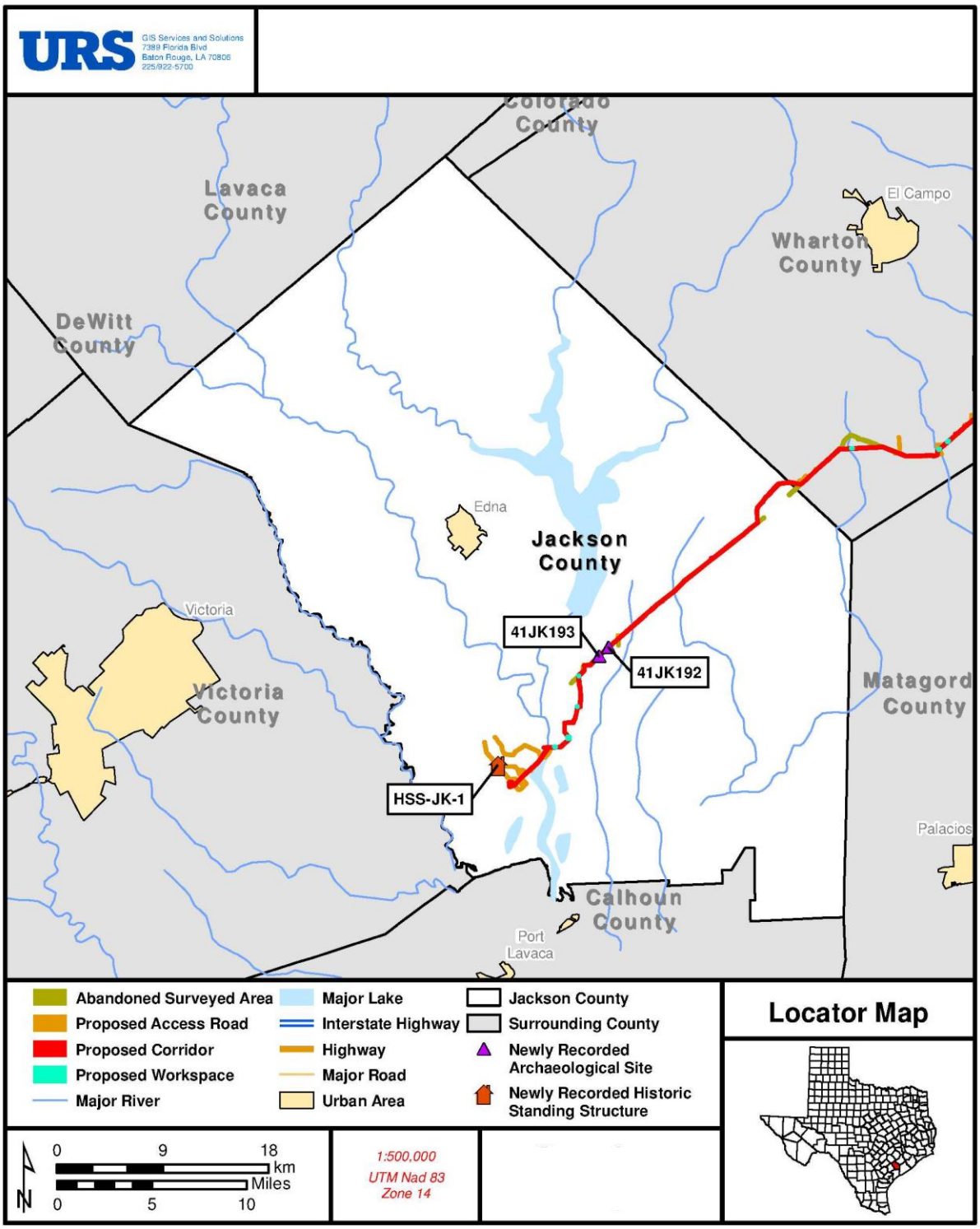


Figure 5.45 Site 41JK192 Planview

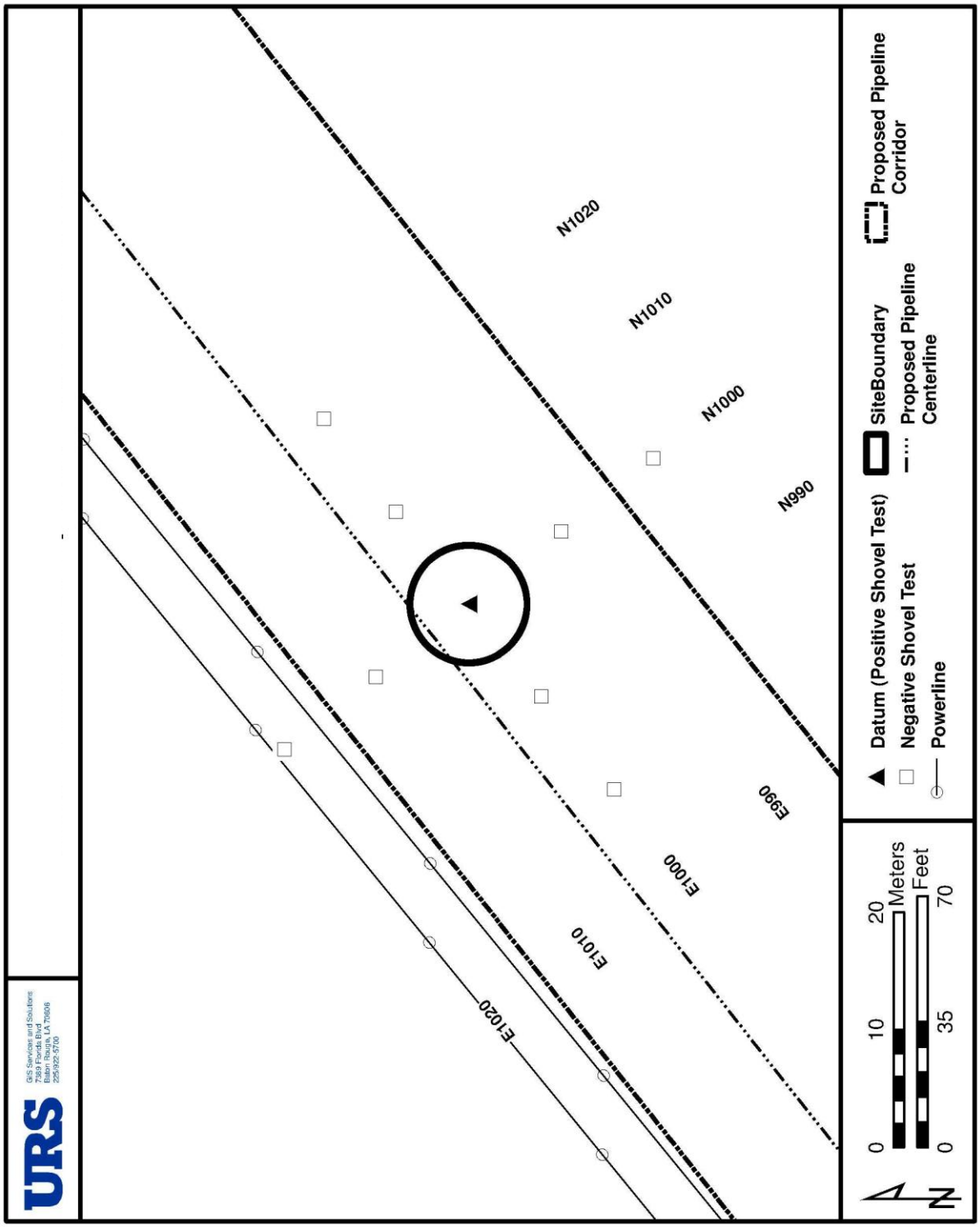
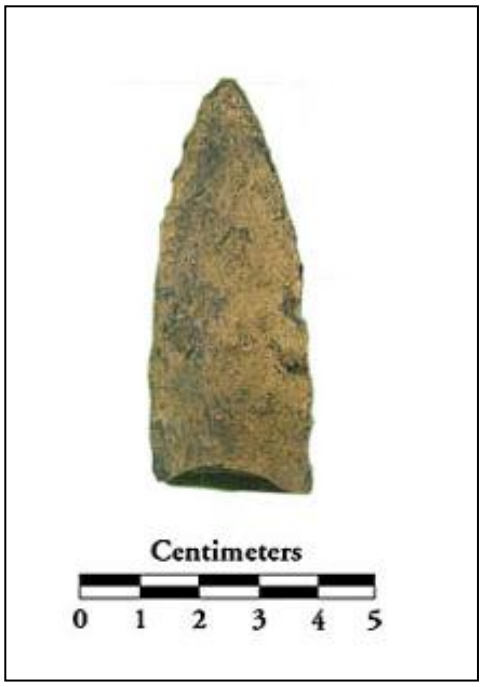


Figure 5.46 Site 41JK192 – Prehistoric Lithic
The proximal portion of a brown chert Archaic projectile point recovered from the surface at the datum of Site 41JK192.



5.4.2 SITE 41JK193, MP 70.9

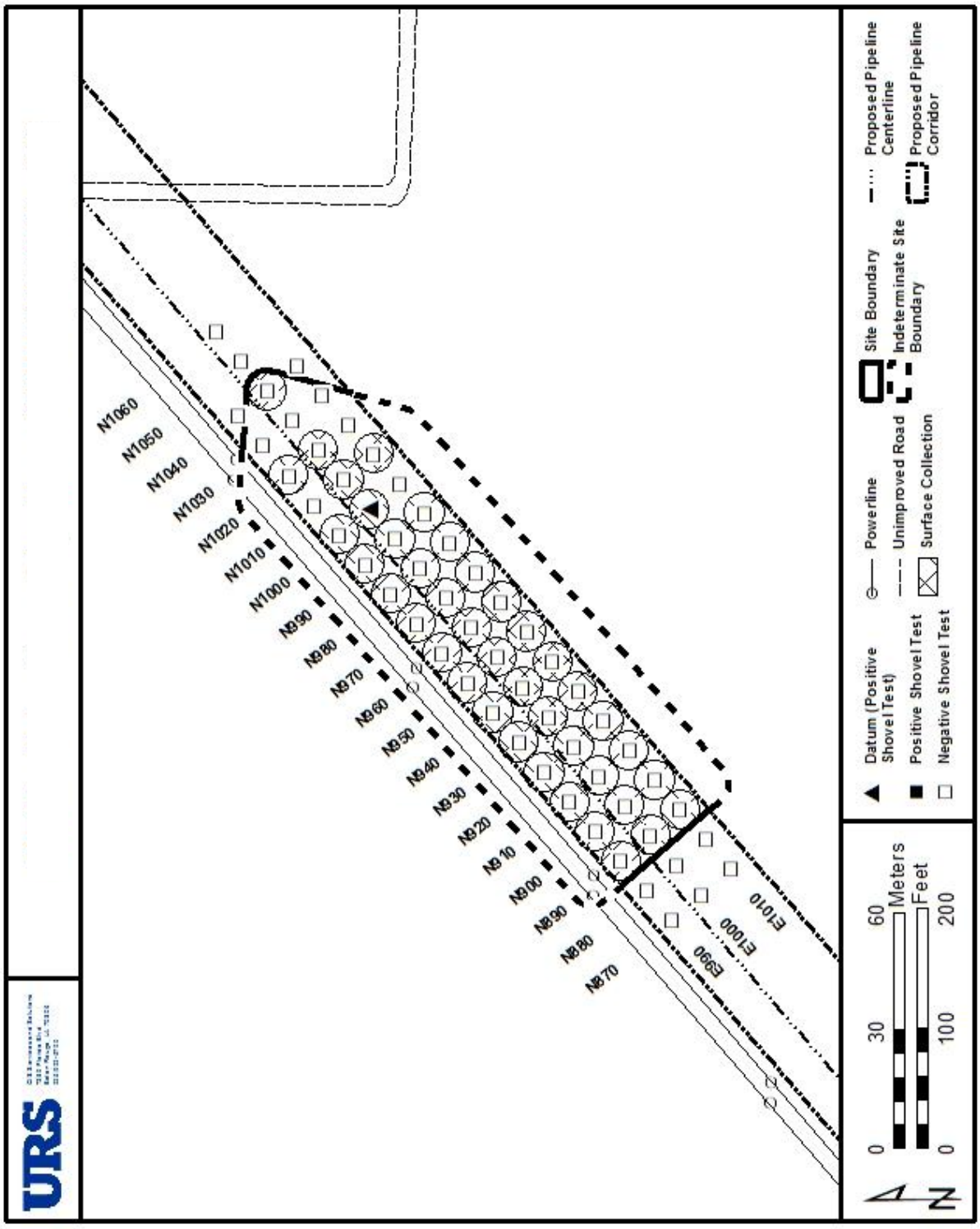
Site Type: Historic Artifact Scatter
Temporal Period: Late Nineteenth to Early Twentieth Centuries
NRHP Status: Recommended Not Eligible

Site 41JK193 is located in a plowed and disked corn field 2,214 ft (675 m) north of Jackson County Road 430 and 2,706 ft (825 m) west of Jackson County Road 426 (Figures 5.44 and 5.47). The center of the site is positioned at MP 70.9 along the proposed pipeline centerline, about 3.14 mi (5.05 km) from the community of Lolita, Jackson County (Survey Segment-142) (Appendix B – Mapsheet 26). The site is situated at an elevation of 45 ft (13.7 m) amsl on the Laewest clay (0 to 1 percent slope). The site displays moderate to extensive ground surface disturbance resulting from recent and ongoing agricultural practices.

Site 41JK193 displays a lineal planview and delineation of the site was not completed per the request of the landowner. The site appears to cover approximately 131 ft (40 m) east-west by 492 ft (150 m) north-south. Fifty-six (56) shovel tests were excavated at 33 ft (10 m) intervals within the proposed survey corridor; however, no shovel tests were positive for subsurface cultural materials. A 16.4 ft (5 m) surface collection radius was implemented around each of the excavated shovel tests; cultural materials were recovered at 39 locations. A typical shovel test excavated at this site was comprised of a single stratum in profile. Stratum I

extended to a depth of 20 inbs (50 cmbs) and it was characterized by a grayish brown (10YR 5/2) silty clay loam.

Figure 5.47 Site 41JK193 Planview



Three hundred and nineteen (319) artifacts were recovered from the ground surface of Site 41JK193; the majority of the items were identified between N910 and N970, along the shovel test grid (Table 5.13). The collection was sorted by material type as construction material (n=126), glass (n=96), ceramics (n=81), metal (n=15), and a single piece of unmodified mammal bone (Table 5.13). By function, they were classified as architectural (n=140), kitchen (n=82), indeterminate domestic (n=74), indeterminate hardware (n=9), personal (n=6), activities (n=3), and miscellaneous (n=5).

The glass assemblage was sorted by manufacture type as blown in mold (n=28), machine made (n=40), and made by an indeterminate manufacturing method (n=28). The blown in mold shards were further sorted as made in a cup bottom mold (n=1), or blown into an indeterminate mold type (n=27). Three (3) of the latter included a tooled double ring finish and two (2) tooled patent finishes. The blown in mold shards were sorted by form as bottles (n=23) or from indeterminate forms (n=5). Vessel colors for this manufacturing process included solarized manganese, colorless, light aqua, aqua, light blue, sapphire blue, and single counts of cobalt blue and white glass. The machine made fragments were categorized as basic machine made (n=36), made with a valve mark (n=2), and one shard each made in post mold and having an Owens suction scar. By form, they were categorized as window (n=13), bottles (n=9), jars (n=5), single counts from chimney glass, drinking glass, lids, and lid liners, and indeterminate forms (n=9). The colors that these forms were present in consisted of light aqua, milk glass, colorless, solarized selenium, light green, solarized manganese, amber, bright green, light blue, and sapphire blue. Finally, the shards made by indeterminate methods were from solarized manganese, light aqua, amber, colorless, light blue, aqua, light green, and sapphire blue vessels. These vessels were bottles (n=11) and indeterminate forms (n=17).

The ceramic assemblage was sorted by type as earthenware (n=53), stoneware (n=15), and porcelain vessels (n=13). Almost all of the earthenware sherds were ironstone varieties (n=51) with the exception of a clay marble and a single piece of plain whiteware (n=1). The ironstone fragments were plain (n=39), blue-tinted (n=5), plain with a stamped maker's mark (n=3), molded (n=2), decalomania decorated (n=1), and transfer printed (n=1). The stoneware sherds were from buff-bodied vessels with Bristol glaze (n=12), a combination of Bristol glaze and Albany slip (n=2), or a combination salt-glaze and Albany slip (n=1). Finally the porcelain consisted of two (2) porcelain bisque figurine fragments, and hard-paste porcelain sherds that were plain, decorated with decalomania (n=3), or molded (n=3). Figure 5.48 illustrates several diagnostic ironstone sherds, while Figure 5.49 depicts the legs from a small doll figurine and the clay marble.

The construction items were all hard mud brick fragments (n=126), including a stamped brick with the letters "…XIA". Fifty (50) of these were determined to be from a brick façade due to the thickness of the pieces. A variety of forms was present in the metal assemblage: a bracket (n=1), a lid (n=1), a machinery brace (n=1), a plug (n=1), a railroad spike (n=1), a rod (n=1), a wheel (n=1), and an indeterminate forms (n=8).

Table 5.13 Historic Artifacts - Site 41JK193

North	East	Bone	Ceramic	Construction	Glass	Metal	TOTAL
1040	1000	-	-	2	1	-	3
1020	1000	-	-	-	2	-	2
	990	-	-	-	1	-	1
1010	1010	-	-	1	-	-	1
	1000	-	-	1	1	1	3
1000	1000	-	1	3	-	-	4
	990	-	-	-	1	1	2
990	1010	-	-	1	-	-	1
	1000	-	-	2	-	-	2
	990	-	-	-	1	1	2
980	1010	-	1	2	2	1	6
	1000	-	4	-	2	-	6
	990	-	1	-	1	-	2
970	1010	-	2	2	-	-	4
	1000	-	2	2	2	-	6
	990	-	-	5	6	-	11
960	1010	-	5	2	1	-	8
	1000	-	5	7	5	-	17
	990	-	-	5	2	1	8
950	1010	-	3	2	4	-	9
	1000	-	10	10	5	-	25
	990	-	-	4	-	1	5
940	1010	1	11	2	4	-	18
	1000	-	5	13	8	1	27
	990	-	4	9	5	2	20
930	1010	-	1	2	1	-	4
	1000	-	6	4	3	-	13
	990	-	3	7	11	-	21
920	1010	-	5	1	3	-	9
	1000	-	1	9	3	-	13
	990	-	4	8	7	2	21
910	1010	-	1	6	4	1	12
	1000	-	2	1	-	1	4
	990	-	-	4	5	-	9
900	1010	-	-	2	-	-	2
	1000	-	3	1	2	2	8
	990	-	-	3	2	-	5
890	1010	-	1	1	-	-	2
	1000	-	-	2	1	-	3
TOTAL		**1**	**81**	**126**	**96**	**15**	**319**

Approximately 81.5% (n=260) of the assemblage possessed temporally diagnostic attributes (Table 5.14). One hundred and fifty-eight (158) of these had open-ended date ranges, of which a large number were hard mud brick fragments (vertical grey hachure; Table 5.14). The remaining 102 artifacts had initial production dates ranging from circa 1810 to circa

1915 and terminal end dates ranging from 1900 to 1982. The majority of the artifacts had overlapping date ranges from the late nineteenth to early twentieth century.

Figure 5.48 Site 41JK193 – Historic Ceramics #1
Ironstone sherds with unidentifiable partial maker's marks collected from the surface of Site 41JK193.

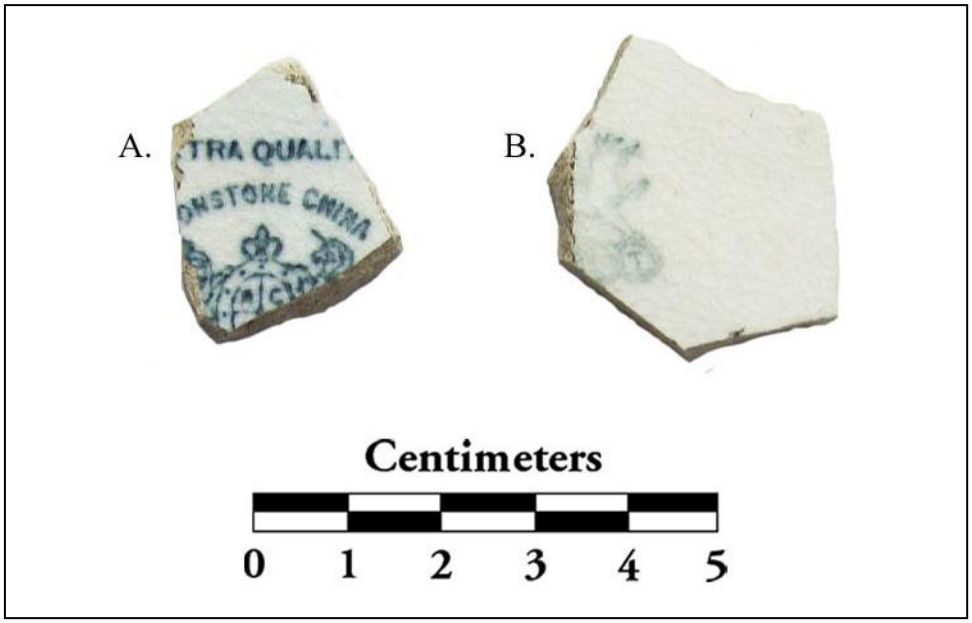


Figure 5.49 Site 41JK193 – Historic Ceramics #2
Personal items recovered from the surface of Site 41JK193 included the legs from a small figurine and a hand-made clay marble.

