PHASE I CULTURAL RESOURCES SURVEY OF THE CONOCOPHILLIPS PROJECT ROUX 64 ACRE PROJECT SURVEY AREA IN LAFOURCHE PARISH, LOUISIANA

Prepared for

ConocoPhillips Company
P.O. Box 2197
Houston, TX 77252

January 2023
Louisiana Report Number 22-XXXX
Office of Coastal Management P20221112

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Providence Project No: 1429-002

PROVIDENCE

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P.O. Box 2197
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Prepared by

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January 2023

ABSTRACT

Providence Engineering and Environmental Group LLC (Providence) was contracted by ConocoPhillips Company to conduct a Phase I cultural resources investigation associated with the construction of an access road and well pad in Lafourche Parish, Louisiana as part of the Project Roux. When completed, the proposed project area will encompass 26.69 acres (ac) [10.8 hectares (ha)]. The field investigations were performed between November 16 and 18, 2022 and encompassed approximately 64 ac (25.9 ha). The proposed project area is 6.6 kilometers (km) [4.14 miles (mi)] west of the town of Des Allemands, 6.47 km (4.02 mi) south of Bayou des Allemands, and 6.46 km (4 mi) north of the town of Raceland. The proposed project consists of the construction of an access road and its associated culverts, passing areas, a parking and laydown area, and a well pad. The well pad area measures 106 meters (m) [350 feet (ft)] by 140 m (460 ft). The access road measures 6 km (3.7 mi) in length and is generally 9.14 m (30 ft) wide and varies in width between 13.71 m (45 ft) and 21.94 m (72 ft) in the passing areas. At the southern extent of the access road the laydown area/parking lot measures 30.48 m (100 ft) wide by 45.72 m (150 ft) long. To ensure all areas along the access road were included in the survey, the access road was assigned a consistent width of 40 m (130 ft) to include the width of the road and the additional passing and parking areas. Thus, the survey area measures a total of 64 ac (25.9 ha).

The U.S. Army Corps of Engineers (USACE) will be the lead federal agency, with permitting authority under Section 404 of the Clean Water Act. Section 106 of the National Historic Preservation Act (NHPA), 16 United States Code (USC) 470, and the Code of Federal Regulations (CFR) Title 36 Part 800.2(a)(3), requires federal agencies to take into account the effects of undertakings (including the issuance of permits) on properties listed in, or eligible for, listing in the National Register of Historic Places (NRHP).

The Phase I cultural resources survey utilized a program of boat and pedestrian survey, and subsurface testing through the excavation of shovel test pits. No cultural resources were identified during the field investigation. Based on the findings of the records review and cultural resource survey, no archaeological sites or historic properties listed in, or recommended eligible for, the National Register of Historic Places will be affected by the proposed construction. No additional cultural resources work is necessary, and it is recommended that the proposed construction proceed.

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ACKNOWLEDGEMENTS

Providence Engineering and Environmental Group LLC. would like to acknowledge the following individuals for their contribution to the project. Ms. Stephanie L. Perrault, M.A., RPA of Providence Engineering and Environmental Group LLC and Mr. Paul Jackson, M.A. RPA, of TerraXplorations, Inc. served as co-Principal Investigators. Mr. Jackson conducted the field investigation. Kevin Rolph and Natalia Moonier of TerraXplorations acted as Crew Chiefs. Cyrus Hulen and Emma Breaux, also of TerraXplorations, Inc. served as field technicians. Ms. Heather Draskovich of TerraXplorations, Inc. and Mr. Tanner Jones and Amelia Adams of Providence Engineering and Environmental Group LLC provided GIS support and prepared the field maps and report figures for this project. Lirette Airboat Services, Inc. provided marine transportation via airboat to move throughout the inundated portions of the project area.

INTRODUCTION

Providence Engineering and Environmental Group LLC (Providence) was contracted by ConocoPhillips Company to conduct a Phase I cultural resources investigation associated with the construction of an access road and well pad in Lafourche Parish, Louisiana as part of the Project Roux. When completed, the proposed project area will encompass 26.69 acres (ac) [10.8 hectares (ha)]. The field investigations were performed between November 16 and 18, 2022 and encompassed approximately 64 (ac) (25.9 ha). The proposed project area is 6.6 kilometers (km) [4.14 miles (mi)] west of the town of Des Allemands, 6.47 km (4.02 mi) south of Bayou des Allemands, and 6.46 km (4 mi) north of the town of Raceland (**Figures 1** and **2**). The proposed project consists of the construction of an access road and its associated culverts, passing areas, a parking and laydown area, and a well pad. The well pad area measures 106 meters (m) [350 feet (ft)] by 140 m (460 ft). The access road measures 6 km (3.7 mi) in length and is generally 9.14 m (30 ft) wide and varies in width between 13.71 m (45 ft) and 21.94 m (72 ft) in the passing areas. At the southern extent of the access road the laydown area/parking lot measures 30.48 m (100 ft) wide by 45.72 m (150 ft) long. To ensure all areas along the access road were included in the survey, the access road was assigned a consistent width of 40 m (130 ft) to include the width of the road and the additional passing and parking areas. Thus, the survey area measures a total of 64 ac (25.9 ha).

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Project Personnel

Project personnel. included Ms. Stephanie L. Perrault, M.A., RPA of Providence and Mr. Paul Jackson, M.A., RPA of TerraXplorations who served as co-Principal Investigators. Kevin Rolph and Natalia Moonier of TerraXplorations acted as Crew Chiefs. Cyrus Hulen and Emma Breaux, also of TerraXplorations served as field technicians. Ms. Heather Draskovich of TerraXplorations, and Mr. Tanner Jones and Ms. Amelia Adams of Providence provided GIS support and prepared the maps and figures for this report. Lirette Airboat Services, Inc. provided transportation via airboat to access the inundated portions of the project area.

Organization of Report

Chapter 1, the introduction, presents an overview of the project and a brief introduction to the findings of the cultural resources investigation. The ensuing chapters in this report describe the natural setting land use history, previous investigations, the field methodology, results of the investigation, a summary and recommendations, and the references cited.

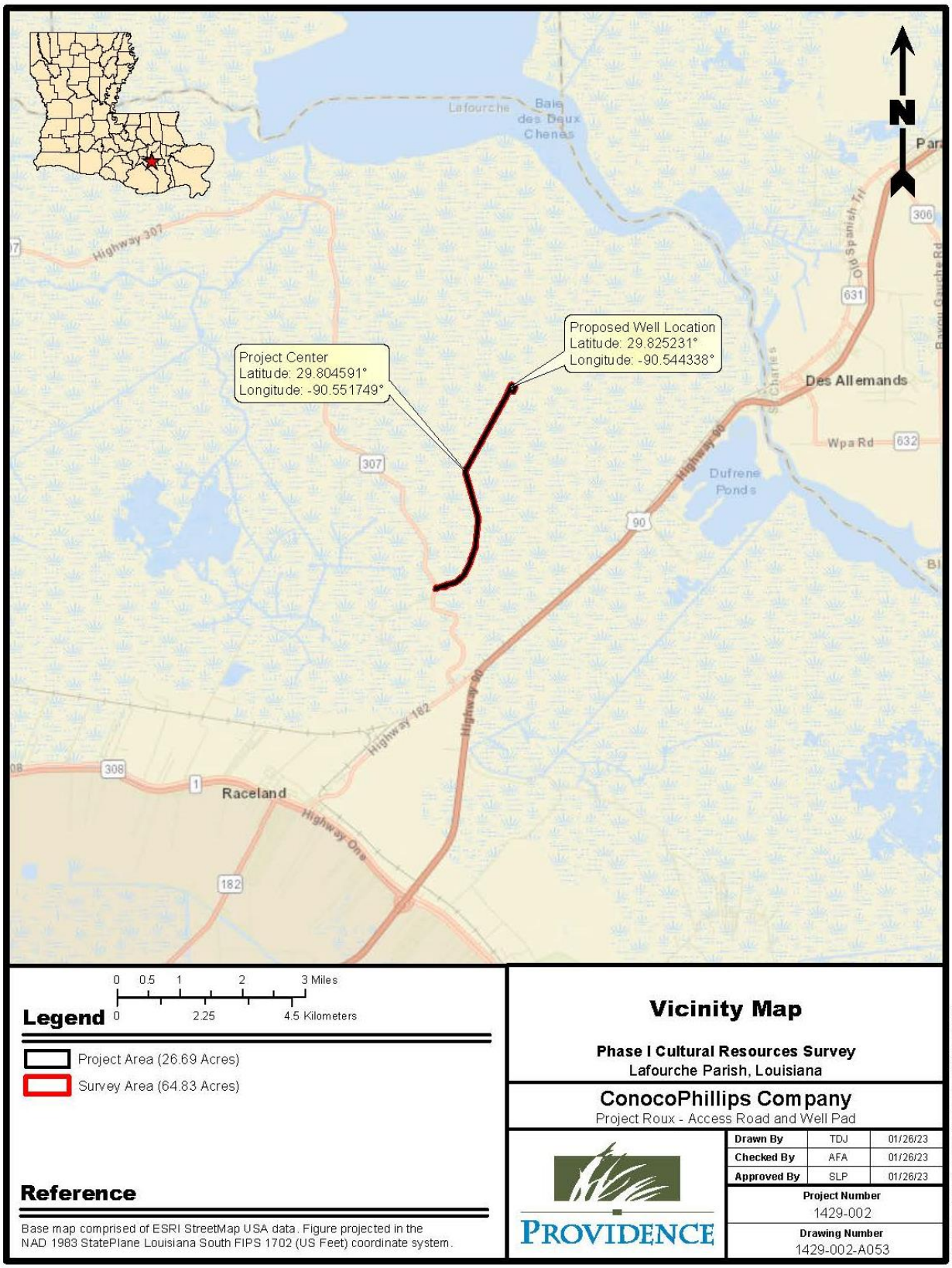

Figure 1. Location Map showing the Project Roux project area.

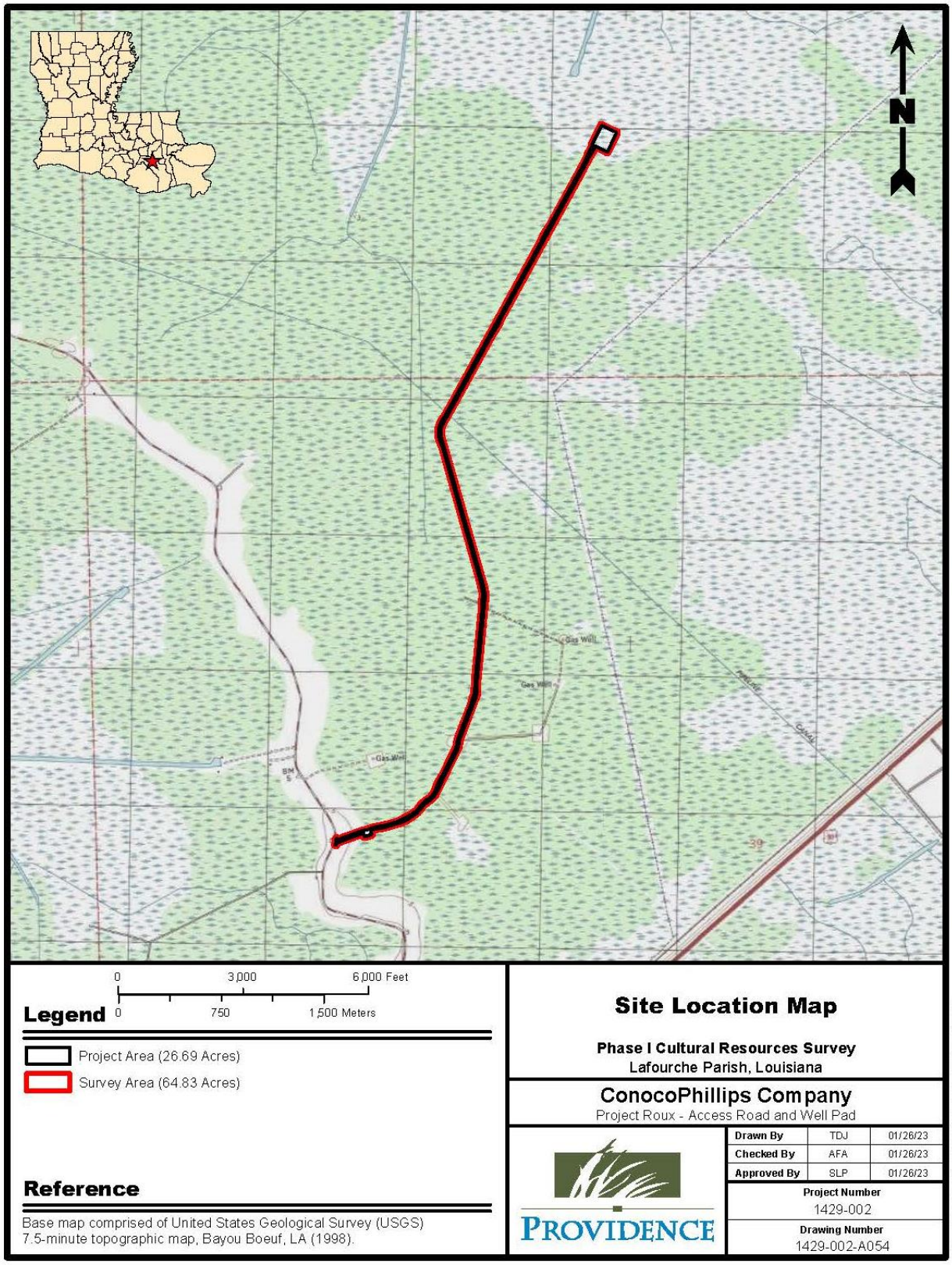

Figure 2. USGS Topographic Map showing the Project Roux project area and its environs.

