Cultural Resource Assessment Reports
Apex Bethel Energy Center
Anderson County, Texas

Prepared for

APEX Bethel Energy Center, LLC

Revised January 2013

CH2MHILL®

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January 11, 2013

Mr. Peter Barth
CH2M Hill
Five Penn Center West
Suite 300
Pittsburgh, Pennsylvania 15276

Re: Proposed 45-acre APEX CAES Bethel Dome project, Anderson County, Texas

Dear Mr. Barth:

William Self Associates, Inc. (WSA), in support of CH2M Hill, Inc. (CH2M), conducted archival research and a site assessment for a new location, 45-acre project in Anderson County, Texas (Figure 1). Apex Bethel Energy Center, LLC (Apex), proposes to construct the Bethel Energy Center (BEC), a 317 MW Compressed Air Energy Storage (CAES) facility near Tennessee Colony, Anderson County, Texas. CAES is a commercially available, economically attractive form of bulk energy storage for the electricity grid. CAES technology involves the storage of energy during off-peak demand periods as compressed air in an underground salt cavern and then releasing the compressed air during peak demand periods to generate electricity. CH2M has subcontracted WSA to conduct project cultural resource investigations, consistent with Section 106 of the National Historic Preservation Act (NHPA). The investigations were conducted under Section 106 of the National Historic Preservation Act (NHPA, 1992, as amended) in support of federal permitting associated with the U.S. Environmental Protection Agency (EPA), Region 6, greenhouse gas permit under the Clean Air Act. It is our understanding the project will not cross over state owned or controlled property at any locations, or involve state funds, and will take place entirely on private lands. The purpose of this letter is to provide a status report regarding the results of the initial cultural resource studies conducted by WSA to CH2M, which will conduct project coordination with the U.S. Environmental Protection Agency (EPA) and the Texas Historical Commission (THC).

PROJECT DESCRIPTION

The area of potential effect (APE) for archaeological cultural resources consists of a 45-acre site subject to ground disturbance in Anderson County, Texas (latitude/longitude 95.913202W 31.887457N). The proposed project is located at the southeast corner of the intersection of County Road (CR) 2706 and CR 2504. The project extends 650 m east along CR 2504 and 280 m south along CR 2706 (Figure 1).

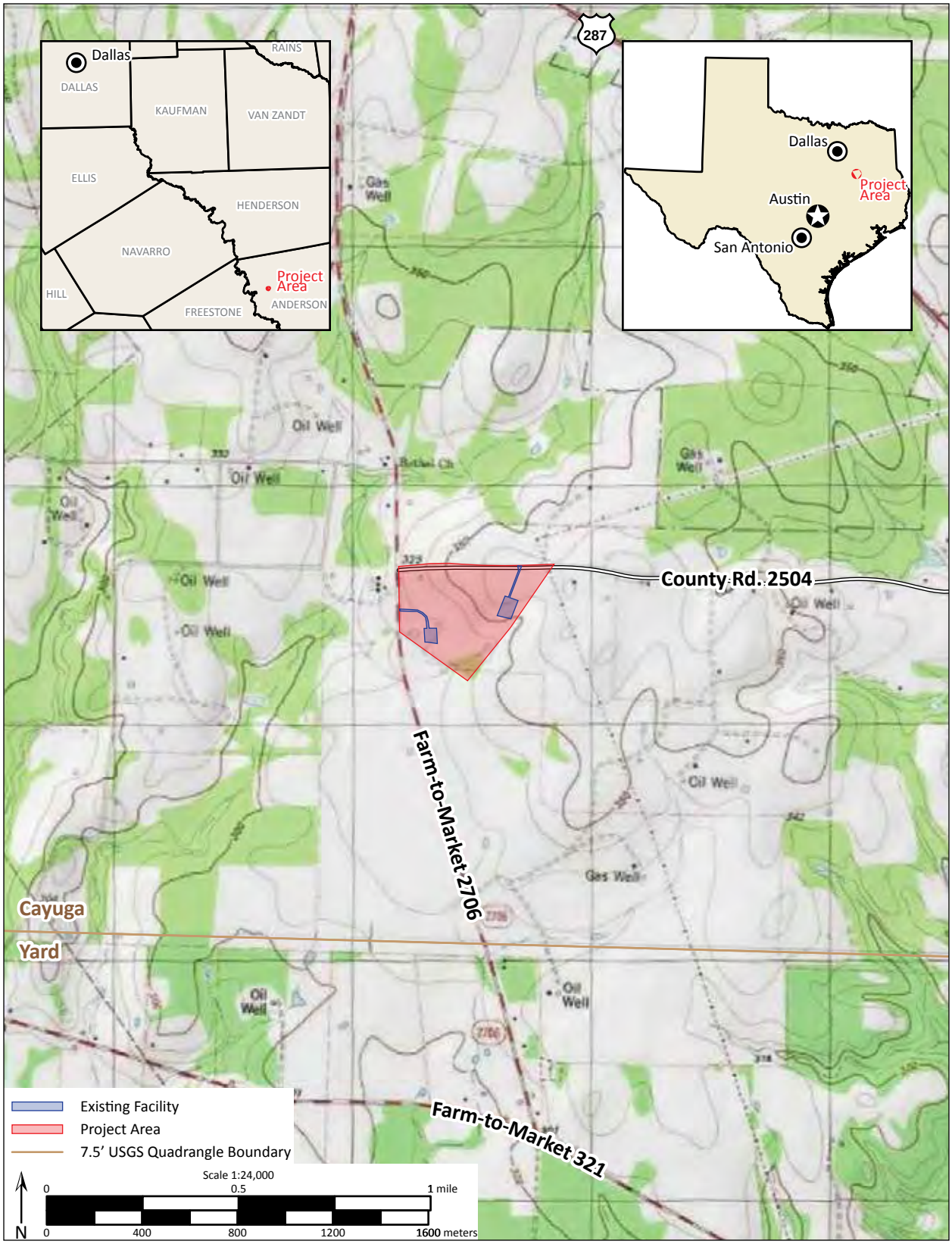

Figure 1. Overview of the proposed project area.

BACKGROUND INFORMATION

WSA has conducted a background records and literature search for the proposed project. This included a search of the Texas Archeological Sites Atlas (Atlas), an online resource hosted by the THC that contains restricted cultural resources information. The Atlas was consulted to identify any previously conducted surveys and determine whether any previously discovered prehistoric and historic archaeological sites, including properties or districts listed on the National Register of Historic Places (NRHP), as well as State Archeological Landmarks (SALs), historic markers, and Registered Texas Historic Landmarks may be located within 0.5 miles (805 m) of the project area. WSA also examined the Atlas and United States Geologic Survey (USGS) topographic maps for existing cemeteries and historic sites.

No sites, surveys, SALs, NRHP properties, or cemeteries were identified in the background search. Existing facilities on the property are less than 50 years of age.

ENVIRONMENT, SOILS, AND GEOLOGY

Examination of the Geologic Atlas of Texas, Palestine Sheet (Bureau of Economic Geology 1993) indicates the proposed project area is entirely located on Eocene-age surface formations. The eastern two-thirds of the project are located on Queen City Sand (Eqc) and the western one-third is on Recklaw Formation (Er); the general area is mapped as the Bethel Dome East Oil and Gas Field. Further research included examination of United States Department of Agriculture (USDA) soil maps of the area. The soils mapped in the area all form in the Eocene-age Claiborne Geologic Group. Rentzel loamy fine sand, 1 to 5 percent slopes (LeC), is mapped in the southwest corner of the project area; Rentzel soils form in sandy and loamy marine deposits. The majority of the rest of the project area is mapped as Lilbert loamy fine sand, 0 to 3 percent slopes (FuB), with pockets of Lilbert loamy fine sand, 3 to 8 percent slopes (FuD) in the southeast and northwest corners, as well as adjacent to the LeC in the southwest corner. Lilbert soils form in sandy and loamy marine deposits on uplands. Any Holocene deposition in this area would be a very thin veneer with a very low probability of buried cultural materials.

The topography of the area, as visible on the USGS Cayuga quadrangle (USGS 1982), is mostly flat, with a gentle slope to the southwest. There is an ephemeral, erosional drainage located in the southeast corner of the proposed project area. The drainage is a headwater of a series of small streams that eventually lead to Catfish Creek, a tributary to the Trinity River. The ephemeral stream has been heavily altered by the construction of several small ponds. An additional small pond has been constructed in the southwest corner of the proposed project area.

Existing disturbances to the proposed project area, in addition to the ponds, are numerous. They include several fences, two facilities, roads/driveways associated with the facilities, at least a half dozen pipelines, and two power line corridors.

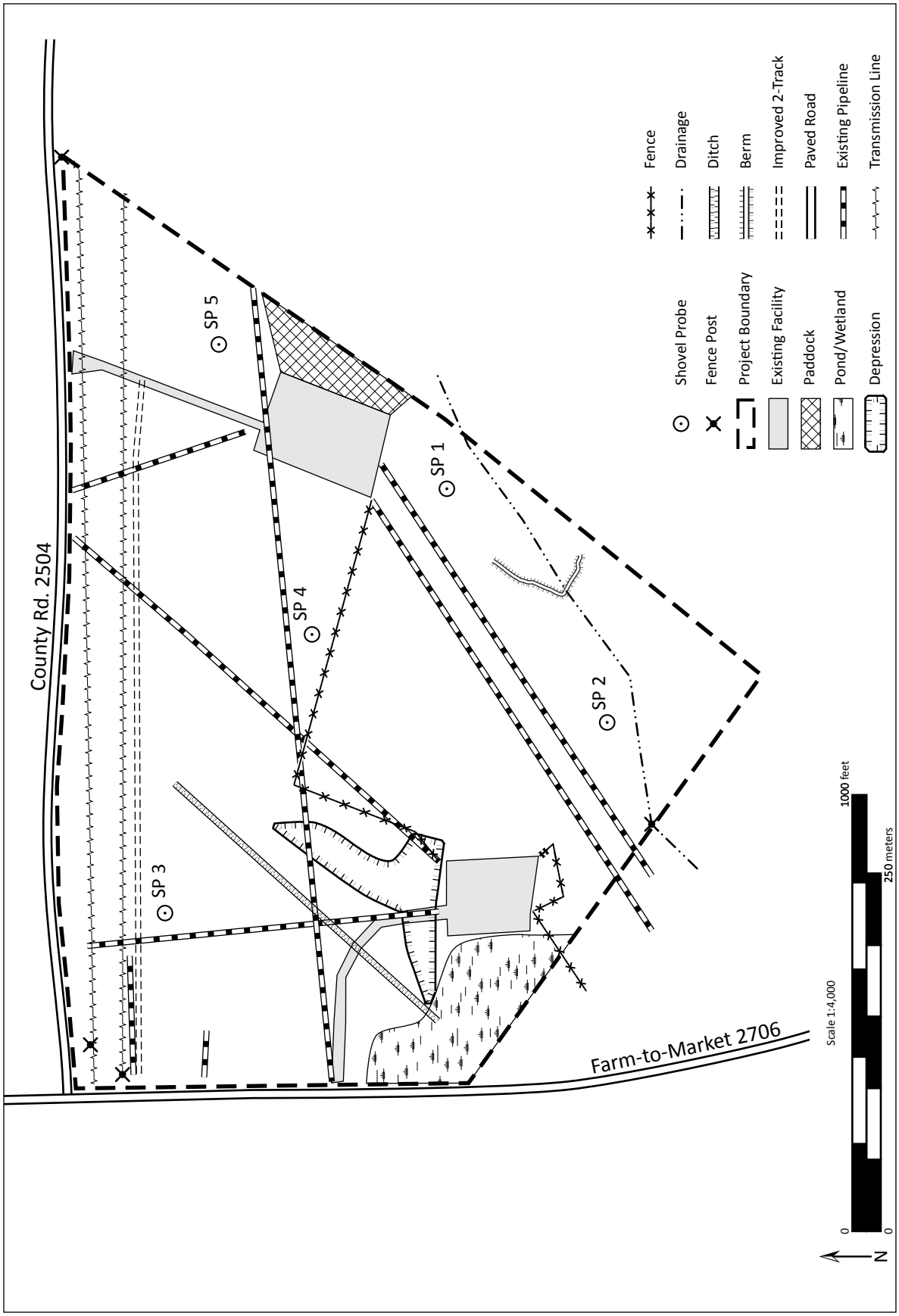

Figure 2. Disturbed areas located within the proposed project area.

SITE OBSERVATION

On March 1, 2012, WSA personnel conducted a site observation at the proposed project location to determine the extent of disturbance, observe the potential for intact surface sites, and to verify the nature of the soils in the area.

The site observation revealed extensive disturbance of the area (Figure 2). The northern 50 m of the property, roughly following the northern boundary, contain two power line corridors, a two-track road, and at least one pipeline, all running roughly east to west. There are existing gas facilities in the northeast and southwest corners, each with an improved gravel driveway to the public road (Photos 1 and 2). The southwest quadrant of the property has been heavily disturbed by large machinery; it appears the facility and road to the facility in the southwest corner are elevated and bermed with materials from the surrounding soils. There is also a heavily modified or entirely artificial pond and/or wetland in the southwest corner of the proposed project area (Photo 3). There is an artificial ditch running from north of the southwest corner facility to the pond, and an additional parallel ditch 40 m to the west (Photo 4). There are two fence lines that cross between the southwest and northeast corner facilities; most of the fencing had been removed at the time of the site visit.

A number of pipelines cross the proposed project area, including but not limited to:

- Two pipelines run to the northwest facility from the midpoint of the southern project boundary west of the creek.
- One or two pipelines run from the northern project boundary in the northeast quadrant to the northeast facility.
- Two pipelines marked as entering on the western boundary that do not have a fully identifiable direction due to the many pipeline markers on the property; they likely run east and/or southeast to the existing facilities.
- One pipeline runs from the western project boundary, north of the driveway to the southwest facility, to the eastern boundary, north of the northwest facility.
- One or two pipelines run from roughly center of the northern boundary to the southwest facility.

East of the northeast facility the area is entirely disturbed by a fenced livestock paddock area. Finally, it appears the creek in the southeast corner has been somewhat channelized and contains several ponding berms. The edges of the creek have small dredge ridges and there is a substantial ponding berm located on the property (Photo 5), and two located downstream just south of the property.

