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Cultural Resource Survey of the South Texas Syngas Directional Drill Locations Negative Findings Phase I Survey Report Justin Hurst Wildlife Management Area Brazoria County, Texas

Jeff Turpin

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**Cultural Resource Survey of the South Texas Syngas Directional Drill Locations
Negative Findings Phase I Survey Report Justin Hurst Wildlife Management Area
Brazoria County, Texas**

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**A CULTURAL RESOURCE SURVEY OF
TWO DIRECTIONAL DRILL LOCATIONS
ON THE AIR LIQUIDE SOUTH TEXAS
SYNGAS PIPELINE WITHIN TPWD'S
JUSTIN HURST WILDLIFE
MANAGEMENT AREA**

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Texas Antiquities Permit Number 7029

Prepared For:

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and
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November 2014

Cultural Resource Survey of the South Texas Syngas Directional Drill Locations

Negative Findings Phase I Survey Report Justin Hurst Wildlife Management Area Brazoria County, Texas

Draft Report

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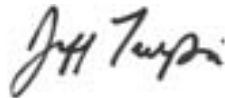
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Abstract

During October of 2014, Turpin and Sons Inc. (TAS) conducted a cultural resource assessment of two potential horizontal directional drill (HDD) locations and one additional baseline trench location along Jones Creek within the Justin Hurst Wildlife Management Area managed by the Texas Parks and Wildlife Department. The area of interest is located along an existing pipeline corridor between the San Bernard and Brazos rivers in southwest Brazoria County, Texas. The project was sponsored by Gremminger and Associates Inc., acting as agents for Air Liquide Large Industries U.S. LP, and conducted under Texas Antiquities Permit Number 7029 issued to Dr. Jeff Turpin. The scope of work involved trenching potential HDD borehole locations to investigate possible impact to archeological material in the subsurface at depth. The field investigations consisted of the mechanical excavation of four trenches across two potential HDD locations, and one additional baseline trench approximately 130 m east of Jones Creek. Trenches were approximately 4 - 6 m long by 2 m wide and were dug to a depth of 0.90 - 1.30 m deep. The trenches were placed on the edges of 200 ft by 200 ft temporary work spaces in the only areas affected by ground disturbance. The remainder of the temporary workspace will be covered in laminated board skids to prevent ground disturbance. The trenches were examined for cultural remains by TAS staff, with geomorphological investigations performed by Brittney Gregory. No cultural resources were identified within the approximately 66 square meters of substrata examined, and geomorphological information suggests that the potential for intact buried cultural deposits in these areas is little to none. Based on the negative findings of trench examinations, TAS recommends no further work at the two potential HDD locations.

A preliminary report containing basic archeological and geomorphological summaries was provided to all vested parties immediately after fieldwork, and based on that report pipeline construction was allowed to proceed. What follows is a detailed report of the cultural resource assessment.

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Introduction

During the week of October 6 - 9, 2014, TAS Inc. (TAS) conducted a Phase I cultural resource assessment of potential horizontal drill locations within the Justin Hurst Wildlife Management Area (JHWMA) in southwest Brazoria County, Texas (Figure 1). As part of the construction of a 42-mile pipeline from the DOW Chemical Plant at Freeport to the Oxea Plant south of Bay City, Air Liquide has negotiated an easement or right-of-way (ROW) to install a 4.3 mile (22,740 linear feet) segment of this pipeline across the northern portion of the JHWMA, a Texas Parks and Wildlife Department (TPWD) property in Brazoria County (Figure 2). The new line would generally parallel existing utilities for the entirety of the route, with pipeline installation being accomplished by a series of horizontal directional drills (HDD). An archeological assessment of the HDD drill entry and exit work locations was requested by TPWD.

The scope-of-work involved trenching potential HDD borehole locations to investigate the possible impact on archeological material during alignment and installation of the 4.3-mile segment. The assessment relied on the mechanical excavation of five trenches across three areas north of an existing utility and pipeline corridor between the San Bernard and Brazos rivers (Figure 2).