LAND USE HISTORY

This section presents data concerning the physical environment, including the geology and geomorphology of the project area, and the prehistoric and historic cultural history. This information will be used to provide context for the findings presented in this report.

Physiography and Geomorphology

Bayou Lafourche, Lake Des Allemands, and Bayou Des Allemands, lies in the central portion of Lafourche Parish. Bayou Lafourche is a major distributary of the Mississippi River originating near Donaldsonville extending southward through the parish and flowing into the Gulf of Mexico. The project area is generally characterized as marsh and backswamp (**Figures 3** and **4**) within an abandoned delta complex of the Mississippi River.

The deltaic plain of the Mississippi River was created by progradation of a series of river courses and deltas that have built delta lobes that were in time subsequently abandoned (**Figure 4**). After abandonment, compaction and subsidence occurred. Human activity has accelerated the rate of coastal land loss and has impeded the growth of the coastal plain (Britsch and Dunbar 1990:25-26). During the last 9,000 years, a series of delta complexes formed. Mississippi River deltaic sediments have been deposited in the Bayou Lafourche area over the past 5600 years (Frazier 1967). The area is marked by a branching network of abandoned distributaries that radiate out from the bank of the present-day Mississippi River. Upstream portions of these distributaries have been erased by meandering river courses or buried by more recent sediments (Britsch and Dunbar 1990:13). A series of alluvial and deltaic processes marking the creation, growth, and decline of delta lobes have created a variety of depositional environments. These are characterized as natural levees, distributary channels, crevasse splays, inland swamps, lakes, as well as freshwater, brackish, and saline marshes (Saucier 1994).

The Teche and Lafourche delta complexes, have been responsible for the environmental development of the Bayou Lafourche area. Bayou Lafourche was a major distributary course of the Mississippi River beginning about 5,600 years ago. At that time, several delta lobes were formed sequentially over time and make up the delta complex. The Bayou Terrebonne lobe was formed approximately 3,500 years ago and was active until 2,050 years ago. The next lobe formed along Bayou Blue from 2,000 to 1,850 years ago. From 2,000 to 1,050 years ago, Bayou Terrebonne was re-occupied, traversed westward and extended Bayou Black forming the third lobe of the Bayou Lafourche delta complex. The fourth and most extensive lobe of the Bayou Lafourche delta complex was the Lafourche-Terrebonne lobe. It was prograded by several distributaries beginning around 800 years ago. The final lobe is the Lafourche lobe, which was created approximately 350 years ago to the southeast of the Lafourche-Terrebonne lobe, and is still the current channel today (Beavers, et al. 1984).

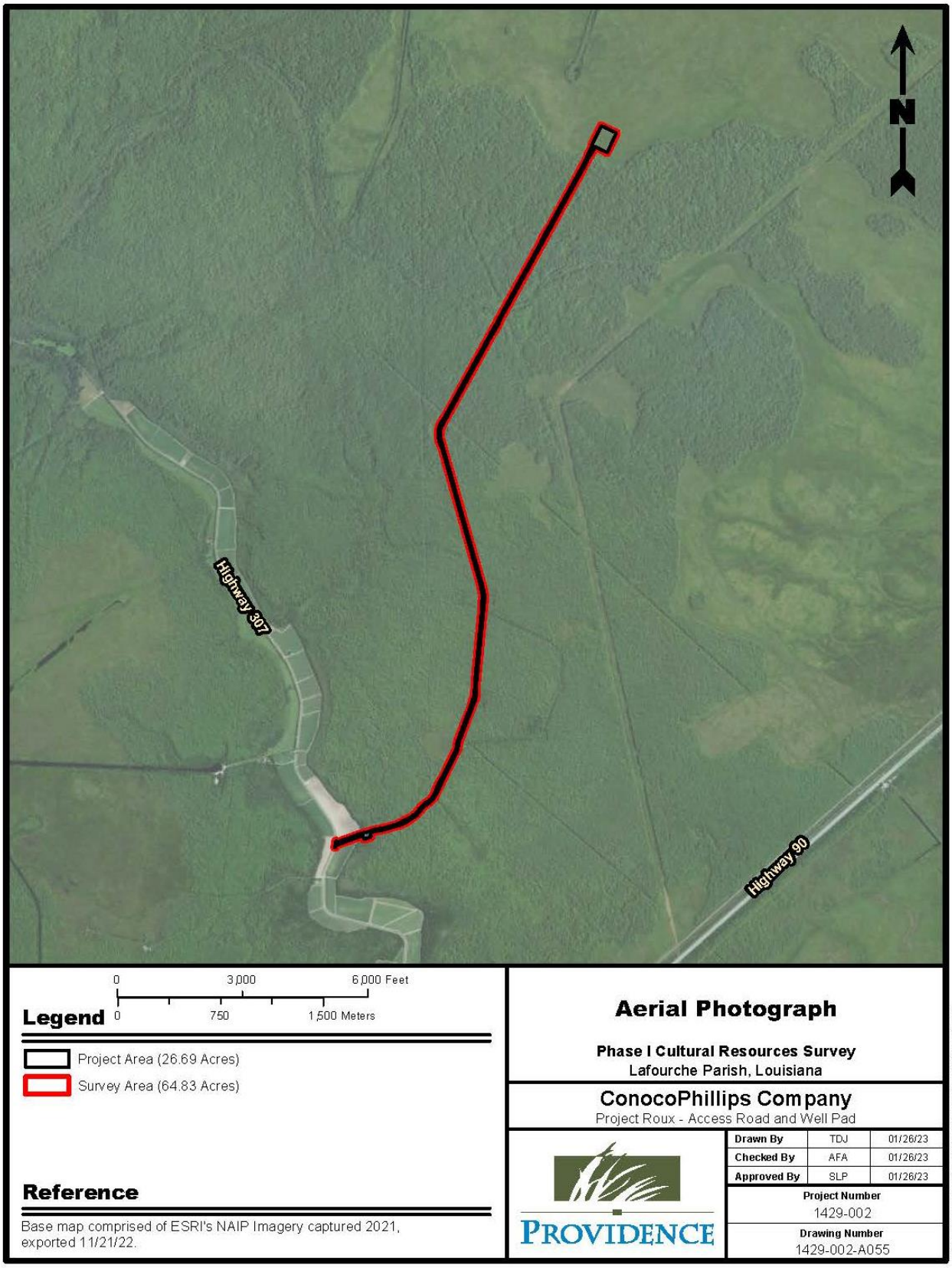

Figure 3. Aerial Photograph of the Project Roux area and its environs.

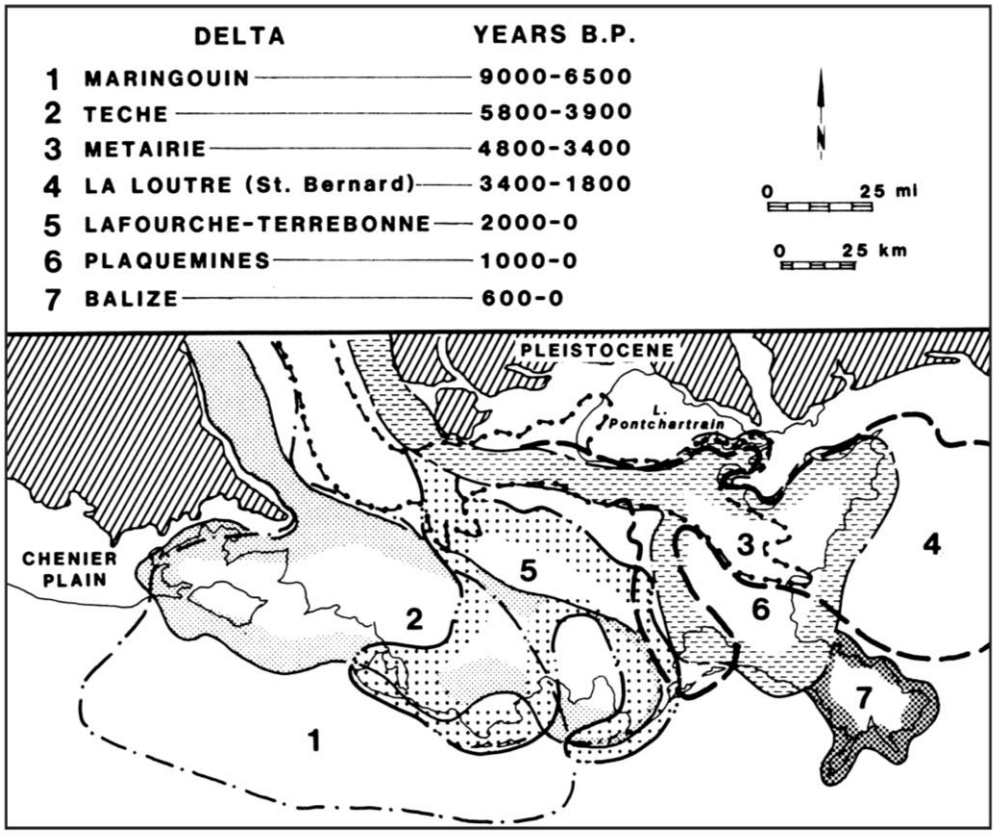

Figure 4. Delta Complexes of the Mississippi River (Gagliano et al. 1979).

Flora

The type and variety of plant species found in an area is influenced greatly by elevation of the land, soil drainage, and salinity of the soil and water (White et al. 1983:103). During prehistoric times the present project area would have been covered by upland forests, bottomland hardwood forests, cypress-tupelo swamp forests, and marshes. The Upland forests would have been confined to only the highest of the natural levees along the Mississippi River. At lower elevations, bottomland hardwood forests, cypress-tupelo swamp forests, and marshes were present. An intermediate swamp may have been present at some locations between these two communities. Large tracts of marsh occur in surrounding areas (White et al. 1983:102). The Upland forests is dominated by mixed deciduous and evergreen trees that are less tolerant of flooding than are bottomland hardwood species including oaks (*Quercus virginiana, Quercus alba, Quercus nigra*), shagbark hickory (*Carya ovata*), hackberry (*Celtis laevigata*), sweetgum (*Liquidambar styaciflua*), pecan (*Carya illinoiensis*), and magnolia (*Magnolia* spp.) (Bahr et al. 1983:82).

Bottomland hardwood forests are dominated by the water oak (*Quercus nigra*), sweet gum, hackberry, and live oak (*Quercus virginiana*). Other forest species include the box-elder (*Acer negundo*), American elm (*Ulmus americana*) and the Nuttall oak (*Quercus nuttalii*). The most common shrub species are palmetto (*Saba minor*) (White et al. 1983:104). The cypress-tupelo swamp forests, located a greater distance from distributaries, are dominated by bald cypress

(*Taxodium distichum*) in areas where it has been re-established after logging. Water tupelo (*Nyssa aquatica*) is often either a sub- or co-dominant species.

Shrubs include wax-myrtle (Myrica cerifera) and button-bush (*Cephalanthus occidentalis*), while vines are cat-briar (*Smilax* spp.), trumpet-creeper (*Campsis radicans*), and poison ivy/oak. Herbaceous ground cover includes smart-weed (*Persicaria punctata*), alligator-weed (*Alternanthera philoxeroides*), swamp potato (*Sagittaria lancifolia*), and the exotic water hyacinth (*Eichhornia crassipes*) (White et al. 1983: 105). Additionally, at lower elevations in the marsh, no trees are present, and the grass covers the area. Grasses include cordgrass (*Spartina patens*) which is dominant, while swamp potato, saltmarsh mallow (*Kosteletzkya virginica*), and seaside goldenrod (*Solidago sempervirens*) are also present (White et al. 1983: 106-1 07).

Fauna

The marshes, bayous, natural levees, and backswamps of coastal Louisiana are host to a diverse assemblage of animal species, including mammals, fish, birds, reptiles and amphibians. Mammal species found in the region include muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), mink (*Mustela vison*), and otter (*Lutra canadensis*). Nutria (*Myocastor coypus*) is a recent introduction and were not present during the prehistoric or early historic periods. Other indigenous mammals known to inhabit the area include the Virginia opossum (*Didelphis virginiana*), the swamp rabbit (*Sylvilagus aquaticus*), the fox squirrel (*Sciurus niger*), the fox (*Vulpes fulva*), the bobcat (*Lynx rufus*), the beaver (*Castor canadensis*), the civet cat or spotted skunk (*Spilopale putoris*), and the white-tailed deer (*Odocoileus virginianus*). Terrestrial rodents and bats are also prevalent throughout the area (Bahr et al. 1983: 118- 126).