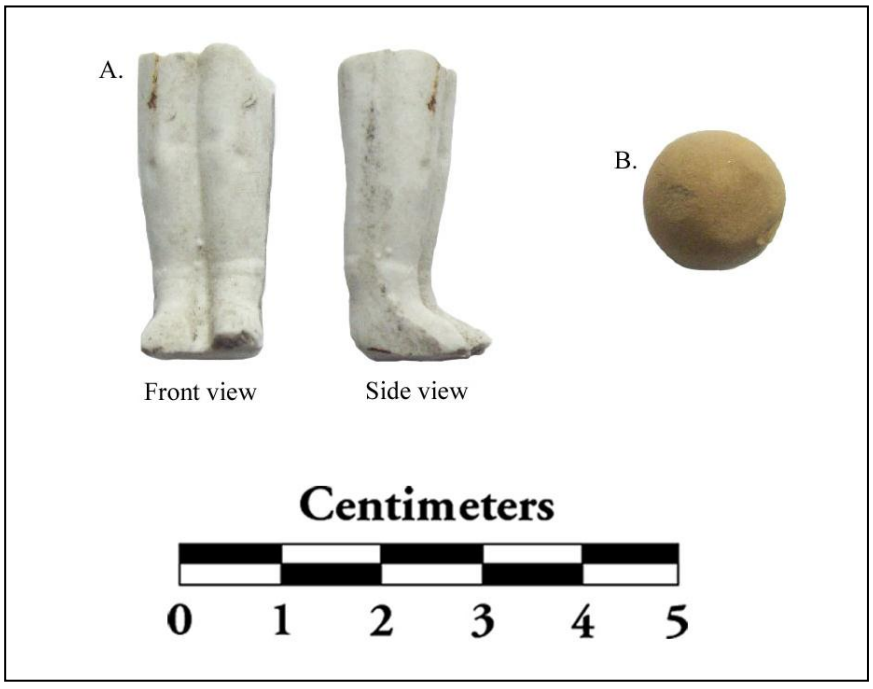


Table 5.14 Temporally Diagnostic Artifact Recoveries - Site 41JK193

North	East	ca. 1810 - ca. 1920	ca. 1820 - Present	ca. 1842 - 1930	1850 - 1895	ca. 1850 - ca. 1910	ca. 1875 - 1920	ca. 1890 - 1900	1890 - 1920	1890 - Present	1893 - 1920	1893 - Present	ca. 1898 - 1950	1905 - 1920	1905 - 1982	ca. 1915 - 1950s	1920 - Present	ca. 1940 - Present	TOTAL
1040	1000	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	**3**
1020	1000	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	**2**
	990	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
1010	1010	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	**1**
	1000	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	**1**
1000	1000	-	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	**4**
	990	-	-	-	-	-	1	-	-		-	-	-	-	-	-	-	-	**1**
990	1010	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	**1**
	1000	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	**2**
980	1010	1	-	1	-	-	-	-	-	2	-	1	-	-	-	-	-	-	**5**
	1000	1	-	1	-	-	-	-	1	-	-	-	-	-	1	-	1	-	**5**
	990	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-		-	**1**
970	1010	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	**3**
	1000	1	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	**5**
	990	2	-	-	-	-	-	-	-	5	-	2	-	-	-	1	-	-	**10**
960	1010	-	-	1	-	-	1	-	-	2	-	-	-	-	-	-	3	-	**7**
	1000	-	-	2	2	-	4	-	-	7	-	-	-	-	-	-	-	-	**15**
	990	1	-	-	-	-	-	-	-	5	-	1	-	-	-	-	-	-	**7**
950	1010	-	-	3	-	-	-	-	-	2	-	-	-	-	-	-	-	-	**5**
	1000	1	-	6	2	-	1	-	-	10	-	1	-	-	-	-	1	-	**22**
	990	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	**4**
940	1010	1		7	-	-	1	-	-	2	-	-	-	-	-	-	1	-	**12**
	1000	1	-	1	-	-	3	-	-	13	-	2	-	-	-	-	2	-	**22**
	990	1	-	2	-	-	2	-	1	9	-	1	-	-	-	-	-	-	**16**
930	1010	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	**3**
	1000	-	1	3	-	-	1	-	-	4	-	1	-	-	-	-	1	-	**11**
	990	2	-	1	-	-	2	-	1	7	-	-	-	-	-	1	1	-	**15**
920	1010	-	-	3	1	-	2	-	-	1	-	-	-	-	-	-	1	-	**8**
	1000	1	-	1	-	-	-	-	-	9	-	-	-	-	-	1	-	-	**12**
	990	-	-	4	-	-	2	-	-	8	-	1	-	1	-	1	-	1	**18**
910	1010	1	-	-	-	-	-	-	-	6	-	2	1	-	-	-	-	-	**10**
	1000	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	**3**
	990	-	-	-	-	-	-	-	-	4	-	1	-	-	-	-	-	-	**7**
900	1010	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	**2**
	1000	-	-	2	-	-	-	1	-	1	1	1	-	-	-	-	-	-	**6**
	990	-	-	-	-	-	1	-	-	3	-	1	-	-	-	-	-	-	**5**
890	1010	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	**2**
	1000	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	**3**
TOTAL		**15**	**1**	**45**	**5**	**1**	**24**	**1**	**3**	**126**	**1**	**18**	**1**	**1**	**1**	**4**	**12**	**1**	**260**

Site 41JK193 appears to be a residential/agricultural occupation from the late nineteenth to early twentieth century. All the artifact recoveries were recovered from the ground surface; therefore, this strongly suggests that there is very limited site integrity remaining at this location. The site appears to represent the remnants of a residential location that has been significantly impacted by ongoing agricultural practices. The site does not appear to possess those qualities of significance as defined by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). No further assessment of Site 41JK193 is recommended.

5.4.3 HSS-JK-1 (Abandoned Corridor)

Site Type: Historic Standing Structure (Residential)
Style: National
Temporal Period: ca. 1940s to 1950s
NRHP Status: Recommended Not Eligible

Historic standing structure HSS-JK-1 is located approximately 74.5 ft (22.7 m) southwest of Mobile Oil Road and approximately 244 ft (74 m) northeast of Venado Creek, near the community of Vanderbilt, Jackson County (Figure 5.44 and 5.50). The building is located approximately 6,600 ft (2,012 m) northwest of the proposed survey corridor on Mobile Oil Road (Survey Segment-164) (Appendix B – Mapsheet 30).

The main building appears to have been constructed between the ca. 1940s and 1950s in the National style. Characteristic features of the National style are present in the form of a gabled massed plan and simple details. The one story building is wood framed and sits on concrete blocks raised approximately 1.5 ft (0.5 m) at its highest elevation from the ground. This appears to be the building's historic height of elevation. The front gabled roof is clad in asphalt shingles, while the exterior is clad in asbestos siding. The windows are double-hung with wooden sashes. The primary façade faces northwest and contains two double hung windows and an entryway door with a shed over hang. The northeast façade is four bays wide, which includes two paired six over six double hung windows, a single six over six double hung window and a covered entryway door. The southeast façade contains two small double hung windows and an entryway door covered by a shed overhang. The southwest façade contains two paired double hung windows and two smaller double hung windows.

There is an outbuilding on the property. The one story building is wood framed and sits on a concrete slab. The front gabled roof is clad in metal, while the exterior is clad is wooden siding. A shed addition extends out from the northeast façade, which contains an open garage and a storage shed. The northeast, southeast and southwest facades could not be surveyed due to the inaccessibility of the parcel.

Figure 5.50 HSS-JK-1 Planview

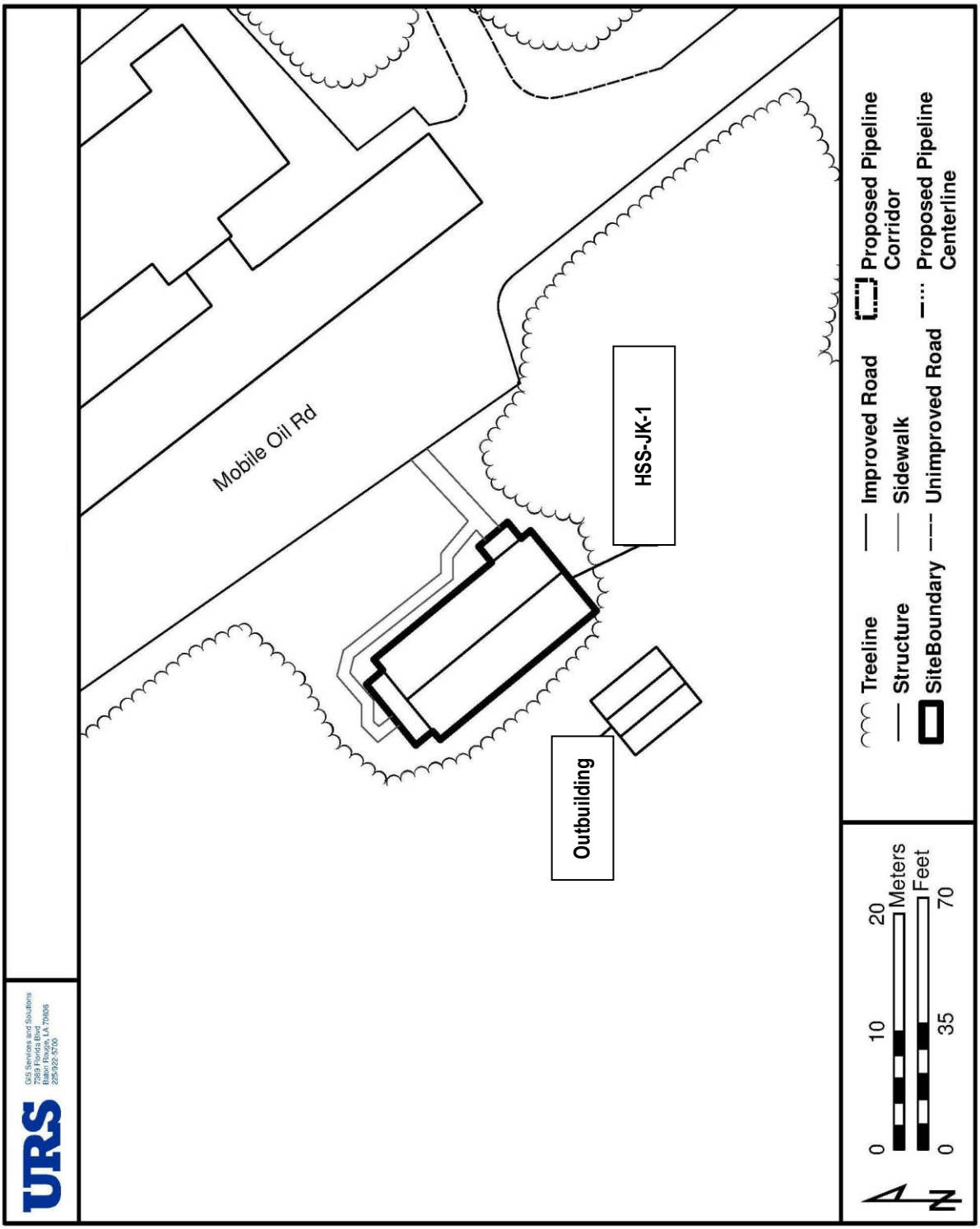


Figure 5.51 Historic standing structure HSS-JK-1 looking north

Figure 5.52 Historic standing structure HSS-JK-1 looking northeast

Historic standing structure HSS-JK-1 retains the integrity of location, setting, feeling or association, and materials. It does not retain integrity of design or workmanship. Historic standing structure HSS-JK-1 does not retain sufficient integrity to relate its historic significance and it does not embody distinctive characteristics of a type, period, method of construction, or the work of a master. Historic standing structure HSS-JK-1 also does not possess high artistic values. This structure does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). Historic standing structure HSS-JK-1 does not appear eligible for listing in the National Register of Historic Places. No additional architectural assessment of these structures is considered necessary.

5.5 RECOMMENDATIONS

The Phase I cultural resource survey and inventory study for the approximately 80-mile-long (130 km) pipeline proposed for the NRG W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project was conducted within portions of Fort Bend, Wharton, and Jackson Counties, Texas. Fieldwork for this project consisted primarily of systematic pedestrian survey and shovel testing. As a result of these investigations, 101.0 miles (162.5 km) of preferred and/or abandoned pipeline corridor, 75 access roads, and 47 additional temporary workspaces were evaluated. In total, 1314.6 ac (532.0 ha) of land was systematically examined for cultural resources and 1,625 shovel tests were excavated. Six archaeological sites and 12 historic standing structures were identified, and 1,935 artifacts were analyzed as part of this investigation (see Table 5.15, below).

Using the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]), these six archaeological sites and 12 historic standing structures were evaluated to determine whether they possess integrity of location, design, setting, materials, workmanship, feeling and association and the following qualities of significance:

(a) are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) are associated with the lives of significant persons in our past; or

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

(d) have yielded or may be likely to yield, information important in history or prehistory.

Table 5.15 Historic Standing Structure and Site Summary

Cultural Resource	Resource Type	Description	Period(s)	Recommended NRHP Eligibility
HSS-FB-1	Historic Structure	National Style	1930s-1940s	Not eligible
HSS-FB-2	Historic Structure	Transverse Crib Barn	1930s-1940s	Not eligible
HSS-FB-3	Historic Structure	National Style	1940s-1950s	Not eligible
HSS-FB-4	Historic Structure	National Style	1940s-1950s	Not eligible
HSS-FB-5	Historic Structure	National Style	1930s-1940s	Not eligible
HSS-FB-6	Historic Structure	Railroad Bridge	1930s	Not eligible
HSS-WH-1	Historic Structure	National Style	1920s-1930s	Not eligible
HSS-WH-2	Historic Structure	Undefined	1930s	Not eligible
HSS-WH-3	Historic Structure	I-House	1890s-1900s	Not eligible
HSS-WH-4	Historic Structure	Undefined	1940s-1950s	Not eligible
HSS-WH-5	Historic Structure	National Style	1930s-1940s	Not eligible
HSS-JK-1	Historic Structure	National Style	1940s-1950s	Not eligible
41WH103	Archaeological Site	Historic	Late 19th-Early 20th Century	Not eligible
41WH104	Archaeological Site	Historic	Late 19th-Early 20th Century	Not eligible
41WH105	Archaeological Site	Historic	Late 19th-Early 20th Century	Not eligible
41WH106	Archaeological Site	Prehistoric	4,000 to 2,200 Before Present	Not eligible
41JK192	Archaeological Site	Prehistoric	4,000 to 2,200 Before Present	Not eligible
41JK193	Archaeological Site	Historic	Late 19th-Early 20th Century	Not eligible

The six (6) archaeological sites identified within the pipeline corridor during the Phase I inventory study conducted by URS were located in Wharton (n=4) and Jackson (n=2) Counties. The artifacts recovered during this investigation were from both the prehistoric and historic periods. The prehistoric period sites (i.e., 41WH106 and 41JK192) consisted of isolated prehistoric lithic projectile point proximal tip fragments, tentatively associated with the Late Archaic Period (ca. 4,000 to 2,200 years ago). The historic period sites (i.e., 41WH103 to 41WH105 and 41JK193) all appear to date mainly from the late nineteenth to early-twentieth centuries and are comprised of glass, historic ceramic, brick, and metal items. All of the historic period sites appear to represent the remains of historic agricultural farmsteads. All of the recovered cultural materials, except for two (2) pieces of brick, were located in recently tilled agricultural fields and no cultural materials were identified below the ground surface. Due to the lack of intact stratigraphy, none of these six (6) sites is considered to be eligible for listing in the National Register and no additional archaeological assessment of these sites is recommended.

Twelve (12) structures greater than 45 years of age were identified within the pipeline project area during the Phase I inventory study. Of these, six (6) were located in Fort Bend County, five (5) from Wharton County, and a single building from Jackson County. The structures were dominated by six (6) National style buildings, two (2) buildings of undetermined design (due to parcel inaccessibility and vegetation), and single examples of a barn, a Spanish-eclectic building, a railroad bridge, and an I-house. As summarized in Table 5.15, ten (10) of the structures were constructed between the ca. 1930s and 1950s, with single examples noted

from the ca. 1890s to 1900s and ca. 1920s to 1930s. All 12 structures lie outside of the proposed pipeline survey corridor and will not be affected by its construction. None of these structures were considered to be eligible for listing in the National Register of Historic Places and no additional architectural assessment of these structures is recommended.

Based on the results of the above investigation, URS recommends that no additional cultural resources investigations should be required with regard to the assessed portions of the NRG Energy W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project.

Additional survey permission is currently required to assess a single proposed access road and three (3) additional temporary workspaces for the project. Once landowner permission has been acquired, these four (4) items will be systematically assessed for cultural resources and the results of those investigations summarized in an Addendum Report that will be submitted to the Texas Historical Commission (THC) for their review. Similarly, once the deep testing evaluations have been completed at the proposed horizontal directional drill (HDD) locations at Big Creek, the San Bernard River, the Colorado River, Jones Creek, and the Lavaca River, this information will be summarized for the THC and submitted as a separate Addendum Report for their review.

The CO_2 capture facility associated with the W.A. Parish Plant located in Thompsons, Fort Bend County, Texas is comprised of the North Laydown Area; South Laydown Area; 80 MW, Natural Gas-Fired Cogeneration Plant; CO_2 Capture Area; Warehouse; Road Relocation; 138kV Switchyard; CO_2 Compressor; Rail Unloading Area; Pipe Rack; and Flue Tank and Dump. As noted in Section 4, all of the above listed project activities are situated within the boundaries of the existing plant on lands that have been extremely disturbed by previous construction and ongoing power generating operations, including leveling, road construction, and building construction. URS recommends that the potential for unrecorded properties to be situated within these project areas is considered very low. Therefore, no cultural resources investigations should be required with regard to the project areas associated with the proposed CO_2 capture facility at the W.A. Parish Plant.

Finally, the delivered CO_2 is intended to be injected by Texas Coastal Ventures LLC (TCV) within the West Ranch oil field, Jackson County, Texas. To the extent practicable, any proposed new wells would be installed on existing well pads, existing built roads would be used for access, and any new CO_2 distribution piping would be installed along the pre-existing piping corridors. If additional rights-of-way for new well pads, access roads, or CO_2 distribution piping are required, beyond what has already been disturbed, URS recommends that TCV initiate consultation with the THC to determine whether any further cultural resources investigations would be necessary.

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APPENDIX A

Scope of Work

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NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

U.S. DEPARTMENT OF ENERGY

February 10, 2012

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
1511 Colorado St.
Austin, Texas, 78701

Subject: Notification of Project and Proposed Phase I Cultural Resources Inventory Scope of Work for the W.A. Parish Post-Combustion Carbon Capture and Storage Project in Southeastern Texas (Fort Bend, Wharton, and Jackson Counties)

Dear Mr. Wolfe:

The U.S. Department of Energy (DOE) proposes to provide funding to NRG Energy, Inc. (NRG) and its subsidiary, Petra Nova, LLC, for a project that would capture carbon dioxide (CO_2) at NRG's W.A. Parish Generating Station (Parish Plant) in Fort Bend County, Texas. The CO_2 would be delivered in a new, approximately 80-mile long, pipeline to the West Ranch oil field located near the city of Vanderbilt in Jackson County, Texas, where it would be used for enhanced oil recovery (EOR) and ultimately sequestered. This proposed project, known as the W.A. Parish Post-Combustion Carbon Capture and Storage Project (Project), would demonstrate an integrated commercial-scale deployment of post-combustion CO_2 capture technology for use in EOR operations and long-term geologic storage.

DOE proposes to provide NRG with approximately $167 million of cost-shared funding, which includes *American Recovery and Reinvestment Act of 2009* funds, to implement the Project. DOE selected the Project for a financial assistance award through a competitive process under the Clean Coal Power Initiative (CCPI) Program. The estimated total project cost is $845 million.