Visual observation of the ephemeral creek in the southeast corner of the proposed project area revealed the creek above the pond on the property has a channel about 1 m wide by 0.25 m deep. The creek below the pond on the property had a channel roughly 4 m wide and 1 m deep (Photo 6). Two shovel probes (SP 1 and SP 2) 40 cm (15.75 inches) deep were placed adjacent to the creek channel on the T1 terrace beyond the obvious dredge berms. These tests both showed dark yellowish-brown sandy loam with manganese staining; the southern of the tests was saturated below 30 cm below surface (Table 1). These profiles are in keeping with the ancient soils mapped in the area. The vegetation around the creek included cedar, oak, thorny vines, and clump grasses;

Photo 1. Existing gas facility in the northeast corner of the proposed project area, view to the southwest.

Photo 2. Existing gas facility in the southwest corner of the proposed project area, view to the north.

Photo 3. Artificial pond in southwest corner of the proposed project area, view to the south.

Photo 4. View of the ditches north of the southwest facility heading to the artificial pond, view to the north-northwest.

Photo 5. Ponding berm on the creek in the southeast corner of the proposed project area, view to the east-southeast.

Photo 6. Creek channel in the southeast corner of the proposed project area, below the ponding berm, view to the southeast.

Table 1. Results of shovel probes.

Shovel Probe	Description	Termination
1	0–40 cmbs 10YR 4/4 dark yellowish brown sandy loam with many manganese stains	40 cmbs (15.75 inches)
2	0–40 cmbs 10YR 4/4 dark yellowish brown sandy loam with many manganese stains, saturated below 30 cmbs	40 cmbs (15.75 inches)
3	0–30 cmbs 10YR 4/6 dark yellowish brown sandy loam; 30–40 cmbs 10YR 6/6 brownish yellow sandy loam, very compact	40 cmbs (15.75 inches)
4	0–30 cmbs 10YR 4/6 dark yellowish brown sandy loam; 30–40 cmbs 10YR 6/6 brownish yellow sandy loam, very compact	40 cmbs (15.75 inches)
5	0–30 cmbs 10YR 4/6 dark yellowish brown sandy loam; 30–40 cmbs 10YR 6/6 brownish yellow sandy loam, very compact	40 cmbs (15.75 inches)

ground surface visibility was zero percent. All of the ground cover around the creek was thoroughly searched for evidence of artifacts and features. No prehistoric or historic artifacts or features were observed. All probes were negative for cultural material.

Visual observation of the hill comprising most of the property had 30 to 70 percent surface visibility through recently mowed pasture grass. The hill was walked in judgmental transects and three additional shovel probes were conducted to 40 cm (15.75 inches) in order to determine the nature of the soil (SPs 3–5). All three probes showed 30 cm (12 inches) of dark yellowish-brown sandy loam over very compact brownish yellow sandy loam (Table 1). These soils are mostly consistent with the ancient soils mapped in the area, with the addition of a roughly 30-cm plowzone. The plowzone is not well defined and suggests the area has not been intensively plowed. No prehistoric or historic artifacts or features were observed. All probes were negative for cultural material.

Further observation of the property and surrounding area did not reveal any historical-age structures on or within 50 m of the project area.

SUMMARY

Previous disturbances and the geology of the area of the proposed project indicate that the potential for the presence of buried historic or prehistoric deposits is very low, and it is recommended that no systematic pedestrian archaeological survey of the proposed project area is warranted. The additional data provided from the site observation further accentuates the severely disturbed nature of this property and the very low likelihood of historic or prehistoric materials to be present on the property.

WSA submits this status report to CH2M, which will coordinate cultural resources clearance with the U.S. EPA and the THC. We recommend and request SHPO concurrence that no NHPA Section 106 archaeological survey or further archaeological assessment is required and that the project may proceed relative to NHPA Section 106 without further regard for archaeological cultural resources, and that all Apex BEC project Section 106 consultation with regard to archaeological cultural

resources be considered concluded and complete. A Section 106 architectural inventory for standing historic structures and buildings within an appropriate APE will be conducted and coordinated with the SHPO under separate cover. If there are any questions or additional information needed please feel free to contact me.

Sincerely,

James W. Karbula Ph.D., RPA
WSA Regional Project Director

REFERENCES CITED

Bureau of Economic Geology (BEG)

1993 *Geologic Atlas of Texas, Palestine Sheet* [map] Scale 1:250,000. Bureau of Economic Geology, University of Texas at Austin. Electronic map, http://www.twdb.state.tx.us/groundwater/aquifer/GAT/palestine.htm, accessed February 22, 2012.

United States Geological Survey (USGS)

1982 *Cayuga, Tex. Topographic Quadrangle* [map]. Scale 1:24,000. United States Geological Survey, Reston, Virginia.

APPENDIX. RESUME FOR JAMES KARBULA

James Karbula, Ph.D., RPA — Regional Project Director

EDUCATION

2000	Ph.D.	Anthropology, University of Texas, Austin
1989	M.A.	Anthropology, University of Texas, San Antonio
1986	B.A.	English, University of Texas, San Antonio

PROFESSIONAL EXPERIENCE

William Self Associates, Inc., Austin, Texas
Regional Project Director and Principal Investigator, 2008–Present

- Supervised all aspects of Austin office including all business relations, staff, and facility management.
- Serves as regional project director and principal investigator on major survey and data recovery projects in the Southern region.
- Responsibilities include the coordination and management of all projects, including development and tracking of project schedules and budgets, supervision of staff in both the office and the field, staff allocation, writing and review of reports, preparation of budgets, technical scopes, and business development proposals, and acting as a point of contact for clients for the Austin office
- Coordinates with local, state, federal, and SHPO regulatory staff in a variety of compliance settings under Section 106 of the National Historic Preservation Act (NHPA), NEPA, and the Texas Antiquities Code (TAC)
- Over 16 years of supervisory experience as cultural resource director documenting cultural resources in the Southern region, especially throughout Texas
- Holds a New Mexico State Archaeology Permit, has held Archaeological Resource Protection Act Permits (ARPA, Texas, and New Mexico) and is listed on the Texas, New Mexico, Oklahoma and Louisiana SHPO lists
- Recently served as regional project director/principal investigator for:
    - AGL Resources, Golden Triangle Storage project (TX)
    - Naismith Engineers, Koch Helena Gathering System and Drees Segment (TX)
    - Tim Glendening Associates, City of Baytown Wastewater Treatment Plant Expansion (TX)
    - U.S. Department of Agriculture, Ouachita National Forest, Jones Creek Watershed Inventory (AR)
    - U.s. Department of Agriculture, Ouachita National Forest, Broken Bow Watershed Inventory, (OK)
    - CH2M Hill, Denbury Conroe 88-mile Pipeline project (TX)
    - National Park Service, Lake Veterans Dam Project, Chickasaw National Recreation Area (OK)
    - CH2M Hill, Koch Industries 60 and 24-mile Pipeline projects (TX)
    - Brown & Gay Engineers (BGE), KMTP Line 127 30-inch Pipeline Replacement project (TX)
    - Power Engineers, Oncor BCE TNP 1 Transmission Line project (TX)
    - CH2M Hill, USIBWC Rio Grande Canalization Levee Rehabilitation project (TX, NM)

AGL Resources, Golden Triangle Storage project, 2008–2013

- Beaumont, Jefferson County, Texas
- Served as principal investigator and project manager for archival research, survey, and mitigation of ca. 1900 industrial and residential remains at the Spindletop Oil Field, a National Historic Landmark
- Identified archeological sensitivity zones of intact Spindletop remains, conducted Section 106 SHPO and FERC coordination, developed and executed project avoidance strategies, directed mitigation of impacted areas, and prepared project reports
- Cultural resources encountered in the project area include: late nineteenth-century industrial and residential remains related to the NHL Spindletop Oil Field
- Received the Texas Historical Commission Award of Merit in Archaeology 2011 for excellence in field investigations, reporting and public involvement on the Golden Triangle Storage Project, and the 2012 Council of Texas Archeologists E. Mott Davis Award for Excellence in Public Outreach.

Hicks & Company, Austin, Texas
Program Manager and Principal Investigator, September 1996–December 2007

- Directed numerous prehistoric and historic survey, testing, and data recovery projects subject to NHPA Section 106 and Texas Antiquities Code (TAC) compliance in virtually all areas of Texas.
- Responsible for reporting results of company archaeological projects.

- Example projects include:
    - Survey, testing, and data recovery of the Davis Springs Branch Site (41WM989), which documented 7000 years of prehistoric occupation, two burned rock middens, and an extensive series of marsh sediments containing pollen, resulting in a 5000 year sequence of paleoenvironmental data;
    - Section 106 compliance under the Exclusive Development Agreement (EDA) for the design-build of SH 130, Austin, Texas, which included data recovery of the Berdoll Site (41TV2125) resulting in documentation of 4-m deep Early Archaic camp dated at 8200 BP including numerous features and faunal materials;
    - Data recovery of 5 city block area in downtown Austin, Texas in advance of the New City Hall project. Functioned as principal investigator for excavations of extensive late 19th century urban remains in Austin's famous red light district known as "Guytown", a notorious boarding house, saloon, gambling and prostitution area. Resulted in the discovery and designation of the subterranean Schneider beer vaults as a City of Austin Historic Landmark. Dr. Karbula received the THC 2003 Award of Merit in Archaeology and the E. Mott Davis Award for outstanding public involvement on the project.

SELECTED PUBLICATIONS and REPORTS

2012 *The Lucas Gusher/Spindletop Oil Field National Historic Landmark Phase 2 Archaeological Investigations of the Golden Triangle Storage Project 90-acre Central Storage Site, Beaumont, Jefferson County, Texas* (senior author with D. Black and S. Trussell). WSA Technical Report No. 2012-13. William Self Associates, Austin, Texas.

2012 *Archaeological Investigations of the Koch Helena Gathering System Crude Oil Pipeline, KAS and Drees Segments, Karnes County, Texas* (second author with D. Black). WSA Technical Report 2012-29. William Self Associates, Inc. Austin.

2011 The Berdoll Site: An Early Archaic Camp on Onion Creek, Travis County, Texas. (senior author with J. Campbell and B. Jones). *Bulletin of the Texas Archeological Society* 82:135-173.

2011 *Final Summary Report: Cultural Resources Survey for Bell County East to TNP 1, Bell, Milam, and Robertson Counties, Texas*. (senior author with Deidra Black). Power Engineers Project No. 120618, WSA Technical Report No. 2010-57. Power Engineers Inc., Boise, Idaho.

2011 *Intensive Archaeological Survey of 647 Acres in the Jones Creek Watershed of the Poteau Ranger District, USDA Ouachita National Forest, Scott County, Arkansas*. (senior author with D. Black, J. Gillentine and M. Palmison). Technical Report No. 2010-85. William Self Associates, Austin, Texas.

2010 *Golden Triangle Storage Project: Phase 1 Cultural Resources Final Report.* (senior Author with E. Stinchcomb). Technical Report No. 2008-21. William Self Associates, Austin, Texas.

2010 *National Park Service Archaeological Survey Of Areas To Be Impacted By The Rehabilitation Of The Veterans Lake Dam Within The Platt Historic District Chickasaw National Recreation Area, Veterans Lake, Sulphur, Oklahoma*. (second author with E. Stinchcomb and D. Stone). Technical Report No. 2009-54. William Self Associates, Austin, Texas.

2009 *Archaeological Investigations of the USIBWC Rio Grande Canalization Project, El Paso County, Texas and Dona Ana County, New Mexico, Final Report*. (second author with E. Stinchcomb, C. Leezer, D. Stone, C. Frederick and S. O'Mack). Technical Report No. 2008-33. William Self Associates, Austin, Texas.

2007 *The AEP/LCRA Del Rio Transmission Line Rebuild Project. Archeological Mitigation Excavations at Site 41UV68, Uvalde County, Texas* (second author, with M. Miller, B. Jones, and S. C. Caran). Archaeology Series No. 179. Hicks & Company, Austin, Texas.

2004 The Toyah Bluff Site (41TV441): Changing Notions of Late Prehistoric Subsistence in the Blackland Prairie, Travis County, Texas. (sole Author). *Bulletin of the Texas Archeological Society* 74:55-82.

PROFESSIONAL MEMBERSHIPS

Register of Professional Archaeologists (RPA), Council of Texas Archeologists (CTA), Texas Archeological Society (TAS)

Archaeological Survey of the Apex Bethel Energy Center Trinity River Pipeline, Water Well Pad and Pipeline Areas, and ETC Connector Pipeline Area, Anderson County, Texas

Prepared by
Deidra A. Black and James W. Karbula

Prepared for
CH2M HILL Engineers, Inc.
Five Penn Center West, Suite 300
Pittsburgh, PA 15276

Trinity River from the levee at the western terminus of the proposed pipeline and wastewater discharge point, view to the west

January 2012
WSA Technical Report No. 2012-56

William Self Associates, Inc.
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WSA

Archaeological Survey of the Apex Bethel Energy Center Trinity River Pipeline, Water Well Pad and Pipeline Areas, and ETC Connector Pipeline Area, Anderson County, Texas

Prepared by
Deidra A. Black and James W. Karbula

Submitted by
Deidra A. Black, M.A., RPA
Principal Investigator

Prepared for
CH2M HILL Engineers, Inc.
Five Penn Center West, Suite 300
Pittsburgh, PA 15276

January 2013
WSA Technical Report No. 2012-56

William Self Associates, Inc.
206 W. Main Street, Suite 111
Round Rock, TX 78664

ABSTRACT

Report Title: *Archaeological Survey of the Apex Bethel Energy Center Trinity River Pipeline, Water Well Pad and Pipeline Areas, and ETC Connector Pipeline Area, Anderson County, Texas*

Report Date: January 11, 2013

Report Number: WSA Technical Report No. 2012-56

Agency: U.S. Environmental Protection Agency (EPA), Region 6 (lead agency); U.S. Army Corps of Engineers (USACE), Fort Worth District

Permit Number: none

Project Description: William Self Associates, Inc. (WSA), in support of CH2M HILL Engineers, Inc. (CH2M HILL), conducted Phase I archaeological survey of a proposed new wastewater/water pipeline approximately 4.0 miles in length (6.44 km, 97 acres) and associated facilities in Anderson County, Texas. Apex Bethel Energy Center, LLC (Apex), proposes to construct the Bethel Energy Center (BEC), a 317 MW Compressed Air Energy Storage (CAES) facility near Tennessee Colony, Anderson County, Texas. The proposed project will connect the BEC main plant energy production to the Trinity River via a 4.0-mile pipeline corridor. Two pad locations for water wells (2.4 acres), one access road (0.7 miles, 4.24 acres), and the Energy Transfer Corporation (ETC) connector pipeline area (1.0 acre) were also surveyed. The survey was conducted under Section 106 of the National Historic Preservation Act (NHPA, 1992, as amended) in support of federal permitting associated with the U.S. Environmental Protection Agency (EPA), Region 6, greenhouse gas permit under the Clean Air Act and the U.S. Army Corps of Engineers (USACE), Fort Worth District, Clean Water Act, Section 404/Rivers and Harbors Act, Section 10 Permit.