Both freshwater and marine fish species can be found in the Bayou Lafourche area. The most common species include largemouth bass (*Micropterus salmoides*), catfish (*Ictalurus* spp.), silver perch (*Bairdiella chrysura*), flounder (*Paralichthys legostimia*), spotted seatrout (*Cynoscion arenarius*), black and red drum (*Pogonias croimis* and *Sciaenops ocellatus*), sheepshead (*Archosargus probatacephalus*) and spot croaker (*Lerostomus xanthurus*), and various species of gar (*Lepisosteus* spp.). Also found in coastal Louisiana, are brackish-water clams (*Rangia cuneata*), freshwater oysters (*Crassostrea viginica*) and crustaceans including crawfish (*Procambrus* spp.) and white and brown shrimp (*Litopenawus setiferus* and *Farfantepeaneus aztecus*) (Abbott 1968; Bahr and Hebrard 1976:69).

The Bayou Lafourche delta complex accommodates a wide variety of reptilian species, of which 14 are snakes, including the cottonmouth moccasin (*Agkistrodon piscivorus*), the copperhead (*Agkistrodon contortrix*), and the common king snake (*Lampropeltis getulus*). The American alligator (*Alligator mississippiensis*) is a notable inhabitant. Various species of turtle are common, including the common snapping turtle (*Chelydra serpentina*), common mud turtle (*Kinostemon subrubrum*), and the box turtle (*Terrapene carolina*). At least 14 species of amphibians occur in the region. Most of these are frogs and toads (Bahr and Hebrard 1976:74-77).

Bird species in the region are predominantly waterfowl, of which many are migratory (Bahr et al. 1983). These include dabbling ducks (mallard, mottled duck, black duck, gadwell, pintail, green-winged teal, blue-winged teal, baldpate, and shoveler) (*Anas* spp.), diving ducks (redhead, canvasback, scaup, ring-necked, ruddy, and mergansers (*Anthya* spp.), egrets (*Ardea alba, Bubulcus ibis, Casmerodius albus*, and *Egretta thula*), herons (*Ardea herodias, Butorides virescens, Egretta Caerulea, Egretta tricolor,* and *Nyctanassa violacea*), ibises (*Plegadis chihi* and *Plegadis falcinellus*), osprey (*Pandion haiaetus*), and kingfishers (*Ceryle alcyon*).

Climate

South Louisiana possesses a subtropical climate that is greatly influenced by the Gulf of Mexico and intermittently affected by continental weather patterns. Daily weather is typically warmer and more humid than most of the United States. The average annual temperature for the State of Louisiana is 21° Celsius (C) [71º Fahrenheit (F)] (NOAA 2023a). The climate in Lafourche Parish, like all of south Louisiana, is strongly influenced by the Gulf of Mexico. The area is characterized by a humid subtropical climate with long, hot, rainy summers that are cooled by breezes from the Gulf, and short, mild winters are common with a rare snowfall. The average annual temperature is 20.4° C (68.8° F) with an average maximum temperature of 27.5° C (81.5° F) and an average minimum temperature of 12.2° C (54.0° F). Temperatures generally hover around 27.7° C (81.9° F) during the months of June, July, and August (NOAA 2023a).

The average precipitation rate in Lafourche Parish is relatively high, averaging 160.02 centimeters (cm) [63 inches (in)] per annum. Fifty-six percent of the rain falls between April and September. During the spring and summer months, almost daily, small storms form along the coastline in the Gulf of Mexico and move northward across the area and are quickly dissipated after a short shower. During the fall and winter months, storms formed through frontal movements dip south and sweep west to east along the Gulf of Mexico. The average relative humidity for the year is 65 percent at midday. Humidity remains at 90 percent throughout the night into the early morning hours (NOAA 2013 and 2023b; Mathews 1984:2). Hurricanes present the most dangerous weather threat to southern Louisiana. They occur every few years during the summer and fall (Mathews 1985:2). Hurricanes have been recorded making landfall in Louisiana since the 1527 Panfilo de Navarez expedition experienced a storm at the mouth of the Mississippi River. Hurricanes have occurred with greater frequency in recent years (Mathews 1984).

Soils

The project area crosses four map units (**Figure 5**). These map units include soils found on natural levees, as well as within marsh and backswamp areas. The first map unit is Allemands LaRose Association (AN). This association is found in marshes and is frequently flooded. The landform these soils are located on have a zero percent slope and is made up of herbaceous organic material over fluid clayey alluvium (Websoil Survey 2022). The second soil is Barbary muck, 0 to 1 percent slopes, frequently flooded (BB). This soil map unit is found on floodplains and is frequently flooded. It is made up of fluid clayey alluvium derived from sedimentary rocks deposited through alluvial action (Websoil Survey 2022). The third map unit is Cancienne silt loam 0 to 1 percent

slopes (CO). It is found on natural levees and is derived from silty alluvium. The final map unit is the Fausse-Sheiver Association. This soil association is found in backswamps and derived from clayey alluvium (Websoil Survey 2022).

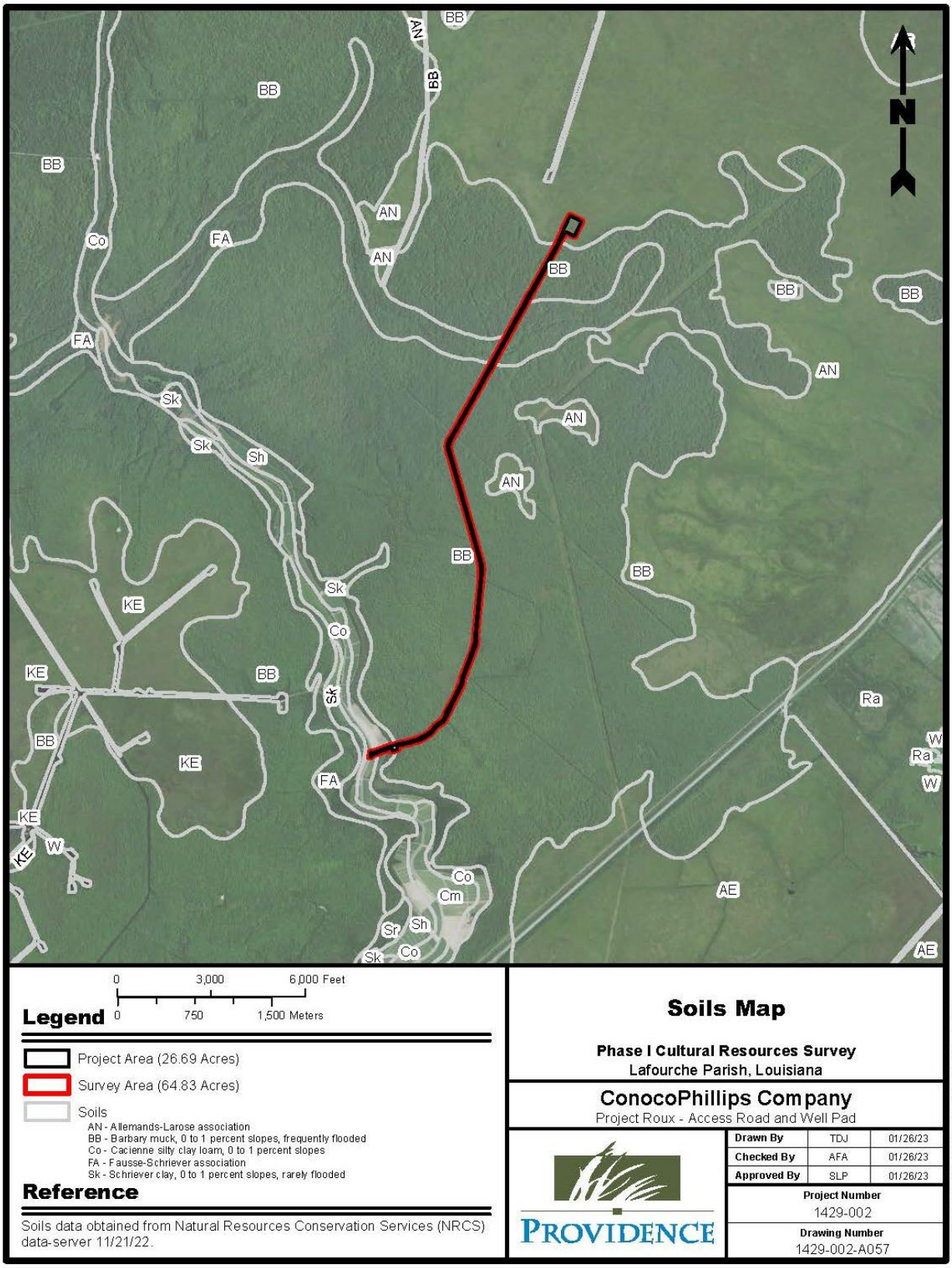

Figure 5. Soils within the Project Roux area (Websoil Survey 2022).

Prehistoric Culture History

The cultural chronology that has been developed for Coastal Louisiana is largely traced through the evolution of ceramic types marked by the changes in tempering, design, and paste (McIntire 1954). The prehistoric sites identified in the coastal parishes of Louisiana present occupations that date between the Tchula and the Mississippi Periods (McIntire 1954 and Person et al 1989). Most of prehistoric sites are found to the north of the present project area along the shores of Lake Pontchartrain, to the east along Bayou Barataria, and westward along Bayou Lafourche and its distributaries to the south. These sites consist primarily of shell middens and mound sites. Tchula Period deposits are found at 16JE91 (Bayou Dupont-Dupre Cut) and 16JE93 (Tom Smith) sites (Gagliano et al. 1979, Goodwin et al. 1985, and Weinstein and Gagliano 1984) east of the project area. While south of the project area, Tchula deposits were found at 16LF4 (Temple Mound) and 16LF56 sites (Neuman 1984).

Marksville Period occupations within coastal Louisiana increases significantly. The Marksville Period in Louisiana can generally be identified by more stylized decorated pottery and the construction of conical burial mounds. Site 16LF56, 16JE37 (Coquilies), and 16JE3 (Bayou Cutler) sites all possess deposits dating to the Marksville Period (Beavers et al. 1982, Giardino 1984, Gagliano et al. 1979, Neuman 1984l; Weinstein 1995). Although not intensively represented in coastal Louisiana, Baytown Period deposits were identified near the present project area at the 16LF17 (Bowie Site). Along Bayou Des Allemands are a number of Coles Creek and Mississippian Period sites. Sites dating to these later Woodland Periods include both large and small shell middens, mounds, and burials. Examples of these late prehistoric sites are 16LF17 (Bowie Site/Cemetery) and 16LF274 (The Hill at Blue Point) (Jackson 1977 and Comardelle 1991). Thus, it is recognized that the present project area was utilized for resource procurement and settlement for much of prehistory. In coastal Louisiana, the Plaquemine occupation is called the “Barataria Phase” (Apollonio et al. 2003).

Several distinctive historic tribes occupied the area during the historic period. These included the Chitimacha, Chawasha, and the Washa. These tribes are known to have lived within the region surrounding the project area immediately prior to, and during contact with Euro Americans (Cummins 2014 and Swanton 1911). These tribes most likely engaged in a mixed fisher-farmer-collector-subsistence strategy that depended on seasonal patterns (Apollonio et al. 2003). Despite the mention of these tribes in the historic record, there are few archaeological sites that represent their occupation. Due to increasing pressure from European settlers, local tribes either left their ancestral lands by choice or were forcibly removed. By the early 1900s, the Chitimacha were relocated to several hundred acres west of the present project area near Charenton, Louisiana.

Historic Culture History

As noted above, the Ouacha and Chaouacha tribes inhabited the area surrounding the present project area at the time of European contact. The project area was considered a prime location for cattle ranching, and was granted to Claude Joseph Dubreuil, Jr. during the French Colonial Period. At that time, it appears that Dubreuil paid the Indians a small number of cattle for two tracts of

land in 1744. No documentation of this sale is extant; however, on June 1, 1763, Dubreuil applied to then-governor of Louisiana, Louis Billouart de Kerlerec, for confirmation of his 20-year-old Indian purchase. The petition indicated that he had begun to clear ground on the property in 1754 and had established a farm with 50 breeding cows and other animals there by 1755. At the time of the petition, Dubreuil was supplying the colony with beef (NONA:Lavergne 1820). Dubreuil over extended himself financially and the property eventually passed into the Florian and Livoudais families in the early nineteenth century (Superior Council Records 1752:1230; (NONA:Broutin 1812) (**Figure 6**).

The project area was used for cattle ranching throughout the early nineteenth century. In 1852, the New Orleans, Opelousas & Great Western (NOO&GW) Railroad, was chartered. It was intended to connect New Orleans' West Bank to Berwick Bay (Morgan City) (Bright 2019). In 1852 the portion of the proposed line between Algiers and Thibodaux was surveyed. This railroad route between Bayou des Allemandes LA 307 and Bayou Chetimahan extends along the present US Highway 90 south of the present project area. The rail line was completed by 1857, and spurs were built leading to nearby plantations. The presence of the railroad opened the area to timbering in addition to cattle ranching (Bright 2019). The presence of the railroad encouraged the creation of small communities that would later grow into towns such as Des Allemands and Raceland. Additionally, evidence of prehistoric occupation was still extant, and the mound and structures surrounding the mound are depicted on the 1892 USGS topographic map shown in **Figure 7**.