DOE is preparing an environmental impact statement (EIS) to assess the potential environmental impacts associated with the proposed Project. As part of the *National Environmental Policy Act of 1969* (NEPA) process, DOE will consult with interested federal, state, regional, and local agencies; as well as Native American tribes, including consultations required under Section 106 of the *National Historic Preservation Act of 1966* (NHPA). Since the Project is also an undertaking under Section 106 of the NHPA, DOE plans to coordinate its Section 106 obligations with the NEPA process.

Project Details

NRG proposes to design, construct, and operate a commercial-scale CO_2 capture facility at its Parish Plant and deliver the CO_2 via an approximately 80-mile-long, 12.75-inch (outside diameter) pipeline to the West Ranch oil field in Jackson County, Texas. A map showing the expected Project footprint is provided in the enclosed scope of work.

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The Project would use an advanced amine-based absorption technology to capture 90 percent (approximately 1.6 million tons) of CO_2 annually from a 240-megawatt (MW) equivalent flue gas slip stream taken from the 617-MW Unit 8 at the Parish Plant. Up to 5,475 tons per day of captured CO_2 would be dried, compressed, and transported via a new pipeline to the West Ranch oil field where it would be used in EOR operations.

The primary components of the Project include the following:

1. *Carbon Capture Facility*
The proposed Project would retrofit one of the Parish Plant's existing coal-fueled units (Unit 8) with a post-combustion CO_2 capture system that would be constructed within the existing 4,880-acre Parish Plant. A new natural gas-fired combined-cycle power plant, estimated to be 80-MW in size, would be constructed to produce the auxiliary power needed to drive the proposed carbon capture system.

2. *CO_2 Transport*
Captured CO_2 would be transported via a new approximately 80-mile-long pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly sparsely-developed rural and agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. The majority (approximately 95 percent) of the planned pipeline route will utilize existing mowed/maintained utility rights-of-ways (ROWs) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical. Although the proposed pipeline will be located within existing ROWs for the majority of its length, NRG may need to review existing landowner agreements along the route to negotiate for widening of the ROW for construction of the pipeline in some areas.

3. *EOR and CO_2 Sequestration*
The proposed Project would deliver up to 1.6 million tons of CO_2 per year to the existing West Ranch oil field, located in Jackson County. The oil field has been in operation since 1938, and Texas Coastal Ventures, LLC, a joint venture between NRG and Hilcorp Energy Company, would conduct the EOR operations.

4. *CO_2 Monitoring, Verification, and Accounting Program*
NRG would implement a monitoring, verification, and accounting (MVA) program to monitor the injection and migration of CO_2 within the geologic formations at the EOR site. The MVA program must meet specific regulatory and CCPI Program requirements, and may consist of a variety of monitoring and modeling activities.

Project Schedule

NRG plans to start construction of the Project in November 2012 and begin the demonstration phase of commercial operations by 2015. The schedule is contingent on NRG receiving the necessary permits and regulatory approvals, as well as financial closing on all funding sources, including DOE's financial assistance. A cultural resources survey along the proposed pipeline route is scheduled to occur between February and March 2012, and the Project is an undertaking under Section 106 of the NHPA. DOE and NRG have contracted with URS Group, Inc. (URS) to provide environmental and cultural resources services to support development of the EIS and other regulatory compliance requirements for the Project.

The scope of work included here presents URS's proposed Phase I cultural resources survey inventory methodology that will be implemented for Project Component #2 listed above, the proposed pipeline to transport captured CO_2 from the W. A. Parish facility in Fort Bend County to the West Ranch oil field in Jackson County. The purpose of this investigation will be to identify any cultural resources, such as historic

and prehistoric archeological sites and/or loci, historic standing structures, and cemeteries that might be located within the boundaries of the proposed undertaking.

This investigation will follow the guidelines and procedures outlined in the following documents: (1) The Texas Historical Commission's *Preserving Our Heritage: a Statewide Plan for Texas*; (2) Council of Texas Archeologists standards for cultural resources survey; (3) the Texas Historical Commission's *Rules of Practice and Procedure for the Antiquities Code of Texas*; (4) NHPA (as amended); (5) Archaeological and Historic Preservation Act of 1974; (6) Archaeological Resources Protection Act of 1979, as amended (if required); (7) Title 36 of the Code of Federal Regulations (Parts 60-66 and 800); and (8) *Archeology and Historic Preservation: The Secretary of the Interior's Guidelines*.

Upon completion of the cultural resources survey along the proposed pipeline route, a Draft Phase I Cultural Resources Report will be submitted to the Texas Historical Commission (THC) for review and comment before finalization. In the near future, DOE will submit a separate letter to the THC requesting Section 106 consultation on Project Components #1 (the CO_2 capture facilities at W. A. Parish), #3, and #4 (the West Ranch Field EOR operations and MVA program). As the project progresses, DOE will also provide THC with a copy of the draft EIS for review and comment by your office. All correspondence with your office will be included in an appendix to the EIS.

Should you have any technical questions regarding the enclosed scope of work, please contact Mr. Rob Lackowicz (NHPA consultant–URS Corporation) at (225) 935-2974 or by email at rob.lackowicz@urs.com. You can reach me for comment by email at mark.lusk@netl.doe.gov, by telephone at (304) 285-4145, or at the address listed on the front page.

Sincerely,

Mark W. Lusk
NEPA Document Manager/NEPA Compliance Officer

Attachment

cc:
Jon Barfield - NRG
Anthony Armpriester - NRG
Ted McMahon - DOE
Rob Lackowicz - URS
Pete Conwell - URS

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URS

Proposed Scope of Work
Phase I Cultural Resources Inventory of NRG Energy's Proposed
W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project in
Fort Bend, Wharton, and Jackson Counties, Texas

Project Introduction

Using funding from the American Recovery and Reinvestment Act of 2009, the U.S. Department of Energy (DOE) has made funds available for large-scale carbon dioxide (CO_2) capture and sequestration projects through Round 3 of the Clean Coal Power Initiative (CCPI). Under Round 3 of the CCPI, the DOE National Energy Technology Laboratory (NETL) selected NRG Energy's W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project (the project) to move to the execution phase, which includes DOE funding for final design, construction, and engineering. The project includes an approximately 79.1-mile (127.3 kilometer) long, 12-inch diameter pipeline that will transport CO_2 captured at NRG's existing W.A. Parish power plant near Sugar Land in Fort Bend County, Texas to the West Ranch oil field in Jackson County, Texas (Figure 1) to be used for enhanced oil recovery, and ultimately sequestered. As proposed, this NRG pipeline will involve new right of way that is directly collocated with existing electrical transmission line corridors for the majority of its length (i.e., approximately 78 of 79 miles). Additionally, NRG's proposed pipeline will be collocated with a new pipeline, which is scheduled for construction in the summer of 2012, for the northern approximately 40 miles of NRG's proposed route.

The project is an undertaking under Section 106 of the National Historic Preservation Act. The project will also undergo National Environmental Policy Act review, which the DOE has determined will be conducted as an Environmental Impact Statement (EIS). The typical environmental and cultural survey corridor is 100 feet (30 meters) wide and lies solely within privately owned (non-federal or state) lands.

NRG has contracted with URS Group, Inc. to provide environmental and cultural resources services in support of their regulatory compliance for this project. This Scope of Work presents the proposed Phase I cultural resources survey inventory methodology that will be implemented for this project for review by the Texas Historical Commission (State Historic Preservation Office) and interested federal agencies. The direct archaeological Area of Potential Effect (APE) is currently defined as the approximately 100 feet (30 m) wide by 80.4 mi (129.4 km) long corridor that will be centered on the proposed pipeline(s), which represents approximately 975 acres (395 hectares) of area to assess. Pedestrian survey and shovel testing efforts will be restricted to the above APE, except where altered to take into account additional temporary workspace (ATWS), horizontal directional drill (HDD) pads, or land owner survey restrictions. New compression or other major ancillary facilities are not anticipated at this time. NRG is currently assessing the need to upgrade or improve private access roads; however, some road upgrades or improvements are expected during the construction phase of the project. These areas will also be surveyed for cultural resource concerns during the project.

Federal Involvement

Principal federal oversight of the project's compliance with Section 106 of the National Historic Preservation Act will come from the DOE as the principal funding agency. DOE will be preparing an environmental impact statement for this project, and it is DOE's intent to use the NEPA process to help fulfill its Section 106 obligations. The U.S. Army Corps of Engineers, Galveston District, is also expected to be involved in the federal review for relevant nationwide environmental permit compliance. Unless the agency decides otherwise, DOE will initiate consultation with federally-recognized Native American tribal organizations that may have interest in the project area. Additional consultation with federal and state agencies and the Texas State Historic Preservation Office is in the planning stage.

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Legend

- Proposed Pipeline Route
- Major Roads
- Streams / Waterways
- Major Streams / Waterways
- County Lines
- Municipalities

N

0 2.5 5 10 Miles

Location Map

W.A. Parish Post-Combustion CO Capture and Sequestration Project

Drawn By:	Date:	Project No.:	Figure:
AM	12-16-11	25014860	1

Proposed Work Guidelines

URS will conduct a Phase I cultural resources inventory of the proposed NRG CO_2 pipeline and access roads. The purpose of this investigation will be to identify and assess significant cultural resources, such as historic and prehistoric archeological sites, historic buildings, or cemeteries that are located within the boundaries of the proposed undertaking. This investigation, including reporting, will follow the guidelines and procedures outlined in the following documents: (1) The THC's *Preserving Our Heritage: a Statewide Plan for Texas*; (2) Council of Texas Archeologists standards for cultural resources survey; (3) Antiquities Code of Texas (and the THC's *Rules of Practice and Procedure for the Antiquities Code of Texas*); (4) National Historic Preservation Act of 1966 (as amended); (5) Archaeological and Historic Preservation Act of 1974; (6) Archaeological Resources Protection Act of 1979, as amended (if required); (7) Title 36 of the Code of Federal Regulations (Parts 60-66 and 800); and (8) *Archeology and Historic Preservation: The Secretary of the Interior's Guidelines.*

Previous Cultural Resource Investigations

The project area lies within the Eastern Planning Region of Texas (Kenmotsu and Perttula 1993). Prior to initiating fieldwork for this project, a review was conducted by URS of data and information currently on file at the THC via the online Texas Archeological Sites Atlas. This research was undertaken to identify previously completed cultural resources surveys and cultural resources recorded within 1 mile (1.6 km) to either side of the proposed pipeline centerline. The proposed NRG CO_2 pipeline crosses, or lies near, a number of areas where cultural resources surveys were conducted between 1973 and 2011 (Table 1). Although none of these studies encompass significant portions of the proposed right-of-way under examination, additional recent projects available to THC staff but not posted to the Site Atlas may also be present.

No known historic buildings or features are recorded within the proposed survey corridor, although several cemeteries, historic buildings and state historic markers are located within the 1 mile study area (Table 2). Based on a review of the online National Park Service database, no above-ground properties listed on the National Register of Historic Places are situated within 1 mile (1.6 km) of the proposed survey corridor.

According to the Texas Archeological Site Atlas, 16 archaeological sites have been recorded within 1 mile (1.6 km) of the proposed pipeline centerline (Table 3). Fifteen are located in Jackson County with the remaining archaeological site situated in Wharton County. Most appear to be smaller Native American campsites situated along well-defined breaks-in-slope above creeks, bayous or rivers. Only two archaeological sites are located in close proximity to the proposed NRG pipeline. Site 41JK122 is a surface scatter of prehistoric artifacts plotted within the proposed survey corridor, atop a break-in-slope overlooking the Lavaca River floodplain. Site 41JK119 is a similar site type that is situation approximately 295 feet (90 m) north of the NRG survey corridor, at the edge of the eastern floodplain on the same river.

Table 1: Cultural resource surveys conducted within 1 mile of proposed pipeline (see Topographic Sheets 1 through 21 in Appendix A) (Shaded entries indicate survey crosses proposed NRG pipeline corridor)

County	Survey Name	Permit Number	Fieldwork Date
Jackson	COE-VD 03/92	N/A	March 1992
Jackson	COE-VD-01/92	N/A	January 1992
Jackson	BR 00/90	N/A	1990
Jackson	TX DOT 12/95	N/A	December 1995
Jackson	FHWA TX DOT 12/95	N/A	December 1995
Jackson	THC 00/73	N/A	1973
Wharton	FERC 03/07	N/A	February 3, 2007
Fort Bend	COE- Galveston (2011)	5877	January 3, 2011
Fort Bend	COE-VD 05/87	N/A	N/A
Fort Bend	BLM AAPL 04/88	N/A	April 1988

Table 2: Historic buildings and markers within 1 mile of proposed pipeline (see Topographic Sheets 1 through 21 in Appendix A)

County	Name	Cemetery / Marker Number	Feature Type	Additional Information
Fort Bend	Guy Cemetery, also known as Old Guy Public, Prairie Mound, Guy Public	FB-C144	Cemetery	Veteran
Fort Bend	Zemanek Cemetery	FB-C134	Cemetery	European Protestant, unmarked graves (1900-1975)
Wharton	Ansgar Evangelical Lutheran Church and Cemetery (also historical marker)	N/A	Cemetery attached to church	Contains three former pastors of the church and veterans of wars ranging from the Civil War to WWII among its more than 500 burials
Wharton	Ansgar Evangelical Lutheran Church and Cemetery	172	Historic Marker	Danish Folk Society helped 93 Danish Lutheran families from the Midwest establish the Danevang Cooperative Settlement in the early 1890s. Erected a meeting hall at the site in 1895 and a sanctuary in 1909. Church known for painting of St. Ansgar and a 1700-pound bell. Sanctuary was destroyed in a 1945 storm and replaced with an army chapel
Wharton	Unknown Cemetery	WH-C016	Cemetery	N/A
Wharton	Danevang	1163	Historic Marker	The first successful Danish community in Texas. Established in 1894 on a portion of 25,000 acres secured through option by Danish Folk Society from Texas Land and Cattle Company.
Wharton	Danevang Community Hall (Danevang Forsamlingshus)	12805	Historic Marker	The Dansk Folkesamfund (Danish Folk Society), organized in the Midwest in 1887 arranged for land for a settlement here and contacted Danes living in the northern and midwestern United States to establish a colony in Texas. After the first colonists arrived, the society helped fund the community hall in 1895, which also acted as the first school and church building. Torn from its foundation in a 1945 hurricane, the Forsamlingshus was repaired and continues to serve the community.

Table 3: Archaeological sites within 1 mile of proposed pipeline
(see Topographic Sheets 1 through 21 in Appendix A)
(Shaded entries indicate site is plotted within 330 feet (100 m) of pipeline)

County	Site Number	Type of Site	Site Age	NRHP Eligibility	Testing Method
Jackson	41JK7	Campsite with Archaic Period lithics	Prehistoric	Potentially Eligible	Surface Collection
Jackson	41JK8	Nineteenth century house	Historic	N/A	Surface Collection
Jackson	41JK9	Sunken steamboat-1865	Historic	Listed / Historic Marker / Shipwreck	None stated
Jackson	41JK116	Shallow campsite indicted by shell scattering	Prehistoric	N/A	Surface Collection
Jackson	41JK117	Open campsite-aboriginal	Prehistoric	N/A	Surface Collection
Jackson	41JK118	Open campsite	Prehistoric	N/A	Surface Collection
Jackson	41JK119	Open campsite	Prehistoric	N/A	Surface Collection
Jackson	41JK120	Open campsite	Prehistoric	N/A	Surface Collection
Jackson	41JK121	Flint chipping concentration / lithic reduction site	Prehistoric	N/A	Surface Collection in 1972; Shovel tested in 2002
Jackson	41JK122	Open campsite or flint chipping concentration	Prehistoric	N/A	Surface Collection
Jackson	41JK123	19th century house	Historic- might be multicomponent due to flint found	N/A	Surface Collection
Jackson	41JK124	Open campsite	Prehistoric	N/A	Surface Collection
Jackson	41JK125	Open campsite	Prehistoric	N/A	Surface Collection
Jackson	41JK127	Campsite with shell and lithics	Prehistoric	N/A	Surface Collection
Jackson	41JK145	Sand dune with buried material	Prehistoric	N/A	Surface Collection
Wharton	41WH82	Campsite with shell, ceramic and lithics	Prehistoric	N/A	Surface Exam

Project Soils and Landforms

According to USDA datasets, the proposed NRG CO_2 pipeline (and its possible alternative route) crosses the 14 major soil series shown in Table 4 and Appendix B. All but a small percentage of the proposed route is located on level landforms with poor drainage. The majority (i.e., approximately 78 of 79 miles) of the line is also collocated with existing cleared electrical transmission corridors. Additionally, NRG's proposed pipeline will be collocated with a new pipeline, which is scheduled for construction in the summer of 2012, for the northern approximately 40 miles of NRG's proposed route.

Table 4: Soil Characteristics within Pipeline Survey Corridor and Possible Reroute (USDA Natural Resource Conservation Service GIS dataset) (see Soil Map Sheets 1 through 89 in Appendix B)

Proposed Route Soils					
Symbol	**Soil Group**	**Slope**	**Drainage**	**Permeability**	**Acres**
Ab	Asa silty clay loam	0 to 3	Well	Moderately rapid	23.26
ABK	Aransas-Bacliff-Kaman clays	0 to 1	Poor	Very slow	13.56
BEC	Bernard-Edna-Cieno-Waller complex	0 to 4	Somewhat poor to poor	Slow to very slow	452.35
Ch	Chicolete clay	0 to 1	Moderately well	Medium	1.20
CN	Clemville-Norwood complex	0 to 8	Well	Slow to moderate	6.27
Da	Dacosta sandy clay loam	0 to 3	Moderately well	Very slow	49.79
GBP	Ganado-Brazoria-Pledger clays	0 to 2	Moderately well	Very slow	84.23
InB	Inez-Telferner sandy loams	0 to 2	Moderately well	Very slow	3.56
Ka	Katy fine sandy loam	0 to 1	Moderately well	Moderately slow	1.46
La	Laewest clay	3 to 8	Moderately well	Very slow	4.37
LCL	Lake Charles-Laewest clays	0 to 4	Moderately well	Very slow	235.95
Na	Navidad fine sandy loam	0 to 2	Well	Moderately rapid	2.50
OWL	Oil-waste land	variable	variable	variable	2.30
TC	Texana-Cieno sandy loams	0 to 1	Moderately well	Very slow	76.84
W	Water	n/a	n/a	n/a	2.32
Ab	Asa silty clay loam	0 to 3	Well	Moderately rapid	23.26

Definition of Archaeological Site Potential and Survey Methods

The poor drainage and general lack of terrain features within the study area indicate that overall archaeological potential along the proposed NRG route is minimal. The potential for intact undisturbed historic properties is further diminished because the proposed NRG pipeline will be collocated with (i.e., installed parallel to and predominantly within the maintained ROW of) a cleared transmission line corridor and some built pipelines for its length (see Appendix B). The anticipated general width of new permanent right-of-way is expected to be 50 feet (15 m) or less, and spoil will generally be deposited on the existing cleared right-of-way during construction. The proposed route is mainly situated within pastoral lands and agricultural fields. The northernmost portion lies within NRG's existing W. A. Parish power plant while the southernmost section lies within the confines of a mature oil field.

Prehistoric archaeological potential is expected to generally be limited in areas lacking terrain features, where major ground disturbance has occurred and with poor soil drainage. Given the distribution of known prehistoric sites, archaeological potential is believed highest when in proximity to drainages and defined breaks-in-slope (as defined for the corridor in Appendix A maps, which show approximately 16.2 miles of high probability area). Historic archaeological site potential is also generally expected to be lim-

ited due to the small number of buildings recorded on topographic maps, the generally open and level terrain without physiographic relief, its collocation with existing transmission line and pipeline corridors, and the soil drainage conditions.

This Phase I cultural resources survey effort will be comprised of linear transect surveys involving systematic pedestrian surveys augmented by shovel testing within the entire project corridor. In general, one survey transect will be placed within the middle of the 100 foot (30 m) wide survey corridor. Transect survey methods will allow for these portions of the proposed survey corridor to be assessed in a systematic and uniform manner and assist with the identification and delineation of any cultural resources encountered as a result of the survey effort. Standardized survey segment forms will record whether each segment was evaluated using Low, Moderate or High Potential survey methods.

Shovel tests will display an average excavated diameter of 12 inches (30 cm) and they will be excavated to at least 20 inches (50 cm) below surface, unless impenetrable subsoils or ground water are encountered. If the soil types encountered indicate the potential for more deeply buried sites, the depth of the shovel test will be increased accordingly, up to 39 inches (100 cm) below surface. Shovel tests will be excavated in natural soil layers at 4-inch or 8-inch (10 or 20 cm) intervals and excavated soils will be screened through ¼-inch mesh unless water-saturated or compacted clay, in which case they will be hand sorted by trowel. If cultural materials are encountered, then the base of the shovel test excavation will extend to at least 16 inches (40 cm) beneath the last occurrence of cultural materials. Based on the types of landforms crossed and existing land disturbance levels, at this time the use of mechanical excavation techniques is not anticipated.