The project area of potential effect (APE) consists of approximately 4.0 miles (6.44 km, 97 acres) of wastewater/water pipeline corridor, one wastewater discharge point, one access road corridor (0.7 miles, 4.24 acres), two water well locations (2.4 acres), and one ETC connector pipeline area (1.0 acre). The APE is approximately 104.6 acres in size. The archaeological survey assumed a pipeline survey corridor approximately 4.0 miles (6.44 km) in length and 200 feet (60 m) in width (100 feet [30 m] on either side of the centerline), focusing on all floodplain areas located immediately adjacent to USACE jurisdictional waters, and included two water wells, one access road corridor, one wastewater discharge area, and one Energy Transfer Corporation (ETC) connector pipeline area located adjacent to the main plant facility. The survey consisted of a 100 percent pedestrian walkover of all USACE jurisdictional drainage areas, and all additional, identified project areas supplemented by shovel testing. The survey covered a total area of approximately 36 acres. A combined total of 1.3 miles (2.1 km) of linear elements were surveyed and a total of 110 negative shovel tests were excavated in support of pedestrian survey. No archaeological sites, historic architecture, or other cultural resources were identified.

Acres Surveyed: 36

Project Number: WSA Project No. 2012-57

Project Location: northwest Anderson County, near Tennessee Colony, Texas

Unevaluated Properties: 0

NRHP Eligible Properties: 0

NRHP Ineligible Properties: 0

NRHP Listed Properties: 0

Isolated Occurrences: 0

Total Project Resources: 0

Recommendations: WSA concludes and respectfully requests concurrence that there exists a low probability that properties eligible for the National Register of Historic Places (NRHP) or as a State Archeological Landmark (SAL) in or adjacent to jurisdictional waters of the USACE will be impacted by the proposed construction of approximately 4.0 miles (6.44 km) of wastewater/ water pipeline and associated facilities due to the negative results of survey and subsurface testing. WSA recommends and respectfully requests that construction within the APE (approximately 104.6 acres) including the approximately 4.0-mile (6.44-km, 97-acre) wastewater/water pipeline, one access road (0.7 miles, 4.24 acres), two water wells (2.4 acres), and modifications to the ETC connector pipeline area (1.0 acre) be allowed to proceed under Section 106 of the NHPA, and that all Section 106 consultation for the proposed pipeline be considered complete.

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MANAGEMENT SUMMARY

William Self Associates, Inc. (WSA), is supporting CH2M HILL Engineers, Inc. (CH2M HILL), in providing a Phase I archaeological survey of a proposed new wastewater/water pipeline, water well pad locations and connector pipeline corridors for the Apex Bethel Energy Center in Anderson County, Texas (Figure 1). Apex Bethel Energy Center, LLC (Apex) proposes to construct the Bethel Energy Center (BEC), a 317 MW Compressed Air Energy Storage (CAES) facility located near Tennessee Colony, Anderson County, Texas. WSA conducted intensive pedestrian survey with shovel testing of approximately 4.0 miles (6.44 km, 97 acres) of wastewater/water pipeline corridor, one access road (0.7 miles, 4.24 acres), two water well locations (2.4 acres), and the Energy Transfer Corporation (ETC) connect pipeline area (1.0 acre) located near the main plant facility. The survey was conducted under Section 106 of the National Historic Preservation Act (NHPA, 1992, as amended) in support of federal permitting associated with the U.S. Environmental Protection Agency (EPA), Region 6 greenhouse gas permit under the Clean Air Act and the U.S. Army Corps of Engineers (USACE), Fort Worth District, Clean Water Act, Section 404/Rivers and Harbors Act, Section 10 permit. It is our understanding that the project will not cross over state-owned or -controlled property at any location or involve state funds, and will take place entirely on private lands.

There are four streams (S1-4) and five wetlands (WL 1-5) that will be subject to open-cut trenching and EPA and USACE permitting. Consistent with similar and previous northeast Texas pipeline projects subject to Section 106, archaeological survey focused on the stream banks and immediate flood terraces and any horizontal directional drill (HDD) locations (200 feet by 200 feet) at USACE jurisdictional drainage crossings. A 100 percent pedestrian survey was conducted of these areas at 30-m transect intervals with shovel tests spaced every 30 m along transects within a 200-foot corridor. Pedestrian survey and shovel testing of the alignment survey corridor was conducted along two parallel 30-m transects focused on the entirety of the width of observed floodplains and associated Holocene sediments, or within 125 feet of wetlands/waterbodies in areas of shallow or no Holocene sediment deposition. Deep, mechanical subsurface testing (backhoe trenches) was not conducted due to demonstrated ancient sediments exhibiting only thin Holocene sediment veneers, and/or hazardous and disturbed floodplain settings with no machine access (Trinity River). The smaller drainages represent limited Holocene sediment deposition and were subject to pedestrian survey and shovel testing.

The project area of potential effect (APE, approximately 104.6 acres) consists of approximately 4.0 miles (6.44 km, 97 acres) of wastewater/water pipeline corridor, one wastewater discharge point, one access road corridor (0.7 miles, 4.24 acres) , two water well locations (2.4 acres), and one ETC connector pipeline area (1.0 acre). These components will be buried, confined to the surface, or in limited areas such as the ETC connector pipeline area, extend no more than 4 to 5 feet above ground. The survey covered a total area of approximately 36 acres. A combined total of 1.3 miles of linear elements were surveyed and a total of 110 negative shovel tests were excavated in support of pedestrian survey. No archaeological sites, historic architecture, or other cultural resources were identified.

WSA concludes and respectfully requests concurrence that there exists a low probability that properties eligible for the National Register of Historic Places (NRHP) or as a State Archeological Landmark (SAL) in or adjacent to jurisdictional waters of the USACE will be impacted by the proposed construction of the approximately 4.0 miles (6.44 km) of wastewater/water pipeline and associated facilities due to the negative results of survey and subsurface testing. WSA recommends and respectfully requests that construction within the APE (approximately 104.6 acres) including the approximately 4.0-mile (6.44-km, 97-acre) wastewater/water pipeline, one access road (0.7 miles, 4.24 acres), two water wells (2.4 acres), and modifications to the ETC connector pipeline area (1.0 acre) be allowed to proceed under Section 106 of the NHPA, and that all Section 106 consultation for the proposed pipeline be considered complete.

INTRODUCTION

William Self Associates, Inc. (WSA), in support of CH2M Hill Engineers, Inc. (CH2M HILL), has conducted intensive Phase I pedestrian survey with shovel testing of a proposed new wastewater/ water pipeline, water well pad locations, and connector pipeline corridors for the Apex Bethel Energy Center in Anderson County, Texas (Figure 1). Apex Bethel Energy Center, LLC (Apex), proposes to construct the Bethel Energy Center (BEC), a 317 MW Compressed Air Energy Storage (CAES) facility located near Tennessee Colony, Anderson County, Texas. CAES is a commercially available, economically attractive form of bulk energy storage for the electricity grid. CAES technology involves the storage of energy during off-peak demand periods as compressed air in an underground salt cavern and then releasing the compressed air during peak demand periods to generate electricity. As part of this project, a 4.0-mile (6.44-km) wastewater/water pipeline corridor, two water well pad areas, and associated water pipeline connector corridors will be disturbed as part of construction activities.

The survey was conducted under Section 106 of the National Historic Preservation Act (NHPA, 1992, as amended) in support of federal permitting associated with the U.S. Environmental Protection Agency (EPA), Region 6, greenhouse gas permit under the Clean Air Act and by the U.S. Army Corps of Engineers (USACE), Fort Worth District, Clean Water Act, Section 404/Rivers and Harbors Act, Section 10 permit. Survey investigations were consistent with the requirements of Section 106 (36 CFR 800) of the NHPA; the Texas Natural Resources Code Title 9, Chapter 191 (Antiquities Code of Texas); and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716-44742), and were conducted in accordance with the Archeological Survey Standards for Texas and the guidelines established by the Council of Texas Archeologists (CTA).

Project Area Description

One proposed project area with six components is identified (Figure 1). The proposed project is located in northwest Anderson County, bounded by the Trinity River to the west and County Road (CR) 321 to the south, and extends past Farm-to-Market (FM) 2706 to the east. The six components are the 4.0-mile (6.44-km) wastewater/water pipeline corridor, Apex Water Well No. 1/1A pad, Apex Water Well No. 2/2A pad, one water well access road corridor to Apex Water Well No. 2/2A pad, the wastewater discharge area located at the Trinity River, and the Energy Transfer Corporation (ETC) connector pipeline area located adjacent to FM 2706.

The water and wastewater pipeline construction will consist entirely of open-cut trenching. The alignment for this component consists of one linear project approximately 4.0 miles (6.44 km) in length. The wastewater/water pipeline corridor starts at the Apex site, east of FM 2706 and south of CR 2504, and runs generally west and south for a total of 21,158 feet, approximately 4 miles, until it terminates at the Trinity River. The exact route of the pipeline corridor is depicted on Figure 1.

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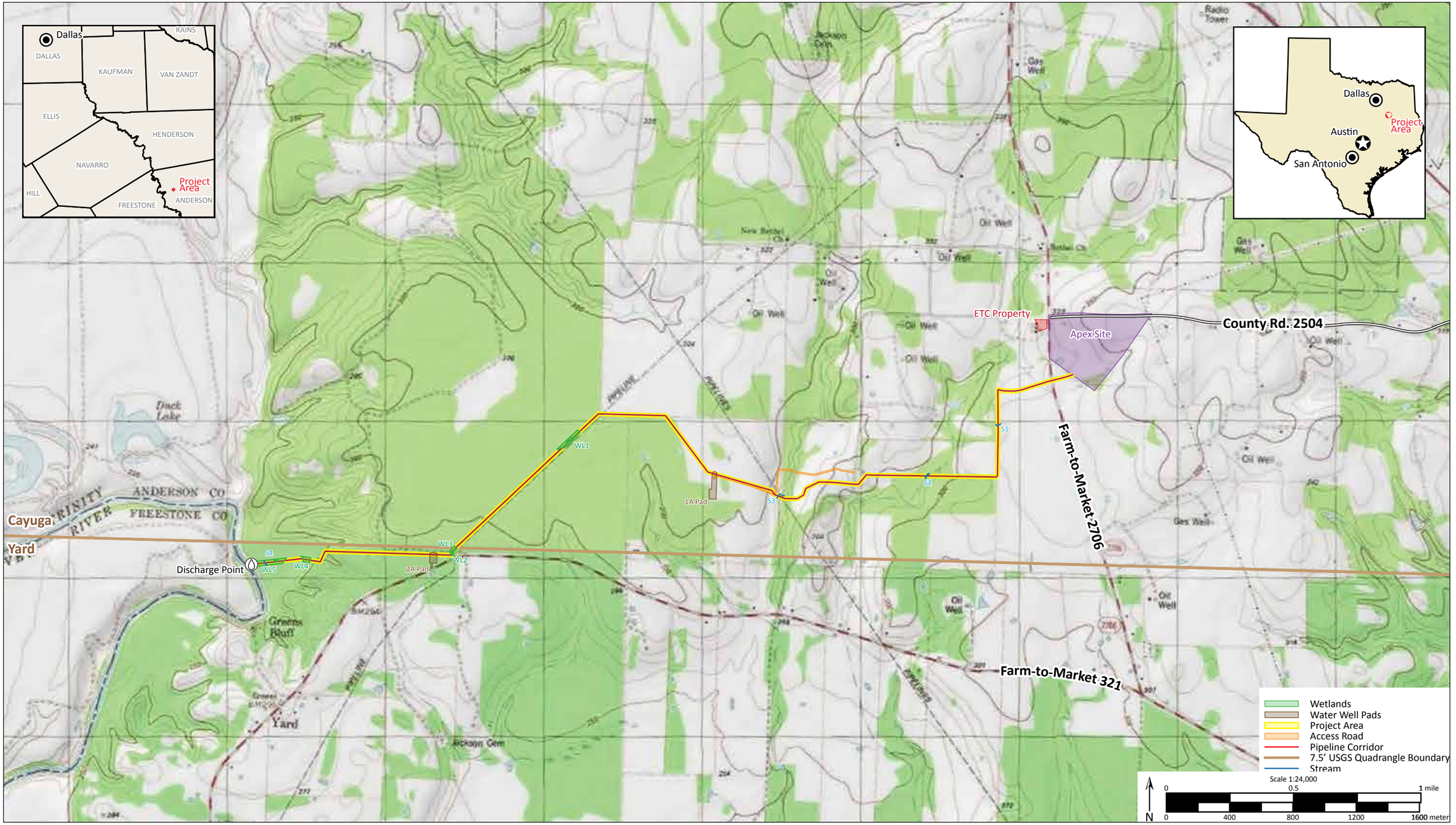

Figure 1. Overview of the project area and components.

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The Apex Water Well No. 1/1A pad is approximately 0.8 acres in size, and is located south of the proposed wastewater/water pipeline alignment, 233 m (766 feet) west of the intersection of West FM 321 and Private Road (PR) 8608. The Apex Water Well No. 2/2A pad is approximately 1.6 acres in size and is located south of the proposed wastewater/water alignment, 885 m (2,903 feet) west of CR 2610, where the road turns north at a farm. There is one access road roughly 0.7 miles (1.1 km) long that connects the Apex Water Well No. 2/2A pad with CR 2610. The ETC connector pipeline area occupies 1.0 acre and is located adjacent to the west side of FM 2706 just south of the intersection with CR 2504, about 335 m (1,100 feet) north of where the water and wastewater/water line crosses FM 2706.

There are four streams (S1–4) and five wetlands (WL1–5) that cross the proposed pipeline corridor that are potentially subject to USACE permitting, in addition to the terminus of the pipeline at the Trinity River (Figure 1). All streams and wetlands will be crossed via open-cut trenching and may require Clean Water Act, Section 404/Rivers and Harbors Act, 10 permits.

Summary of Archaeological Work Performed

WSA conducted background research of available publications, manuscripts, site records, and the Texas Archeological Sites Atlas. The purpose of the archival research was to identify any previously recorded archaeological sites, cemeteries, historic structures, markers, properties, and districts listed on the National Register of Historic Places (NRHP), as well as State Archeological Landmarks (SALs) for the proposed project area. In addition, prior to fieldwork WSA examined U.S. Department of Agriculture (USDA) soil maps and U.S. Geological Survey (USGS) geologic maps to determine the probability and relative depth of quaternary or Holocene alluvial deposits in the proposed project area.