By the end of the nineteenth century, cypress logging became one of Louisiana's primary economic endeavors, and because cypress became extremely valuable, the vast stands of virgin cypress in south Louisiana began to see logging on an almost unimaginable scale. By 1914, Louisiana was the leading producer of lumber in the nation, and most of the timber was taken from the swamps that flanked the lower reaches of the Mississippi River as well as the Barataria and Pontchartrain Basins (Creekmore 2007). Company towns sprang up almost overnight, built around lumber mills in order to keep them running continuously. The town of Bowie, located just north of the present project area was associated with the Bowie Lumber Company mill that was established in 1895 by William Cameron George M. Bowie. The Bowie Lumber company also formed a sugar mill and began ranching in the area. Buildings associated with the mill and quarter for the workers were built along what would become Highway 307 (**Figure 7**).

Ownership of the property in the project area remained in the hands of private owners until the mid-twentieth century. The potential for oil and gas in south Louisiana was realized in 1934 when geophysical surveys identified a salt dome on Bowie Lumber Company property. Drilling in the vicinity of the project area began 20 years later in the 1950s (New Orleans States 1934:1). In July 1957, the Union Oil Company of California applied for a permit to drill an oil well near the project area (**Figures 8 and 9**). Since then, numerous canals and small roads have been cut across the marsh. Presently, much of the region surrounding the project area is still used for cattle ranching, sugar cane cultivation, as well as oil and gas extraction.

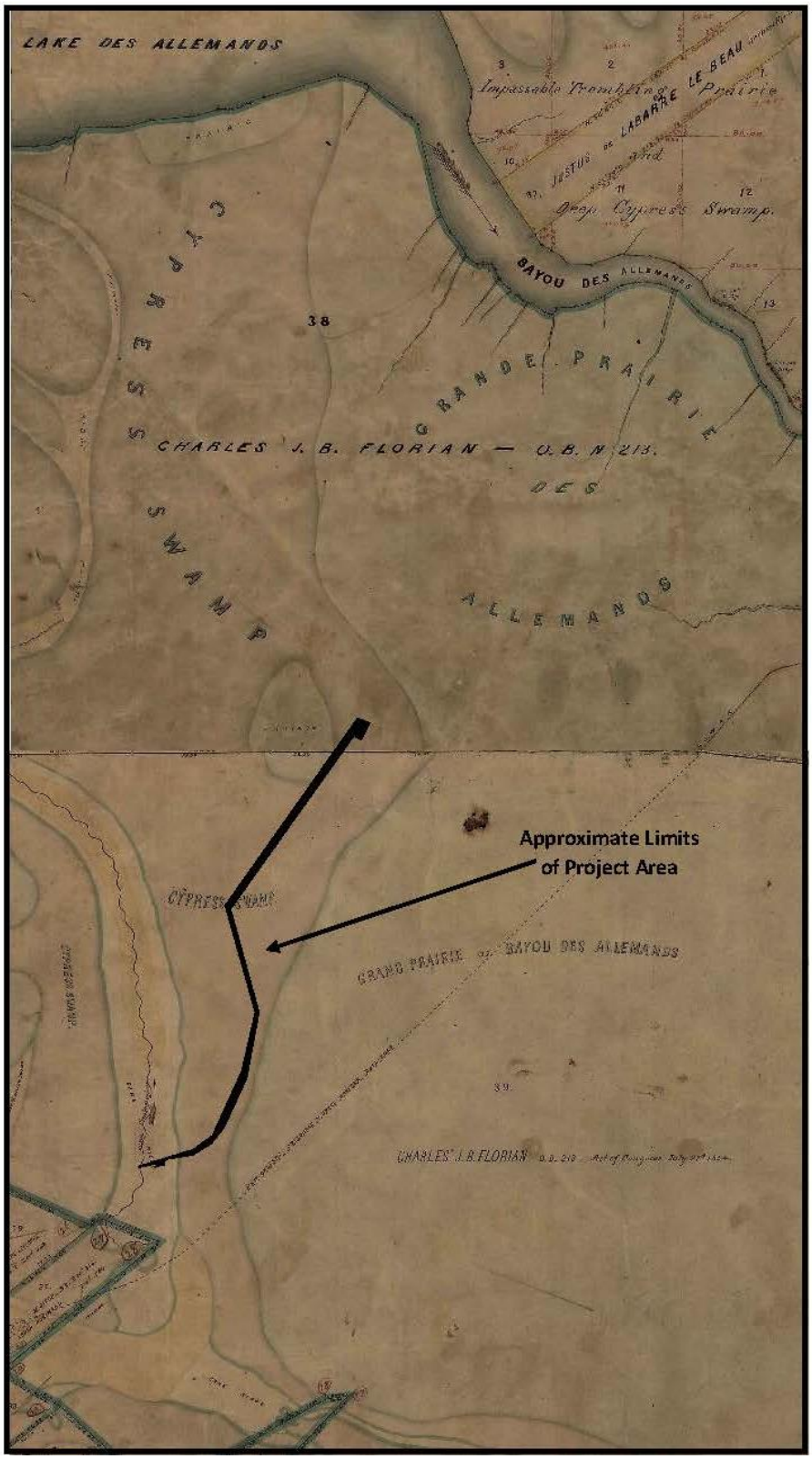

Figure 6. Portions of the 1858 14S Range 19E and 15S Range 19E Plat maps of showing the project area (OSL 1858a and OSL 1858b).

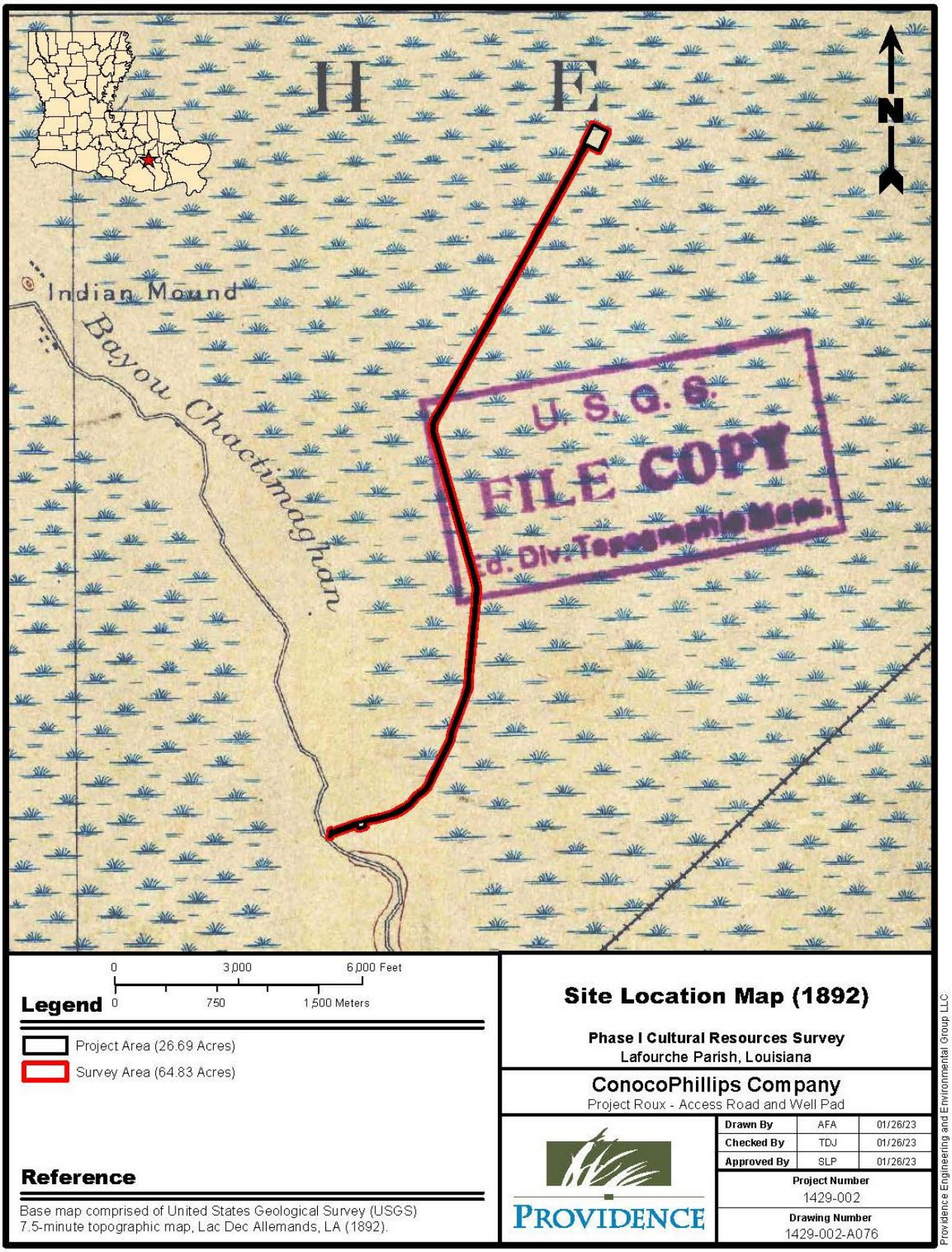

Figure 7. 1892 USGS Topographic Map showing the Project Roux area.

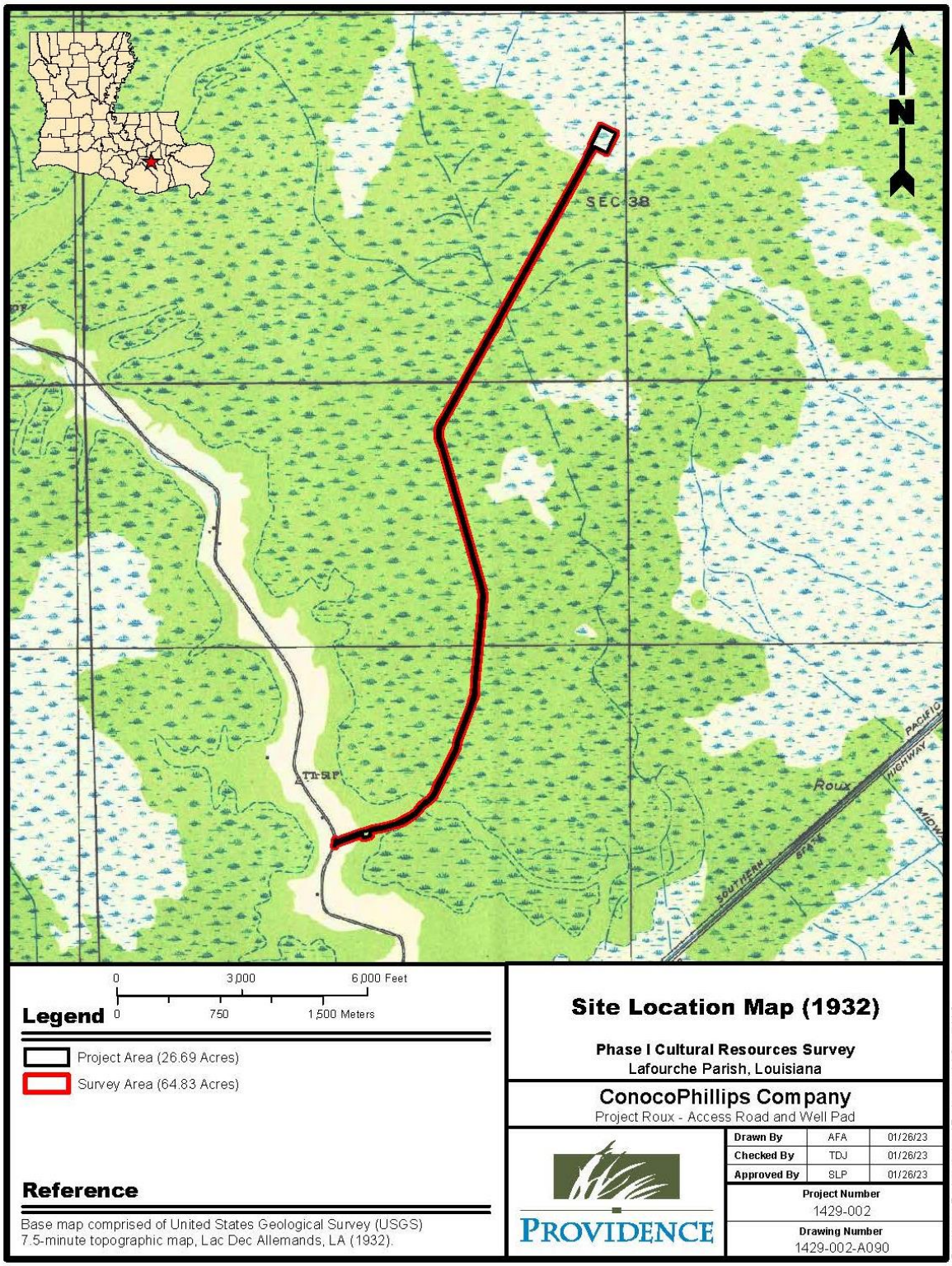

Figure 8. 1932 USGS Topographic Map showing the Project Roux Area.