Munsell® soil color charts will be used to describe soil color. Standard soils nomenclature will also be used in the description of the excavated sediments associated with each shovel test. Prior to closing up the shovel test, each shovel test will have survey ribbon placed into it indicating the Date, Crew Initials, Transect Number, and Shovel Test Number. Excavated shovel tests will be backfilled immediately upon the completion of the excavation process. Shovel testing will not be conducted in areas where the landform slope is greater than 20%; where safety hazards, such as buried utilities, exist and the shovel test cannot be offset; or where standing water, impenetrable clays, environmental hazards, or impervious substrates (e.g. asphalt roads) are encountered. The above information concerning each shovel test location will be recorded on standardized shovel test forms; any shovel test that cannot be excavated due to one or more of the above reasons will be defined in the Phase I cultural resource survey report sent to THC.

Recovered cultural materials will be recorded in the field using electronic standardized field collection techniques using an electronic field data collection device (e.g., Toughbook, Yuma, or similar). GPS data collectors with sub-meter accuracy will be used to record the beginning and endpoint of survey transects, pipeline inflexion (PI) points, survey areas, access roads, locus datum locations, and the corners of any standing structures encountered during the course of this investigation. Digital photographs will be taken of survey areas to document current conditions. Detailed pace-and-compass maps for encountered cultural resources will also be produced.

Survey Methods in Low Archaeological Potential Areas

Portions of the project corridor may cross short sections of wetlands that may be fully inundated by water. In these areas, pedestrian survey of accessible lands with photo-documentation of inundated survey areas will be considered sufficient for the purposes of cultural resources assessment. Where extensive pastoral or agricultural cultivation is present, ground surface exposures exceed 50 percent and the likelihood of buried archaeological sites is low based on soil types and topography, systematic pedestrian survey will be used as an adequate survey methodology, augmented with judgmental shovel tests to confirm soil conditions. Each judgmental shovel test will be excavated at an interval of 1640 feet (500 m) or less.

Survey Methods in Moderate Archaeological Potential Areas

In areas with poorly draining soils, located away from defined drainages poor but where buried sites are considered possible, shovel tests will be excavated at 328 feet (100 m) intervals along the primary survey transect located within the 100 foot (30 m) wide survey corridor (Table 5).

Survey Methods in High Archaeological Potential Areas

High archaeological site potential for this project includes elevated landforms such as ridges or hills, and landforms close to natural water drainages (approximately 16.2 miles (26.0 kilometers of the corridor, as defined in Appendix A maps). In these areas, shovel tests will be excavated at 164 feet (50 m) intervals along the primary transect of the proposed pipeline (Table 5). Judgmentally placed shovel tests on top of landforms may be used if the landform is less than 165 feet (50 m) in width.

If cultural materials are encountered within areas defined as having Low or Moderate Archaeological Potential, the survey crew will immediately change to the High Potential shovel testing intervals and the site delineation methods presented further below will also be implemented. If deeply buried cultural deposits are encountered as a result of the shovel testing program, heavy machinery may be required to more fully assess these deposits. These activities will be performed only after consultation with THC and NRG.

Table 5: Proposed Shovel Test Intervals

Shovel Test Width	Shovel Test Depth	Moderate Probability	High Probability	Site Delineation
30 cm (12 in)	50 cm (20 in) (unless artifacts or possibility of deeply buried sites)	Every 100 m (328 ft) along centerline	Every 50 m (164 ft) along centerline	10 to 25 m (33 to 82 ft) intervals within site area

Horizontal Directional Drilling / Boring Segments and Additional Temporary Work Spaces

Horizontal drills and bores are expected to be used along the length of the proposed NRG CO_2 pipeline at roadways and larger drainage or water body crossings. Setup locations for the HDD and bore locations (pads) may exceed the standard 100 foot (30 m) wide survey corridor. Additional temporary work spaces (ATWS) may also be required in some areas. Any location that exceeds the standard survey corridor will be assessed for cultural resource concerns using the methods discussed above, as determined by the site potential. Standardized URS forms will also be used to document cultural resource survey information associated with these additional facilities.

Access Roads

Access roads to the pipeline right-of-way are expected to be used by NRG and its contractors during the construction phase of the project. If the access road is an existing public roadway, or is constructed of asphalt or concrete, no examination for cultural resources is proposed. For any existing dirt or gravel access road that will require no improvements (e.g., widening, straightening or grading for addition of gravel or sand), it is proposed that only a visual examination of both road sidewalls (i.e., the edges of the road and the visible vertical areas at the resultant ditch, when present) up to 50 feet (15 m) from the road centerline will be required. For any access road that will require new construction, or where improvements (e.g., widening, straightening or grading for addition of gravel or sand) will be required during the course of the project to make the roadway suitable for heavy machinery, a visual examination of both road sidewalls up to 50 feet (15 m) from the road centerline will be made for cultural resources and shovel tests will be excavated along its extent, with the tests alternating to either side of the roadway, away from existing land disturbance. If the access road is positioned within an area considered to display high potential for buried cultural resources, these tests will be excavated at 165 foot (50 m) intervals. Otherwise, the

tests will be excavated at 328 foot (100 m) intervals. Information associated with the cultural resources survey of these access roads will be noted on standardized URS forms.

Ancillary Facilities

Major ancillary facilities, such as compression stations or warehouse yards, are not currently anticipated for the project. In the event that they are added, the survey methods presented above will be implemented. Standardized URS survey area forms will be used to document cultural resource survey information associated with these additional facilities.

Archaeological Site Delineation

Identified archaeological sites will be recorded on Texas Archeological Site Data Forms and submitted for a site number. The above information, in association with the analysis of the recovered cultural material, will be used in support of determining whether the sites should be considered eligible, not eligible, or cannot be assessed using the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]).

Any cultural resource identified by the Phase I cultural resource inventory study will be reported to THC, although if cultural resources are identified, route modifications may be first considered by NRG. If a decision is made to proceed at the site the cultural resources identified will be systematically assessed to determine the integrity, association, and research potential of the cultural deposits. Delineation of the cultural resources will involve the excavation of shovel tests at approximately 82 foot (25 m) intervals from an established locus datum for large sites and at approximately 33 foot (10 m) intervals for sites less than 165 feet (50 m) in diameter. Shovel tests will be oriented in a cruciform (cross) pattern and will continue to be excavated until two negative shovel tests are encountered within the established project corridor or workspace.

Where possible, landowner permission will be requested to extend the evaluation beyond the survey corridor if the site exceeds it, to fully delimit the horizontal boundaries of the site. When cultural materials are encountered, the base of the shovel test excavation will be extended to at least 16 inches (40 cm) beneath the last occurrence of cultural materials; this will function to define the vertical boundaries of the site. A bucket auger may also be used to excavate to a maximum depth of 39 inches (100 cm) to determine if more deeply buried deposits are represented within the boundaries of the identified archaeological site. If the site location is characterized by a deflated, erosional context (i.e., recently plowed agricultural or pastoral field with sufficient ground visibility), a systematic surface collection will be conducted at approximately 50 foot (15 m) intervals from the established site datum; cultural materials from a 16.4 foot (5 m) wide radius around each point will then be collected.

Historic Building and Structure Evaluation

Cultural resources staff will assess buildings, structures, cemeteries, Texas Historic Landmarks and State Archeological Landmarks that are visually located within 164 feet (50 m) of the project survey corridor, access road or ATWS / HDD pad location. The recording procedures for architectural resources will follow the guidelines established by the National Park Service in their 1995 "*National Register Bulletin 24: Guidelines for Local Survey – A Basis for Preservation Planning*". Both straight-on and corner photographs of historic structures and/or engineering elements over approximately 45 years in age will be taken, where possible from public rights-of-way or from within the landowner permitted survey area. Specific information related to building materials, foundation type, structural form, architectural style, associated outbuildings, and observed alterations, will be collected to assist in assessing if the structure should be eligible, not eligible, or not assessed for the purposes of the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Locally or state-available archival information and land title data will also be used when making this determination.

Laboratory Analysis

Upon return to the URS laboratory, recovered cultural materials will be cleaned and separated into their basic material categories (i.e., prehistoric [lithic, shell or ceramic], historic [ceramic, glass, metal, etc.] or faunal). Relevant provenience and material culture observations will be recorded for each artifact and will be entered into a relational database. This information will then be used to support any determinations of eligibility for the purposes of the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). All recovered prehistoric cultural materials and identified cultural features will be interpreted based upon cultural historical frameworks developed for the prehistory of Southeast Texas, including discussions in Aten (1983), Perttula (1993), and Story (1990), among others.

Historic Material Analysis

Historic cultural materials will be categorized by material type (e.g., ceramic, glass, metal or synthetic). Following this, a functional classification will be implemented, following those attributes as generally defined by South (1977); individual diagnostic attributes, specifically those describing a temporal or cultural relationship, will also be identified. The following standard historic material culture reference works will be utilized for this project: Jones and Sullivan (1989), Lockhart (2004, 2006), Lyman (1977), Miller (1991), Miller and McNichol (2002), Miller et al. (2000), Toulouse (1969, 1971), and White (1978).

Prehistoric Lithic Analysis

The lithic analysis protocol will be technological in nature and designed to document lithic reduction strategies and tool function. The first attribute analyzed will be lithic raw material type, which will be identified through comparisons to known geological descriptions, based on texture, color, and translucence. Artifact types will be described according to their general morpho-functional class (i.e., biface, core, debitage, drill, graver, groundstone, manuport, projectile point/knife, scraper, etc.) and degree of intentional shaping (formed vs. unformed). Typological classifications for temporally and/or regionally diagnostic tools will use standard references to established regional lithic typologies.

Prehistoric Ceramic Analysis

Encountered prehistoric ceramics will be categorized using established type and variety systems, including surface decoration, aplastic inclusions, and vessel portion. Regional named ceramic types and varieties will be identified through reference to published sources for the study area noted in Aten (1983) and Story (1990), among others. Surface decorations represented will be described, including surface treatment, slips, paint type, and style. As well, vessel form, portion (i.e., base, body, collar, neck, rim, etc.), principal paste and temper will be documented.

Faunal Material Analysis

Faunal material recovered as a result of the project will be analyzed with standard zooarcheological identification protocols. The identification of faunal specimens will be based on comparing the recovered material to a skeletal reference collection. The analysis will be augmented by consulting standard reference works such as Gilbert (1980), Hillson (1986), and Olsen (1964, 1968). The selected samples will be identified as to class, order, family, genus, and species, as applicable. Taxonomic classes may include Aves (birds), Mammalia (mammals), Osteichthyes (fish), and Reptilia (reptiles), along with Invertebrates and Indeterminate specimens. If specimens cannot be identified below class, fragments will be placed into size categories; large, large-medium, medium, medium-small, and small. Size classes will be determined subjectively based on cortical thickness, amount of cancellous bone present, and fragment curvature. Within each taxon, efforts will be made to determine element, portion, and side of each specimen.

Curation

Following review and acceptance of the final cultural resources report, archeological records, photographs, and field notes will be curated with the Texas Archeological Research Laboratory (TARL) at The University of Texas at Austin, 1 University Station R7500, in Austin, Texas (78712-0714). It is anticipated that private landowners will retain ownership of any artifacts identified during the field effort. In the event that they decide not to keep the artifacts then they will be curated at the above facility.

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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX
Thompsons, TX

- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

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Sheet 01 of 20

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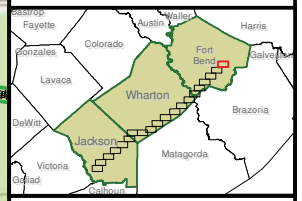

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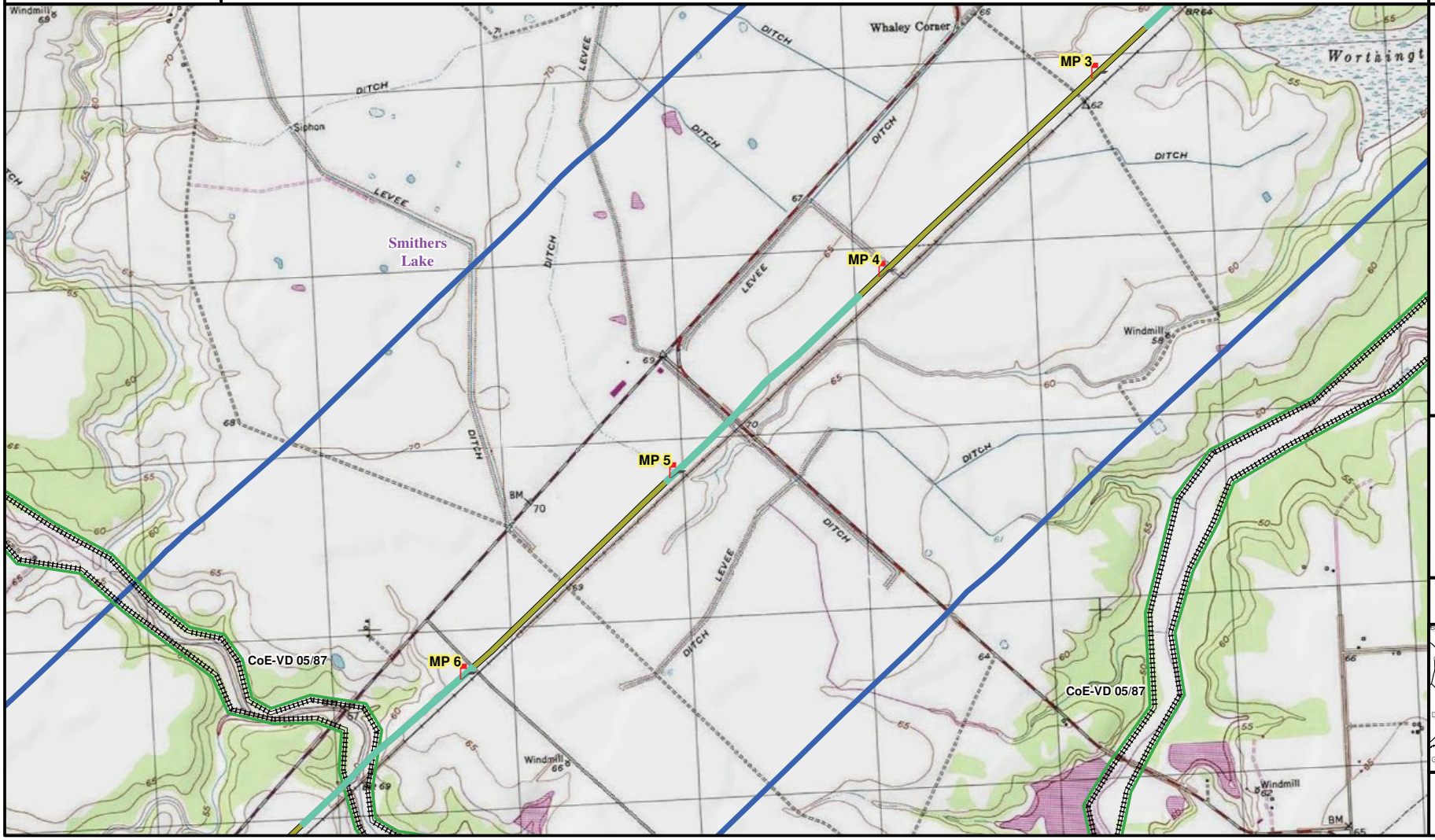

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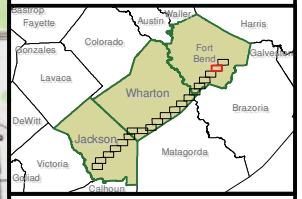

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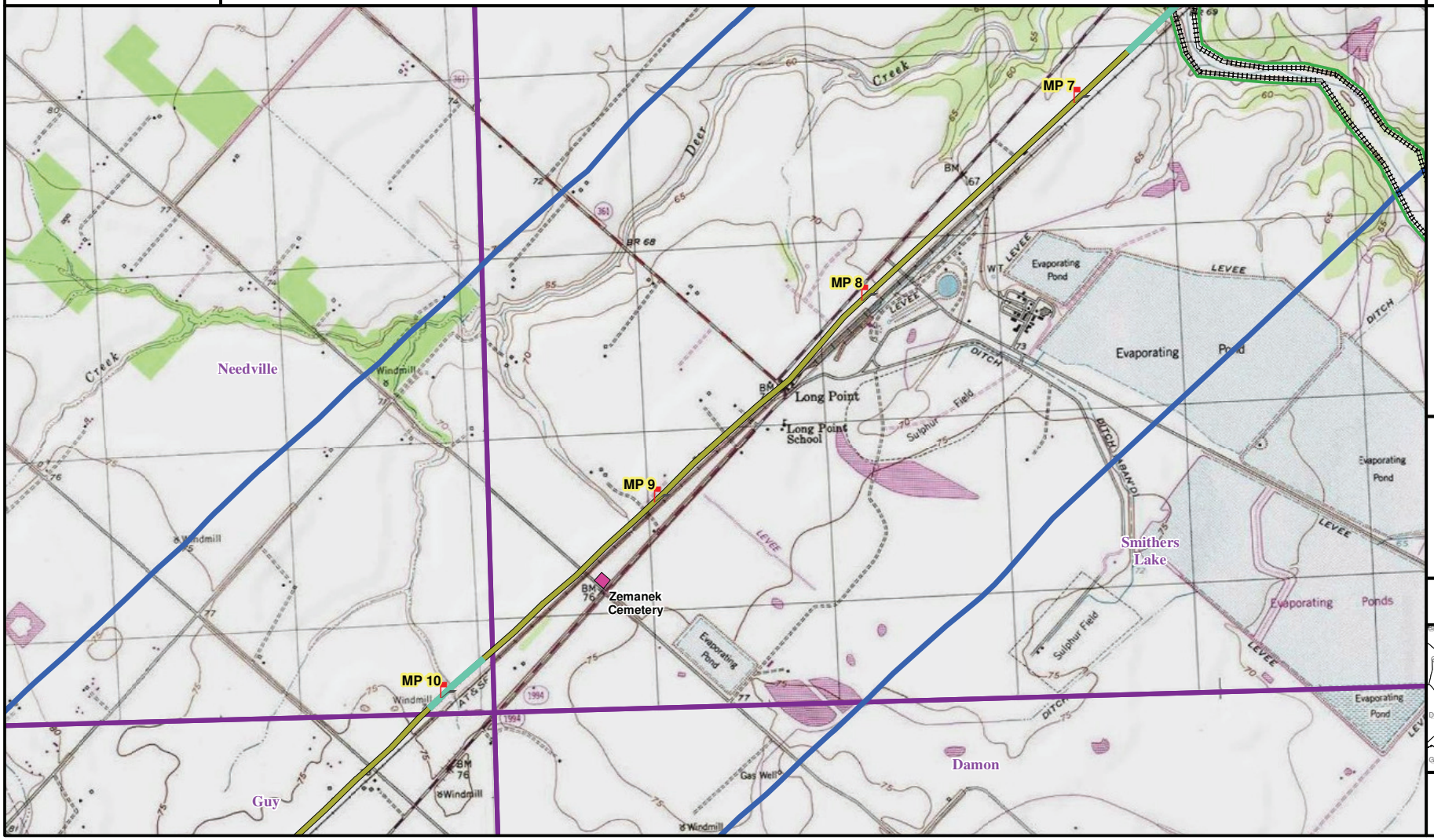

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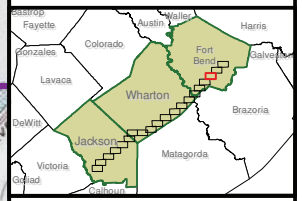