WSA conducted a complete, 100 percent pedestrian inventory including 110 shovel tests focusing on the stream banks and immediate flood terraces of USACE jurisdictional drainage crossings, within the entirety of the width of the observed floodplains and Holocene sediments, and to a distance of 125 feet from the edge of drainages with shallow or no Holocene sediment deposition. A 100 percent pedestrian survey was conducted of these areas at 30-m transect intervals with shovel tests spaced every 30 m along transects within a 200-foot corridor. During survey, the archaeological crew used a Trimble hand-held GPS unit to follow transects within the 200-foot survey corridor and excavated shovel tests at 300-m intervals between transects. WSA also conducted 100 percent pedestrian inventory of two water well locations, an access road, and the ETC connector pipeline area, which included numerous transects and shovel tests. The Trinity River discharge area was initially identified as exhibiting the potential for deep Holocene terrace sediments; however, field inspection indicated this area to be steep, erosional, and hazardous, and to contain ancient sediments exhibiting only a thin Holocene sediment veneer, in addition to a complete lack of machine access. As a result, no deep, subsurface prospecting was conducted. The majority of the project is represented by smaller drainages with limited Holocene sediment deposition; these were subject to intensive pedestrian survey and shovel testing.

The archaeological survey was performed September 24–27, 2012. All work met acceptable professional and safety standards. WSA personnel met all requirements necessary to carry out archaeological investigations in areas subject to EPA and USACE permitting, and in areas of USACE jurisdiction, including the requirements listed under the Secretary of the Interior's Standards for Archaeology and Historic Preservation. The project area largely exists on ancient and/or heavily disturbed landforms. No archaeological sites, historic architecture, or other cultural resources were identified.

Typically, projects that are subject to Section 106 of the NHPA require collection, analysis, publication, and professional curation or accessioning of all temporally diagnostic artifacts found in surface contexts, and all subsurface artifacts from excavated shovel test units, whether located within archaeological sites or encountered as isolated finds, as well as project records at a recognized state or federal repository subsequent to reporting. On private land, however, this is accepted procedure only when landowners have granted permission for archaeologists to remove artifacts in order to facilitate study and reporting. Once archaeologists have studied the artifacts, they are often returned to the landowner by request. During the reported investigation, no artifacts were found in any context. Therefore, in the absence of artifacts, WSA will curate all project notes, photographs, maps, and records in-house.

Personnel Commitment

WSA personnel time commitment consisted of pre-field archival research, pre-field preparation, fieldwork, and report preparation. The pre-field archival research consisted of two days conducted by principal investigator Deidra Black. The pre-field preparation involved coordination with Texas 811 One-Call intermittently over the course of two days conducted by Deidra Black. Field research consisted of five days, including travel time to and from Austin, Texas, and was conducted by Deidra Black and staff archaeologist Brady Wink. The report preparation was conducted by James Karbula and Deidra Black and occurred September 27 through October 12, 2012. WSA chief editor Melanie Medeiros was responsible for assembling the draft into InDesign and for quality control. Trevor Self, WSA cartographer and GIS technician, is credited with GIS production of the report illustrations and plates. Resumes for supervisory personnel (James Karbula and Deidra Black, are contained in the Appendix).

Report Organization

The orientation sections of the report are organized into an Abstract, Management Summary, and Introduction. Subsequent sections include Previous Investigations and Archaeological Background, Environmental Setting, and Research Design and Survey Methods. The Results of Field Investigations is presented from east to west by CH2M HILL assigned designations. These are then followed by a Summary and Recommendations section detailing NRHP recommendations for the project area, and then the References Cited.

PREVIOUS INVESTIGATIONS AND ARCHAEOLOGICAL BACKGROUND

In preparation for conducting the survey, research was carried out at the WSA office utilizing digital and physical resources. These included the Texas Archeological Sites Atlas, U.S. Bureau of Economic Geology (BEG) maps of Texas, and the Eastern Planning Region archaeological planning document for Texas (Kenmotsu and Perttula, eds. 1993).

Archival Research

A records and literature search was conducted for the proposed 4.0-mile-long (6.44-km-long) alignment for the Apex wastewater/water pipeline in Anderson County, Texas, assuming a 1,000-foot (305-m) archival corridor, with 500 feet (152.5 m) on either side of the proposed centerline. This included a search of the Texas Archeological Sites Atlas, an online resource hosted by the Texas Historical Commission (THC) that contains restricted cultural resources information. The Texas Archeological Sites Atlas and WSA project files were consulted for information on previously conducted surveys or the presence of previously discovered prehistoric and historic archaeological sites, including properties or districts listed on the National Register of Historic Places (NRHP), as well as State Archeological Landmarks (SALs), Historic Markers, and Registered Texas Historic Landmarks (RTHLs) that may be located within or adjacent to the proposed project area. WSA also examined United States Geological Survey (USGS) topographic maps for existing cemeteries and historic sites.

There are no previously recorded SALs, Historic Markers, Landmarks, or Historic/National Register Districts that intersect the archival search corridor for the proposed alignment or well locations. There are no previously recorded sites or cemeteries that intersect the archival search corridor. There are five previously conducted surveys within the archival corridor for the proposed wastewater/water pipeline alignment. The first is a 1977 USACE aerial survey that encompasses the western end of the proposed alignment up to but not including the marshy bank of the Trinity River. The second is a 1978 USACE aerial survey located immediately north of the 1977 survey and is northwest of the northeast–southwest portion of the line. The third survey, another 1978 USACE aerial survey, is located just south of the proposed alignment where the alignment crosses the marshy bank of the Trinity River. The fourth survey, the 2006 Enbridge Pipeline aerial survey (Texas Antiquities Code [TAC] No. 4204), crosses the eastern half of the proposed alignment east of CR 2610. The fifth survey was conducted by WSA in March of 2012 and consisted of a site observation and reconnaissance survey of the proposed 45-acre Apex CAES plant site located at the eastern end of the proposed wastewater/water pipeline (Karbula 2012a).

Reconnaissance survey demonstrated the proposed Bethel Energy Center site to be heavily disturbed by numerous intersecting existing, buried pipelines, by clearing, and to contain only ancient, truncated sediments. WSA recommended that there is only a low probability that properties eligible for the NRHP or as a SAL are present in this area (Karbula 2012b).

Culture History

The project area is located on the west side of the Northeast Texas Archaeological Region in the center of the Eastern Planning Region (Kenmotsu and Perttula, eds. 1993:6). The culture history in this area can be broadly divided between prehistoric and historic time periods. The prehistoric period begins with the first introduction of humans to the area; the historic period begins with the first well-documented European arrivals in the area (Perttula and Kenmotsu 1993:44-46).

Prehistoric Period

The prehistory of northeast Texas is commonly divided into Paleoindian, Archaic, Early Ceramic, and Caddoan periods (Perttula and Kenmotsu 1993:44). The archaeological record in the region prior to 6000 B.P. is fairly sparse, largely consisting of surficial and/or mixed finds (Perttula 1995).

The Paleoindian period (ca. 11,000–8950 B.P.) is the earliest recognized period of human occupation of northeastern Texas. It is best recognized by the presence of diagnostic projectile points including Clovis, Folsom, Dalton, San Patrice, and/or Scottsbluff types. Many of the points are made of materials not found in the region, suggesting a highly mobile population with large territories (Perttula and Kenmotsu 1993:44). Most of the Paleoindian sites identified in the region are found in river and large creek basins, such as in the Sabine and Cypress river valleys, suggesting the waterways may have been a primary travel path. Chronological, floral, and faunal research in the area indicate the people were highly mobile, following megafauna that, in turn, followed eastward-expanding grasslands. A unique find in this region is the John Pearce site, which has been identified as a discrete and intact Late Paleoindian site (Perttula 1995).

The Archaic period (ca. 8950–2150 B.P.) occurs after the Paleoindian period, and is marked by increased regional exploitation and population, and a decrease in group territory. It is generally discussed in terms of Early, Middle, and Late Archaic. Early and Middle Archaic sites are identified by the presence of straight and expanding stem dart points; contracting stem dart points are found in Late Archaic and Early Ceramic period sites (Perttula 1995). Throughout the Archaic, stone tool assemblages are more diverse than in the Paleoindian period, and the raw stone material is more likely to be from local sources (Perttula and Kenmotsu 1993). This is particularly true of the Late Archaic, as site assemblages show local stone sources and suggest not only well-developed group territories but a reduction in outer-territory contact (Perttula 1995). Archaic occupation sites are likely to have milling stones and baking pits, indications of a greater reliance on plant foods than during previous periods (Perttula and Kenmotsu 1993). In addition, sites are larger and more likely to contain accumulations of refuse, which take the form of large middens by the Late Archaic (Perttula 1993). Further evidence of increased regionality and reuse of sites is indicated by the presence of cemeteries, some of which are quite large (Perttula and Kenmotsu 1993). Most of the Archaic chronology for the region comes from a handful of stratified sites, most notably the Yarbrough site (41VN6) and sites along the Lake Fork Reservoir (Perttula 1995).

The Early Ceramic period (ca. 2150–1150 B.P.) follows the Late Archaic period. In general, this period is a transitional one from a mobile hunter-gatherer to sedentary lifeway, with stationary huts and the exploitation of cultigens (Perttula and Kenmotsu 1993). Artifacts found in Early Ceramic sites include Gary projectile points, corner-notched arrow points, and double-bitted axe heads. The most defining artifacts are plain, thick bowls and flowerpot shaped jars. In the Sabine River valley, incised and stamped vessels also appear. Research into the remains of the Early Ceramic period indicates that during this time, the people in this region were still largely hunter-gatherers, but lived in increasingly larger groups that were increasingly more sedentary (Perttula 1995). Cultigens are present in the following Caddoan period, but how far back into the Early Ceramic period horticulture—the purposeful planting of local seeds—starts is unknown, likely due to the very small number of well-researched Early Ceramic sites in the region (Perttula and Kenmotsu 1993).

The Caddoan period (ca. 1150–270 B.P.) is the best preserved and most represented prehistoric period in the region. The prehistoric portion of the Caddoan period is generally divided into Formative Caddoan (1150–950 B.P.), Early Caddoan (950–750 B.P.), Middle Caddoan (750–550 B.P.), and Late Caddoan (550–-270 B.P.); a historic Caddoan occupation follows the end of the Late Caddoan period and is discussed below (Perttula and Kenmotsu 1993). Artifacts found at Formative, Early, and Middle Caddoan period sites include Gahagan bifaces, corner-notched and rectangular-stemmed arrow points, siltstone and greenstone celts, ceramic pipes, ceramic earspools, and ceramic figurines (Perttula 1995). By the time of the Caddoan period, pottery making was practiced throughout the region, and horticulture was well established, with evidence of an increased reliance on cultigens, although this reliance varied depending on how suitable the site area was for farming (Perttula and Kenmotsu 1993). By the Middle Caddoan period, traditional horticulture was supplemented by the introduction of corn, and by the Late Caddoan period, corn represented over 50 percent of the diet (Perttula 1995). In general, the Caddoan period was a time of increased sedentism, with the establishment of huts and houses in hamlets and villages, and the appearance of ceremonial sites including burial mounds and other earthworks. This pattern of farming, ceramics, hamlets, and ceremonial-site building is likely related to similar activities happening on an even greater scale to the east (Perttula and Kenmotsu 1993). Further, by the Late Caddoan period there are large planned cemeteries in the region, and there is evidence the societies had become hierarchically stratified (Perttula 1995). The prehistoric Caddoan sequence ends with the arrival of Europeans in A.D. 1680 (Perttula and Kenmotsu 1993).

Historic Period

The project area is located in northeast Texas, in modern-day Anderson County. Here, the historic period consists ofthe Historic Caddoan (A.D. 1680–1860) period, which begins with the arrival of Europeans to the region, and the Anglo Occupation period (Perttula and Kenmotsu 1993).

There is evidence of contact between the Caddoan peoples and Europeans in the region as early as the sixteenth century. The region was first traveled and described by the expedition of Hernando de Soto, followed by further exploration by French and other Spanish groups. This exploration decimated the indigenous population with the introduction of diseases. The Historic Caddoan pe-

riod (A.D. 1680–1860) continues many of the traditions and practices of the prehistoric Caddoan period, along with the introduction of European trade goods. During the late eighteenth century, displaced indigenous groups from elsewhere moved northeastern Texas, some joining the Caddoan societies, and some choosing to remain separate. These groups included but were not limited to the Osage, Comanche, Alabama, Coushatta, Cherokee, Kickapoo, and Delaware (Perttula and Kenmotsu 1993). In particular, records indicate the Comanche, Kichai, Kickapoo, Tawakonis, Waco, and Wichita peoples settled in the area that is now Anderson County. These groups were part of a general southern migration of indigenous peoples in the area, largely focused on the river valleys (Caraway 2012). Historic contact sites are best recognized by a mixture of traditional goods, such as traditional corn varieties and pottery techniques, with European trade goods, such as beads and thimbles, as well as the modification of European materials into metal arrow points and decorations (Pertulla 1995).

The nineteenth century saw increased use of the area of Anderson County by Anglo settlers. The first land grant in the area was granted in 1826 to empresario David G. Burnet, but no Mexican or Anglo settlers arrived until 1833, when Anglo settlers established a Protestant community. In 1835, settlers Willison Ewing and Joseph Jordan erected Fort Sam Houston, from which a settlement grew. During the Texas Revolution (1835–1836; the Texas War of Independence), settlers from destroyed settlements along the Trinity River fled to Fort Houston until Santa Ana's defeat. The remainder of the 1830s saw hostilities between Anglo settlers, Mexicans, and indigenous peoples that did not end until forced removal of indigenous peoples in the 1840s. After this, Anglo settlement began in earnest. By 1846 the population was sufficient to form Anderson County, with the city of Palestine as the county seat. Many of the settlers of Anderson County came from southern states and established cotton production in the area. By 1860, 35 percent of the population, about 3,600 people, was slaves (Caraway 2012).

The American Civil War (1861–1865) was felt strongly in Anderson County. The County voted in favor of secession and many men left the county to fight. During Reconstruction, recently freed slaves incurred many political blockades from participating in judicial processes. The local economy and population declined after the war until 1870, when the International–Great Northern Railroad was given incentive to locate its repair shops in the county. After this, the county population doubled and continued to increase until 1940 (Caraway 2012)

In the late nineteenth century, oil was found in the county, but pumping did not begin until the twentieth century. Commercial wells were dug in the 1910s and 1920s; the subsequent economic boon greatly reduced the impact of the Great Depression within the county. Oil is still being produced in the area. Other economic sources established in the early twentieth century include agriculture and timber. Mid- to late-twentieth-century economies established include manufacturing and correctional facilities (Caraway 2012).