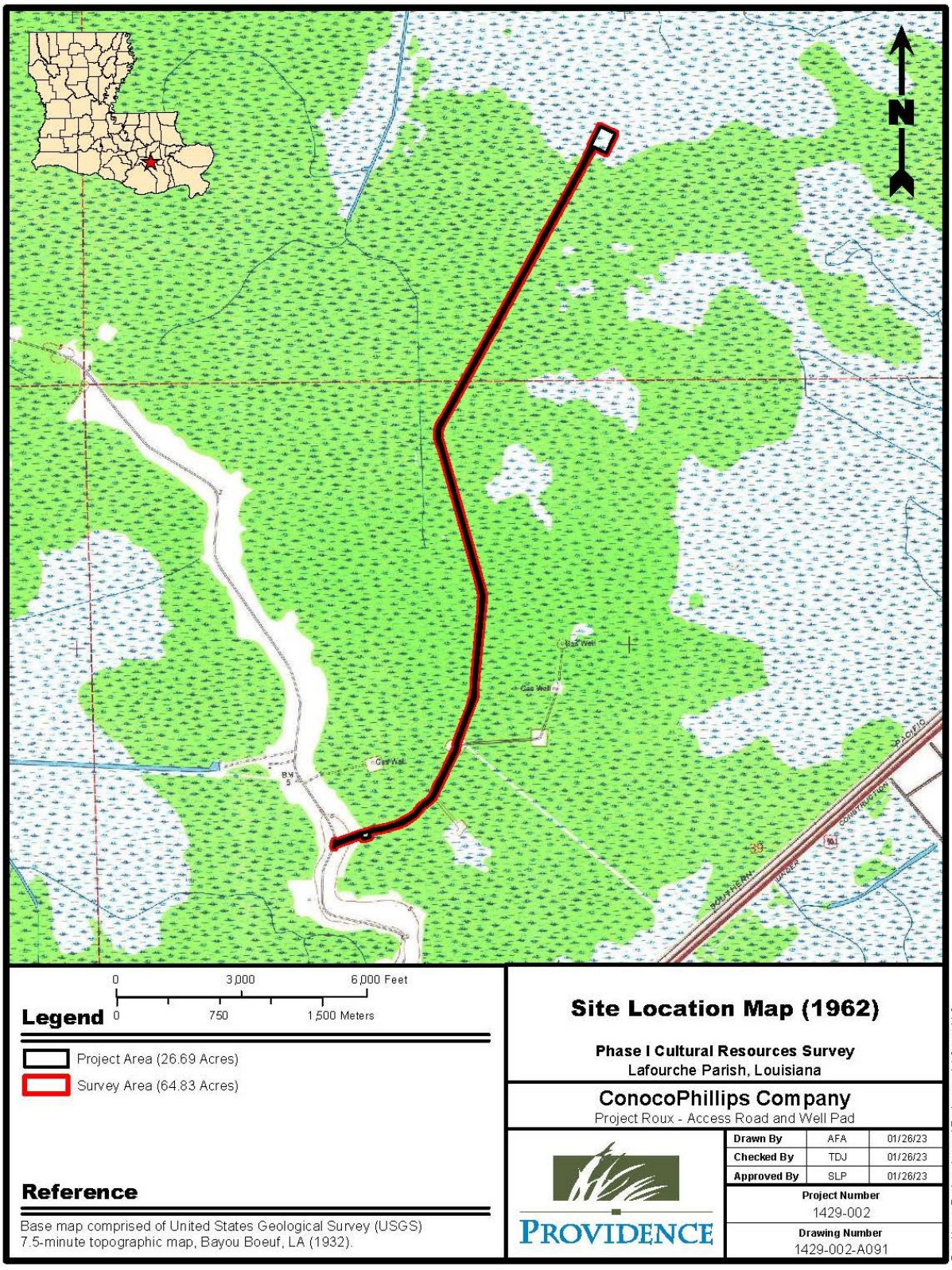

Figure 9. 1962 USGS Topographic Map showing the Project Roux Area.

PREVIOUS INVESTIGATIONS AND KNOWN RESOURCES

A review of the Louisiana Division of Archaeology site files and online database revealed that that three previous cultural resources investigations were conducted within 1.6 km (1 mi) of the project area. The archaeological background and site file search also showed that nine previously recorded cultural resources comprised of four archaeological sites (16LF247, 16LF309, 16LF310, and 16LF311) and five historic structures (29-00171, 29-00172, 29-00173, 29-00174, and 29-07621) are located within 1.6 km (1 mi) of the project area (**Figure 10; Tables 1 and 2**). These investigations and resources are discussed in detail below. No properties currently listed on the National Register of Historic Places, National Historic Landmarks, or known cemeteries are situated within 1.6 km (1mi) of the project area.

Previous Investigations

One historic Structure survey and three cultural resources investigations have been conducted within 1.6 km (1mi) of the present project area (**Figure 10; Table 1**). These investigations consist of one historic structure survey (Leslie 1997a, 1997b, 1997c, 1997d), two assessment and reconnaissance surveys (GSRI 1976 and Ryan 1982) and one Phase I survey (Jungeblut 2020) Assessment and reconnaissance surveys are used to build predictive models for archaeological site occurrence. They generally lack intensive subsurface testing across the entire project area. Predominantly the project area is visually inspected. To that end, GSRI performed an environmental evaluation of a proposed pipeline corridor during which the project area was examined from a car and by helicopter (GSRI 1976). This methodology was used to identify geomorphic landforms that would be suitable for human occupation. A possible mound was identified west of Kraemer Road (Louisiana Highway 307), but no artifacts were observed on the ground surface during on-the-ground examination of the locale. A landform east of the proposed 1976 pipeline alignment was identified as a high probability location for encountering archaeological sites. It was acknowledged that additional sites may be in the 1976 study area, and avoidance of the earthen mound locale was recommended GSRI (1979:7-10).

During a geology field trip in the Upper Barataria Basin, several archaeological sites were examined, and two were discussed in detail (16LF17 and 16SC2) (**Figure 10; Table 1**). These sites both represent prehistoric mounds. Neither fall within the 1.6 km (1 mi) study area surrounding the present project area, but they do provide information that will aid in predictive modeling for site occurrence in the project area. No subsurface testing at site 16SC2 was performed. However, it was noted this site was in the Boutte Crevasse system. The distal end of a previously excavated trench at site 16LF17 was reopened (Ryan 1982) The exposed profile displayed a stratified sequence of cultural and natural deposits dating from the Coles Creek Period to the Mississippi Period (Ryan 1982:8). The NRHP eligibility of the site was not determined at that time. The soil profiles supported the model that the natural levees of crevasse splay complexes were high probability locations for encountering prehistoric sites (Ryan 1982:8).

In the late 1990s Dr. Paul Leslie, a professor of history at Nicholls State University, conducted an historic structure survey across Lafourche Parish (Leslie 1997a, 1997b, 1997c, 1997d). During that

survey, a four-structure complex was recorded on the west side of Louisiana Highway 307 within the 1.6 km (1 mi) buffer of the present project area (29-00171, 29-00172, 29-00173, 29-00174) (**Figure 10; Table 1**). These four structures consisted of early twentieth century residences and a barn. The eligibility of the structures was not determined at that time.

The most recent investigation was a Phase I cultural resources survey performed along Louisiana Highway 307 between Raceland and Des Allemands by Coastal Environments, Inc. (Jungeblut et al. 2020) (**Figure 10; Table 1**). The survey included a pedestrian survey and shovel testing. In addition to the archaeological investigation, a survey of historic structures was conducted. Four archaeological sites and two historic structures were recorded. Three of the four archaeological sites, (16LF309, 16LF310, and 16LF311) are situated within 1.6 km (1 mi) of the present project area. All three consist of sparse artifact scatters most likely associated with a former nearby lumber mill or former small hotel. The manufacture dates of the recovered artifacts range between the mid-nineteenth century to the early twentieth century. All of the sites were deemed not eligible for inclusion in the NRHP. The two historic structures investigated during the survey (29-07621 and 29-07622) consist of residential bungalows. Structure 29-07621 is situated within the 1.6 km (1 mi) buffer of the present project area and was deemed not eligible for inclusion in the NRHP, while structure 29-07622 was considered to be potentially eligible for inclusion of the NRHP, but it is situated outside the 1.6 km (1 mi) buffer of the project area.

Previously Recorded Cultural Resources

Nine previously recorded cultural resources comprised of four archaeological sites (16LF247, 16LF309, 16LF310, and 16LF311) and five historic structures (29-00171, 29-00172, 29-00173, 29-00174, and 29-07621) are located within one mile of the project area (**Figure 10; Table 2**). Site 16LF247 is located near the distal end of an oil field canal that extends southwest from Bayou Des Allemands. It was originally recorded by Michael Comardelle (1991). The site was described as a shell midden with a 2 m (6.56 ft) high earth and shell mound with two lower aprons that were shaped like a square horseshoe. The mound and associated aprons were oriented east to west. The aprons measured approximately 30 m (98.42 ft) in length, 16 m (52.49 ft) in width, and 0.75 m (2.46 ft) in height. Comardelle (1991) suggests that the mound plus the aprons form a "boat harbor" as the area between the aprons is low and wet. Artifacts were observed in animal burrows and tree falls. Cultural material included prehistoric ceramics including Pontchartrain Check Stamped and Baytown Plain types. Observed faunal material included deer, turtle, and muskrat bones. Two pieces of brick or daub were also found. Taken together, the artifacts suggested that both Coles Creek prehistoric and historic period components are present at the site. Additional work was recommended to determine the NRHP eligibility of the site.

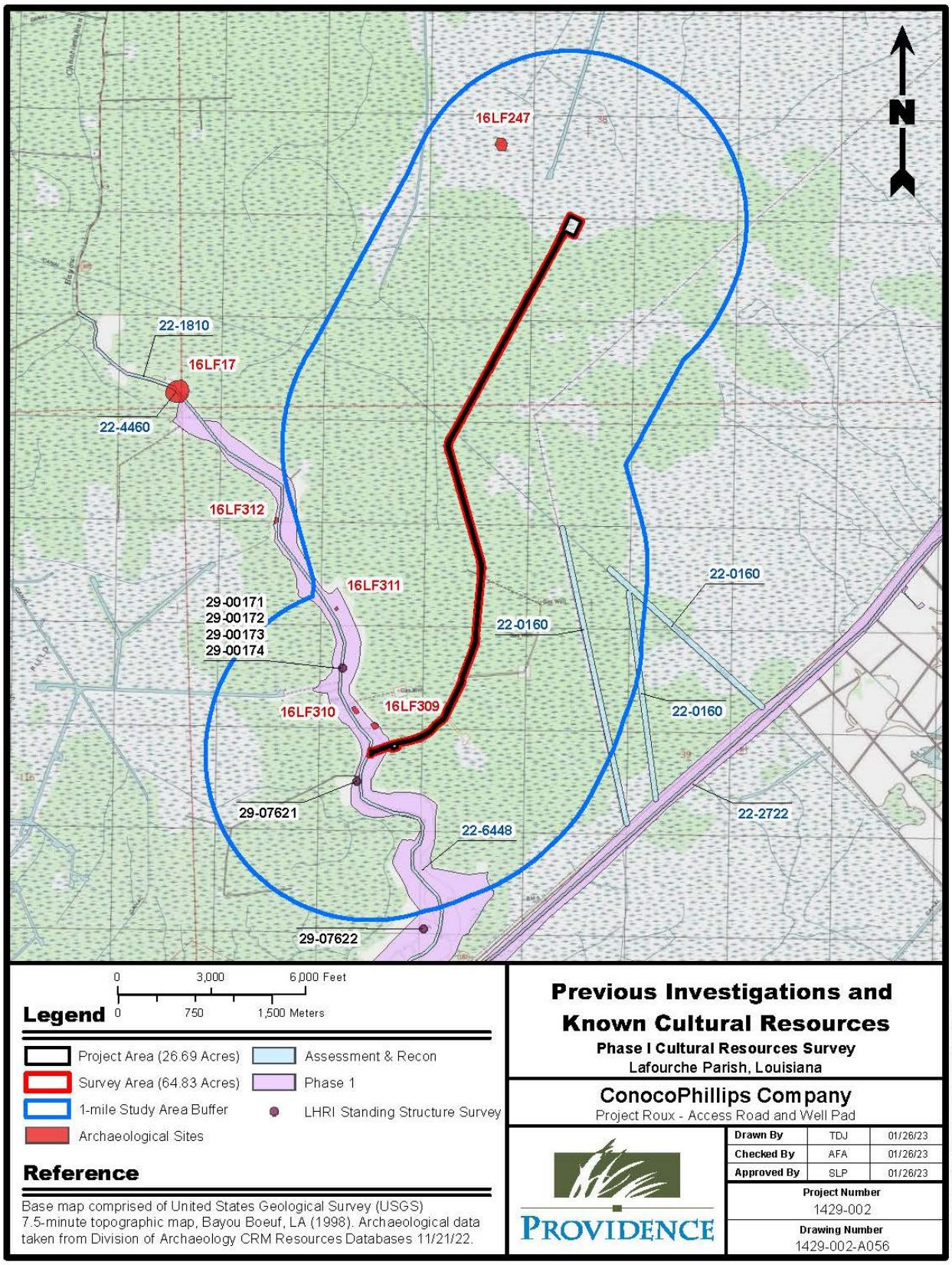

Figure 10. Topographic Map of the project area showing previous investigations and known cultural resources.