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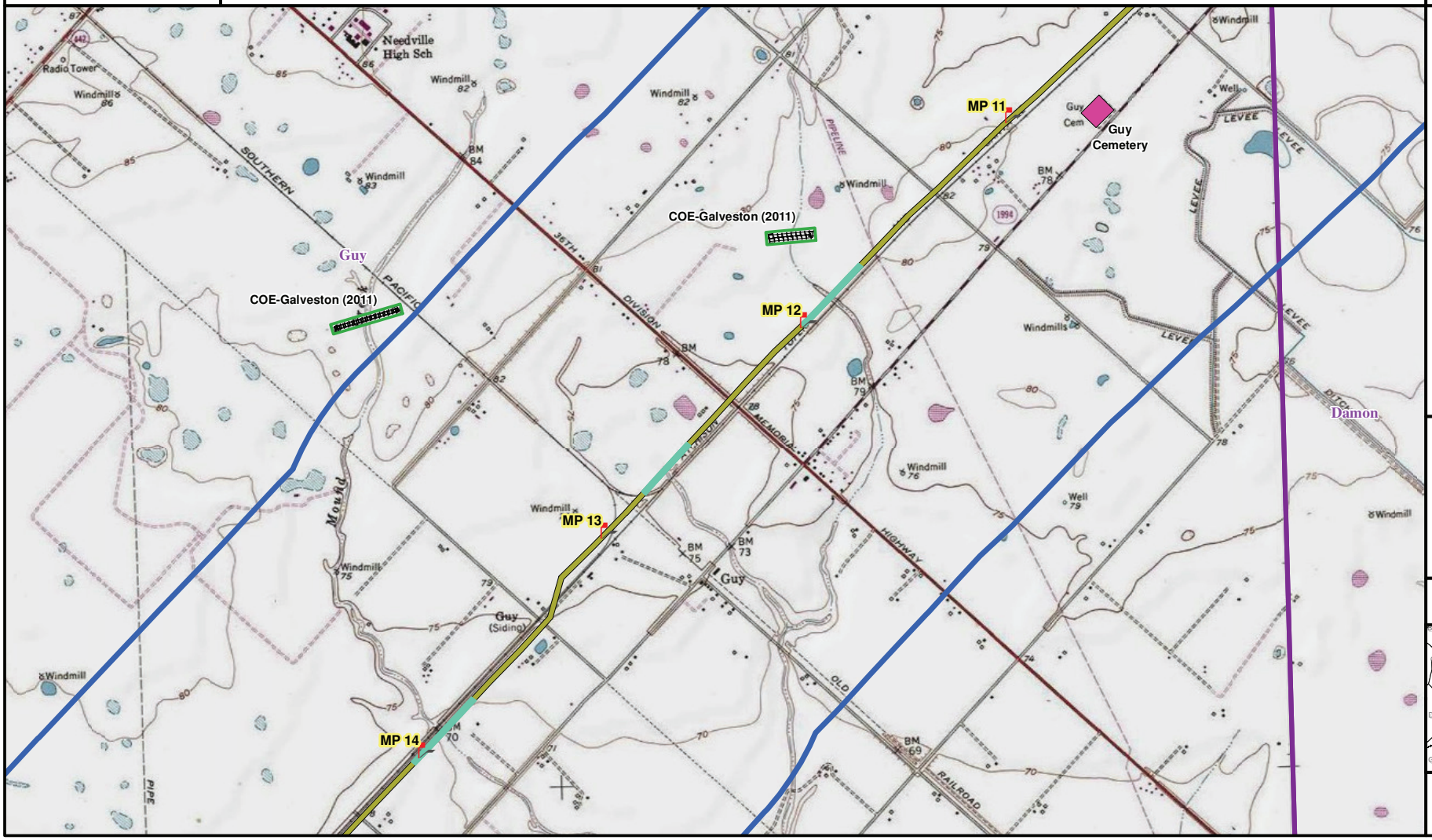

Legend

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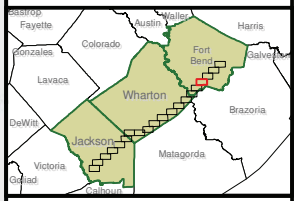

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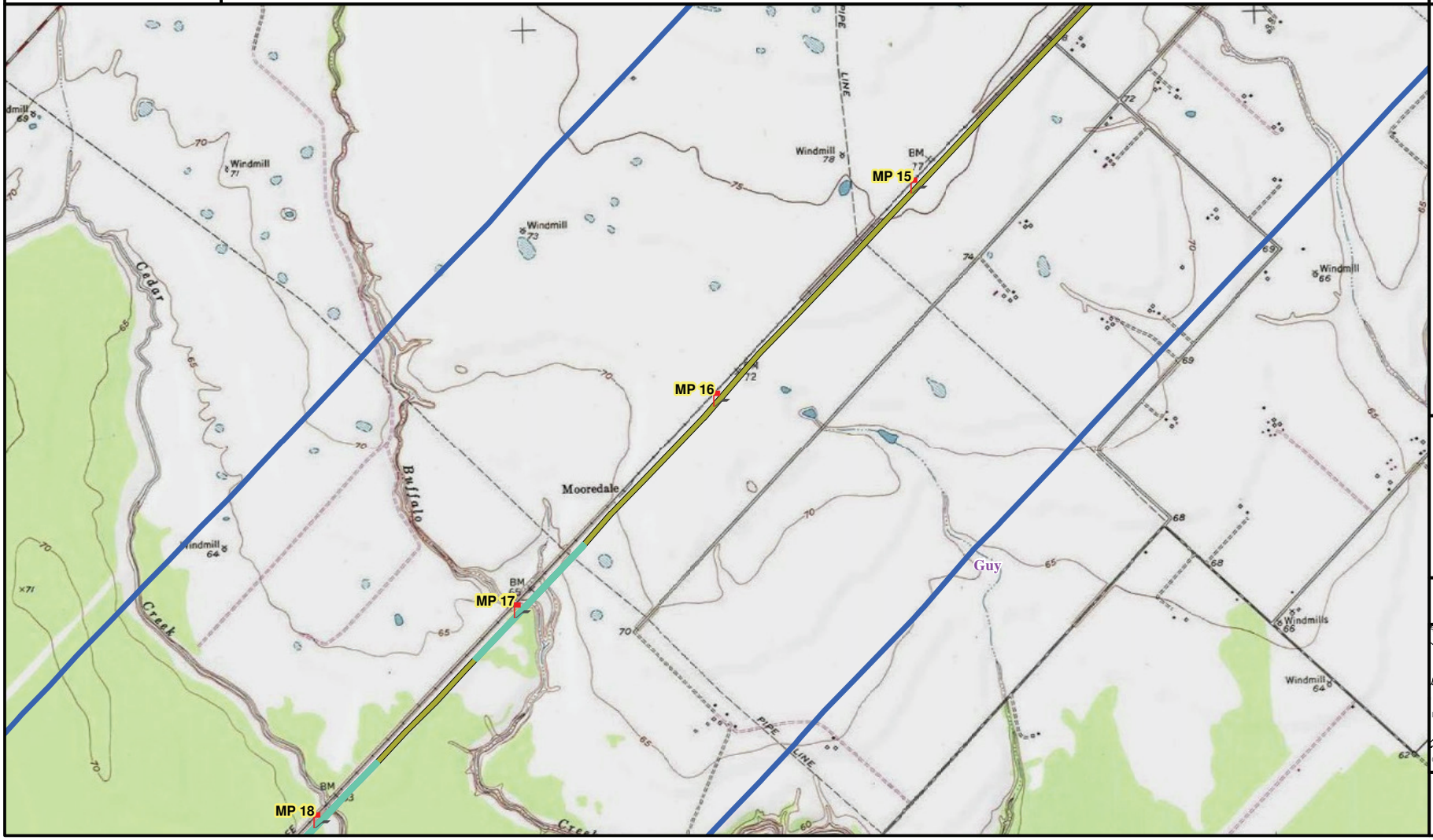

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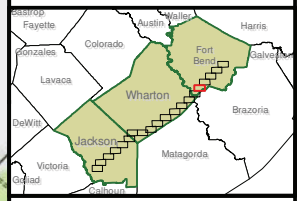

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NRG W. A. Parish CO_2 Pipeline

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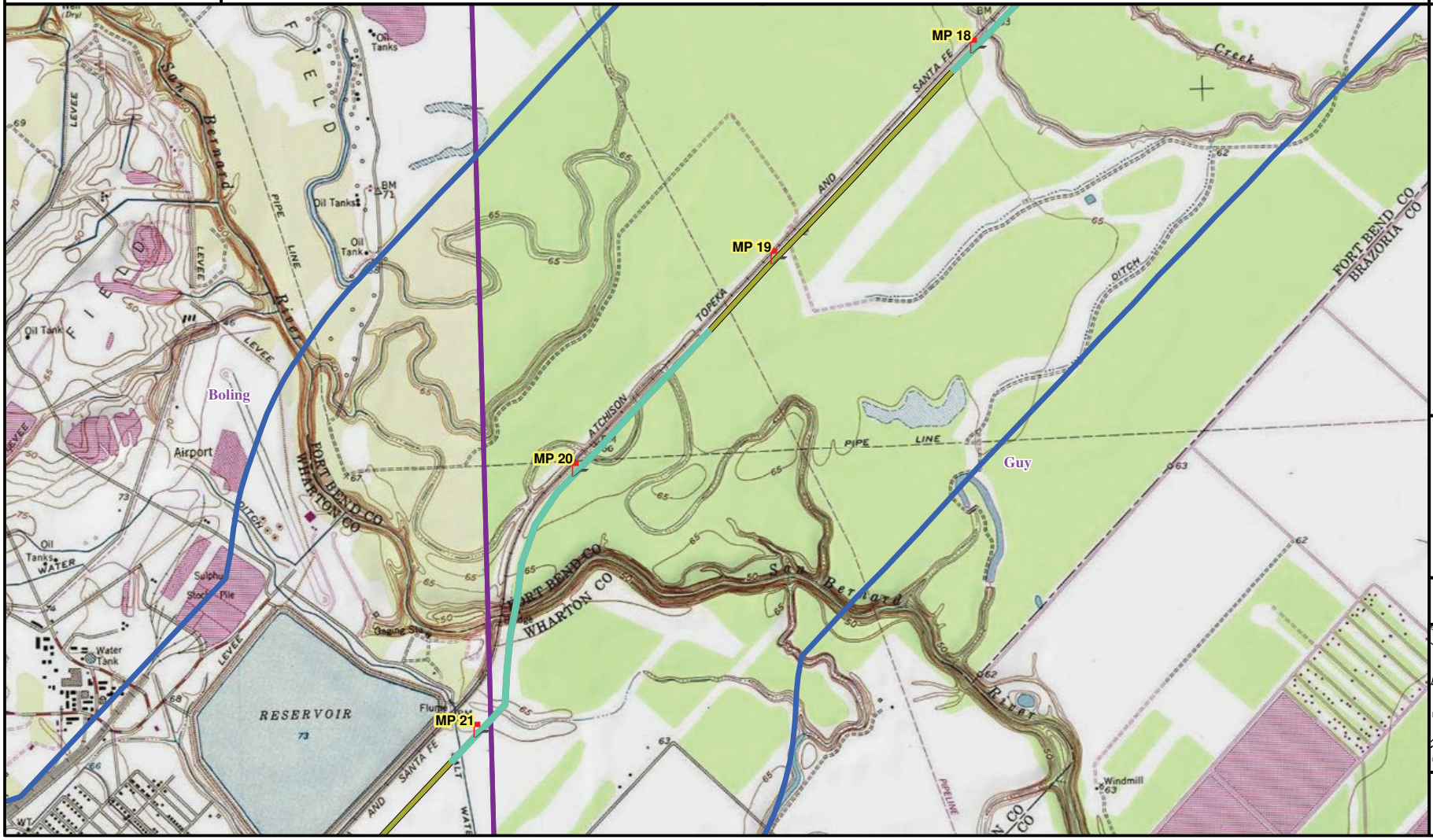

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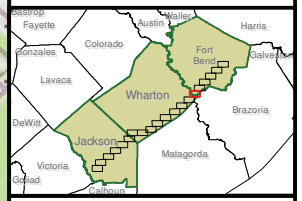

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NRG W. A. Parish CO_2 Pipeline

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Lane City, TX
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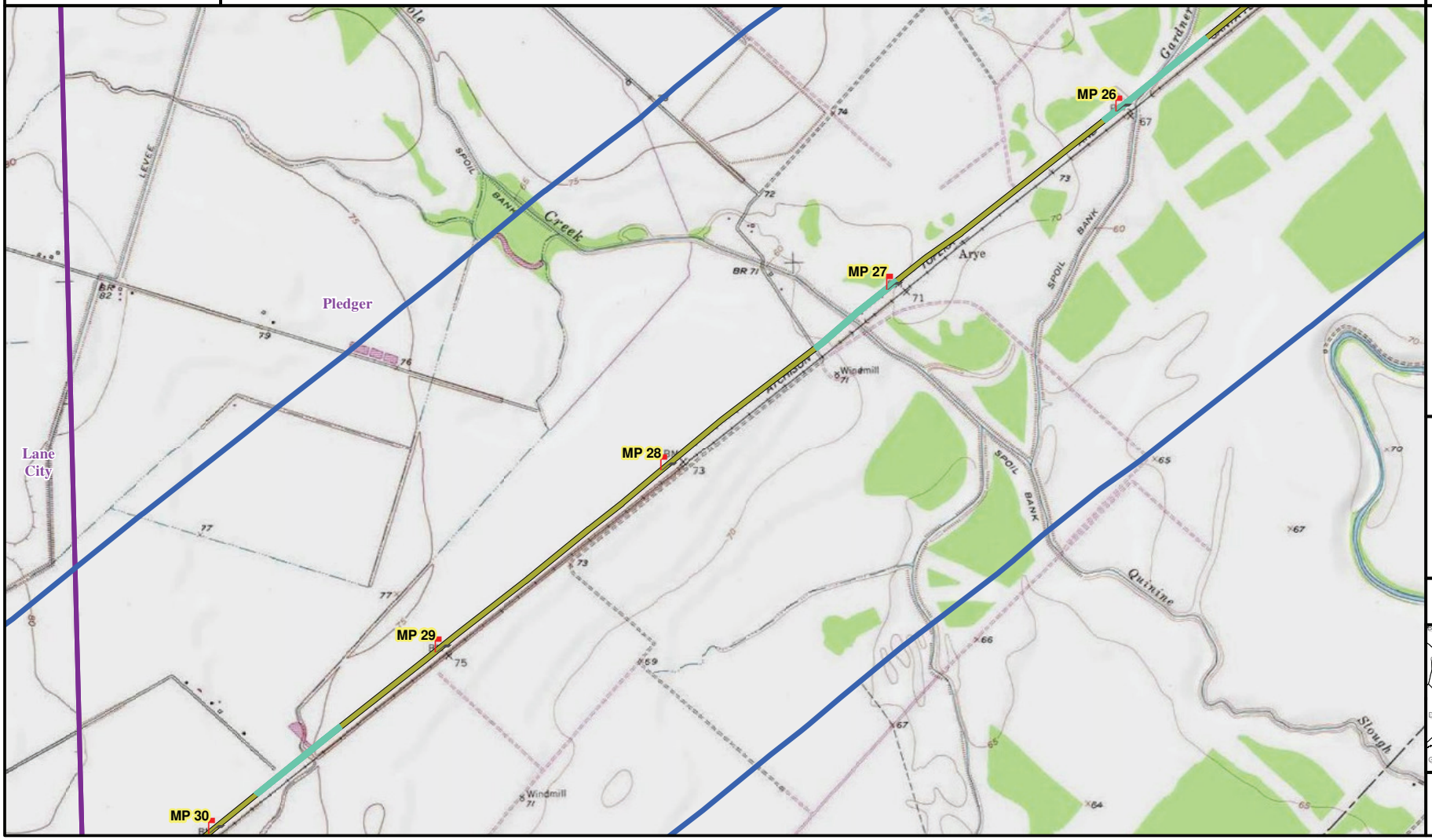

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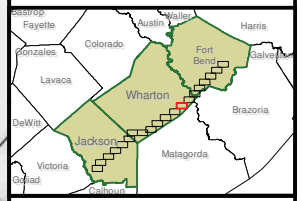

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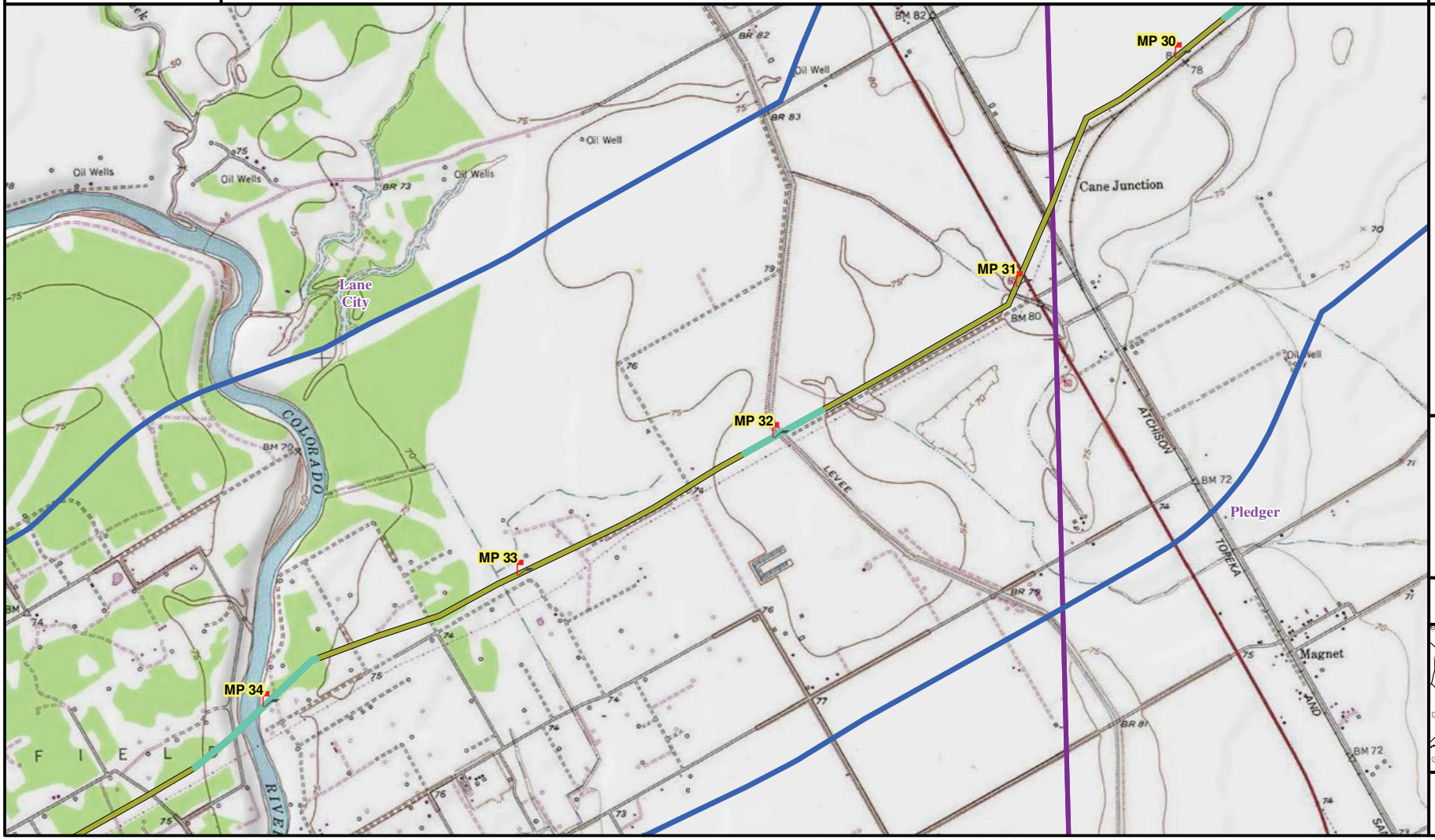

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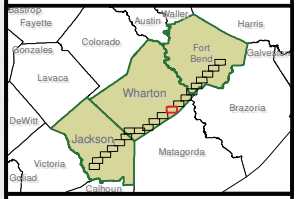

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NRG W. A. Parish CO_2 Pipeline