ENVIRONMENT, SOILS, AND GEOLOGY

The project area is located on the Interior Coastal Plains physiographic region (BEG 1996a), generally within the Claiborne Group (BEG 1992). Examination of the Geologic Atlas of Texas, Palestine Sheet (BEG 1993) indicates that the proposed wastewater/water pipeline alignment is located on a combination of Holocene-, Pleistocene-, and Eocene-age surface formations. The eastern third of the proposed wastewater/water pipeline alignment, the access road to Apex Water Well No. 1/1A pad, Apex Water Well No. 2/2A pad, and the ETC connector pipeline area are located on the Eocene-age Recklaw Formation (Er). The soils mapped in this area, including Tonkawa, Nimrod, Lilbert, Iuka, Rentzel, Silstid, Annona, Thenas, have typical profiles that are consistent with the soils of the Recklaw Formation and other Eocene formations found nearby. The majority of the rest of the proposed wastewater/water pipeline alignment is located on Pleistocene-age fluviatile terrace deposits (Qt). The soils mapped in this area, including Normangee, Axtell, Derly, Lufkin, and Garner, have typical profiles consistent with forming in Pleistocene fluviatile sediments. The 150 m of proposed alignment adjacent to the Trinity River is the proposed location of the wastewater discharge area and is mapped as Trinity Clay, which roughly correlates with the mapped Holocene alluvium (Qal) on the Palestine Sheet. However, deep, mechanical subsurface testing (backhoe trenches) was not conducted due to observed ancient sediments exhibiting only thin Holocene sediment veneers, and/or hazardous and disturbed floodplain settings with no machine access (Trinity River).

The topography of the area, as visible on the USGS Cayuga and Yard Quadrangles (USGS 1982a, 1982b), is mostly flat across the majority of the project area, with a ridgeline near the western end of the proposed wastewater/water pipeline alignment that drops down to the Trinity River to the west. The upper ends of small intermittent or ephemeral drainages cut through the ancient landscape west of the ridgeline.

The project area is located in the Trinity River Basin and receives 76 to 102 cm (30 to 40 inches) of rain a year (BEG 1996b). The general ecoregion is the Northern Post Oak Savanna (33a) and Floodplains and Low Terraces (33f) of the East Central Texas Plains (33) (BEG 2010). The vegetative types of the project area are Post Oak Woods, Forest, and Grassland Mosaic (30b); Post Oak Woods/Forest (30c); and Water Oak-Elm-Hackberry Forest (36) (BEG 2000, 2010).

RESEARCH DESIGN AND SURVEY METHODS

The archaeological survey assumed two linear elements, one wastewater discharge point, and three non-linear elements. The linear elements are the pipeline, with a survey corridor assumed to be approximately 4.0 miles (6.44 km) in length, and an access road approximately 0.7 miles long (1.1 km), each 200 feet (60 m) in width (100 feet [30 m] on either side of the centerline), consisting of all of the Holocene Trinity River floodplain and the areas immediately adjacent to jurisdictional waters of the USACE. The wastewater discharge point is located at the western terminus of the pipeline corridor at the Trinity River. The non-linear elements are the 0.8-acre Apex Water Well No. 1/1A pad, the 1.6-acre Apex Water Well No. 2/2A pad, the access road to Apex Water Well No. 1/1A pad, and the 1.0-acre ETC connector pipeline area.

Based on aerial photography and experience in this region, this northeast Texas project area consists of densely vegetated zones, open cleared areas, agricultural fields, wetlands, and disturbed areas. These areas are interspersed with several streams and roads. The primary land use is agricultural. The terraces and floodplains of the streams and drainages in the project area represent a moderate probability for buried prehistoric archaeological sites. Many of the agricultural fields and developed areas represent disturbance with no potential for intact archaeological sites. As such, survey methodology for the linear elements targeted only the high-probability areas adjacent to streams and drainages, and any known archaeological sites located in the project area. This method is consistent with previous archaeological survey conducted for other projects in northeast Texas and focuses only on USACE jurisdictional crossings of linear project elements under Section 106 and the whole of areal project elements due to EPA and USACE permitting.

There are four streams (S1–4) and five wetlands (WL1–5) that cross the proposed pipeline corridor, one river (Trinity) at the pipeline western terminus and wastewater discharge point, and one stream that crosses the proposed access road that were assessed under the purview of NHPA Section 106. The survey consisted of a 100 percent pedestrian survey with intensive shovel testing of the terraces and floodplains of the Trinity River and intact USACE jurisdictional waters that cross the proposed pipeline and access road, as well as the entire area of three non-linear elements. Pedestrian survey and shovel tests were conducted along two 30-m transects on both sides of undisturbed drainages within the proposed pipeline and access roads corridors, and throughout the non-linear project elements. Shovel tests were placed along these transects at 30-m intervals, and sufficient tests were placed to satisfy the minimum survey standards of the Texas Historical Commission (THC). All shovel tests were conducted to a depth of 1 m or until pre-Holocene age sediments were reached. No shovel testing or pedestrian survey was conducted in disturbed or developed areas. All shovel test locations were mapped and recorded with a Trimble GPS unit for plotting on the WSA GIS system. Texas 811 calls were placed 48 or more hours before any shovel testing was conducted for the identified shovel test locations. As no deep Holocene deposits were identified in the project area, no backhoe trenches were deemed necessary.

RESULTS OF FIELD INVESTIGATIONS

The field survey included: three individual streams on the pipeline route (S1–3), one individual stream on the access road route (S3), one individual wetland on the pipeline route (WL1), one grouping of two wetlands on the pipeline route (WL2 and WL3), one ridgeline on the pipeline route, one grouping of two wetlands and a stream on the pipeline route (S4, WL4, and WL5), one river at the terminus of the pipeline at the wastewater discharge point (Trinity River), two well pads, and one parcel (Figure 1). The survey is described first by the pipeline from west to east, then by the access road, then by the non-linear elements. The wastewater discharge point is included in the pipeline route description. Shovel test data for 110 negative shovel tests are depicted on Figure 2 and presented in Table 1.

Proposed Pipeline: Stream 1

Stream 1 (S1) runs across the proposed pipeline route roughly 700 m from the east end of the proposed pipeline corridor, where the proposed route runs north to south on the east side of a fence and property line (Figure 2). Within the project area this is an ephemeral stream with a moderately defined channel approximately 0.5 m deep by 2 to 3 m wide in pre-Holocene deposits. Vegetation around the stream includes thatched pasture grass with oak and briars along the stream bank and against the fence line. Ground visibility was 0 percent on the margins of Stream 1. Four shovel tests (STs 9–12) were excavated on the south bank and four shovel tests (STs 13–16) were excavated on the north bank. These tests revealed 20 to 40 cm of brown loamy sand to silt loam overlying pale brown silty clay that became increasingly compact with depth. The tests terminated between 30 and 55 cm below surface (cmbs) due to impenetrable sediment (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Proposed Pipeline: Stream 2

Stream 2 (S2) runs across the proposed pipeline route roughly 775 m south and then west along the proposed route from S1, along an east to west section of the proposed pipeline corridor (Figure 2). Within the project area, this intermittent stream has a well-defined channel roughly 1 m deep by 2 m wide, with a number of shallow flood channels cutting across the banks in pre-Holocene deposits (Photo 1). At the time of archaeological survey, this stream had shallow flowing water. The surrounding vegetation was a mixed hardwood forest with thorny underbrush and 1 to 5 cm of leaf fall; ground visibility was less than 1 percent. Four shovel tests (STs 1–4) were placed on the west bank of the stream and four shovel tests (STs 5–8) were placed on the east bank. All but one test revealed 20 to 70 cm of yellowish brown fine loamy sand to sandy silt over hard packed pale brown silty clay; these tests terminated between 40 and 70 cm due to impenetrable sediments. A single test (ST 5) adjacent to the creek had yellow sand to 1 m and was terminated due to depth (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

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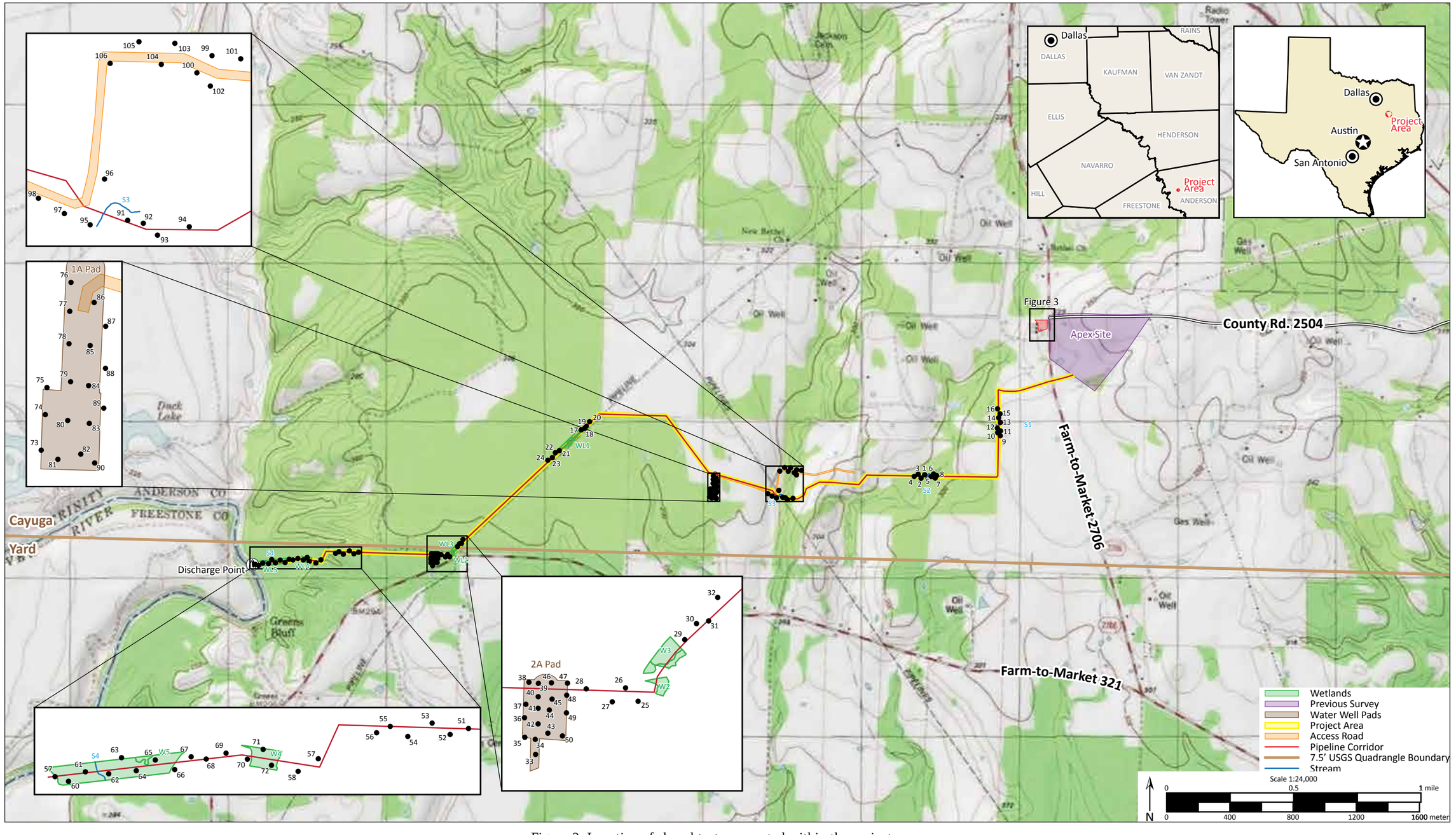

Figure 2. Location of shovel tests excavated within the project area.

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Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
1	0–70 cm 10YR 6/4 light yellowish brown sandy silt; 70 cm hard packed clayey silt	70 cm	impenetrable sediment	S2
2	0–55 cm 10YR 5/4 yellowish brown fine loamy sand; 55 cm compact silty clay	55 cm	impenetrable sediment	S2
3	0–50 cm 10YR 6/3 pale brown silt loam; 50 cm hard packed clayey silt	50 cm	impenetrable sediment	S2
4	0–20 cm 10YR 5/2 grayish brown loamy sand; 20–40 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	40 cm	impenetrable sediment	S2
5	0–10 cm 10YR 5/3 brown sandy loam; 10–70 cm 10YR 6/4 light yellowish brown silty sand; 70–100 cm 10YR 7/2 light gray very fine sand	100 cm	depth	S2
6	0–20 cm 10YR 5/2 grayish brown loamy sand; 20–45 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	45 cm	impenetrable sediment	S2
7	0–10 cm 10YR 6/4 light yellowish brown silty clay; 10–30 cm 10YR 6/4 light yellowish brown, 10YR 6/6 brownish yellow mottled silty clay	30 cm	impenetrable sediment	S2
8	0–20 cm 10YR 5/2 grayish brown loamy sand; 20–40 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	40 cm	impenetrable sediment	S2
9	0–10 cm 10YR 6/3 pale brown silt loam; 10–45 cm 10YR 6/3 brown silty clay, increasing compactness with depth	45 cm	impenetrable sediment	S1
10	0–10 cm 10YR 5/2 grayish brown loamy sand; 10–40 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	40 cm	impenetrable sediment	S1
11	0–30 cm 10YR 6/3 brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	S1
12	0–20 cm 10YR 5/2 grayish brown loamy sand; 20–35 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	35 cm	impenetrable sediment	S1
13	0–10 cm 10YR 6/3 brown silt loam; 10–40 cm 10YR 6/3 brown silt clay, increasing compactness with depth	40 cm	impenetrable sediment	S1

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
14	0–40 cm 10YR 5/2 grayish brown loamy sand; 40–55 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	55 cm	impenetrable sediment	S1
15	0–10 cm 10YR 6/3 brown silt loam; 10–45 cm 10YR 6/3 brown silty clay, increasing compactness with depth	45 cm	impenetrable sediment	S1
16	0–20 cm 10YR 5/2 grayish brown loamy sand; 20–45 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	45 cm	impenetrable sediment	S1
17	0–15 cm 10YR 3/2 very dark grayish brown clay loam; 15 cm mottled clay	15 cm	mottled clay	WL1
18	0–30 cm 10YR 3/2 very dark grayish brown slightly silty clay; 30 cm mottled clay	30 cm	mottled clay	WL1
19	0–15 cm 10YR 3/1 very dark gray clay loam; 15 cm mottled clay	15 cm	mottled clay	WL1
20	0–20 cm 10YR 3/2 very dark grayish brown slightly silty clay; 20 cm mottled clay	20 cm	mottled clay	WL1
21	0–10 cm 10YR 3/1 very dark gray clay loam; 10 cm mottled clay	10 cm	mottled clay	WL1
22	0–20 cm 10YR 3/2 very dark grayish brown slightly silty clay; 20 cm mottled clay	20 cm	mottled clay	WL1
23	0–10 cm 10YR 3/1 very dark gray clay loam; 10 cm mottled clay	10 cm	mottled clay	WL1
24	0–20 cm 10YR 3/2 very dark grayish brown slightly silty clay; 20 cm mottled clay	20 cm	mottled clay	WL1
25	0–20 cm 10YR 7/3 very pale brown silty clay; 20 cm mottled clay	20 cm	mottled clay	WL2/WL3
26	0–15 cm 10YR 7/3 very pale brown silty clay; 15 cm mottled clay	15 cm	mottled clay	WL2/WL3