Table 1. Previous Investigations within 1.6 km (1 mi) of the Project Area.				
Report No.	**Authors**	**Title**	**Investigation Type**	**Resources Examined**
22-1810	Ryan, Thomas (1982)	*Cultural and Morphological Changes in the Upper Barataria Basin Ca. 900-1700 AD.*	Assessment and Reconnaissance	16LF17 and 16SC2
22-6448	Jungeblut, Philip, Ben Davis, Michael Carpenter, Katie Jungeblut, and Sara Hahn (2020)	*Phase I Cultural Resources Investigation of the Proposed West Bank and Vicinity Hurricane and Storm Damage Risk Reduction System Flood Side Bottomland Hardwoods-Wet (BLH-West) and Swamp Mitigation Project, Lafourche Parish, Louisiana.*	Phase I	16LF309, 16LF310, 16LF311, 16LF312, 29-07621, and 29-07622
22-0160	GSRI (1976)	*Environmental Evaluation of Proposed Pipeline Construction in Lafourche Parish, Louisiana.*	Assessment and Reconnaissance	None

Table 2. Known Resources within 1.6 km (1 mi) of the Project Area.				
Resource Number	**Resource Type**	**Form/Style**	**Date**	**NRHP Eligibility**
16LF247	Archaeological Site	Possible Mound/Shell Midden	Cole Creek/Historic	Unknown
16LF309	Archaeological Site	Artifact Scatter	19th-20th Century	Not Eligible
16LF310	Archaeological Site	Artifact Scatter	19th-20th Century	Not Eligible
16LF311	Archaeological Site	Artifact Deposit and Surface Scatter	19th-20th Century	Not Eligible
29-00171	Structure/Building	Shotgun	c 1935	Unknown
29-00172	Structure/Building	Barn-Coop	c 1935	Unknown
29-00173	Structure/Building	Shotgun	c 1935	Unknown
29-00174	Structure/Building	Bungalow	c 1947	Unknown
29-07621	Structure/Building	Bungalow	1965	Not Eligible

Three historic archaeological sites (16LF309, 16LF310, and 16LF311) are located along Louisiana Highway 307 (**Figure 10; Table 2**). Recorded and examined by CEI in 2020, the sites were described as small deposits of historic artifacts (Jungeblut et al. 2020:). It was determined that the sites are most likely associated with a former nearby lumber mill or former hotel. Recovered artifacts include glass and ceramics with manufacturing dates beginning in the nineteenth century

and terminating in the twentieth century. All three sites were deemed not eligible for inclusion in the NRHP, and no further work was recommended.

Five historic structures greater than 50 years in age were identified in the vicinity of the project area (**Figure 10; Table 2**). The structures consisted of four residences (29-00171, 29-00173, 29-00174, and 29-07621) and one barn/coop (29-00172). All the structures were described as buildings associated with the Bowie Mill or hotel. The structures were found to date to the early- to mid-twentieth century. Structures 29-00171, 29-00172, -00173, and 29-00174 were recorded in 1997 by Paul Leslie of Nichols University. Photographs of the structures show that they were not in good condition. No NRHP evaluation was offered at that time, but additional work was recommended. Although situated in the later CEI project area, they were not examined during the 2020 Phase I survey, indicating they may no longer be extant. The CEI survey recorded structure 29-07621. It was described as a mid-twentieth century bungalow. It was deemed not eligible for inclusion in the NRHP.

NRHP Properties, National Historic Landmarks, and Known Cemeteries

No NHRP listed properties or National Historic Landmarks are located inside the project area or within its 1.6 km (1 mi) buffer. No known cemeteries are in the project area or its 1.6 km (1 mi) buffer.

FIELD METHODOLOGY

The data presented in the preceding chapter indicates that high probability areas for encountering prehistoric sites are located at points where the project area extends across subsided, drowned or buried, natural levees in the marsh or along Louisiana Highway 307 ridge. Also, historic archaeological sites or historic structures are most likely to be located where the project area intersects with Highway 307 or in the locations associated with early oil and gas dill sites.

The field survey implemented standard archaeological survey techniques (Louisiana Division of Archaeology 2021). Full land coverage requirements were achieved through visual and subsurface inspections of the survey area and its viewshed. Planned locations of the subsurface shovel tests were pre-plotted at high probability intervals across the project area. Handheld Garmin GPS units were utilized to locate the planned positions in the field. If a pre-plotted location was found to be inundated by water a shovel test was not excavated. As noted in the Louisiana field regulations, "Systematic shovel-testing in areas of permanent or semi-permanent water is not required..." (Louisiana Division of Archaeology 2021:11). The viewshed included the area immediately surrounding the boundary of the project area. In areas of inundation by water, shovel tests were not excavated. While conducting visual inspections, any exposed surfaces above the surface of the water were carefully examined for cultural material. Subsurface testing was performed at 30 (m) (98.42 ft) intervals along a transect placed down the center of the of the access road, five transects spaced 30 m (98.42 ft) apart in the well pad area, and two transects spaced 30 m (98.42 ft) apart in the work area. Standard shovel tests measured 30 (cm) (11.81 in) in diameter and were excavated to the top of the sterile subsoil layer or until the water table, or other impenetrable obstructions were encountered. Soils from each test were screened through 0.64 cm (0.25 in) hardware cloth to recover any cultural material that may be present. If cultural material had been encountered, the material would have been sorted by provenience and placed into bags labeled with the pertinent excavation information before being transported to TerraXploration's laboratory.

If cultural material were identified during the field investigation, the artifacts would have been further examined to better define the horizontal and vertical limits of the deposit. Excavation of delineation shovel tests would have been conducted by placing additional shovel tests around positive tests. These additional tests would be placed at 10 m intervals off the initial positive tests or cultural features in cardinal directions in the project area. This testing would be conducted until two negative shovel tests are encountered in each direction or until delineations extend beyond the project boundary. A handheld Garmin GPS unit would be used to record the site center, and a sketch map would be drawn by compass and pace and plotted to scale. Digital photographs were taken for any recorded archaeological locus as well as for the survey area. For the proposed project, 233 planned shovel test locations were plotted on across the project area **(Figure 11).** Forty-two shovel tests were successfully excavated across the project area. All proved negative for cultural material. The remaining 191 shovel tests were not excavated due to the presence of standing water measuring over 15.24 cm (6 in) in depth. As noted above, shovel tests positioned in areas of permanent inundation by water, are not required to be excavated.

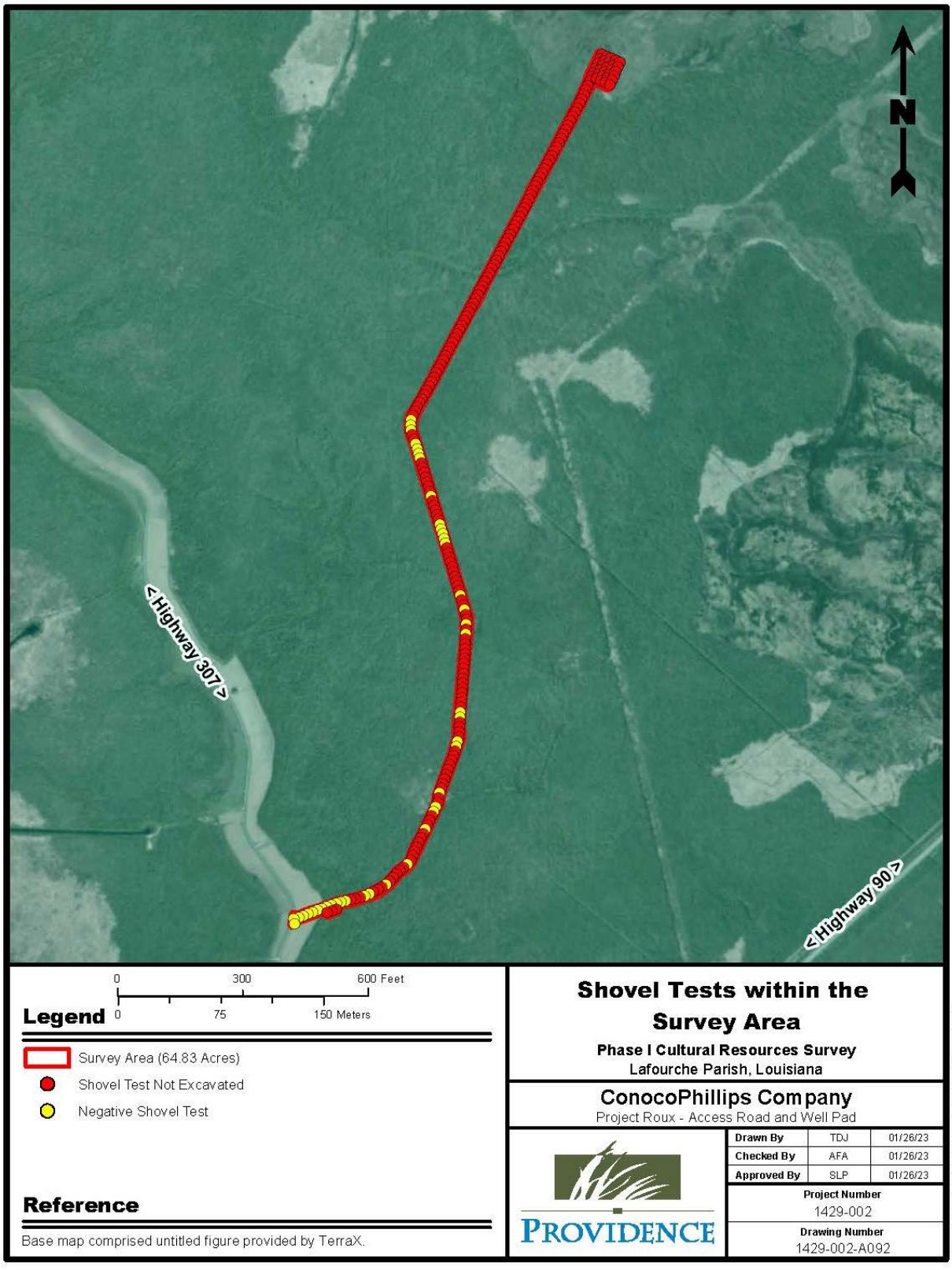

Figure 11. Overview Map showing shovel test location within the Project Roux area.

RESULTS

The field investigations were performed between November 16 and 18, 2022 by TerraXplorations. The project area encompassed approximately 64 acres (158.147 ha) and is located 6.6 km (4.14 mi) west of the town of Des Allemands, 6.47 km (4.02 mi) south of Bayou des Allemands, and 6.46 km (4 mi) north of the town of Raceland. The Phase I cultural resources survey included a program of pedestrian/boat survey and subsurface testing through the excavation of shovel tests. Across the project area **(see Figures 12-16; Figures)**. The project area was visually examined either from a boat in areas of inundation or by foot where dry land was found. The pedestrian/boat survey identified no historic structures greater than 50 years in age within the project area or its viewshed.

When completed, the proposed project area will encompass 26.69 ac (10.8 ha). The survey area consisted of the proposed well pad area measuring 106 m (350 ft) by 140 m (460 ft). The access road measures 6 km (3.7 mi) in length and generally 9.14 m (30 ft) wide. Passing areas along the access road varied in width between 13.71 m (45 ft) and 21.94 m (72 ft). At the southern extent of the access road the laydown area/parking lot measures 30.48 m (100 ft) wide by 45.72 m (150 ft) long. To ensure all areas along the access road were included in the survey, the access road was assigned a consistent width of 40 m (130 ft) to include the width of the road and the additional passing and parking areas. Thus, the survey area measures a total of 64 ac (25.9 ha).

The coastal marsh landforms, and associated flora and fauna, as described in the Land Use History section above were observed in the project area. Two ecological areas were found along the survey area. A portion of the project area was covered with trees and palmettos (**Figure 17**), and the other presented with marsh grass (**Figure 18**). However, inundation by water was found throughout the project area (**Figure 19**).

Of the planned 233 shovel tests, 42 were excavated. (**Figures 12-16)**. Because of the presence of permanent standing water, and in accordance with the fieldwork Guidelines for Cultural Resource Investigations, the remaining 191 shovel tests could not be excavated (Louisiana Division of Archaeology 2021). Additionally, the shovel tests could not be offset as inundation of the area is widespread. All excavated shovel tests were placed at 30 m intervals along a single transect placed in the center of the access road area. Shovel tests were also placed at 30 m intervals along five transects spaced 30 m apart in the proposed well pad located at the north end of the access road and along an additional transect in the workspace at the southern extent of the access road. Shovel testing typically exhibited a soil profile comprised of one strata of grayish brown hydric clay (10 YR 5/2) that extended from the ground surface to the bottom of the shovel tests at 70 cm below the surface (cmbs) [27.56 inches below the surface (inbs)]**.** None of the shovel tests proved positive for cultural material or features.

The viewshed of the project area was examined for above ground historic structures greater than 50 years in age. No historic structures or cemeteries were observed within the project area or its viewshed. No cultural resources were identified as a result of the field investigation. Based on the findings of the records review and cultural resource survey, no archaeological sites or historic properties listed in, or recommended eligible for, the National Register of Historic Places will be

affected by the proposed construction activities. No additional cultural resources work is necessary, and it is recommended that the proposed construction proceed.