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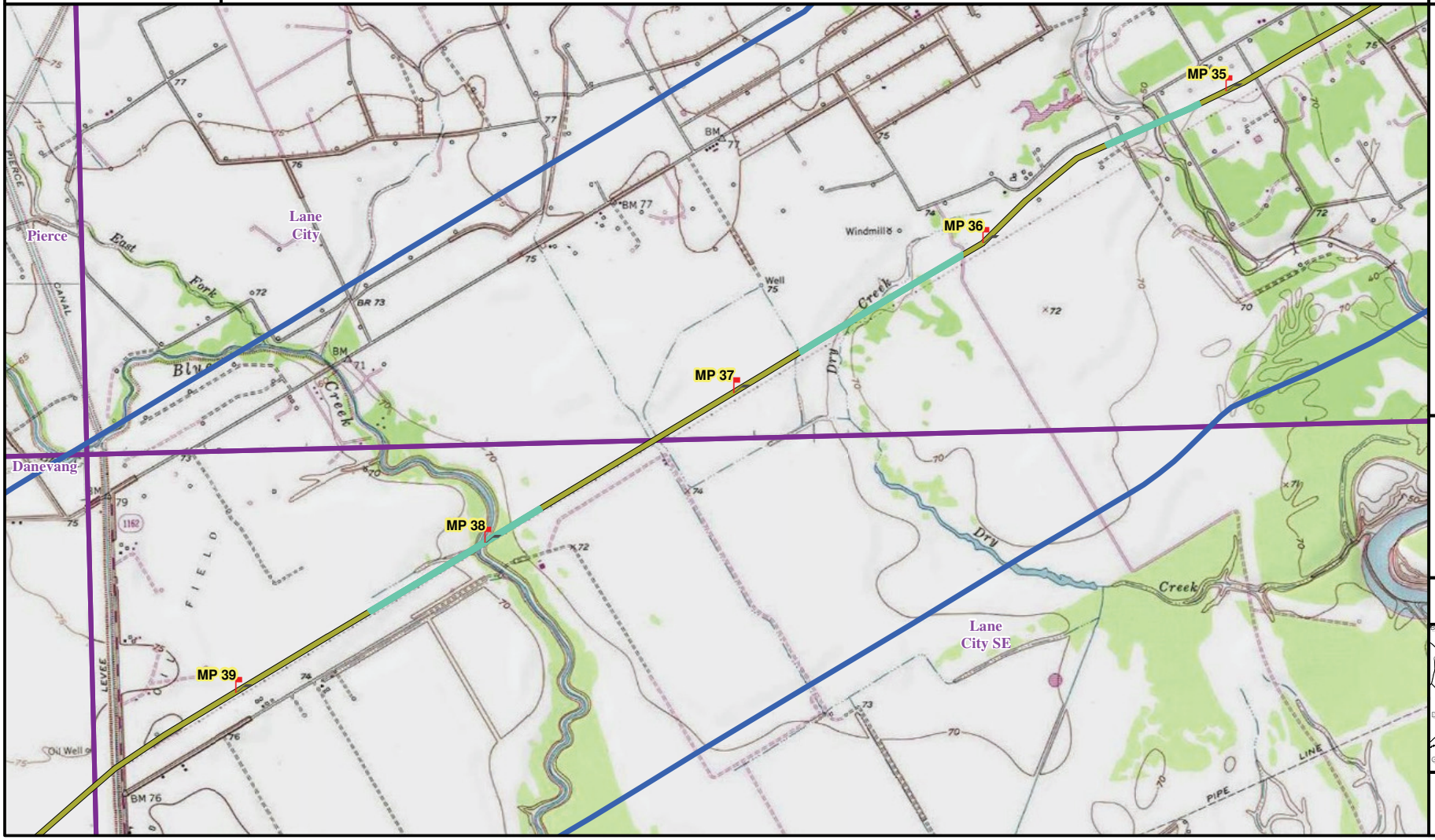

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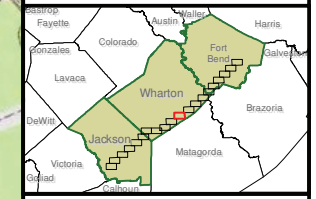

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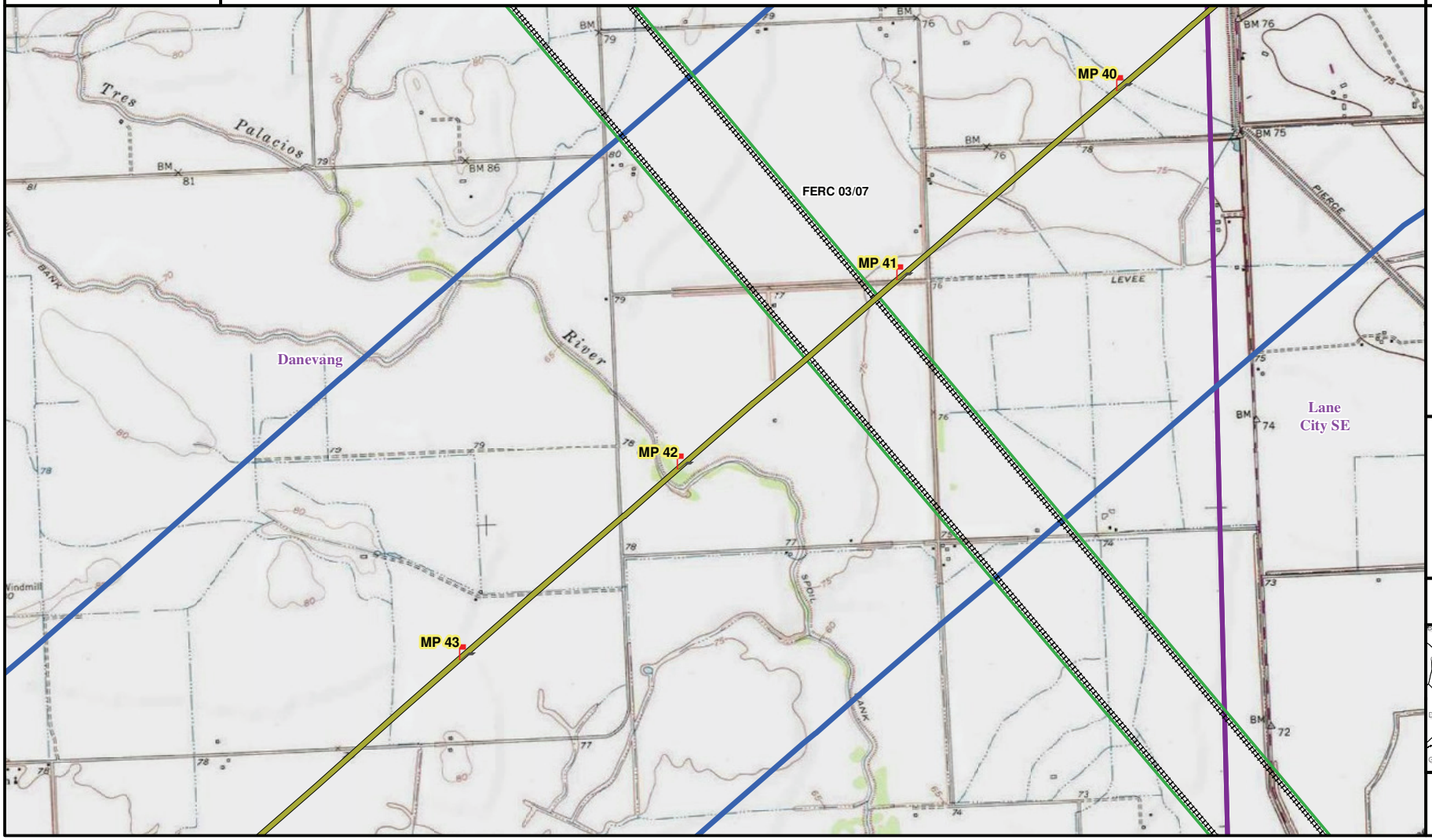
NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Danevang, TX
Lane City SE, TX



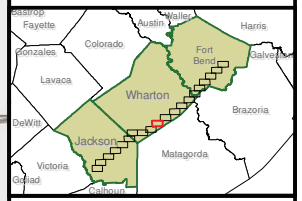
- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 11 of 20

Location Map



Wharton & Matagorda County

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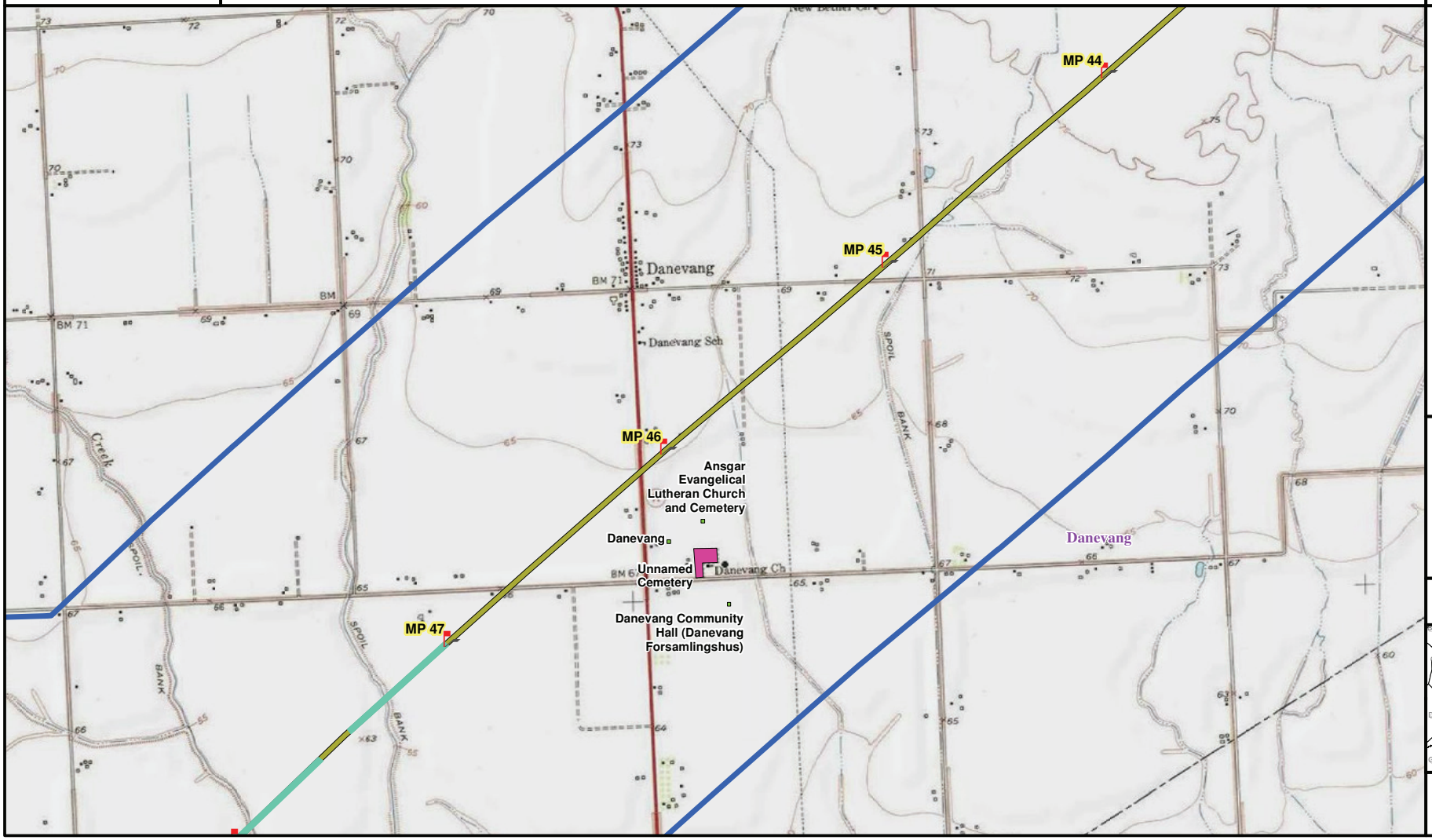
NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Danevang, TX



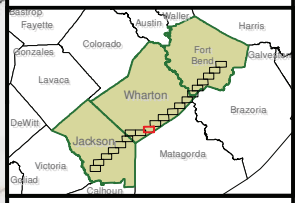
- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 12 of 20

Location Map



Wharton County

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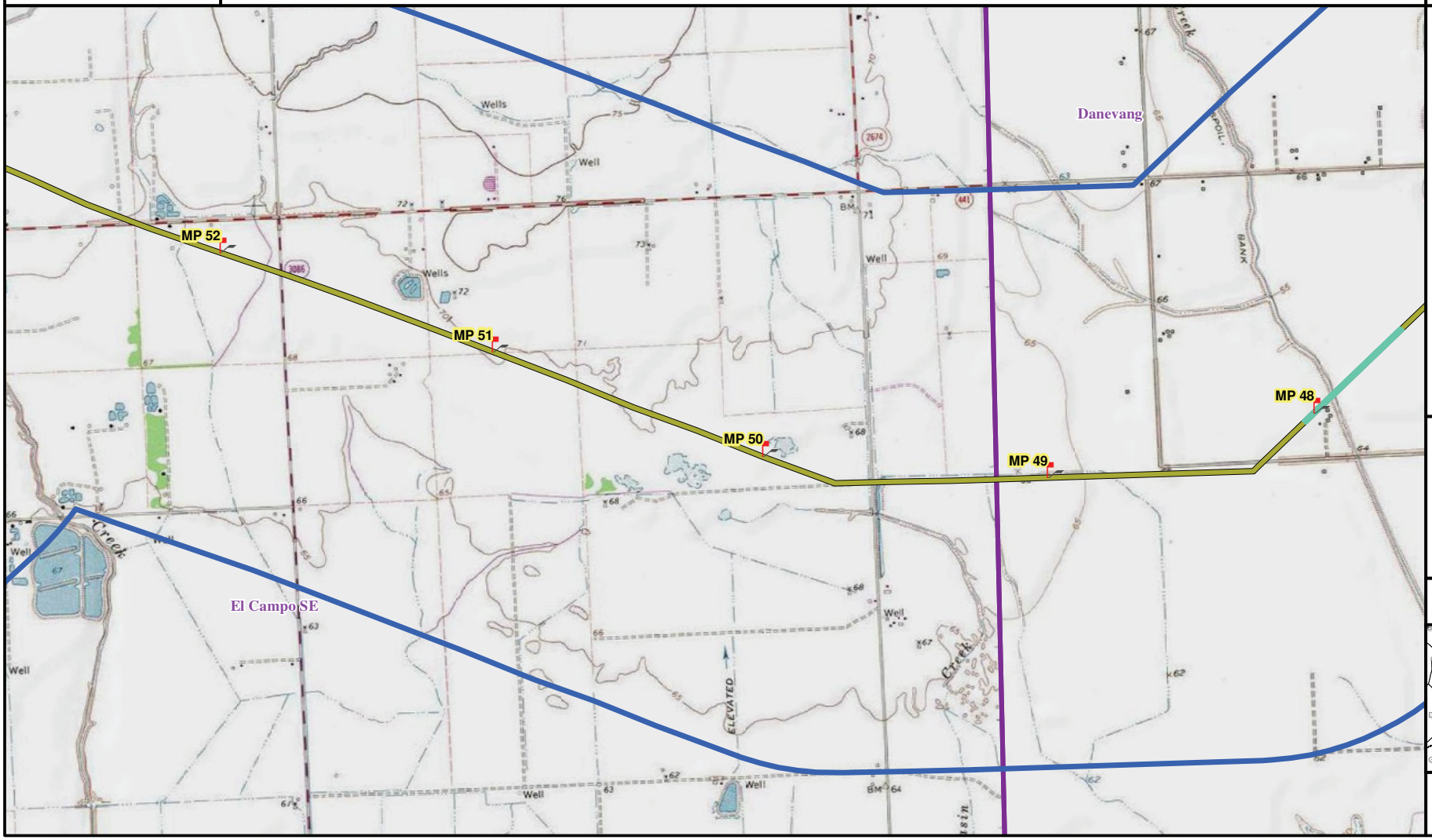
NRG W. A. Parish CO_2 Pipeline

USGS Quads:
El Campo SE, TX
Danevang, TX



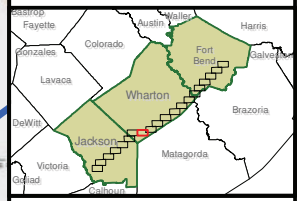
- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 13 of 20

Location Map



Wharton County

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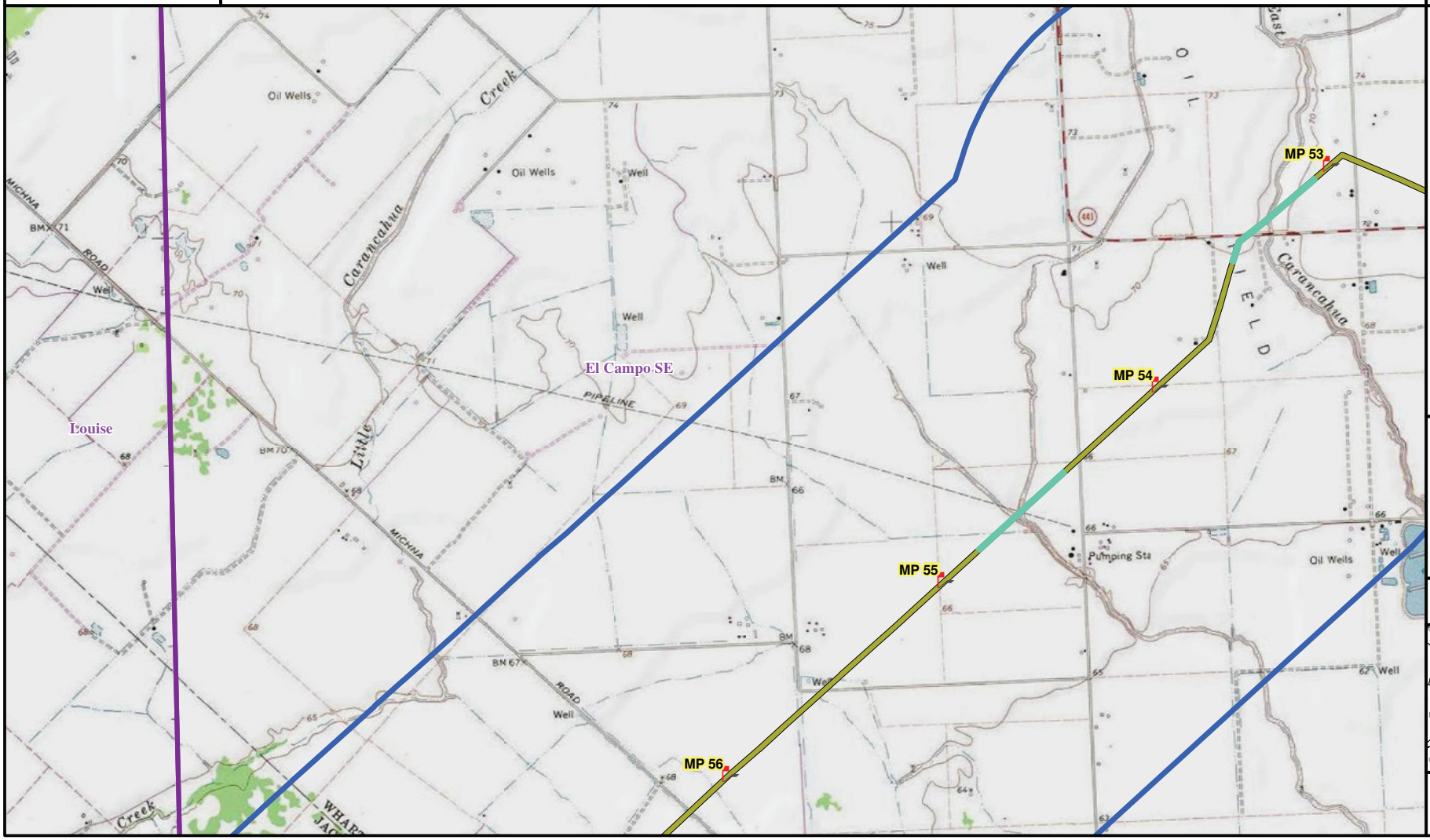
NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Louise,TX
El Campo SE, TX



- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 14 of 20

Location Map

Wharton County

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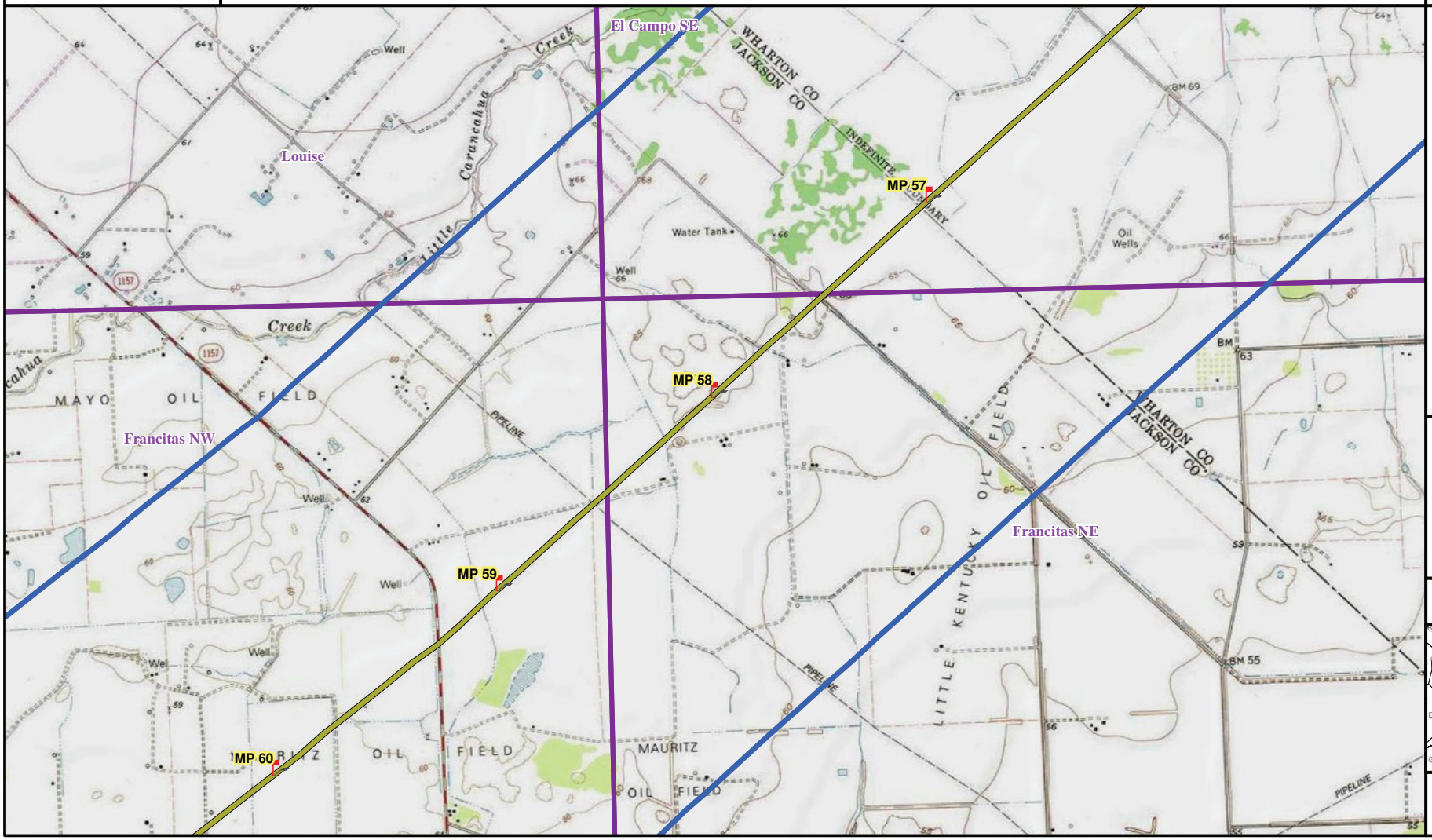
NRG W. A. Parish CO_2 Pipeline