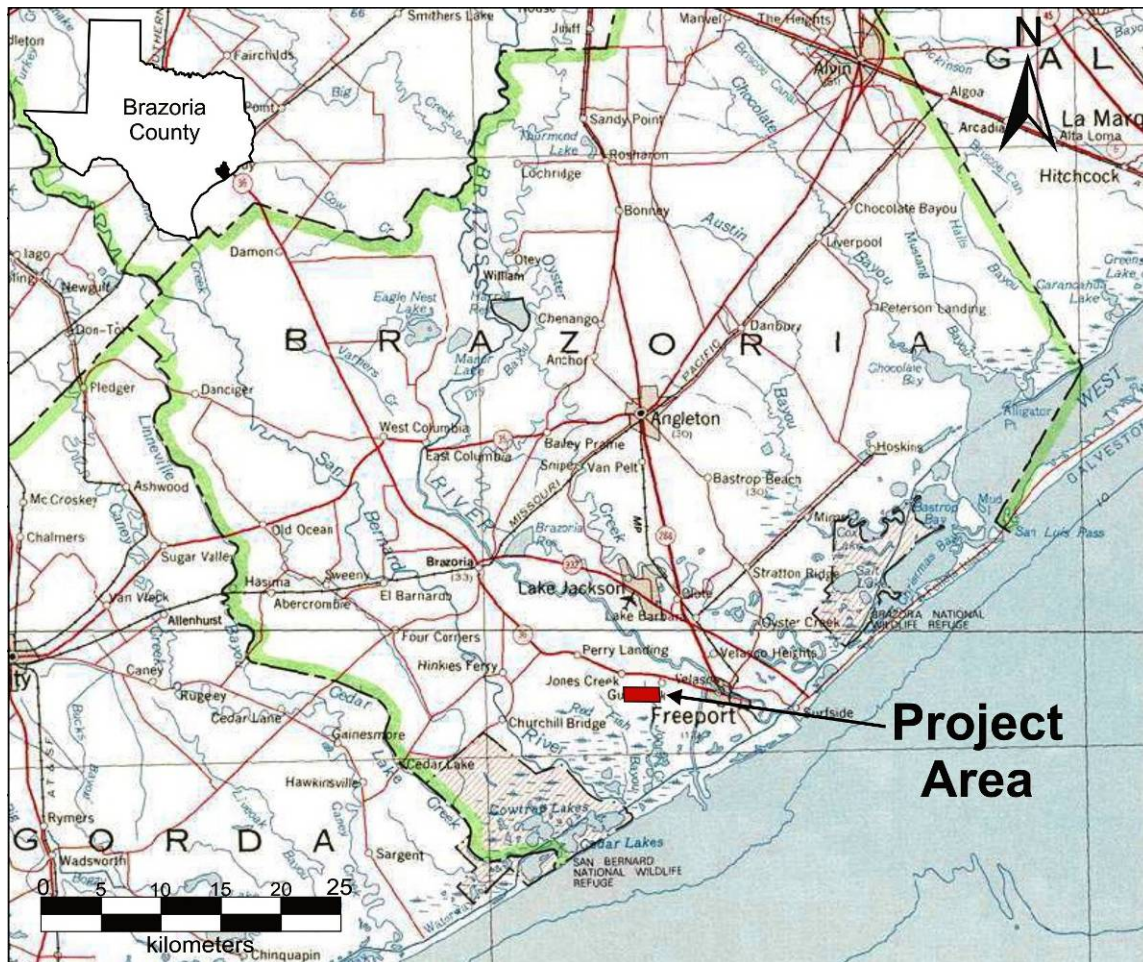


Figure 1. General overview of project location (source: National Geographic Topo).

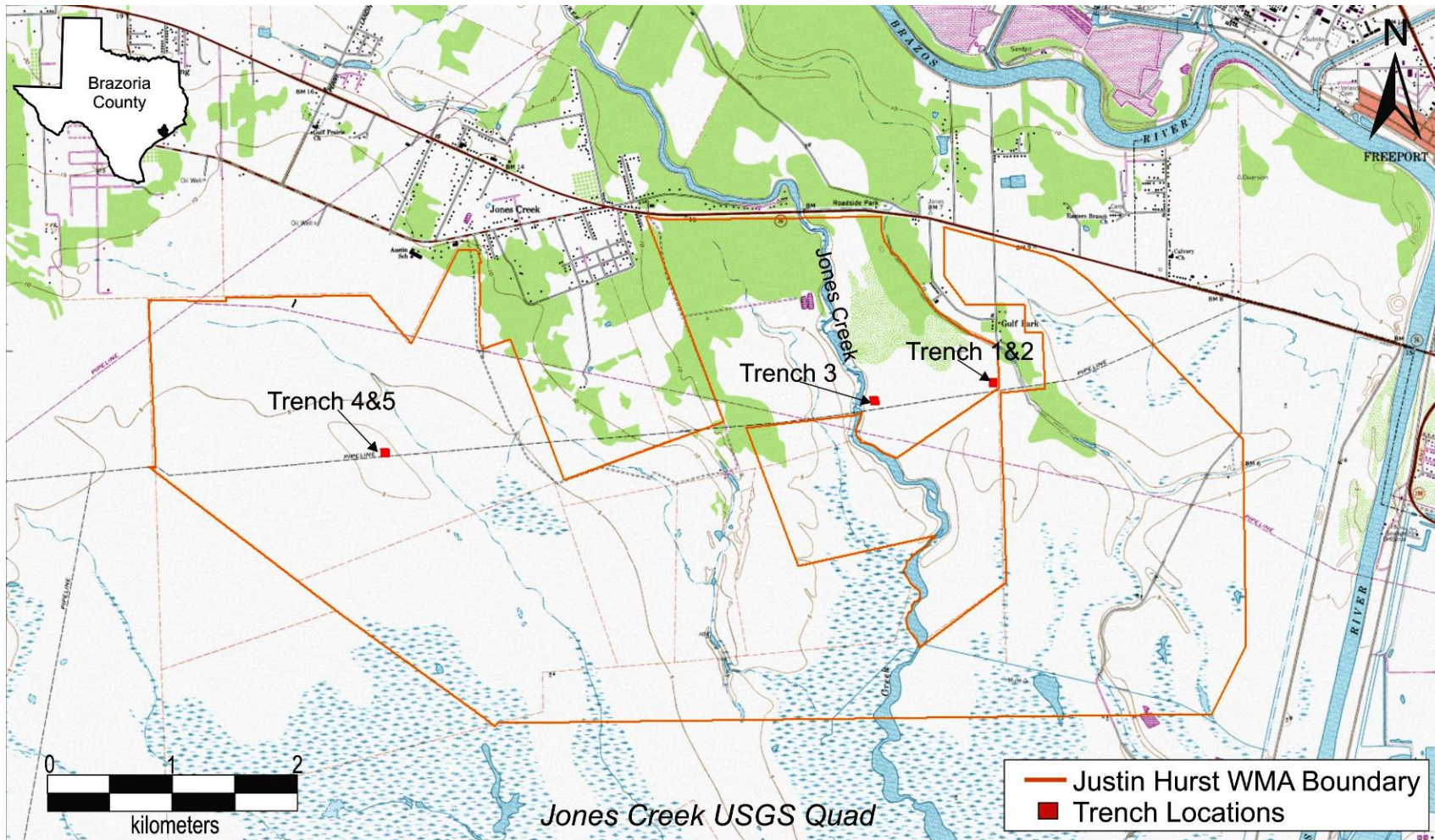


Figure 2. Project location map (source: Terrain Navigator).

Management Summary

The project was sponsored by Gremminger and Associates Inc., acting as agents for Air Liquide Large Industries U.S. L.P., and conducted under Texas Antiquities Permit 7029 issued to Dr. Jeff Turpin. A cultural resource and geomorphological investigation was required by the Texas Parks and Wildlife Department (TPWD) in advance of construction.