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
27	0–10 cm 10YR 5/3 brown silt loam; 10–25 cm 10YR 7/3 very pale brown silty clay; 25 cm mottled clay	25 cm	mottled clay	WL2/WL3
28	0–50 cm 10YR 6/4 light yellowish brown fine loamy sand; 50 cm mottled clay	50 cm	mottled clay	WL2/WL3
29	0–10 cm 10YR 5/3 brown silt loam; 10–30 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	WL2/WL3
30	0–20 cm 10YR 7/3 very pale brown silty clay; 20 cm mottled clay	20 cm	mottled clay	WL2/WL3
31	0–30 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	WL2/WL3
32	0–20 cm 10YR 7/3 very pale brown silty clay; 20 cm mottled clay	20 cm	mottled clay	WL2/WL3
33	0–30 cm 10YR 5/2 grayish brown silt loam; 30 cm mottled clay	30 cm	mottled clay	Well No. 1
34	0–20 cm 10YR 5/2 grayish brown loamy sand; 10–30 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	Well No. 1
35	0–10 cm 10YR 5/2 grayish brown silt loam; 10–45 cm 10YR 6/3 pale brown silty clay	45 cm	basal clay	Well No. 1
36	0–10 cm 10YR 5/2 grayish brown loamy sand; 10–50 cm 10YR 6/6 brownish yellow loamy sand; 50–60 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	60 cm	impenetrable sediment	Well No. 1
37	0–45 cm 10YR 5/4 yellowish brown very fine sandy loam	45 cm	impassable root	Well No. 1
38	0–5 cm 10YR 7/3 very pale brown silty clay, 5 cm mottled clay	5 cm	mottled clay	Well No. 1
39	0–10 cm 10YR 5/3 brown silt loam; 10–45 cm 10YR 6/3 pale brown silty clay	45 cm	mottled clay	Well No. 1

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
40	0–20 cm 10YR 5/2 grayish brown loamy sand; 20–30 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	Well No. 1
41	0–10 cm 10YR 5/3 brown silt loam; 10–50 cm 10YR 5/3 brown silty clay	50 cm	mottled clay	Well No. 1
42	0–10 cm 10YR 5/2 grayish brown sandy clay loam; 10–30 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	Well No. 1
43	0–10 cm 10YR 5/3 brown sandy loam; 10–20 cm 10YR 6/2 light brownish gray silty clay loam; 20–40 cm 10YR 7/2 light gray silty clay	40 cm	mottled clay	Well No. 1
44	0–20 cm 10YR 6/6 light yellowish brown sandy clay loam; 20–40 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	40 cm	impenetrable sediment	Well No. 1
45	0–10 cm 10YR 5/2 grayish brown sandy loam; 10–50 cm 10YR 6/4 light yellowish brown silty clay	50 cm	mottled clay	Well No. 1
46	0–20 cm 10YR 5/3 grayish brown sandy loam; 20–35 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	35 cm	impenetrable sediment	Well No. 1
47	0–20 cm 10YR 5/4 yellowish brown very fine sandy clay loam; 20–45 cm 10YR 6/6 brownish yellow very fine sandy clay loam; 45 cm mottled clay	45 cm	mottled clay	Well No. 1
48	0–20 cm 10YR 5/3 grayish brown sandy loam; 20–40 cm 10YR 7/3 very pale brown silty clay, increasing compactness with depth	40 cm	impenetrable sediment	Well No. 1
49	0–30 cm 10YR 5/4 yellowish brown sandy loam; 30–45 cm 10YR 5/3 brown silty clay; 45 cm mottled clay	45 cm	mottled clay	Well No. 1
50	0–20 cm 10YR 7/3 very pale brown silty clay; 20 cm mottled clay	20 cm	mottled clay	Well No. 1
51	0–20 cm 10YR 5/4 yellowish brown sandy loam; 20–100 cm 10YR 6/6 brownish yellow loamy sand	100 cm	depth	Trinity Ridge
52	0–20 cm 10YR 5/3 grayish brown loamy sand; 20–75 cm light yellowish brown sand; 75 cm 5YR 5/8 yellowish red clay	75 cm	basal clay	Trinity Ridge

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
53	0–20 cm 10YR 5/4 yellowish brown sandy loam; 20–100 cm 10YR 6/6 brownish yellow loamy sand	100 cm	depth	Trinity Ridge
54	0–100 cm 10YR 6/6 light yellowish brown fine sand	100 cm	depth	Trinity Ridge
55	0–10 cm 10YR 5/4 yellowish brown sandy loam; 10–100 cm 10YR 6/6 brownish yellow loamy sand	100 cm	depth	Trinity Ridge
56	0–10 cm 10YR 5/3 grayish brown loamy sand; 10–50 cm light yellowish brown fine loamy sand	50 cm	impassable root	Trinity Ridge
57	0–100 cm 10YR 4/4 dark yellowish brown loamy sand	100 cm	depth	Trinity Ridge
58	0–60 cm 10YR 5/3 grayish brown loamy sand	60 cm	impassable root	Trinity Ridge
59	0–20 cm 10YR 3/2 very dark grayish brown slightly silty clay; 20–40 cm mottled clay	40 cm	mottled clay	Trinity River, WL4, WL5, S4
60	0–2 cm 10YR 4/2 dark grayish brown clay; 2–30 cm mottled clay, 40% 5YR 5/6 yellowish red, 30% 10YR 4/1 dark gray, 30% 10YR 6/1 gray	30 cm	mottled clay	Trinity River, WL4, WL5, S4
61	0–30 cm 10YR 3/2 very dark grayish brown clay; 30–40 cm mottled clay	40 cm	mottled clay	Trinity River, WL4, WL5, S4
62	0–30 cm mottled clay, 40% 10YR 5/6 yellowish red, 30% 10YR 4/1 dark gray, 30% 10YR 6/1 gray	30 cm	mottled clay	Trinity River, WL4, WL5, S4
63	0–20 cm 10YR 3/2 very dark grayish brown clay; 20–30 cm mottled clay	30 cm	mottled clay	Trinity River, WL4, WL5, S4
64	0–5 cm 10YR 3/1 very dark gray clay; 5–30 cm mottled clay	30 cm	mottled clay	Trinity River, WL4, WL5, S4
65	0–5 cm 10YR 3/2 very dark gray clay; 5–30 cm mottled clay, 75% 5YR5/8 yellowish red, 25% 10YR 3/2 very dark grayish brown	30 cm	mottled clay	Trinity River, WL4, WL5, S4

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
66	0–10 cm 10YR 3/1 very dark gray clay; 10–30 cm mottled clay	30 cm	mottled clay	Trinity River, WL4, WL5, S4
67	0–30 cm 10YR 3/2 very dark grayish brown clay; 30–40 cm mottled clay	40 cm	mottled clay	Trinity River, WL4, WL5, S4
68	0–30 cm 10YR 3/1 very dark gray clay; 30 cm mottled clay	30 cm	mottled clay	Trinity River, WL4, WL5, S4
69	0–40 cm 10YR 3/2 very dark grayish brown clay; 40–45 cm mottled clay	45 cm	mottled clay	Trinity River, WL4, WL5, S4
70	0–30 cm 10YR 3/1 very dark gray clay; 30 cm mottled clay	30 cm	mottled clay	Trinity River, WL4, WL5, S4
71	0–30 cm mottled clay	30 cm	mottled clay	Trinity River, WL4, WL5, S4
72	0–30 cm mottled clay, 75% 5YR 5/6 yellowish red, 20 % 10YR 2/1 black, 5% 10YR 4/1 dark gray	30 cm	mottled clay	Trinity River, WL4, WL5, S4
73	0–40 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth	40 cm	impenetrable sediment	Well No. 2
74	0–45 cm 10YR 7/3 very pale brown silty clay loam, increasing compactness with depth; 45 cm mottled clay, 40% 10YR 7/1 light gray, 40% 10YR 3/3 very pale brown, 20% 10YR 3/1 very dark gray	45 cm	mottled clay	Well No. 2
75	0–20 cm 10YR 6/4 light yellowish brown sandy clay loam; 20–30 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	Well No. 2
76	0–10 cm 10YR 7/2 light gray silty clay loam; 10–40 cm 10YR 7/3 very pale brown fine sandy clay loam; 40 cm mottled clay	40 cm	mottled clay	Well No. 2
77	0–30 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	Well No. 2

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
78	0–10 cm 10YR 7/2 light gray silty clay loam; 10–40 cm 10YR 7/3 very pale brown fine sandy clay loam; 40 cm mottled clay	40 cm	mottled clay	Well No. 2
79	0–45 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth; 45 cm mottled silty clay	45 cm	mottled clay	Well No. 2
80	0–30 cm 10YR 7/3 very pale brown fine sandy loam; 30 cm mottled clay	30 cm	mottled clay	Well No. 2
81	0–25 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth	25 cm	impassable root	Well No. 2
82	0–20 cm 10YR 7/2 light gray silty clay loam, 20 cm mottled clay	20 cm	mottled clay	Well No. 2
83	0–30 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth	30 cm	impenetrable sediment	Well No. 2
84	0–30 cm 10YR 7/3 very pale brown fine sandy clay loam; 30 cm mottled clay	30 cm	mottled clay	Well No. 2
85	0–45 cm 10YR 6/4 light yellowish brown silty clay loam, increasing compactness with depth; 45 cm mottled silty clay	45 cm	mottled clay	Well No. 2
86	0–25 cm 10YR 7/2 light gray silty clay loam; 25 cm mottled clay	25 cm	mottled clay	Well No. 2
87	0–35 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth	35 cm	impenetrable sediment	Well No. 2
88	0–30 cm 10YR 7/3 very pale brown fine sandy clay loam; 30 cm mottled clay	30 cm	mottled clay	Well No. 2
89	0–35 cm 10YR 6/4 light yellowish brown silty clay, increasing compactness with depth; 35–40 cm mottled silty clay	40 cm	mottled clay	Well No. 2
90	0–20 cm 10YR 7/2 light gray silty clay; 20 cm mottled clay	20 cm	mottled clay	Well No. 2

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
91	0–20 cm 10YR 6/4 light yellowish brown fine sand; 20–35 cm 10YR 6/4 light yellowish brown sandy clay; 35–40 cm mottled sandy clay 7.5YR 5/8 strong brown prominent	40 cm	mottled clay	S3
92	0–40 cm 10YR 5/3 brown fine sandy loam; 40 cm mottled clay	40 cm	mottled clay	S3
93	0–45 cm 10YR 5/3 brown silty clay, increasing compactness with depth	45 cm	impenetrable sediment	S3
94	0–50 cm 10YR 5/3 brown sandy loam	50 cm	impassable root	S3
95	0–10 cm 10YR 5/3 brown very fine sandy clay; 10–20 cm mottled clay	20 cm	mottled clay	S3
96	0–20 cm 10YR 7/3 very pale brown silty clay loam; 20 cm mottled clay	20 cm	mottled clay	S3
97	0–35 cm 10YR 6/4 light yellowish brown silty clay; 35–40 cm 10YR 6/4 light yellowish brown very dense silty clay	40 cm	impenetrable sediment	S3
98	0–30 cm 10YR 6/3 pale brown very fine sandy loam; 30 cm mottled silty clay	30 cm	mottled clay	S3
99	0–40 cm 10YR 5/3 brown sandy loam; 40–45 cm 10YR 5/3 brown silty clay, increasing compactness with depth	45 cm	impenetrable sediment	access road stream
100	0–30 cm 10YR 5/3 brown sandy loam; 30 cm 2.5YR 4/8 red basal clay	30 cm	basal clay	access road stream
101	0–25 cm 10YR 5/3 brown silt loam; 25 cm clay	25 cm	impenetrable sediment	access road stream
102	0–25 cm 10YR 5/3 brown sandy loam; 25 cm 2.5YR 4/6 red basal clay	25 cm	basal clay	access road stream

Table 1. Results of shovel tests.

ST No.	Profile	Termination Depth	Reason for Termination	Feature
103	0–50 cm 10YR 5/3 brown silt loam; 50 cm mottled silty clay	50 cm	impenetrable sediment	access road stream
104	0–30 cm 10YR 5/3 brown sandy loam; 30–50 cm 10YR 7/2 light gray silty clay; 50 cm mottled clay	50 cm	mottled clay	access road stream
105	0–35 cm 10YR 5/3 brown silty loam; 35–40 cm mottled clay, 5YR 4/6 yellowish red prominent	40 cm	mottled clay	access road stream
106	0–10 cm 2.5YR 4/6 red basal clay	10 cm	basal clay	access road stream
107	0–15 cm 10YR 5/3 brown silt loam; 15 cm gravel and red basal clay	15 cm	basal clay	ETC property
108	0–15 cm 10YR 5/3 brown silt loam; 15 cm gravel and red basal clay	15 cm	basal clay	ETC property
109	0–25 cm 10YR 5/3 brown silt loam; 25 cm gravel and red basal clay	25 cm	basal clay	ETC property
110	0–15 cm 10YR 5/3 brown silt loam; 15 cm gravel and red basal clay	15 cm	basal clay	ETC property

Photo 1. Stream 1 as seen from the centerline of the proposed pipeline route, view to the southwest.