USGS Quads: Louise,TX
El Campo SE, TX
Francitas NE, TX
Francitas NW, TX



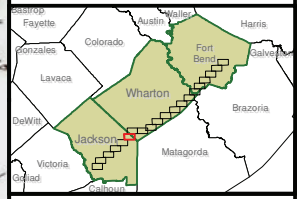
- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 15 of 20

Location Map



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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Francitas NW, TX

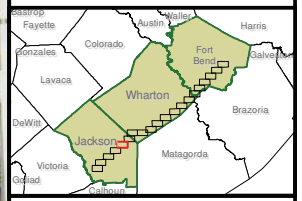
- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 16 of 20

Location Map



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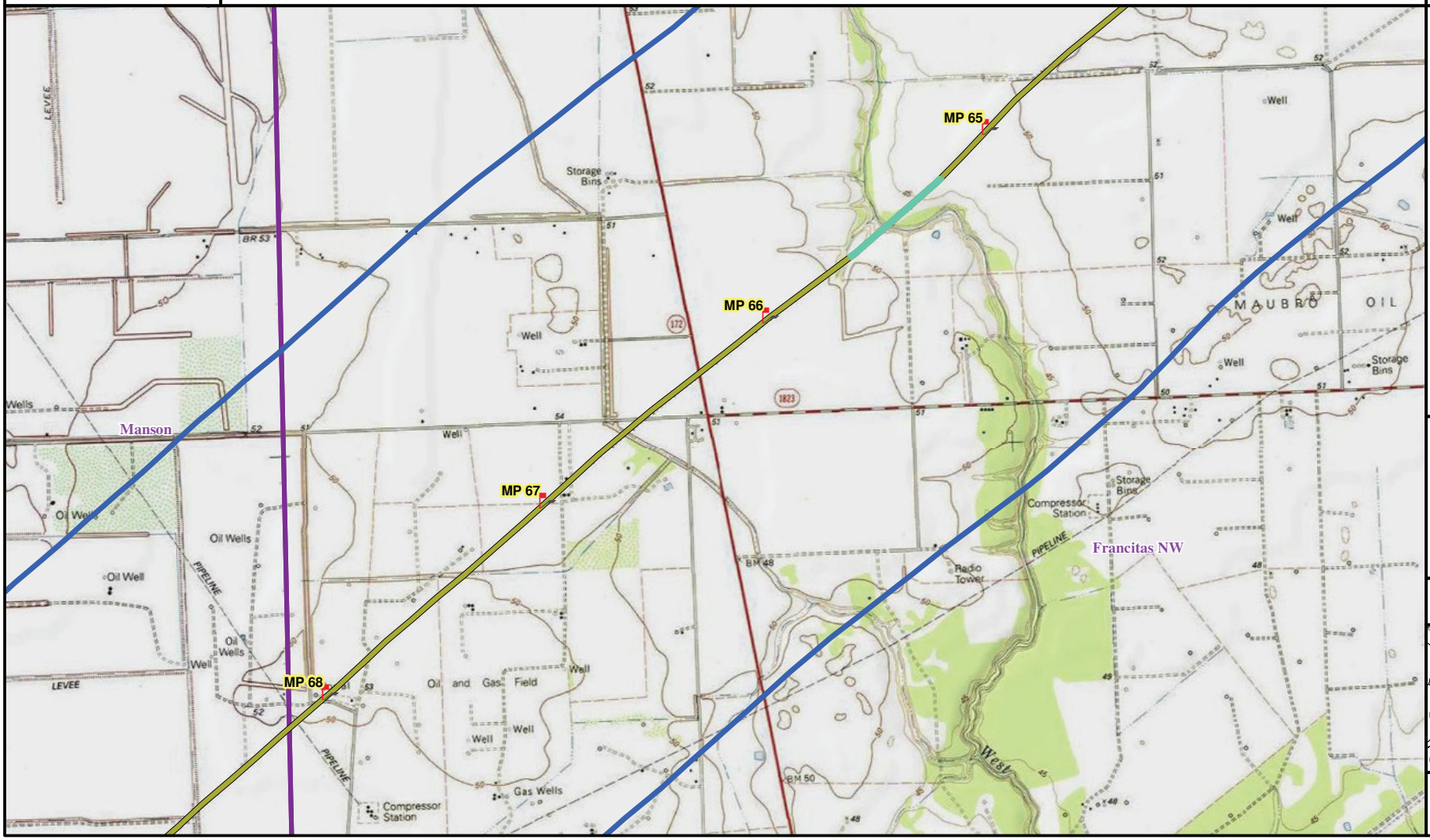
NRG W. A. Parish CO_2 Pipeline

USGS Quads:
Manson, TX
Francitas NW, TX



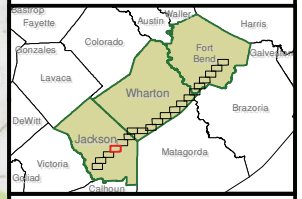
- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 17 of 20

Location Map



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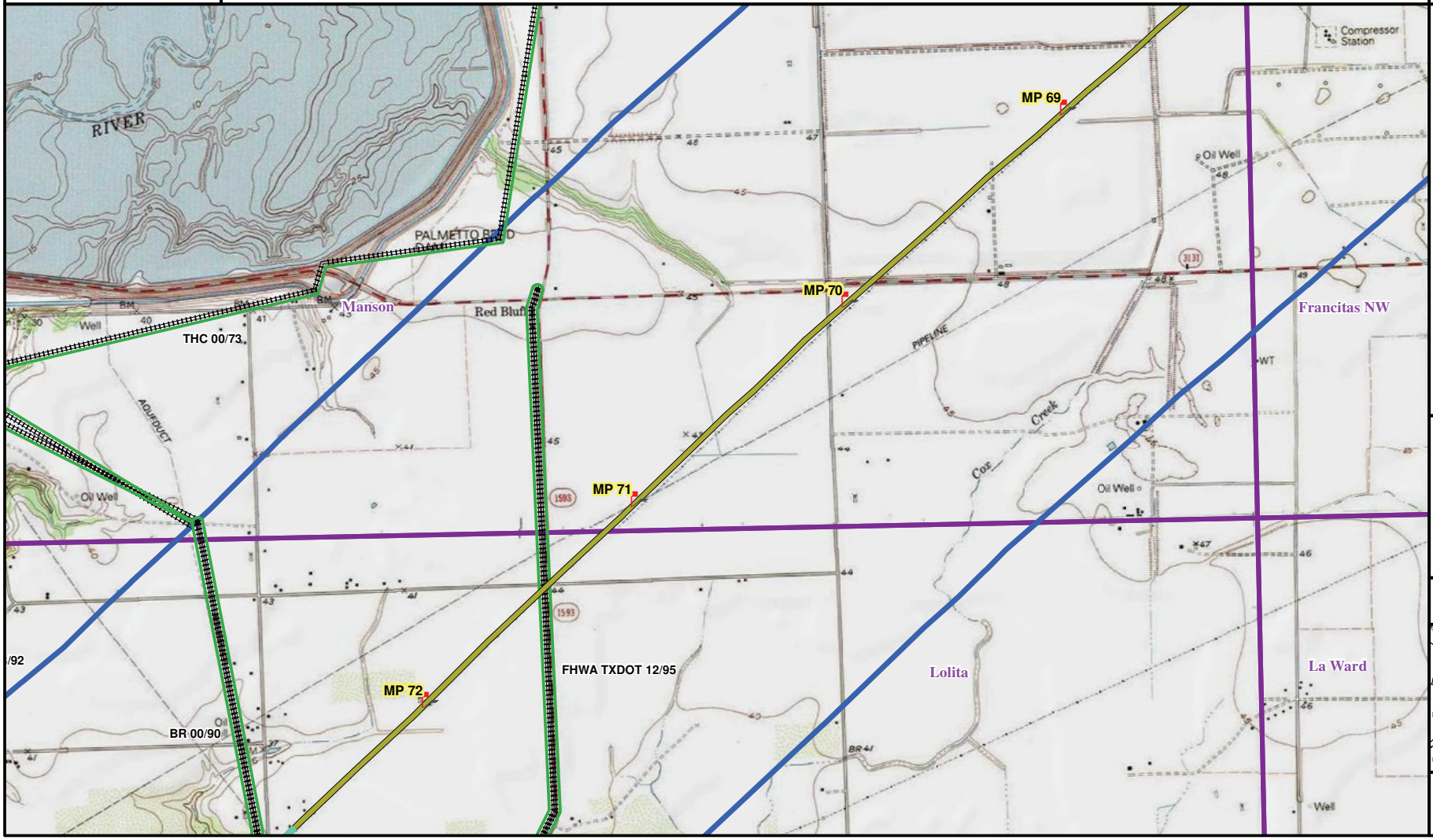
NRG W. A. Parish CO_2 Pipeline

USGS Quads: Manson, TX
Francitas NW, TX
La Ward, TX
Lolita, TX



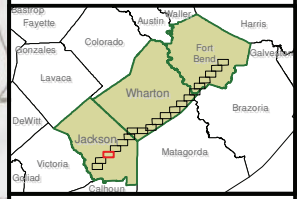
- Proposed Pipeline Corridor
- High Probability Area
- 1 Mile Buffer
- Previously Recorded Archaeological Site
- Previously Recorded Cemetery
- Previously Recorded Historical Marker
- Previously Recorded NRHP Historic District
- Previously Surveyed
- Quad Boundary

0 400 800 Meters
0 1,400 2,800 Feet

UTMS Nad 83 Zone 14
1:24,000

Sheet 18 of 20

Location Map



Jackson County

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NRG W. A. Parish CO_2 Pipeline

USGS Quads:
Smithers Lake, TX
Thompsons, TX

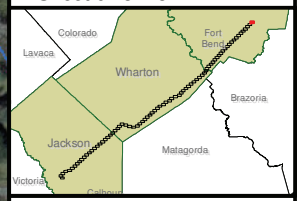
- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
BEC	Bernard-Edna-Cieno-Waller complex
Ch	Chicolete clay
CN	Clemville-Norwood complex
Da	Dacosta sandy clay loam
GBP	Ganado-Brazoria-Pledger clays
InB	Inez fine sandy loam
Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 01 of 78



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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

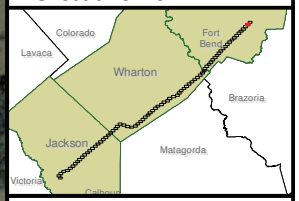
- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
BEC	Bernard-Edna-Cieno-Waller complex
Ch	Chicolete clay
CN	Clemville-Norwood complex
Da	Dacosta sandy clay loam
GBP	Ganado-Brazoria-Pledger clays
InB	Inez fine sandy loam
Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 02 of 78



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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
BEC	Bernard-Edna-Cieno-Waller complex
Ch	Chicolete clay
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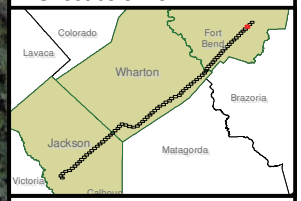
GBP	Ganado-Brazoria-Pledger clays
InB	Inez fine sandy loam
Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 03 of 78



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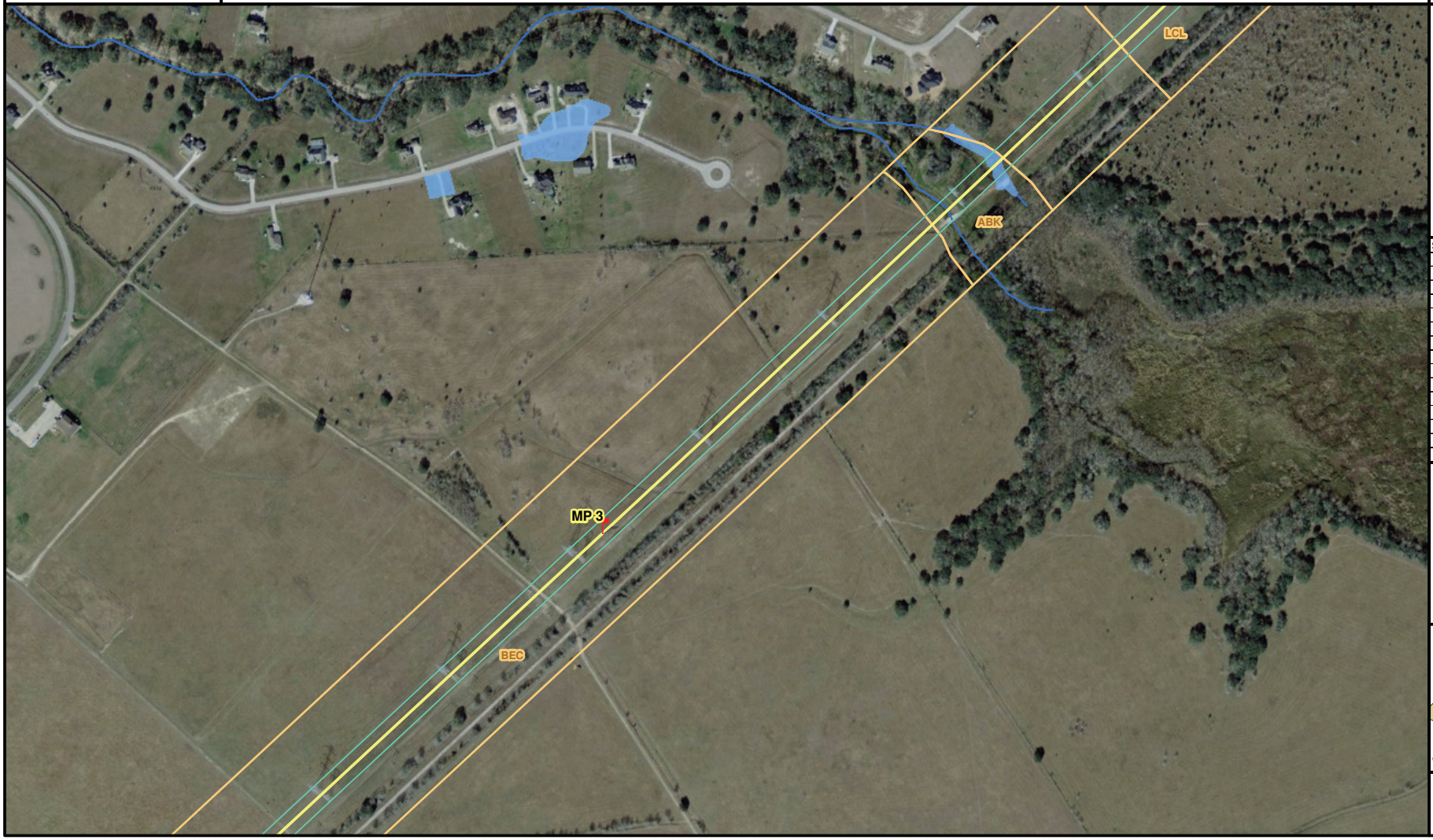
NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX



- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
BEC	Bernard-Edna-Cieno-Waller complex
Ch	Chicolete clay
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GBP	Ganado-Brazoria-Pledger clays
InB	Inez fine sandy loam
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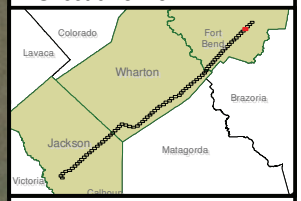
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 04 of 78



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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
BEC	Bernard-Edna-Cieno-Waller complex
Ch	Chicolete clay
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GBP	Ganado-Brazoria-Pledger clays
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Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 05 of 78

Fort Bend County

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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
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Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 06 of 78

Fort Bend County

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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
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BEC	Bernard-Edna-Cieno-Waller complex
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Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 07 of 78

Fort Bend County

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225/922-5700

NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
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BEC	Bernard-Edna-Cieno-Waller complex
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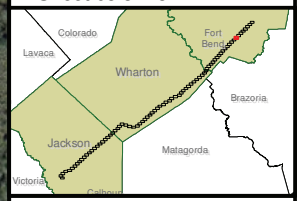
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

Sheet 08 of 78



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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
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BEC	Bernard-Edna-Cieno-Waller complex
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LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

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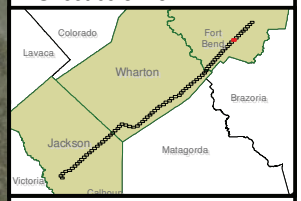

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NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Smithers Lake, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
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OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

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Fort Bend County

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NRG W. A. Parish CO_2 Pipeline

USGS Quads: Needville, TX
Smithers Lake, TX
Damon, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
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La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

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Fort Bend County

Texas

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225/922-5700

NRG W. A. Parish CO_2 Pipeline

USGS Quad:
Guy, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
BEC	Bernard-Edna-Cieno-Waller complex
Ch	Chicolete clay
CN	Clemville-Norwood complex
Da	Dacosta sandy clay loam
GBP	Ganado-Brazoria-Pledger clays
InB	Inez fine sandy loam
Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

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Fort Bend County

Texas

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0 350 700 Feet

UTMS Nad 83 Zone 14
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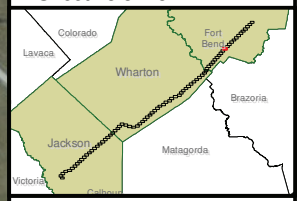

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UTMS Nad 83 Zone 14
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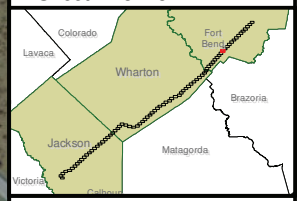
Sheet 14 of 78



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UTMS Nad 83 Zone 14
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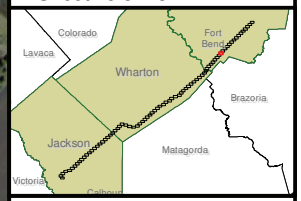