Field work consisted of the mechanical excavation of two trenches at each of the two proposed directional drill locations and a solitary baseline trench east of Jones Creek (Figures 3-5). Trench 3, the baseline trench, was excavated in the area of a proposed but abandoned HDD, and was excavated both to flesh out the local geomorphological information and provide TPWD with data from this area near Jones Creek. The drill location trenches were placed at the proposed boreholes and mud pits, which are the only areas of anticipated ground disturbance. The walls and back fill were inspected for cultural resources and the geologic sediment patterns of each trench were examined in hopes of understanding the potential for cultural deposits. No cultural artifacts or features were identified and geomorphologic investigations propose that the soil is too old to harbor *in situ* buried cultural deposits (Gregory 2014). These findings indicate that cultural resources will not be affected by the planned HDDs.

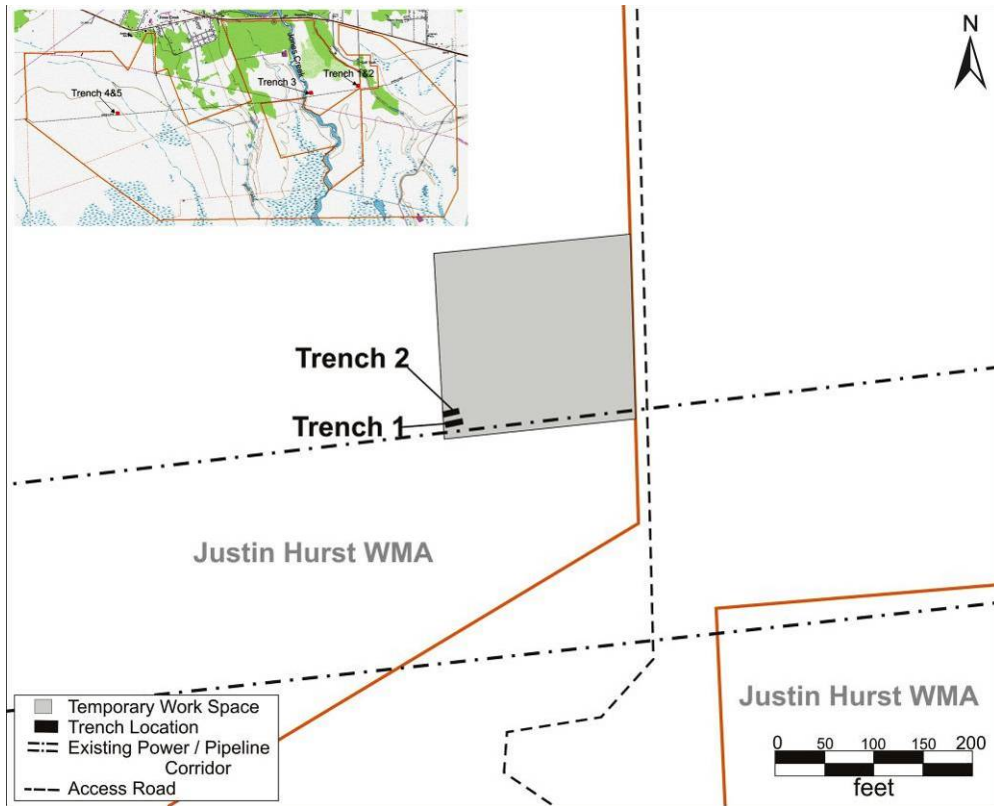


Figure 3. Trenches 1 and 2 location map.

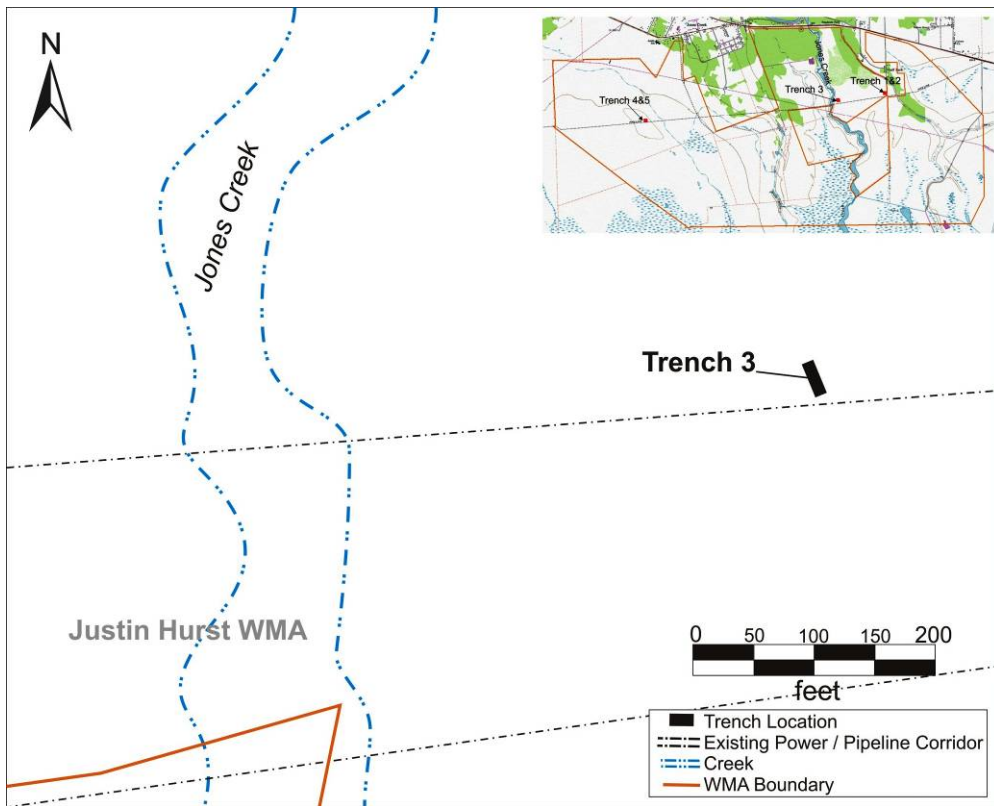


Figure 4. Trench 3 location map.