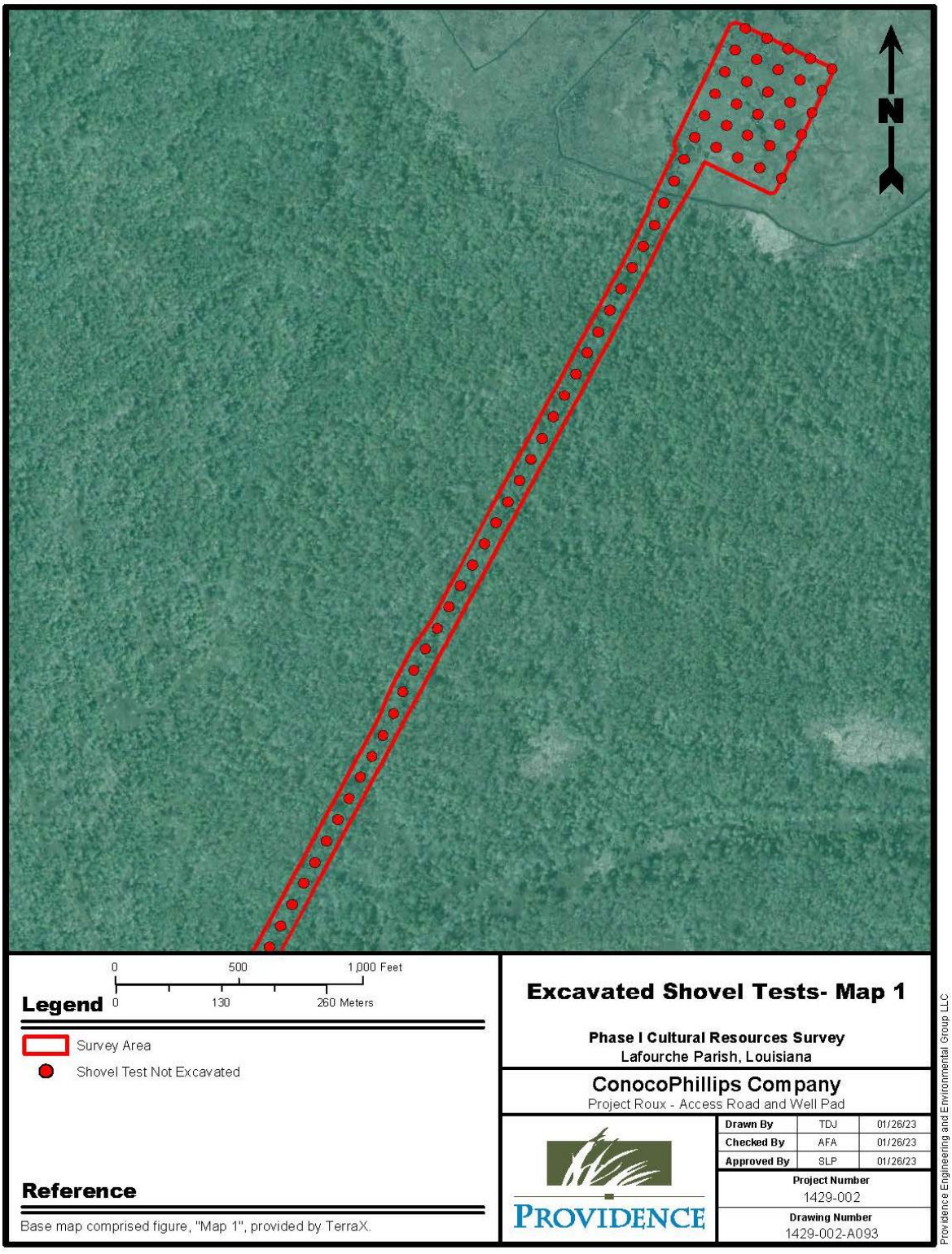

Figure 12. Mosaic Map 1 showing shovel test location within the Project Roux area.

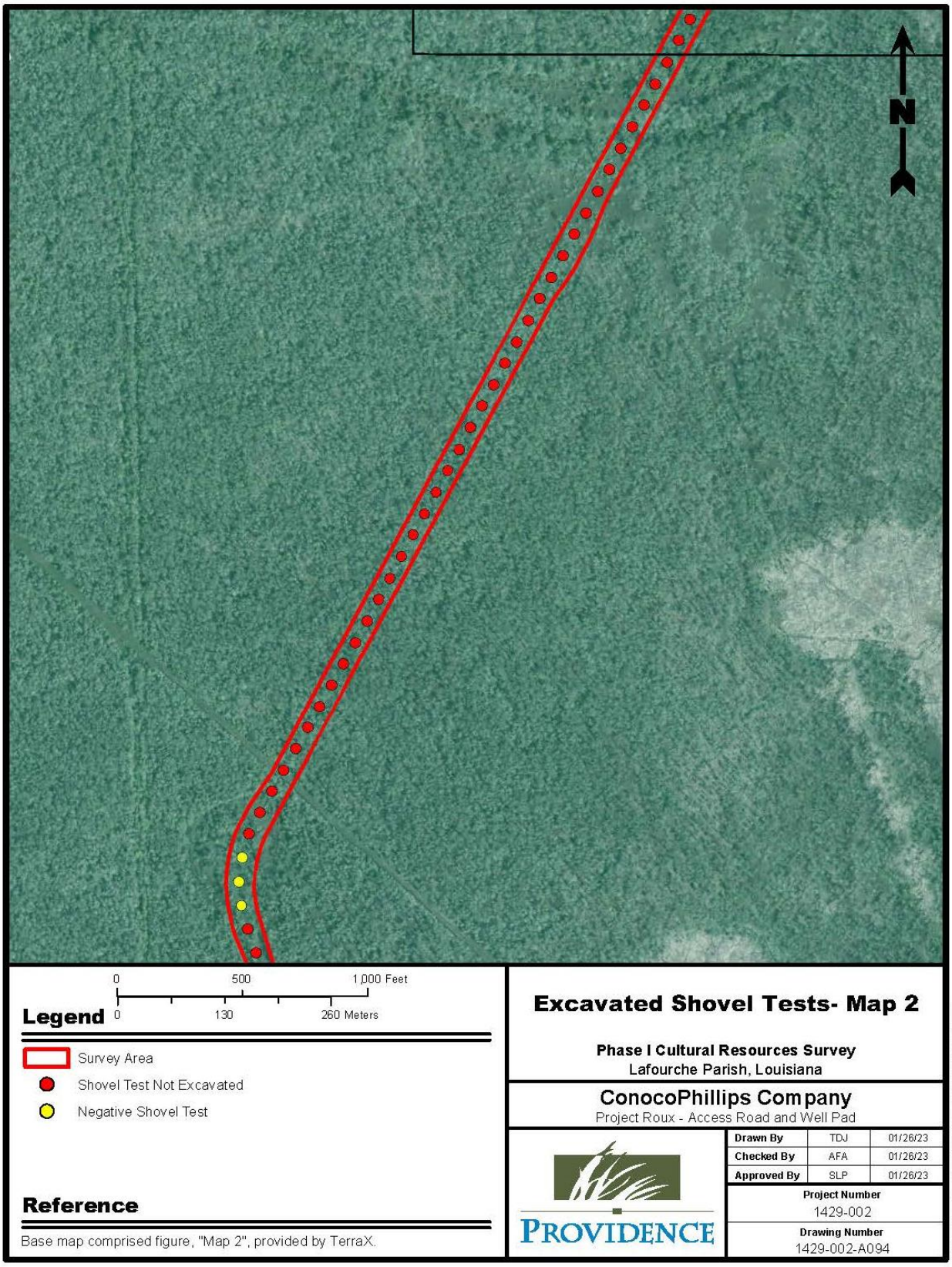

Figure 13. Mosaic Map 2 showing shovel test location within the Project Roux area.

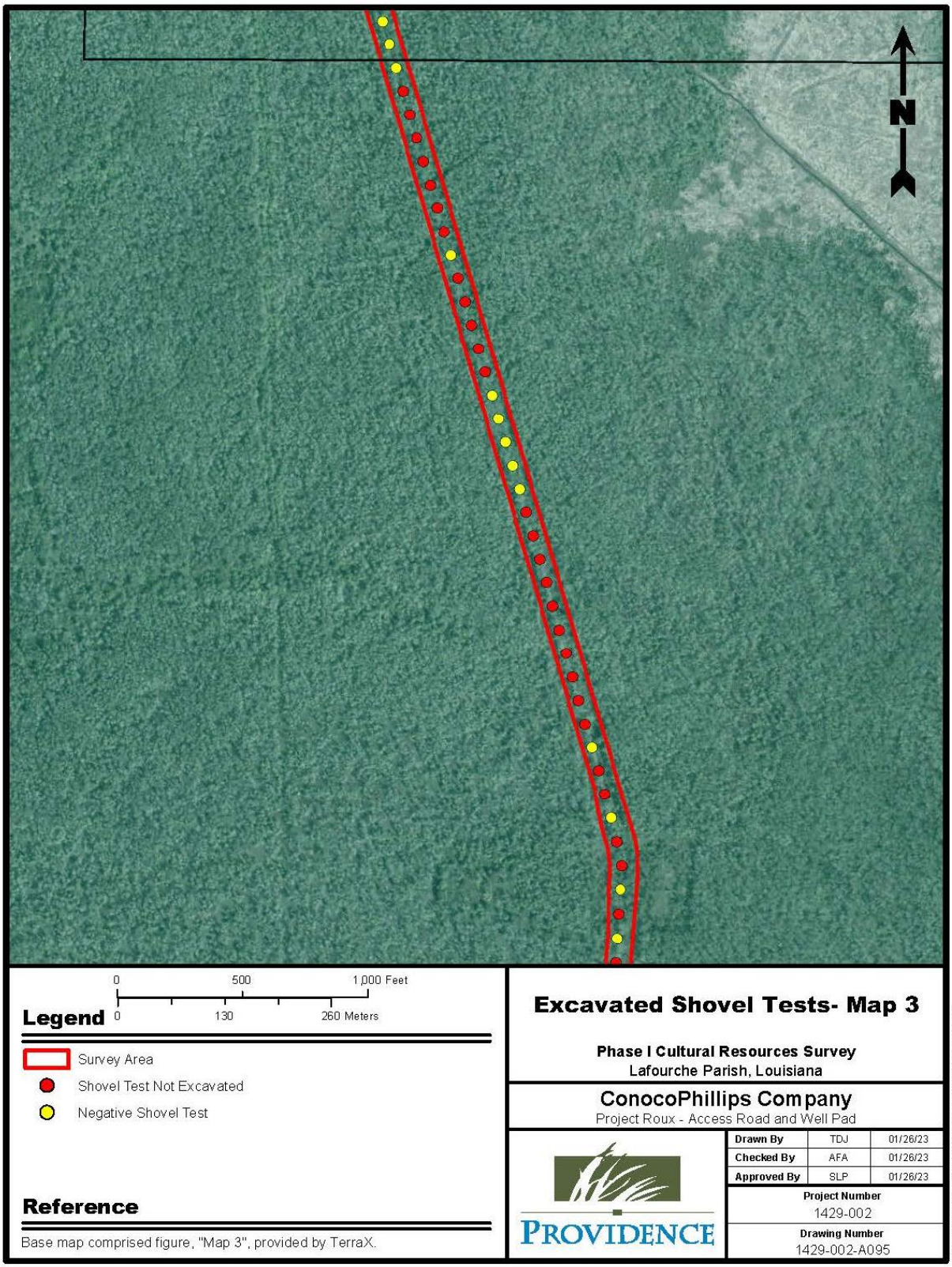

Figure 14. Mosaic Map 3 showing shovel test location within the Project Roux area.