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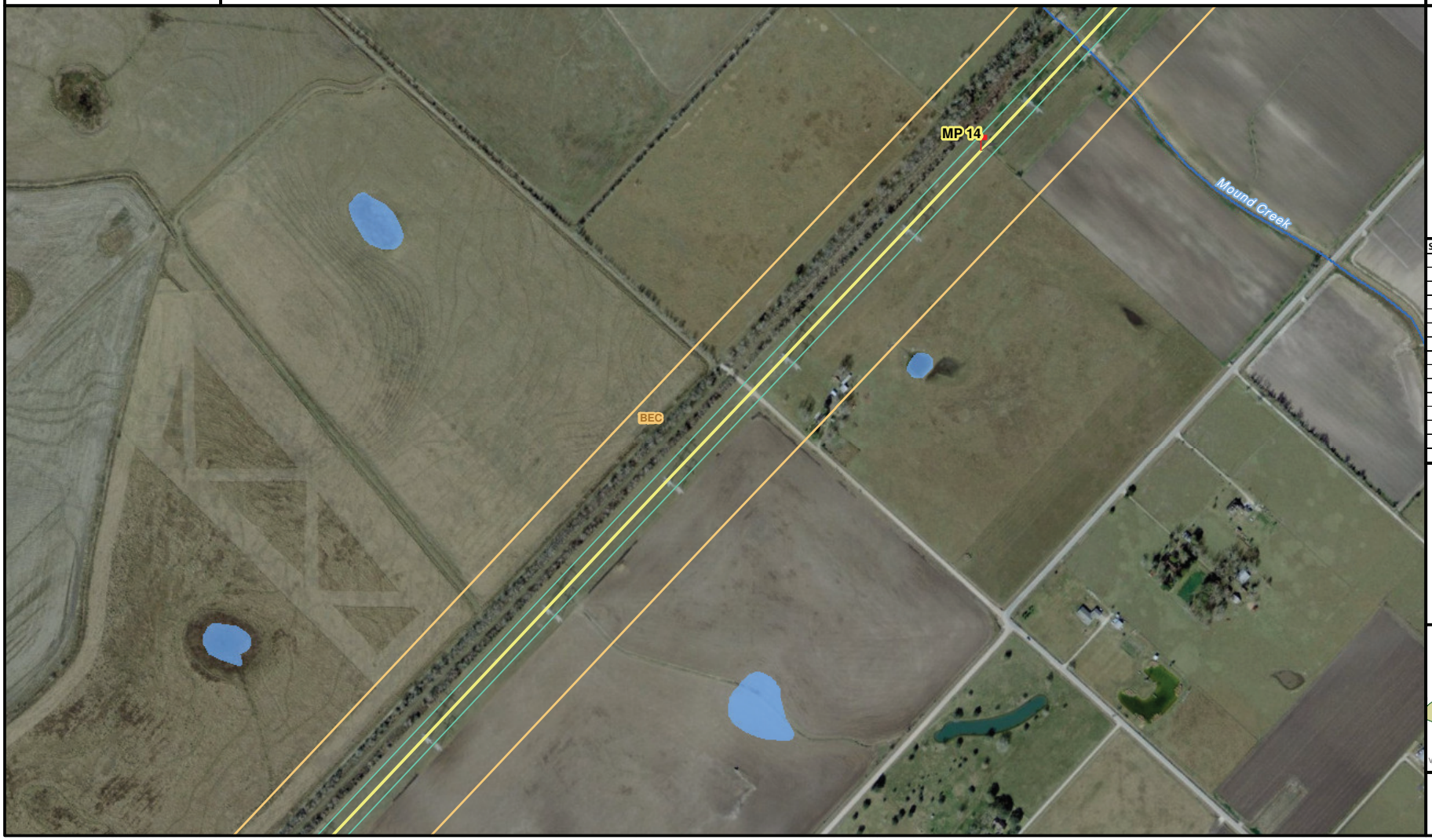

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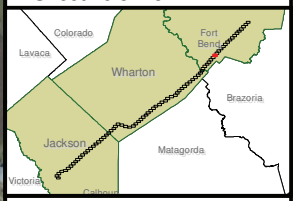

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UTMS Nad 83 Zone 14
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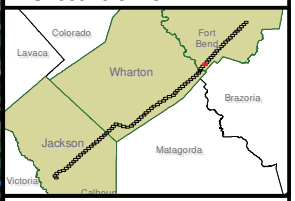

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UTMS Nad 83 Zone 14
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Fort Bend County

Texas

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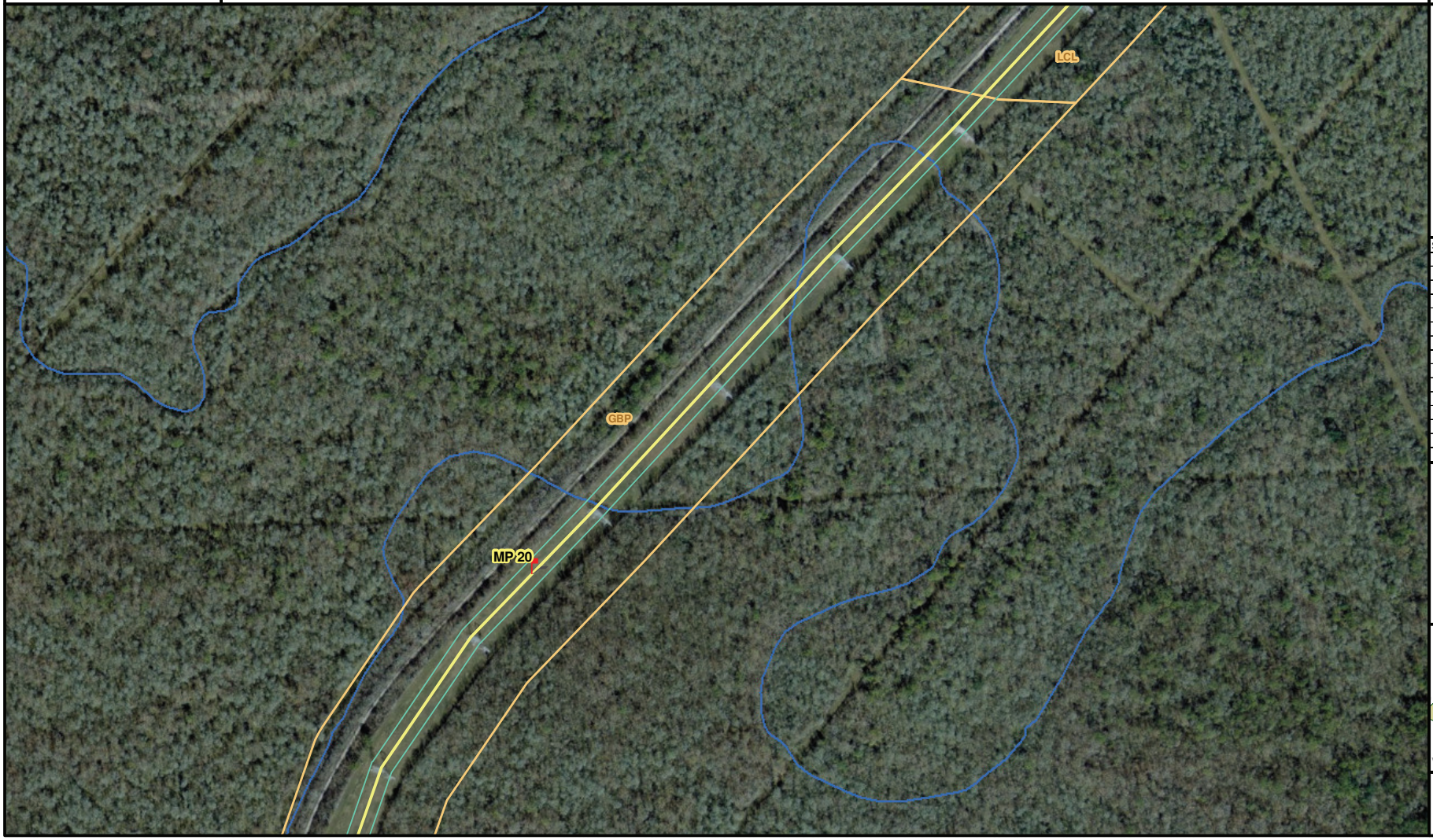
NRG W. A. Parish CO_2 Pipeline

USGS Quads:
Boling, TX
Guy, TX



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W	Water

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0 350 700 Feet

UTMS Nad 83 Zone 14
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Fort Bend County

Texas

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NRG W. A. Parish CO_2 Pipeline

USGS Quads:
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0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

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Wharton & Fort Bend County

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NRG W. A. Parish CO_2 Pipeline

USGS Quads:
Boling, TX
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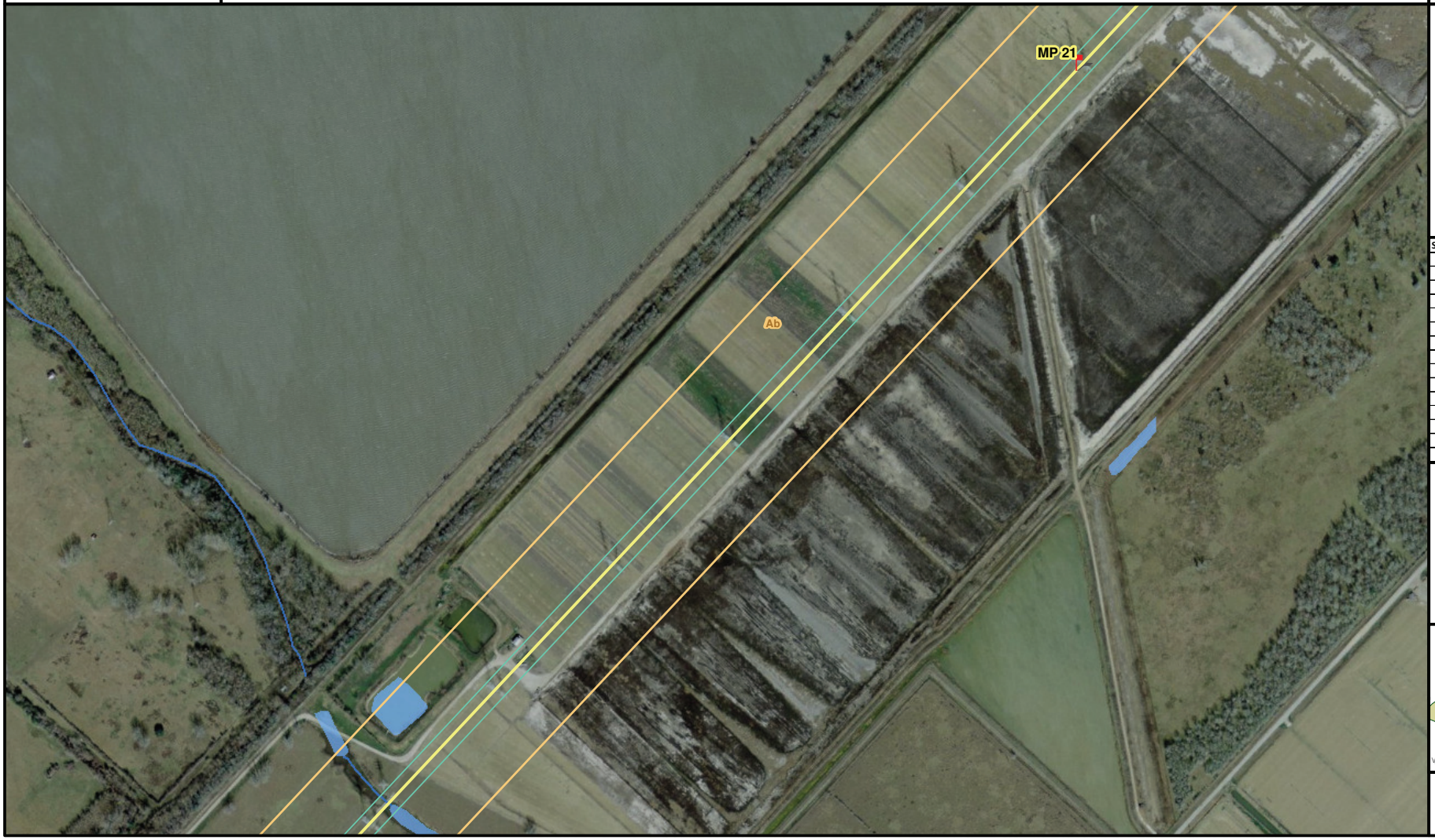

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Wharton County

Texas

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NRG W. A. Parish CO_2 Pipeline

USGS Quads:
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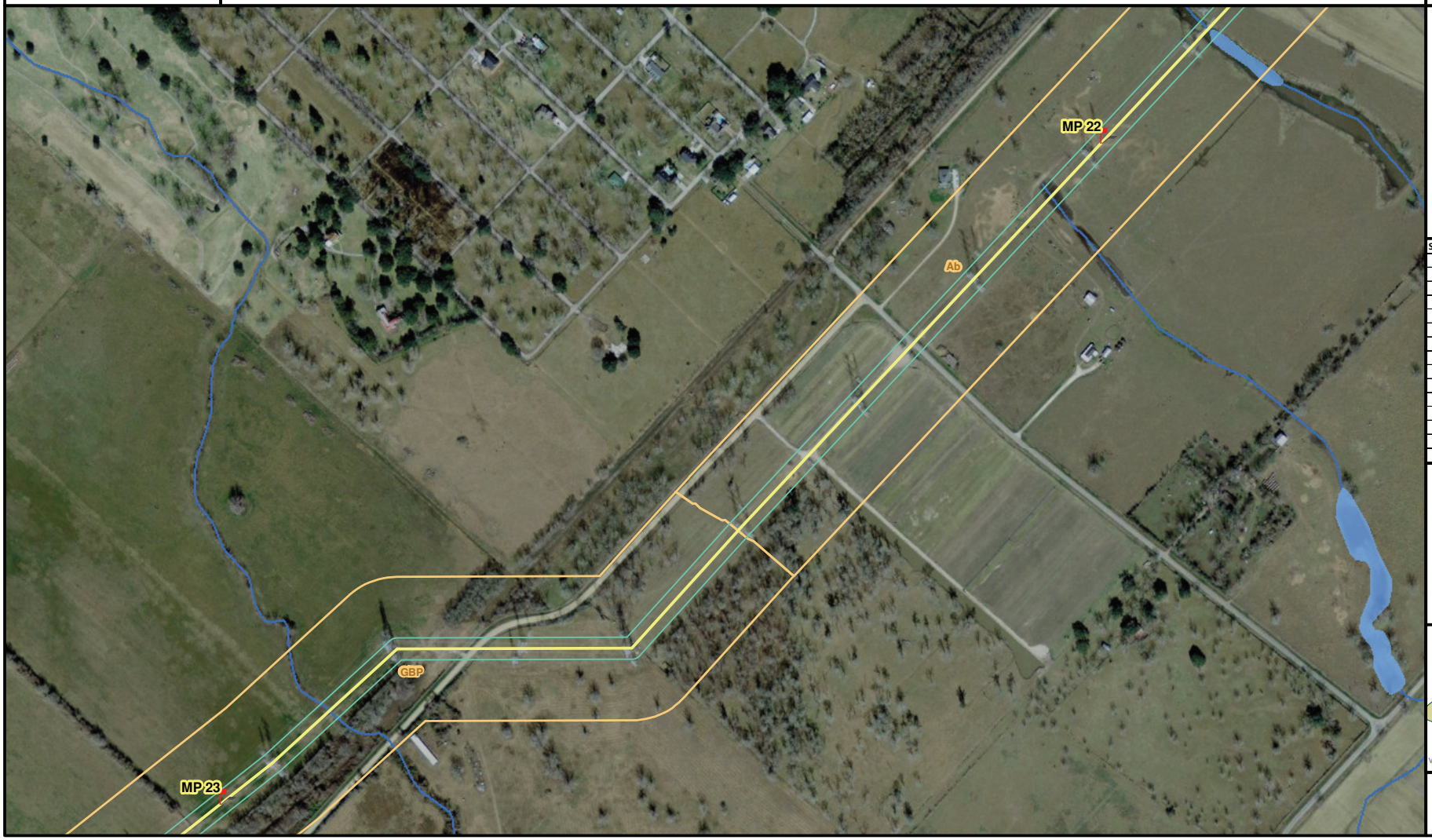

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UTMS Nad 83 Zone 14
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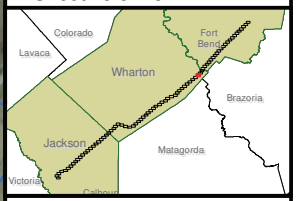

Wharton County

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NRG W. A. Parish CO_2 Pipeline

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Wharton County

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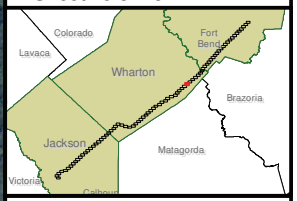

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Wharton County

Texas

URS
GIS Services and Solutions
7389 Florida Blvd
Baton Rouge, LA 70806
225/922-5700

NRG W. A. Parish CO_2 Pipeline

USGS Quads:
Lane City, TX
Pledger, TX

- Mile Post
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor
- Archaeological Site
- Cemetery
- Historical Marker

Symbol	Soil Grouping
ABK	Aransas clay, saline, frequently flooded
Ab	Asa silty clay loam
BEC	Bernard-Edna-Cieno-Waller complex
Ch	Chicolete clay
CN	Clemville-Norwood complex
Da	Dacosta sandy clay loam
GBP	Ganado-Brazoria-Pledger clays
InB	Inez fine sandy loam
Ka	Katy fine sandy loam
La	Laewest clay, 3-8% slope
LCL	Lake Charles-Laewest clays
Na	Navidad fine sandy loam
OWL	Oil-waste land
TC	Texana-Cieno sandy loams
W	Water

0 100 200 Meters
0 350 700 Feet

UTMS Nad 83 Zone 14
1:6,000

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Wharton County

Texas

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NRG W. A. Parish CO_2 Pipeline

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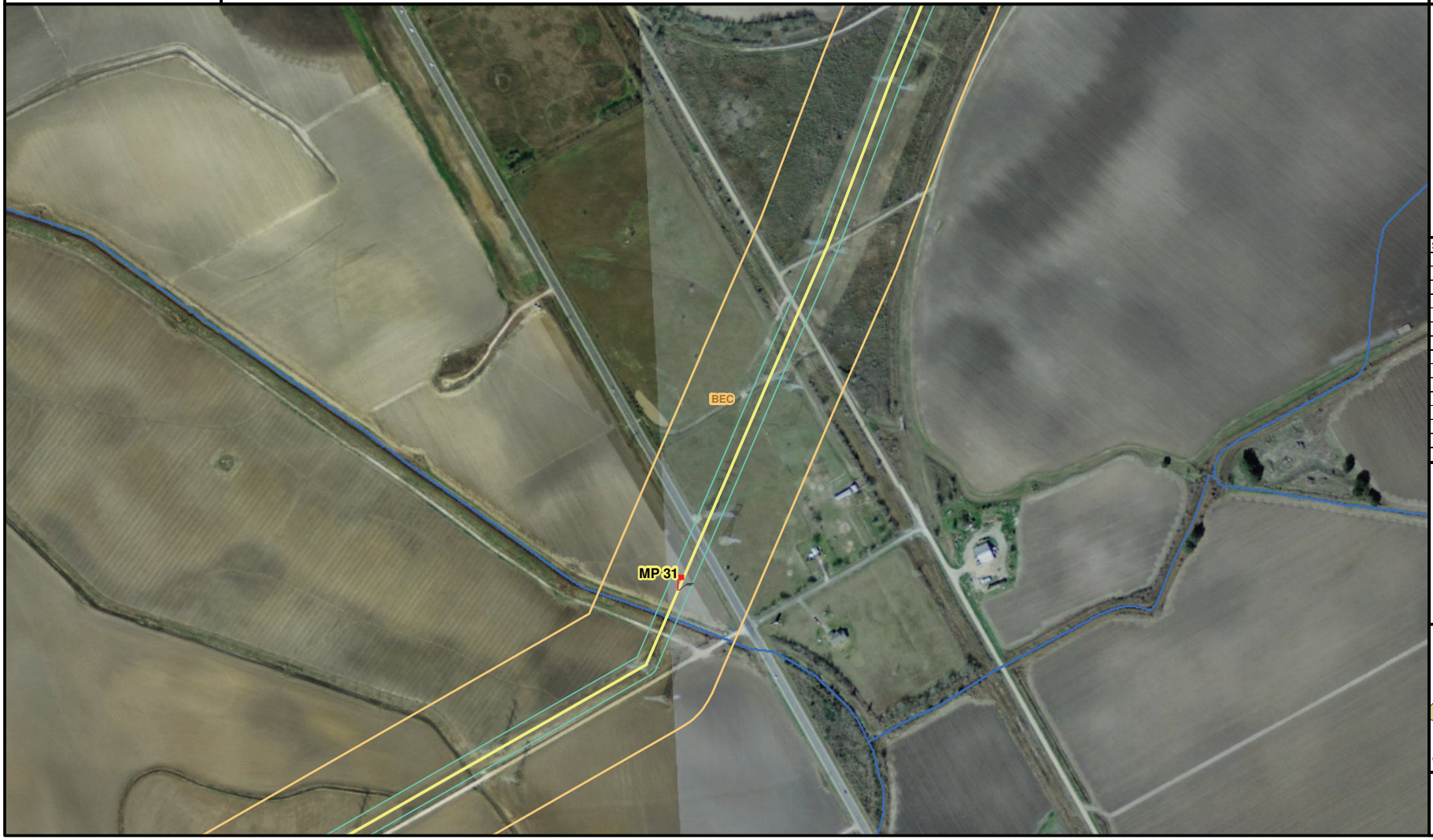

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0 350 700 Feet

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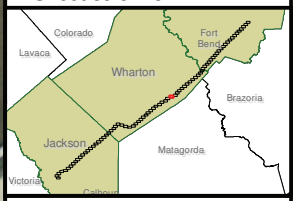

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