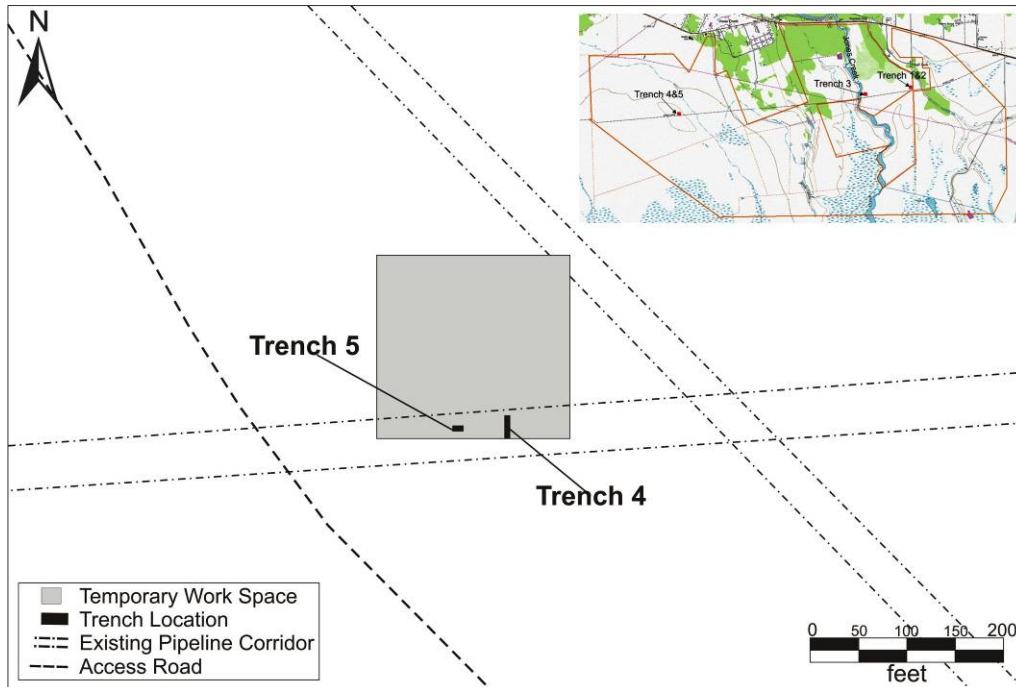


Figure 5. Trenches 4 and 5 location map.

As mandated by laws governing state lands, the archeological study was carried out under the authority of Texas Antiquities Permit 7029, issued to TPWD, Air Liquide and TAS. Dr. Jeff Turpin served as the Principal Investigator and Billy Turner was Project Manager. Field work encompassed 32 person hours and was conducted by Dr. Jeff Turpin, Billy Turner, and Jacob Combs. Geomorphological investigations and data collection were carried out by Brittney Gregory. The report was produced by Carrie Davis, and graphics were created by Billy Turner.

This cultural resource assessment consisted of an archival search, the excavation and examination of five trenches, and preparation of a report suitable for review by the Texas Historic Commission (THC) in accordance with the Council of Texas Archeologists (CTA) report standards as specified in a scope of work developed in consultation with TPWD's Cultural Resource Specialist Dr. Christopher Lintz.

The investigations were conducted under authority of the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm) and its regulations (43 CFR 7). The work was performed in compliance with the National Historic Preservation Act of 1966 (NHPA), as amended (16 U.S.C. 470 et seq., P.L. 89-665, 80 Stat. 915), and the implementing regulations 36CFR800. They were also

intended to provide information on cultural resources for an environmental impact statement, as required by the National Environmental Policy Act (NEPA) of 1969; the National Environmental Policy Act of 1974 (PL 81-190, 83 Stat. 915, 41 USC 4321, 1970); the Archaeological and Historic Preservation Act of 1974 (PL 93-291); the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 Fed. Reg. 44716-42, Sept. 29, 1983); and the National Register Bulletin Series of the National Park Service.

Environmental Setting

Physiography and Geomorphology

The project is located in the Justin Hurst Wildlife Management Area (JHWMA) in southwest Brazoria County, Texas, eight miles west of Freeport, Texas. The JHWMA is divided into two sections; the Main Unit and the Bryan Beach Unit. The field work was conducted within the northern region of the Main Unit, paralleling an existing pipeline and utility corridor between the San Bernard and Brazos rivers (see Figure 2).

The refuge was formed in 1986 as part of the Central Coast Wetlands Ecosystem Project (CCWEP), and contains 15,612 acres of upland hardwood and prairie, as well as fresh and saltwater marshes. The land was acquired with funds provided by the Texas Waterfowl Hunting Stamp and as mitigation lands for the loss of wildlife habitat. The CCWEP's mission is to provide for sound biological conservation of all wildlife resources within the central coast of Texas for the public's common benefit (TPWD).

The JHWMA is representative of the Gulf Coast Prairies and Marshes Ecoregion, which encompasses approximately 15,000 square miles of Texas. The region is a nearly level, slowly drained plain with a general elevation of five feet or less. Deltaic sands, silts and clays have eroded to flat grasslands that slope gently to the southeast. Native vegetation once included tall grass prairies and live oak woodlands and mottes, but has given way to planted agricultural fields and invasive trees such as mesquite, Chinese tallow and sweetgum (Figure 6). The climate is generally warm humid subtropical with infrequent incursions of cold air in the winter months. Rain is common and hurricanes frequent.



Figure 6. General environment near Trenches 4 & 5, looking SE.

The Brazos River divides Brazoria County into two distinct areas, prairielands in the east and hardwoods in the west. The JHWMA is located in the western portion of the county. Groves of hardwoods can be found in the creek and river bottoms, while grasses and sedges dominate the coastal marshlands. Fauna includes white-tailed deer, gophers, opossums, rabbits, skunks, alligators, freshwater mussels, and many species of snails, fish, and reptiles (Jones 1982).

Soils

Soils in the JHWMA are primarily poorly drained clays (Crenwelge et al. 1991). The areas examined consist of Surfside clay as mapped by the NRCS. Surfside clay consists of mildly alkaline, saline, very dark gray to black clay. It is formed in clayey costal sediments on level to depressed areas that are deep, poorly drained and saturated most of the year (NRCS/USDA).