Proposed Pipeline: Stream 3

Stream 3 (S3) crossed the proposed pipeline corridor approximately 1.0 km west along the proposed route from S2 (Figure 2). Within the project area, this ephemeral stream has a well-defined main channel roughly 1 m wide and 0.5 m deep, and is located in a steep valley about 3 m deep by 5 m wide in pre-Holocene deposits. The surrounding vegetation is a mix of thatched pasture grasses, hardwood trees, vines, poison ivy, and greenbriar; ground visibility ranged from 0 to 10 percent. Within the survey corridor, the majority of this stream and its margins are heavily disturbed by several existing subsurface pipelines (Photo 2). Care was taken to place tests outside the disturbed area; four shovel tests (STs 91–94) were placed on the southeast bank of the stream and four shovel tests (STs 95–98) were placed on the northwest bank. These tests revealed 20 to 50 cm of brown sandy loam to silty clay loam over mottled clay or compact pale brown silty clay. Tests terminated between 20 and 45 cm due to mottled clay or impenetrable sediment, except one test (ST 94) that terminated due to an impassable root (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Proposed Pipeline: Wetland 1

Wetland 1 (WL1) is located 800 m northeast of where the proposed pipeline corridor crosses PR 8606 (Figure 2). Within the survey corridor, this wetland stretches across most of the corridor for roughly 180 m and has pre-Holocene clay soil visible on the surface. The corridor east of the pro-

Photo 2. The very wide, disturbed, existing pipeline corridor at Stream 3, view to the southeast.

posed pipeline centerline is disturbed by existing subsurface pipelines. The surrounding vegetation included thatched grasses, oak, cypress, and thorny vines. A total of four shovel tests (STs 17–20) were placed on the northeast side of the wetland and four shovel tests (STs 21–24) were placed on the southwest side of the drainage. These tests revealed 10 to 30 cm of dark grayish brown clay loam to silty clay over mottled clay; all tests terminated at heavily mottled clay (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Proposed Pipeline: Wetlands 2 and 3

Wetlands 2 and 3 (WL2 and WL3) are located just west of PR 8606 where the proposed survey corridor turns from heading southwest to heading west (Figure 2). Within the survey corridor, these wetlands combined cover 55 m of centerline and most of the width of the survey corridor. The two wetlands, which are located in pre-Holocene sediments, are separated by a raised two-track road following an existing subsurface pipeline. The surrounding vegetation is a mixed hardwood forest with a few pines and thorny underbrush with 1 to 5 cm of leaf fall and ground visibility of 0 percent. The road represents a disturbance and no tests were placed in the disturbed area. Four shovel tests (STs 25–28) were excavated on the west side of the pair of wetlands and four shovel tests (STs 29–32) were excavated on the northeast side of the pair of wetlands. These tests revealed 15 to 50 cm of brown loamy sand to silty clay over mottled clay or compact pale brown silty clay. Tests terminated between 15 and 50 cm due to mottled clay or impenetrable sediment (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Proposed Pipeline: Ridgeline

The proposed pipeline corridor crosses two lobes of the ridgeline overlooking the Trinity River floodplain approximately 800 m west of W3 (Figure 2). This sandy ridge is located adjacent to USACE jurisdictional WOUS, and was deemed to be high probability for sites based on its location compared to other sites recorded in the region. The sandy ridge in the corridor has a large northern lobe and small southern lobe. The ridge is an ancient deposit, a combination of Eocene- and Pleistocene-age deposits in origin (BEG 1993). The surrounding vegetation is a mix of hardwood and pine with a short understory of greenbriar, poison ivy, and prickly pear. A two-track road is cut into the ridge on the smaller, southern lobe and represents a disturbance; a fence line and another two-track road are located in the northern third of the survey corridor of the larger, northern lobe. A total of six shovel tests (STs 51–56) were excavated in the larger, northern lobe and two tests (STs 57–58) were excavated in the smaller, southern lobe. The corridor between them was subject to pedestrian survey but not shovel testing because it was a steep grade. Most of the tests had 100 cm of brown to yellowish brown loamy sand and terminated due to depth. Two tests (STs 56 and 58) were terminated due to large, impassable roots. One test located further from the leading edge of the ridge (ST 52) was terminated due to red basal clay at 75 cmbs (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Proposed Pipeline, Wastewater Discharge Point: Trinity River Floodplain

The Trinity River floodplain starts at the base of the ridgeline and continues to the river (Figure 2). Wetland 4 (WL4) is located at the base of the ridgeline and is bisected along the proposed centerline by a raised two-track road base that has been heavily eroded. WL4 is part of an old oxbow of the Trinity River, and is about 55 m long east to west and extends far beyond the survey boundaries. There is about 120 m between WL4 and Wetland 5 (WL5). WL5 represents part of the same oxbow as WL4, as the proposed corridor crosses it again; W5 continues up to the levee of the Trinity River and includes Stream 4 (S4). WL5 is approximately 190 m long and extends beyond the corridor. S4 is an ephemeral drainage with a moderately defined, possibly artificial channel 0.5 m wide by 0.2 m deep. The artificial levee is located immediately against the river margin; the levee is about 1.5 m tall and 8 to 10 m across. It extends beyond the survey boundaries. The levee has likely been constructed after 1977, as it is not noted on archaeological survey of this Trinity River segment (Richner and Bagot 1978). The levee represents a significant disturbance to the natural landscape. The wastewater discharge point location is in the bank of the Trinity River, below the levee (Photo 3). However, due to the steepness of the levee and bank, the bank at the discharge zone could not be visually examined.

A total of 14 shovel tests (STs 59–72) were excavated at regular intervals throughout the floodplain of the Trinity River. No tests were placed on the levee or raised road. All tests revealed 0 to 30 cm of dark gray to dark grayish brown clay to loamy clay over heavily mottled red clay (Photo 4). Tests terminated between 30 and 45 cm due to mottled clay (Table 1). Considering the standard profile of the Holocene-age soil recorded in this area, this indicates the landscape has been heavily

Photo 3. Trinity River from the levee at the western terminus of the proposed pipeline and wastewater discharge point, view to the west.

modified and much of the Holocene pedon is missing; there is minimal chance of buried Holocene materials in the surveyed portion of the Trinity River floodplain. All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Access Road: Stream

The access road is 0.7 miles (1.1 km) long and connects CR 2610 to the proposed pipeline corridor and the proposed location of Apex Water Well No. 2/2A pad (Figure 2). The east to west portion of this access road is an improved two-track road; the rest is two-track road or maintained pipeline corridor through pasture. The road traverses only pre-Holocene sediments. There is a modern structure (mobile home) located 100 m west of CR 2610, just north of the access road; this was not surveyed as a historic feature (Photo 5). The access road crosses a stream near the western end of the east to west portion of the road; the stream is the upstream portion of S3 on the proposed pipeline corridor. In this location the stream has a well-defined channel roughly 2 m wide by 1.5 m deep, located in a valley 3 m deep and 6 m wide. There is a large culvert at the access road in the stream channel, and the remains of an older but still modern bridge crossing immediately south of the current two-track road crossing. There appear to have been a number of modifications to the area of the stream in this location. Four shovel tests (STs 99–102) were placed on the east bank of the stream and four tests (STs 103–106) were placed on the west bank. All but one of these tests had brown loam over either red basal clay or compact brown silty clay, and terminated between 20

Photo 4. Shovel Test 60, located in the floodplain of the Trinity River, showing the red basal clay indicative of a highly disturbed pedon, view downwards.

and 50 cmbs due to basal clay or impenetrable sediment. One test (ST 106) was located at the turn south of the access road and contained basal clay at surface (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Non-Linear Element: Apex Water Well No. 1/1A Pad

Apex Water Well No. 1/1A pad is located west of WL3, between the proposed pipeline route and FM 321. It is almost square, totaling 0.8 acres in size (Figure 2). The vegetation in the well location was mixed hardwood and pine, with a woody understory punctuated with greenbriar, poison ivy, and prickly pear with 2 to 5 cm of leaf fall. The topography was mostly flat with small (<5 m diameter), short (<0.5 m tall) sandy hummocks throughout. The area is mapped as pre-Holocene sediments. Whenever possible, shovel tests were placed on the sandy hummocks. Eighteen shovel tests (STs 33–50) were excavated in the area of the well. These tests generally showed 10 to 45 cm of grayish brown to yellowish brown very fine sandy loam over pale brown silty clay that increased in compactness with depth. These shovel tests terminated between 5 and 60 cm at mottled clay, red basal clay, or impenetrable silty clay (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Photo 5. View of a structure—a modern mobile home—located north of the eastern end of the access road, view to the northeast.

Non-Linear Element: Apex Water Well No. 2/2A Pad

Apex Water Well No. 2/2A Pad is located 430 m west of S3 on the proposed pipeline corridor (Figure 2). This is a 1.6-acre rectangle oriented with the long side north to south, taking up most of the southeast corner of a pasture and located southwest of an artificial pond on top of the hill in the pasture. The area of this well is mapped as pre-Holocene sediments. The north side of the well location, where it meets the proposed pipeline corridor, is disturbed by an existing maintained pipeline corridor. Vegetation in the area of the well is mostly pasture grass, with vines, briars, and oaks near the pond and the southern and western edges against the property fences. The topography was near the top of a hill, with gentle slopes (< 5 degrees) to the south, east, and west. Eighteen shovel tests (STs 73–90) were excavated within the well area. These tests showed 20 to 45 cm of brown to yellowish brown silty clay loam over mottled clay or compact pale brown silty clay; the tests terminated between 20 and 45 cm due to mottled clay or impenetrable sediment (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Non-Linear Element: ETC Connector Pipeline Area

The ETC connector pipeline area is located on the west side of CR 2706, 360 m north of where the proposed pipeline centerline crosses the road (Figure 3). This area is part of an active facility, sitting on a surface mapped as pre-Holocene sediments. The parcel surveyed is 1.0 acres in size

Figure 3. Overview of the ETC connector pipeline area, with the location of the four shovel tests excavated in this area.

and constitutes the area between the county road and a gravel base housing four large tanks (Photo 6). This parcel contains a number of disturbances including subsurface pipelines, power lines, power line poles, light poles, a gravel road, a fence, small buildings, and a raised foundation for a modern portable building that has since been removed. The vegetation was short yardscape grass and a single cedar tree. A total of four shovel tests (STs 107–110) were placed in the least disturbed areas and the whole of the property was subject to pedestrian survey in transects no more than 30 m apart. The shovel tests showed 15 to 25 cm of brown silt loam over red basal clay (Table 1). All shovel tests were negative for cultural material and no cultural remains were discovered at this location.

Photo 6. View of multiple disturbances on the ETC connector pipeline area, view to the northwest.

SUMMARY AND RECOMMENDATIONS

WSA has conducted archaeological survey of one river (Trinity River), four streams (S1–4), and five wetlands (WL1–5) crossing the proposed wastewater/water pipeline route and one stream (S3) crossing a proposed access road route, representing USACE, Fort Worth District, jurisdictional drainage crossings along the location of the proposed Apex Bethel Energy Center Water Supply and Wastewaster Pipeline project. In addition, WSA has conducted archaeological survey of one wastewater discharge point and the entire area of three non-linear project elements consisting of two water wells and one ETC connector pipeline area located adjacent to the main plant facility as required by EPA and USACE permitting. All streams and wetlands will be crossed by the pipeline via open-cut trenching for pipeline placement; the pipeline will have a discharge situated in the bank of the Trinity River. The project area of potential effect (APE, approximately 104.6 acres) consists of approximately 4.0 miles (6.44 km, 97 acres) of wastewater/water pipeline corridor, one wastewater discharge point, one access road corridor (0.7 miles, 4.24 acres), two water well locations (2.4 acres), and one ETC connector pipeline area (1.0 acre). These components will be buried, confined to the surface, or in limited areas such as the ETC connector pipeline area, extend no more than 4 to 5 feet above ground. The survey consisted of a 100 percent pedestrian walkover of all USACE jurisdictional drainage areas, and all additional, identified project areas supplemented by shovel testing. The survey covered a total area of approximately 36 acres. A combined total of 1.3 miles (2.1 km) of linear elements were surveyed and a total of 110 negative shovel tests were excavated in support of pedestrian survey. No archaeological sites, historic architecture, or other cultural resources were identified.

WSA concludes and respectfully requests concurrence that there exists a low probability that properties eligible for the National Register of Historic Places (NRHP) or as a State Archeological Landmark (SAL) in or adjacent to jurisdictional waters of the USACE will be impacted by the proposed construction of approximately 4.0-mile (6.44-km) wastewater/water pipeline and associated facilities due to the negative results of survey and subsurface testing. WSA recommends and respectfully requests that construction within the APE of approximately 104.6 acres, including the approximately 4.0-mile (6.44-km, 97-acre) wastewater/water pipeline, one access road (0.7 miles, 4.24 acres), two water wells (2.4 acres), and modifications to the ETC connector pipeline area (1.0 acre) be allowed to proceed under Section 106 of the NHPA, and that all Section 106 consultation for the proposed pipeline be considered complete.

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2012b *Texas State Historic Preservation Officer (SHPO) Coordination Letter Regarding Cultural Resource Investigations for the Proposed Apex Bethel Energy Center Water Supply and Wastewater Pipeline Project, Anderson County, Texas*. William Self Associates. Prepared for and submitted to CH2M Hill. Draft letter report dated October 8, 2012. Copies available, William Self Associates, Austin, Texas.

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1993 *Archeology in the Eastern Planning Region, Texas: A Planning Document.* Cultural Resources Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

Pertulla, Timothy K.
1995 The Archeology of the Pineywoods and Post Oak Savanna of Northeast Texas. *Bulletin of the Texas Archeological Society* 66:331–360.

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1993 2.1. Introduction (to the Northeast Texas Archeological Region). In *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by Nancy A. Kenmotsu and Timothy K. Perttula, pp. 35–47. Cultural Resources Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

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1978 *A Reconnaissance Survey of the Trinity River Basin, 1976–1977*. Archaeology Research Program, Department of Anthropology, Southern Methodist University. Prepared for and submitted to the U.S. Army Corps of Engineers, Contract DACW63-76-C-0133. Copies available from the Texas State Library & Archives Commission, Liberty, Texas.

United States Geological Survey (USGS)
1982a *Cayuga, Tex. Topographic Quadrangle* [map]. Scale 1:24,000. United States Geological Survey, Reston, Virginia.

1982b *Yard, Tex. Topographic Quadrangle* [map]. Scale 1:24,000. United States Geological Survey, Reston, Virginia.