The current trenching regime revealed a very consistent depositional profile in all five trenches. The sediment ranged from sandy clay loam to clay and, in general, exhibited a fining upward sequence. The deposit was characterized by an A-ABkss-Bk soil profile with stage II to III calcic horizon. Generally the A horizon was very melanized (10YR 2/1 black and 10YR 3/1 very dark gray) and was completely leached of calcium carbonate. The ABkss horizon had few, medium

carbonate nodules with matrix leaching and prominent slickensides on ped faces. This gradually transitioned into a Bk horizon with a violently effervescent matrix and nodules and masses from 0.5 to 4.0 cm in diameter. In general, the profiles fined from east to west supporting evidence that this is a floodplain sequence with fluvial depositional processes (Gregory 2014).

The trenched areas are in the Holocene delta/floodplain of the Brazos River. The basic geomorphological characteristics of the area are a result of sediment deposition changes due to sea level fluctuations and variations in the sediment carrying capacity of the region's rivers. Soils were created by quaternary fluvial deposits formed by ancient rivers. The Quaternary Period is subdivided into the Pleistocene and Holocene with the Pleistocene or "Ice Age" extending from about 2 million to about 10,000 years ago and the Holocene (or Recent) continuing to present (Baskin n.d.). Soils across the region derived from the Pleistocene Beaumont Formation with later Holocene fluvial deposits consisting of clay, silt, and sand underlying a flat terrain (Barnes 1979, 1987).

Brazoria County is underlain by sediments ranging in age from the Miocene to Holocene (Abbott 2001, Van Siclen 1991). Soils across the examined areas are presumed to be from the Beaumont Formation, which is generally thought to predate human occupation in the region. The area is thought to contain "Deweyville Terraces" that, while undated, are believed to be Late Pleistocene overbank terraces.

Typically Holocene sediment is stratified, with moderate soil development and disseminated calcium carbonate throughout the profile. Within the areas examined, the degree of pedogenic alteration and the absolute leaching of calcium carbonate from the A horizon of these deposits infer that the region contains ancient sediment pre-dating the Holocene. Other indicators such as lack of bedding or stratigraphy, gradual transitional boundaries, and advanced calcium carbonate formation are also indicative of the advanced age of this deposit (Gregory 2014).

The deposits are most likely synonymous with the Eagle Lake Alloformation (ELA) (Blum and Valastro 1994) and correlate to the Late Pleistocene deposits of

the most recent Deweyville (Gregory 2014). The ELA is defined by dates from 20,000 to 14,000 years BP and can be found both buried and on the surface within the modern floodplain (Blum and Valastro 1994:1005; Blum 1992). This alloformation is contemporaneous with the youngest Deweyville depositional regime and is inset into either older Deweyville or Beaumont deposits. This sediment is characterized by an A-Bt-Bk soil profile with a well-developed stage II or stage III calcic horizon (Blum and Valastro 1994).

Hydrology

The trenches are located in the lower coastal prairie ecology, slightly higher in elevation than the estuarine marshlands that dominate the JHWMA. Jones Creek is the only formal named waterway in proximity to this project. It is located 130 m west of Trench 3 (see Figures 2, 4). Jones Creek is a more prominent drainage north of the project areas (Figure 7). Trenches 1, 2, 4 and 5 are near smaller unnamed drainages that were dry and only slightly lower in elevation than the surrounding topography. The drainage near Trenches 1 and 2 is 245 m to the east and drains generally south to join the Intracoastal Waterway 4.6 miles to the south. It is presumed that the area would have drained to the Brazos River before modern alterations. The drainage near Trenches 1 and 2 is 375 m to the east and drains generally south to empty into Red Fish Bayou and eventually the San Bernard River 5 miles to the south.

The area has been previously disturbed by clearing and construction related to pipeline and power line installation. There has been additional surface and subsurface disruption due to agriculture, predominantly cotton farming and animal husbandry. Prior to its purchase by the State of Texas, the acreage that comprises JHWMA was a cotton and sugar cane plantation, a cattle ranch, and was once owned by a petro-chemical consortium (TPWD).



Figure 7. Jones Creek south of Hwy 36, 1 mile north of project area.

Research Design

As part of the construction of a 42-mile pipeline from the DOW Chemical Plant at Freeport to the Oxea Plant located south of Bay City, Air Liquide negotiated an easement or right-of-way (ROW) to install a 4.3 miles (22,740 linear feet) segment across the northern portion of the JHWMA, in Brazoria County . The easement would generally parallel existing utilities for the entirety of the route, with the pipeline installed by a series of horizontal directional drills (HDD). An archeological assessment of the HDD drill entry and exit work locations was requested by the TPWD.

Air Liquide will install the pipeline segments across the JHWMA by a series of HDD. The HDDs will be performed from two temporary work locations inside the JHWMA that will be 200 ft long and 200 ft wide (61 m x 61 m) (see Figures 3, 5). The HDD work locations will be accessed via existing roads inside the JHWMA that connect to public roads or roads on adjacent private property. The HDD locations will be covered with laminated board, providing a complete above-ground surface means of access for equipment, materials, and construction staff. The boards will be installed using a track-driven backhoe outfitted with hooks or a grappler that lifts each board segment off a transport truck and lays the pieces out into an interconnecting grid, creating a continuous board surface. Surface

disturbance is minimal since the equipment and trucks work off the created surface as it is built.

At the HDD work locations, almost the entirety of the 61-m-square work area will be covered by the laminated boards. An approximate 6-m-wide by 6-m-long area over the centerline of the pipeline installation will be left uncovered for the entry and exit points of the HDDs and adjacent mud pits. It was these exposed areas that were examined for cultural resources with the excavation of trenches 1, 2, 4 and 5.

Within the HDD work locations, the pits will be used as entry and exit locations with ground disturbance confined to these areas: thus these were the areas examined for buried cultural resources. Five trenches were dug, with two each at the two HDD locations and one baseline trench dug east of Jones Creek. Trenches were approximately 4-6 m long by 2 m wide by 0.9-1.5 m deep. Approximately 33 square meters of trench wall profile were hand-cleared and examined for cultural remains. This entailed the hand clearing of one wall in each of the trenches. The remaining wall, as well as the back dirt, was also visually examined. The trenches were studied for geomorphic evidence of sediment patterns in hopes of obtaining a probability of the potential for human habitation in the area.

Although no cultural resources were discovered as a result of this survey, the following techniques would have been used as agreed upon by the TPWD in the Scope of Work if they had been identified. Any historic (50 yr +) or prehistoric feature such as a hearth, midden, lithic, shell or bone concentration in a non-midden setting, chimney foundation, septic tank, in-place footing stones or steps, grave, *in-situ* grave stone, etc. would be treated as a formal site. Archeologists would document all artifacts and ecofacts encountered, even if the remains did not meet the definition of an archaeological site as listed above. Any "non-site" artifacts or ecofacts would be included in the report as isolated occurrences (I.O.) since these could alert other projects about the potential of cultural activities at specific locations and advise field archaeologists of features that might be anticipated in similar settings. Such deposits would be documented using

standardized site forms suitable for the State's TexSite database, and will include photography, sketch mapping, and GPS locations for features and boundaries. If any cultural materials were documented, the horizontal and vertical location of these materials within the examination trench would be established by licensed surveyors. The location, setting, and nature of documented cultural materials would be used to hypothesize on the extent of potential materials outside the examination trench.

Recommendations for further assessment of potentially informative features or sites would be based on Council of Texas Archeologist guidelines and would be determined in consultation with all vested parties. If sites with potentially significant information content, i.e. intact features, depositionally sealed or buried deposits, chronological markers, historic associations, etc., were encountered, JHWMA, TPWD, and Air Liquide would be consulted as to their proper disposition. Avoidance by relocation of the HDD workspace would be the preferred alternative. If avoidance was not feasible, recommendations for further work would be issued at the end of the survey phase.

Examination of the trenches did not reveal any artifacts or ecofacts. The absence of cultural remains indicates that the planned construction will have no adverse effects on cultural resources.

Cultural Resource Investigations

This cultural resource assessment consisted of an archival search, the excavation of five trenches, a geomorphologic investigation and preparation of a report suitable for review by the Texas Historic Commission (THC).

Previous Investigations

Prior to the inception of fieldwork, the archives at the THC's Texas Archeological Sites Atlas website (Atlas) were reviewed to determine the density of archeological resources and the extent of professional investigations in the vicinity of the project area. Brazoria County claims nearly 300 recorded archeological sites of which 47 have been designated State Antiquities Landmarks (SAL) and eleven found eligible for the National Register of Historical Places (NRHP). Most of the landmark sites and all of the NRHP sites are historic buildings

or shipwrecks. Locally, recorded prehistoric sites tend to cluster along the San Bernard River to the southwest, and the Brazos River to the north and east. Most are Rangia and/or oyster shell middens along the riverbanks. Temporally diagnostic artifacts are rare, and no records from nearby sites mention formal human burials (Atlas).

In 2012, HRA Gray and Pape, LLC, conducted an intensive survey for a similar utility alignment across the JHWMA. That survey utilized 1.3 shovel tests per acre, and included 46 bucket auger tests and 23 backhoe trenches. No cultural resources were discovered by that survey (Soltysiak et al. 2014); however, that investigation does not overlap the Air Liquide APE. The THC on-line Atlas indicates that six other cultural resource surveys were conducted in or across the current proposed ROW in the JHWMA area, and that none of these discovered any archeological sites. These six earlier projects date between 1977 and 1996, and shovel testing to depth of disturbance by the utility installations was rarely conducted in that time period.

The only recorded site in the immediate area of the APE is 41BO136, the Durazno Plantation, a privately owned NRHP property (Atlas 1980, 1990). The southwest corner of the property is 1.6 km (5218 feet) from Trenches 4 and 5, and the southeast corner is 3.1 km (1.9 miles) from Trenches 1 and 2. The plantation will be avoided by the proposed ROW, and is not a part of this scope of work.

A cursory review of recorded sites within 10 km of the project area found 15 shell middens (two with Goose Creek ceramic sherds, dating to >1000 years before present (YBP); one multi-component scatter (multiple stratigraphically separated oyster shell lenses), four historic scatters, five isolated historic structures, one historic cemetery, two plantations, and a ranch complex. All of the middens were on one of the two major rivers, or in freshwater ponds/lakes such as Pelican, McNeal, and Jones lakes, closer to the coastline. None of these sites will be affected by the Air Liquide pipeline.

Archeological Methodologies / Techniques

The project area was considered to have a moderate probability for containing cultural resources. This probability was based on the proximity to Jones Creek and several unnamed tributaries to the San Bernard and Brazos Rivers, and the presumed Holocene age of geologic deposits. No cultural remains were identified, and as such there is no need for curation.

The proposed HDD borehole locations are 3.2 miles apart along an existing heavily utilized pipeline and utility corridor. Four backhoe trenches were placed at the position of the proposed drill entry and exit work locations (Trenches 1, 2, 4, and 5), which are the only areas of anticipated ground disturbance. An additional trench (Trench 3) was dug as a baseline east of Jones Creek. No additional construction activity will occur at the Trench 3 location. The proposed HDD locations are shown on the Jones Creek United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps (see Figure 2). Trenches were cut to a depth of approximately 1.25 meters, and one wall from each trench was hand-cleaned with shovel and trowel and inspected for archeological material. Total examined trench surface amounted to almost 33 square meters. The remaining walls, as well as the back dirt, were also checked for cultural remains. Geomorphologic investigation entailed sediment and depositional interpretation and comparison to similar deposits, and degree of pedogenesis and stratification (Gregory 2014). Trench locations were recorded and locations mapped with hand-held GPS units (Table 1, Figures 2-5).

Table 1. Trench Location table.