APPENDIX. RESUMES OF KEY PERSONNEL

James Karbula, Ph.D., RPA — Regional Project Director

EDUCATION

2000	Ph.D.	Anthropology, University of Texas, Austin
1989	M.A.	Anthropology, University of Texas, San Antonio
1986	B.A.	English, University of Texas, San Antonio

PROFESSIONAL EXPERIENCE

William Self Associates, Inc., Austin, Texas
Regional Project Director and Principal Investigator, 2008–Present

- Supervised all aspects of Austin office including all business relations, staff, and facility management.
- Serves as regional project director and principal investigator on major survey and data recovery projects in the Southern region.
- Responsibilities include the coordination and management of all projects, including development and tracking of project schedules and budgets, supervision of staff in both the office and the field, staff allocation, writing and review of reports, preparation of budgets, technical scopes, and business development proposals, and acting as a point of contact for clients for the Austin office
- Coordinates with local, state, federal, and SHPO regulatory staff in a variety of compliance settings under Section 106 of the National Historic Preservation Act (NHPA), NEPA, and the Texas Antiquities Code (TAC)
- Over 16 years of supervisory experience as cultural resource director documenting cultural resources in the Southern region, especially throughout Texas
- Holds a New Mexico State Archaeology Permit, has held Archaeological Resource Protection Act Permits (ARPA, Texas, and New Mexico) and is listed on the Texas, New Mexico, Oklahoma and Louisiana SHPO lists
- Recently served as regional project director/principal investigator for:
    - AGL Resources, Golden Triangle Storage project (TX)
    - Naismith Engineers, Koch Helena Gathering System and Drees Segment (TX)
    - Tim Glendening Associates, City of Baytown Wastewater Treatment Plant Expansion (TX)
    - U.S. Department of Agriculture, Ouachita National Forest, Jones Creek Watershed Inventory (AR)
    - U.s. Department of Agriculture, Ouachita National Forest, Broken Bow Watershed Inventory, (OK)
    - CH2M Hill, Denbury Conroe 88-mile Pipeline project (TX)
    - National Park Service, Lake Veterans Dam Project, Chickasaw National Recreation Area (OK)
    - CH2M Hill, Koch Industries 60 and 24-mile Pipeline projects (TX)
    - Brown & Gay Engineers (BGE), KMTP Line 127 30-inch Pipeline Replacement project (TX)
    - Power Engineers, Oncor BCE TNP 1 Transmission Line project (TX)
    - CH2M Hill, USIBWC Rio Grande Canalization Levee Rehabilitation project (TX, NM)

AGL Resources, Golden Triangle Storage project, 2008–2013

- Beaumont, Jefferson County, Texas
- Served as principal investigator and project manager for archival research, survey, and mitigation of ca. 1900 industrial and residential remains at the Spindletop Oil Field, a National Historic Landmark
- Identified archeological sensitivity zones of intact Spindletop remains, conducted Section 106 SHPO and FERC coordination, developed and executed project avoidance strategies, directed mitigation of impacted areas, and prepared project reports
- Cultural resources encountered in the project area include: late nineteenth-century industrial and residential remains related to the NHL Spindletop Oil Field
- Received the Texas Historical Commission Award of Merit in Archaeology 2011 for excellence in field investigations, reporting and public involvement on the Golden Triangle Storage Project, and the 2012 Council of Texas Archeologists E. Mott Davis Award for Excellence in Public Outreach.

Hicks & Company, Austin, Texas
Program Manager and Principal Investigator, September 1996–December 2007

- Directed numerous prehistoric and historic survey, testing, and data recovery projects subject to NHPA Section 106 and Texas Antiquities Code (TAC) compliance in virtually all areas of Texas.
- Responsible for reporting results of company archaeological projects.

- Example projects include:
    - Survey, testing, and data recovery of the Davis Springs Branch Site (41WM989), which documented 7000 years of prehistoric occupation, two burned rock middens, and an extensive series of marsh sediments containing pollen, resulting in a 5000 year sequence of paleoenvironmental data;
    - Section 106 compliance under the Exclusive Development Agreement (EDA) for the design-build of SH 130, Austin, Texas, which included data recovery of the Berdoll Site (41TV2125) resulting in documentation of 4-m deep Early Archaic camp dated at 8200 BP including numerous features and faunal materials;
    - Data recovery of 5 city block area in downtown Austin, Texas in advance of the New City Hall project. Functioned as principal investigator for excavations of extensive late 19th century urban remains in Austin's famous red light district known as "Guytown", a notorious boarding house, saloon, gambling and prostitution area. Resulted in the discovery and designation of the subterranean Schneider beer vaults as a City of Austin Historic Landmark. Dr. Karbula received the THC 2003 Award of Merit in Archaeology and the E. Mott Davis Award for outstanding public involvement on the project.

SELECTED PUBLICATIONS and REPORTS

2012 *The Lucas Gusher/Spindletop Oil Field National Historic Landmark Phase 2 Archaeological Investigations of the Golden Triangle Storage Project 90-acre Central Storage Site, Beaumont, Jefferson County, Texas* (senior author with D. Black and S. Trussell). WSA Technical Report No. 2012-13. William Self Associates, Austin, Texas.

2012 *Archaeological Investigations of the Koch Helena Gathering System Crude Oil Pipeline, KAS and Drees Segments, Karnes County, Texas* (second author with D. Black). WSA Technical Report 2012-29. William Self Associates, Inc. Austin.

2011 The Berdoll Site: An Early Archaic Camp on Onion Creek, Travis County, Texas. (senior author with J. Campbell and B. Jones). *Bulletin of the Texas Archeological Society* 82:135-173.

2011 *Final Summary Report: Cultural Resources Survey for Bell County East to TNP 1, Bell, Milam, and Robertson Counties, Texas*. (senior author with Deidra Black). Power Engineers Project No. 120618, WSA Technical Report No. 2010-57. Power Engineers Inc., Boise, Idaho.

2011 *Intensive Archaeological Survey of 647 Acres in the Jones Creek Watershed of the Poteau Ranger District, USDA Ouachita National Forest, Scott County, Arkansas*. (senior author with D. Black, J. Gillentine and M. Palmison). Technical Report No. 2010-85. William Self Associates, Austin, Texas.

2010 *Golden Triangle Storage Project: Phase 1 Cultural Resources Final Report.* (senior Author with E. Stinchcomb). Technical Report No. 2008-21. William Self Associates, Austin, Texas.

2010 *National Park Service Archaeological Survey Of Areas To Be Impacted By The Rehabilitation Of The Veterans Lake Dam Within The Platt Historic District Chickasaw National Recreation Area, Veterans Lake, Sulphur, Oklahoma*. (second author with E. Stinchcomb and D. Stone). Technical Report No. 2009-54. William Self Associates, Austin, Texas.

2009 *Archaeological Investigations of the USIBWC Rio Grande Canalization Project, El Paso County, Texas and Dona Ana County, New Mexico, Final Report*. (second author with E. Stinchcomb, C. Leezer, D. Stone, C. Frederick and S. O'Mack). Technical Report No. 2008-33. William Self Associates, Austin, Texas.

2007 *The AEP/LCRA Del Rio Transmission Line Rebuild Project. Archeological Mitigation Excavations at Site 41UV68, Uvalde County, Texas* (second author, with M. Miller, B. Jones, and S. C. Caran). Archaeology Series No. 179. Hicks & Company, Austin, Texas.

2004 The Toyah Bluff Site (41TV441): Changing Notions of Late Prehistoric Subsistence in the Blackland Prairie, Travis County, Texas. (sole Author). *Bulletin of the Texas Archeological Society* 74:55-82.

PROFESSIONAL MEMBERSHIPS

Register of Professional Archaeologists (RPA), Council of Texas Archeologists (CTA), Texas Archeological Society (TAS)

Deidra Ann Aery Black, M.A., RPA — Project Director

EDUCATION

2007	M.A.	Anthropology, Texas State University- San Marcos
2001	B.A.	Anthropology, University of Texas, Austin
2001	B.A.	Archaeology, University of Texas, Austin

PROFESSIONAL EXPERIENCE

William Self Associates, Inc., Austin, Texas
Senior Archaeologist, 2010–Present

- Over 10 years of experience in south-central, southern, and midwestern United States, especially Texas
- Four years of supervisory experience, with primary role as project archaeologist and field director
- Responsibilities include supervision of temporary field staff for projects managed through and completed by the Austin office, coordinate with regional management on projects, and report writing
- Assists in coordination with local, state, federal, and SHPO regulatory staff in a variety of compliance settings under Section 106 of the National Historic Preservation Act (NHPA), NEPA, and the Texas Antiquities Code (TAC), and other applicable State codes
- Recently served as Project Archaeologist/Field Director for:
    - AGL Resources, Golden Triangle Storage Facility Project, Phase 2 Excavations, Jefferson Co. (TX)
        - Included supervision of both staff and volunteers
    - U.S. Department of Agriculture, Ouachita National Forest, Jones Creek Watershed Inventory (AR)
    - U.S. Department of Agriculture Ouachita National Forest, Broken Bow Inventory (OK)
    - U.S. Department of Agriculture Ouachita National Forest, Ouachita National Forest, South Irons Inventory (AR)
    - Denbury-Conroe 88 mile Pipeline Project (TX)
    - Tim Glendening Associates, City of Baytown wastewater treatment plant project, Harris Co (TX)
        - Held Texas antiquities permit for this project
    - Brown & Gay Engineers (BGE), Flewellen Creek Enhancement Project, Fort Bend Co (TX)
    - CH2M Hill, APEX CAES Bethel Dome Project, Anderson Co (TX)
    - Brown & Gay Engineers (BGE), KMTP 127 30-inch Pipeline Replacement Project, Wharton Co (TX)
    - Tim Glendening Associates, Ocean Drive Reconstruction Project, Calhoun Co (TX)
        - Held Texas antiquities permit for this project
    - CP&Y, Inc., FM 471 Culebra Road Widening Project, Bexar County (TX)
        - Held Texas antiquities permit for this project

SWCA Environmental Consultants, Austin, Texas
Crew Chief, 2008-2009

- Responsibilities included supervision of field personnel, site recording, mobile data management
- Served as Crew Chief for:
    - Keystone XL Pipeline Archaeological Survey in Oklahoma and Texas
    - Ammonite Seismic Survey of Northwest Louisiana

GTI Environmental, Inc., Austin, Texas
Project Archaeologist, 2007-2008

- Primary role as Project Archaeologist and Field Director
- Responsibilities included project organization, report writing.
- Served as Project Archaeologist/Field Director for:
    - USFW Inks Dam Shore Stabilization, Burnet Co (TX)
    - City of Donna/International Bridge Corporation 8’ Water Line near FM493 (TX)
    - USFW 16 acre Complex at Lake Anahuac, Chambers Co (TX)
    - Spectra Energy Moss Bluff Project, Liberty Co (TX)
    - Hydrostatic Test of Spectra 24” Gas Pipeline and 3LN151 Site Integrity Assessment, Lonoke Co (AR)

Multiple Environmental Services firms
Field Technician, 2002-2010

- Primary role as field technician at multiple companies.
- Responsibilities included field excavation and data recording for survey and excavation projects.
- Project locations throughout Texas as well as Arkansas, Mississippi, Ohio, and Michigan
    - East Texas Counties include: Harris, Nacogdoches, Rusk, Sabine, Shelby, San Augustine, Shelby

- Mississippi Counties include: Coahoma, Quitman, Panola
- Arkansas Counties include: Union, Bradley, Cleveland, Drew, Lincoln, Jefferson, Lonoke, White

SELECT PUBLICATIONS and REPORTS

2012 *The Lucas Gusher/Spindletop Oil Field National Historic Landmark Phase 2 Archaeological Investigation of the Golden Triangle Storage Project 90-Acre Central Storage Site, Beaumont, Jefferson County, Texas* (Second author with James W. Karbula and Suzanne L. Trussell) Technical Report No. 2012-13. William Self Associates, Austin, Texas.

2012 *Archaeological Investigations of the Koch Helena Gathering System Crude Oil Pipeline, KAS and Drees Segments, Karnes County, Texas* (primary author with James W. Karbula) Technical Report No. 2012-29. William Self Associates, Austin Texas.

2012 *Cultural Resources Survey of the City of Baytown Wastewater Treatment Plant, Harris County, Texas* (sole author). Technical Report No. 2012-01. William Self Associates, Austin, Texas

2011 *Final Summary Report: Cultural Resources Survey for Bell County East to TNP 1, Bell, Milam, and Robertson Counties, Texas*. (second author with James Karbula). Power Engineers Project No. 120618, WSA Technical Report No. 2010-57. Power Engineers Inc., Boise, Idaho.

2011 *Cultural Resources Status Report of the Proposed Koch Pipeline Company, LP, 24-mile Pipeline Project, Bee and Karnes Counties, Texas* (sole author) Technical Report No. 2011-29. William Self Associates, Austin, Texas

2011 *Archaeological Survey of the Koch Pipeline Company 60-mile Pipeline Project, Bee and San Patricio Counties, Texas* (sole author) Technical Report No. 2011-40. William Self Associates, Austin, Texas

2010 *Intensive Archaeological Survey of 647 Acres in the Jones Creek Watershed of the Poteau Ranger District, USDA Ouachita National Forest, Scott County, Arkansas*. (second author with J. Karbula, J. Gillentine and M. Palmison). Technical Report No. 2010-85. William Self Associates, Austin, Texas.

2009 *Cultural Resources Inventory of the Keystone XL Pipeline Project: Gulf Coast Segment in Oklahoma: Payne, Lincoln, Okfuskee, Creek, Seminole, Hughes, Coal, Atoka, and Bryan Counties, Oklahoma: Addendum A* (contributing author with L. Acuña, S. Carpenter, J. Low, K. Lawrence). SWCA Environmental, Austin, Texas.

2008 *An Intensive Archaeological Survey: U.S. Fish & Wildlife Service Inks Dam Shore Stabilization, Burnet County, Texas* (second author with S. Iruegas, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *An Intensive Archaeological Survey: City of Donna/International Bridge Corporation New 8'Waste Water Line near FM493 at La Cruz Resaca/ Main Floodway* (second author with S. Iruegas, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Canton Treated Effluent Line Project from Canton to the Tuscarawas River: Intensive Archeological Survey Canton, Perry, and Bethlehem Townships, Stark County, Ohio* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Marathon Pipeline Samaria Detroit 20-Inch Crude Pipeline Heavy Oil Upgrade Project: National Register Testing for site 20MR809 Monroe County, Michigan* (contributing author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 2 CRM Report. GTI Environmental, Austin, Texas

2008 *Marathon Pipeline Samaria-Detroit 20-Inch Crude Pipeline Heavy Oil Upgrade Project: Supplemental Intensive Archeological Survey Monroe County, Michigan* (contributing author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *An Intensive Archaeological Survey: U.S. Fish and Wildlife Service 16-Acre Complex at Lake Anahuac, Chambers County, Texas* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Spectra Energy Moss Bluff Project, Liberty County, Texas* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Hydrostatic Test of Spectra 24-inch Gas Pipeline and 3LN151 Site Integrity Assessment, Lonoke County, Arkansas* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2006 "Uncovering Ancient Hunter Gatherers at Aquarena Springs" (sole author) in *Texas Archeology Quarterly Newsletter.* Fall 2006.

AWARDS

E. Mott Davis Award for Excellence in Public Outreach, 2012

PROFESSIONAL REGISTRATIONS

Register of Professional Archeologists, Council of Texas Archeologists, Texas Archeological Society