Name	Construction Location	UTM <i>Zone 15 - NAD 83</i>	Dimensions Meters <i>Length x width x depth</i>	Heading <i>Degrees Magnetic</i>
Trench 1	6	0264720 E / 3205524 N	5 x 2 x 1.25	260
Trench 2	6	0264718 E / 3205526 N	6 x 2 x 1.25	260
Trench 3	5	0263736 E / 3205398 N	6 x 2 x 1.30	160
Trench 4	2	0259548 E / 3205018 N	6 x 2 x 1.25	200
Trench 5	2	0259530 E / 3205015 N	4 x 2 x 0.90	270

The trenched areas are on a slight topographic rise in the floodplain that is presumed to be a remnant dissected section of an older relict Brazos floodplain.

Given the proximity of Jones Creek to the bore locations, it is possible that old leached A horizons from somewhere upstream could have been more recently deposited on the locations. If this were the case, any archaeological material would be located within the upper stratigraphy of the trenches. As the entire A horizon of the trenches was hand-cleaned and did not reveal any features or artifacts, it is presumed that there are no cultural resources within the examined areas. Based on the soil morphology, the sediments in the APE are likely Late Pleistocene in origin and too old to harbor any *in situ* buried cultural deposits.

RESULTS

During the second week of October 2014, two proposed HDD borehole entry and exit work locations as well as a baseline trench were assessed for cultural remains. The examination entailed a detailed geomorphic investigation as well as hand clearing of approximately 33 square meters of trench wall profiles. The trenches were placed along the entry/exit borehole locations at the edge of 200 ft by 200 ft temporary workspaces.

Trenches 1 and 2 are located near the southwest corner of the eastern most workspace (see Figures 2, 3). The trenches are located along the northern edge of a cleared existing utility and pipeline corridor 60 m west of County Road 330 (Figure 8). Both trenches were oriented east-west at a 260 degree magnetic bearing.

Trench 1 is the southern of the two and is the proposed location of the bore entry/exit hole, 8 m northeast of the southwest corner of the temporary work space (see Figure 3, 8). The trench was 5 m long by 2 m wide by 1.25 m deep. The trench showed Munsell 10YR 2/1 black clay loam from 0-94 centimeters below surface (cmbs) over 10YR 5/8 strong brown clay from 94-125+ cmbs (Figure 9). Both walls were examined for archeological material, with the entire north wall hand-cleared. No artifacts or features were exposed in either of the two 6.25 square meter walls or in the back dirt.



Figure 8. 2012 aerial showing Trench 1 and 2 locations (source: Google Earth).



Figure 9. Trench 1 north wall soil profile.

Trench 2 is located approximately 2 m north of Trench 1, and is the proposed location of the mud pit which will be used in conjunction with the drill hole at Trench 1. The trench was 6 m long by 2 m wide by 1.25 m deep. The soil was similar to Trench 1, with 10YR 2/1 black clay over 10YR 5/8 strong brown clay (Figure 10). The south wall, covering 7.5 square meters, was hand cleared and examined for cultural remains. The remaining wall and the back dirt were also examined. No artifacts or features were noted.



Figure 10. Trench 2 south wall profile - note trench 1 in the background.

Trench 3 was dug 130 m east of Jones Creek, in an area that had the highest potential for containing cultural remains. No construction activity will occur at this location. The trench was placed along the northern edge of the existing utility corridor, oriented in an east-west direction at 160 degrees magnetic (Figure 11). The trench was 6 m long by 2 m wide by 1.30 m deep. The soil was slightly different than that at Trenches 1 and 2 and showed 10YR 3/1 very dark gray clay from 0-63 cmbs over 10YR 6/6 reddish yellow clay from 63-104 cmbs covering 10YR 5/8 strong brown clay from 104-130+ cmbs (Figure 12). Examination of the 7.8 square meters of the hand-cleared north wall as well as the south wall and back dirt produced no cultural material.



Figure 11. 2012 aerial showing Trench 3 location (source: Google Earth).



Figure 12. Trench 3 north wall profile.

Trenches 4 and 5 were dug at the westernmost temporary work location, 1.2 miles east of the western boundary of the JHWMA (see Figures 2, 5). Trench 4 is the easternmost of the two and is located along the central southern edge of the 200 ft by 200 ft temporary workspace (Figure 13). The trench was dug along a generally north-south trajectory at the location of the proposed drill entry/exit pit. The trench was aligned along a 200 degree magnetic compass bearing and was 6 m long by 2 m wide by 1.25 m deep. The soil showed 10YR 2/1 black clay from 0-46 cmbs, over 10YR 3/1 very dark gray clay from 46-68 cmbs over, 10YR 5/4 yellowish brown clay from 68-83 cmbs covering 10YR 5/8 strong brown clay from 83-125+ cmbs (Figure 14). The west wall covering 7.5 square meters was hand cleared and examined for cultural remains. The remaining wall and the back dirt were also examined. No artifacts or features were noted.

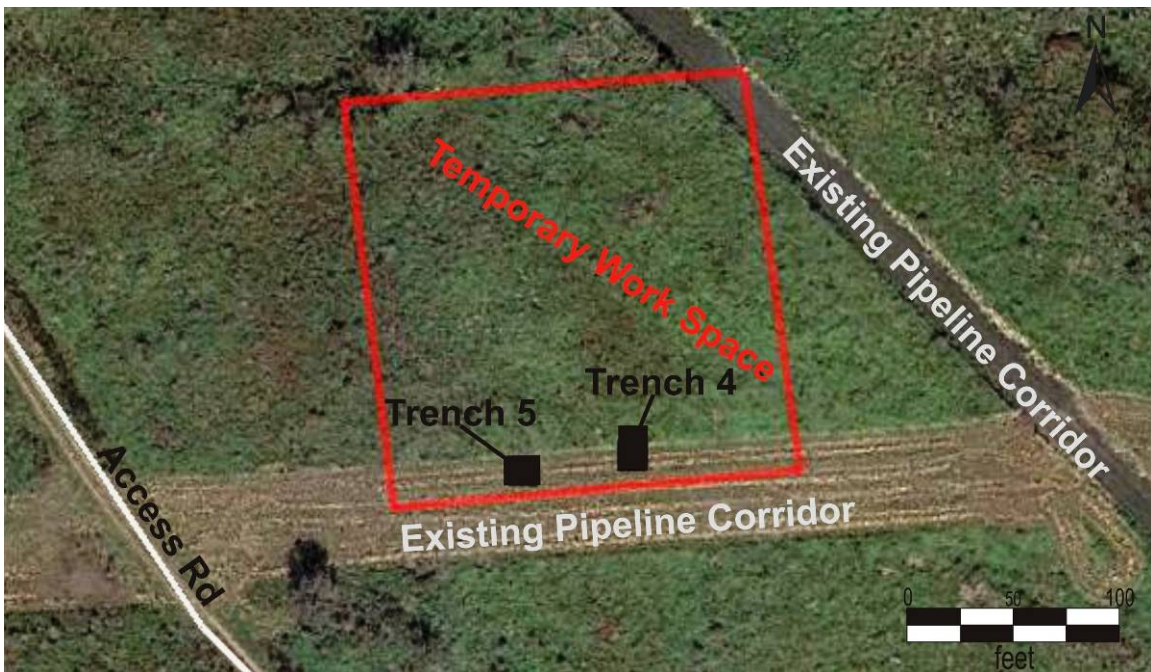


Figure 13. 2012 aerial showing location of Trench 4 and 5 (trench icons not to scale; source: Google Earth).

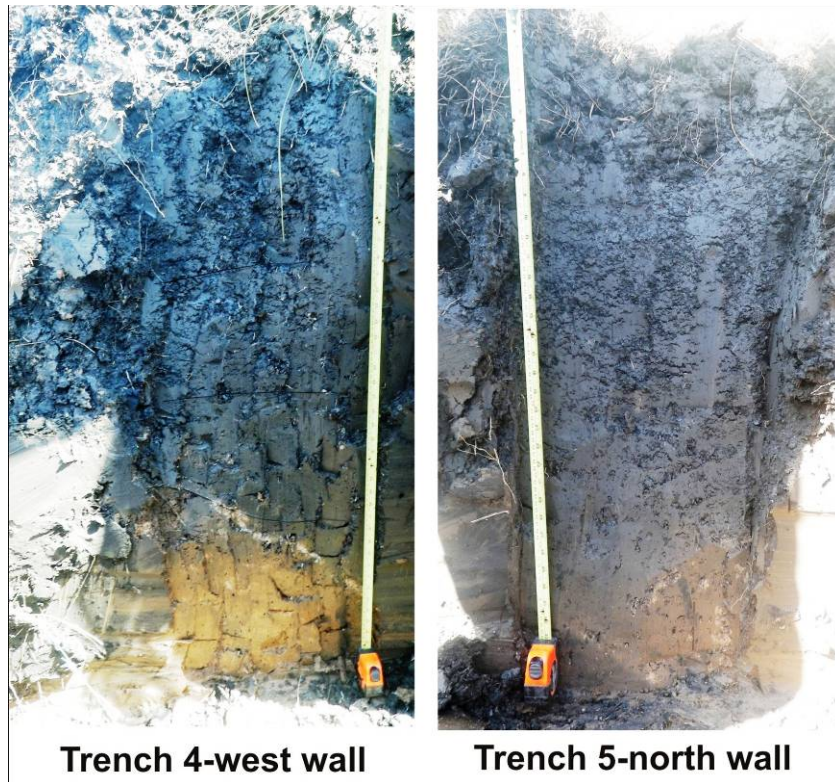


Figure 14. Trench 4 and 5 soil profiles.

Trench 5 is the western of the two and is also located along the central southern edge of the 200 ft by 200 ft temporary workspace (see Figures 13, 5). The trench was dug along an east-west trajectory near the location of the mud pit. The trench was aligned along a 270 degree magnetic compass bearing and was 4 m long by 2 m wide by 0.90 m deep. The soil showed 10YR 2/1 black clay from 0-61 cmbs over 10YR 5/4 yellowish brown clay from 61-78 cmbs covering 10YR 5/8 strong brown clay from 78-90+ cmbs (see Figure 14). The north wall covering 3.6 square meters was hand cleared and examined for cultural remains. The remaining wall and the back dirt were also examined. No artifacts or features were noted.

Although the locations seemed to have a moderate probability of containing cultural remains based on proximity to Jones Creek and unnamed tributaries to the Brazos and San Bernard rivers, no such remains were identified in any of the trenches examined.

A very consistent soil profile was revealed in all five trenches, with an A horizon completely leached of calcium carbonate, indicative of the advanced age

of the sediment (Gregory 2014). Geomorphological investigation attributes the lack of subsurface cultural material to the Late Pleistocene age of the geological deposits. All five of the backhoe trenches were negative for cultural material.

SUMMARY AND CONCLUSIONS

This report presents the results of a cultural resources survey and geomorphic investigation of five trench locations in Brazoria County, Texas within the JHWMA managed by the TPWD. The Lead Federal Agency for this project is the USACE, Galveston District. Work done to complete this survey was conducted under the Antiquities Code of Texas Permit Number 7029, issued by the THC on 9/24/2014. All work was conducted following accepted standards set forth by the THC, the CTA, and the NHPA. Specifically, fieldwork was conducted in accordance with a scope of work approved by TPWD's Cultural Resource Specialist Dr. Christopher Lintz.

Five trenches were dug across the area, and none revealed any evidence of historic or prehistoric occupation or use. Geomorphological investigation determined that the sediments in the APE are of Late Pleistocene origin, and too old to contain any *in situ* cultural remains. These results concur with Abbott's (2001) classification of Surfside clay as having low to moderate geoarchaeological potential (Bludeau 2012).

The absence of any historic or prehistoric remains implies that cultural resources will not be affected by the planned installation of the South Texas Syngas HDD boreholes. Based on these negative findings, TAS recommends no further work at the two potential HDD locations and requests that the field work outlined in the scope-of-work for Texas Antiquities Permit 7029 be considered complete.

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