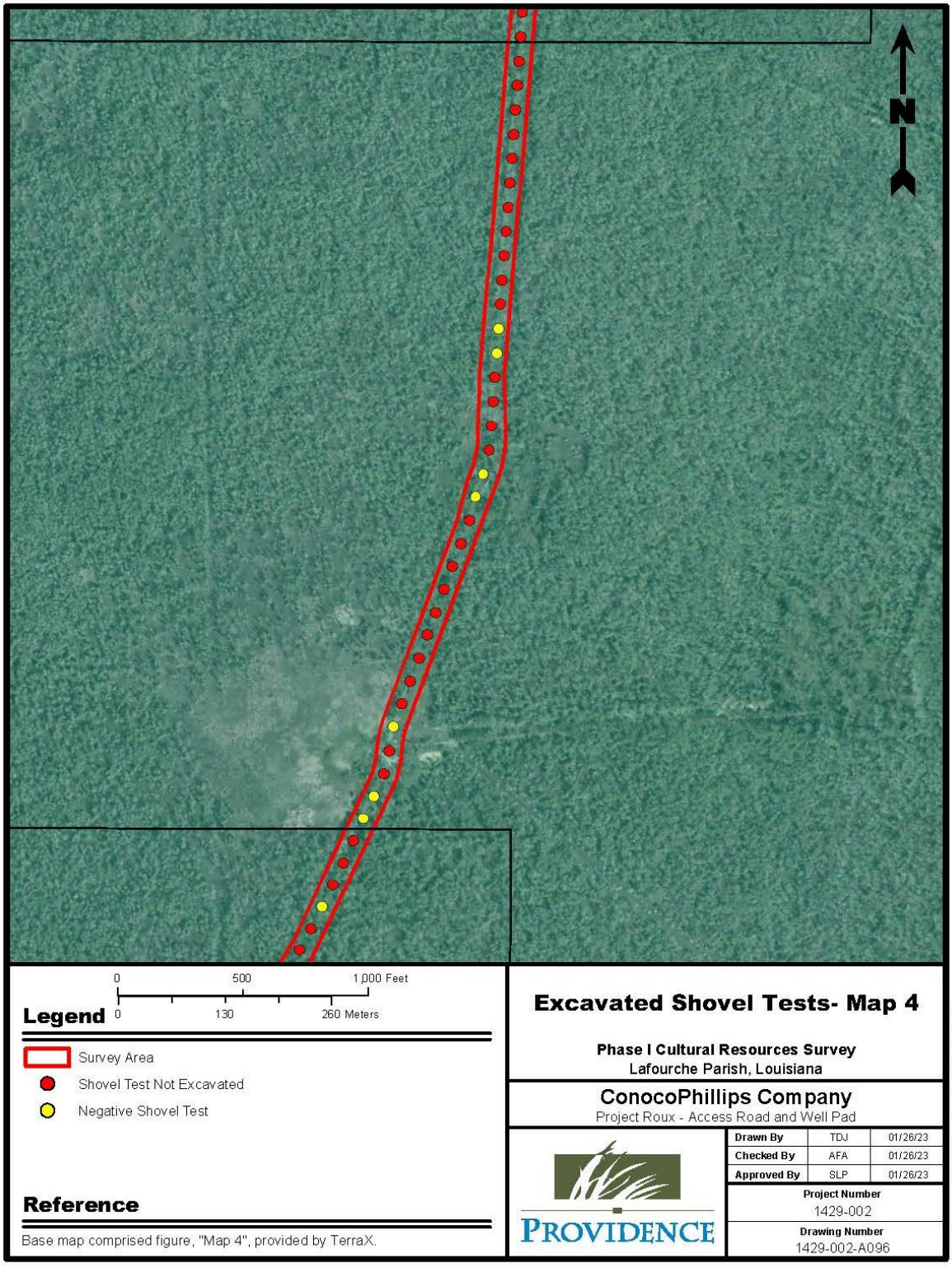

Figure 15. Mosaic Map 4 showing shovel test location within the Project Roux area.

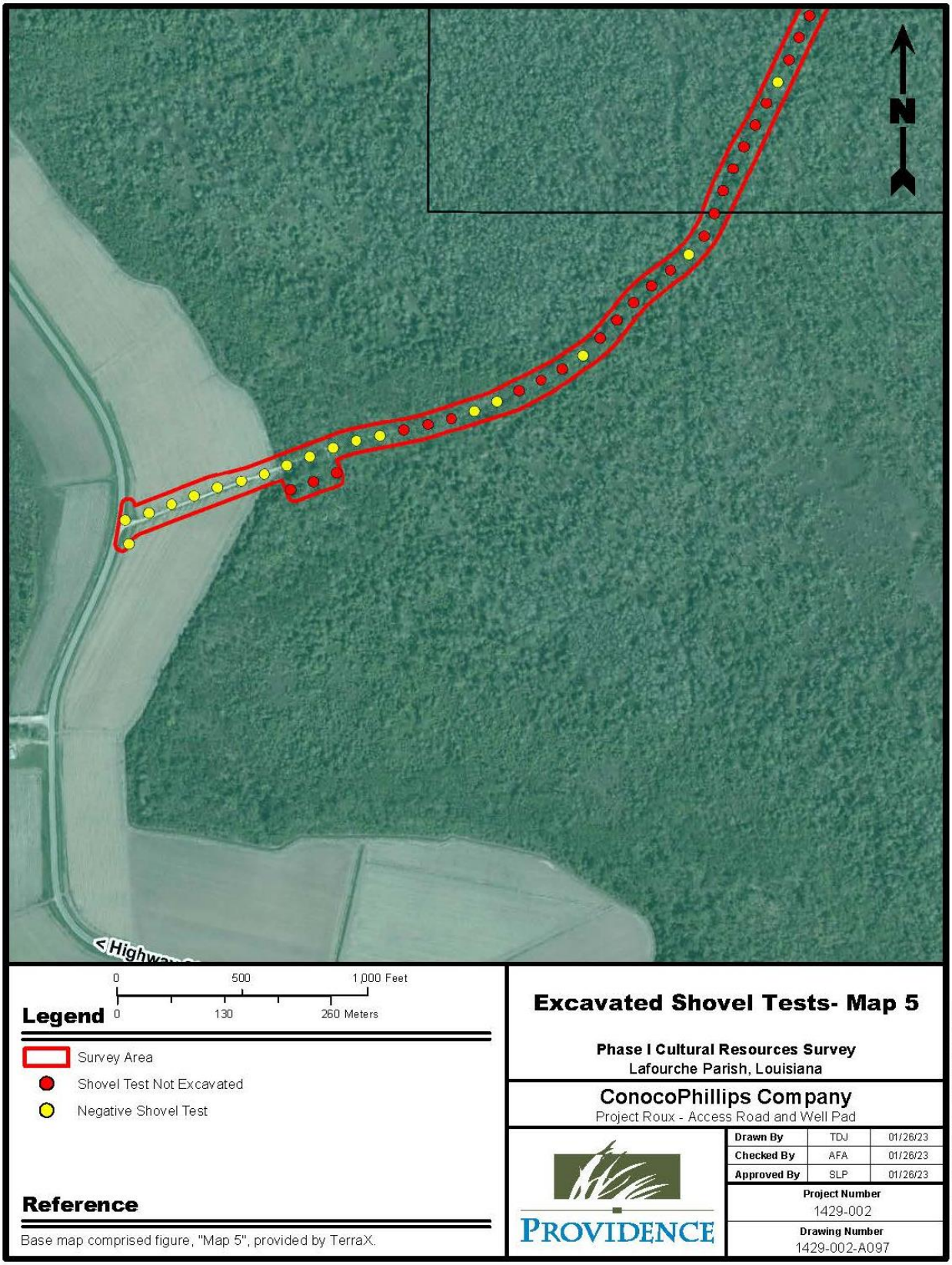

Figure 16. Mosaic Map 5 showing shovel test location within the Project Roux area.

Figure 17. Overview photograph of the Project Roux area showing trees and palmettos. View to the SSE.

Figure 18. Overview photography of the Project Roux area showing marsh grasses. View to the NNE.

Figure 19. Overview photograph showing water inundation within the Project Roux area. View to the south.

SUMMARY AND RECOMMENDATIONS

The field investigations were performed between November 16 and 18, 2022 by TerraXplorations. The project area encompassed approximately 64 ac (158.147 ha) and is located 6.6 km (4.14 mi) west of the town of Des Allemands, 6.47 km (4.02 mi) south of Bayou des Allemands, and 6.46 km (4 mi) north of the town of Raceland. The Phase I cultural resources survey included a program of pedestrian/boat survey and subsurface testing through the excavation of shovel tests. Across the entire project area **(**see **Figures 11-16).**

The proposed project area encompasses 26.69 (ac) (10.8 ha) and consists of a proposed well pad area measuring 106 m (350 ft) by 140 m (460 ft), and an access road measuring 6 km (3.7 mi) in length and generally 9.14 m (30 ft) wide. Passing areas along the access road vary in width between 13.71 m (45 ft) and 21.94 m (72 ft). At the southern extent of the access road the laydown area/parking lot measures 30.48 m (100 ft) wide by 45.72 m (150 ft) long. To ensure all areas along the access road were included in the survey, the access road was assigned a consistent width of 40 m (130 ft) to include the width of the road and the additional passing and parking areas. In total, the survey area measures a total of 64 ac (25.9 ha).

The project area was visually examined either from a boat in areas of inundation or by foot where dry land was found. The pedestrian/boat survey identified no historic structures greater than 50 years in age. The subsurface testing program resulted in the excavation of 42 shovel tests. No cultural material or features were identified. Therefore, it is considered that no further work is necessary in association with this project. However, cultural features or deposits may be present in inundated areas that could not be tested. If human remains, cultural material, or cultural features such as artifact deposits, midden, mounds, structure foundations, or ruins, are encountered during construction, work should stop, and the unexpected discoveries plan should be put in place with consultation of the Louisiana State Historic Preservation Officer (SHPO).

Unexpected Discoveries Plan

Reasonable efforts have been made during this investigation to identify and evaluate possible locations of prehistoric or historic archaeological site locations. However, the possibility still exists that evidence of prehistoric and historic resources not identified during Providence's investigation may be discovered during ground disturbing activities in the direct Area of Potential Effect (APE). Should evidence of archaeological resources be discovered during construction activities, it is recommended that all work in that portion of the project area cease immediately. Evidence of historic resources include prehistoric or historic pottery, prehistoric stone tools, bone or shell tools, as well as historic archaeological remains including ceramic sherds, glass shards, metal and brick fragments. Should questionable materials be uncovered during construction, procedures contained in regulations put forth by the Advisory Council on Historic Preservation (ACHP) and 36 CFR Part 800 will take effect. If human remains are encountered, all work should stop and local law enforcement should be notified immediately in accordance with the provisions of the Louisiana Unmarked Human Burial Sites Preservation Act (Revised Statute 8:671-681). A copy this report and all records of this project will be curated with the Louisiana SHPO in Baton Rouge, Louisiana.

REFERENCES CITED

Abbott, R. Tucker
1968 *A Guide to Field Identification of the Seashells of North America*. Golden Press, New York.

Apollonio, Heather, Kathryn B. Lintott, Benjamin D. Maygarden, Angele Montana, Sara S. Orton, Jessica Barton, Marie E. Pokrant, and Paul V. Heinrich
2011 Intensive Cultural Resources Survey, Future I-49 South Corridor, SIU-1, Lafourche and St. Charles Parishes, Louisiana. (22-2722) Earth Search, Inc., New Orleans. Submitted to DMJM + Harris, New Orleans. Manuscript on File, Louisiana Division of Archaeology, Baton Rouge.

Apollonio, Heather, Rhonda Smith, Benjamin Maygarden, Michael Godzinski, and Jill-Karen Yakubik
2003 *Intensive Cultural Resources Survey, Goose Bayou Tidal Flood Protection System, Jefferson Parish, Louisiana*.(22-2550). Earth Search, Inc. New Orleans. Submitted to Submitted to Coastal Engineering and Environmental Consultants, Inc., Westwego, Louisiana.

Bahr, Leonard M., and James J. Hebrard
1976 *Barataria Basin: Biological Characterization.* Center for Wetlands Resources, Louisiana State University, Baton Rouge.

Bahr, Leonard M., Jr., Robert Costanza, John W. Day, Jr., Suzanne E. Bayley, Christopher Neill, Scott G. Leibowitz, and J. Fruci
1983 *Ecological Characterization of the Mississippi Deltaic Plain Region: A Narrative with Management Recommendations*. U.S. Fi8sh and Wildlife Service, Division of Biological Services, Washington, D.C.

Beavers, Richard C., Teresia R. Lamb, Gary B. DeMarcay
1982 2 Archeological Site Inventory: Barataria Basin Marsh Unit-Core Area, Jean Lafitte National Historical Park, Jefferson Parish, Louisiana. (22-1129). Submitted to Jean Lafitte National Historical Park and Preserve, New Orleans.

Beavers, Richard C., Teresia R. Lamb, and John R. Green
1984 *Archaeological Survey of the Upper Lafourche Delta, Lafourche, Terrebonne Parish, Louisiana*. University of New Orleans.

Bright, David L.
2019 *Confederate Railroads: The New Orleans, Opelousas, and Great Western Railroad*. Electronic document, http://www.csa-railroads.com/New_Orleans,_Opelousas_and_ Great_ Western.htm, accessed 12/9/22.

Britch, Louis D. and Joseph B. Dunbar
1990 *Geomorphic Investigation of Davis Pond, Louisiana*.US Army Corps of Engineers Waterways Experimental Station, Vicksburg.

Creekmoore, Judy
2007 Logging Failed; Parish Survives. Electronic document, http://www.nola.live.advance.net/news /t-p /index.ssf?/base/news-11/1190874789120200 .xml&coll=1, accessed 12/9/2022.

Comardelle, Michael
1991 *Louisiana Site Record Form 16LA249*. Manuscript on file at the Louisiana Division of Archaeology, Baton Rouge.

Cummins, Light Townsend
2014 Native Peoples and European Contact. In *Louisiana: A History*, Sixth Edition, edited by Bennet H. Wall and John C. Reilley, pp.10-31. Wiley Blackwell, Hoboken, New Jersey.

Gagliano, Sherwood M., Richard A Weinstein, Eileen K. Burden, Kathrine L. Brooks, Wayne P. Glander
1979 *Cultural Resources Survey of the Bayou Barataria, Segnette, Rigaud Waterways*. (22-0732). Coastal Environments, Inc., Baton Rouge. Unpublished Manuscript on file at the Louisiana Division of Archaeology, Baton Rouge.

Giardino, Marco J.
1984 *Report on the Ceramic Materials from the Coquille Site (16JE37), Barataria Unit, Jean Lafitte National Historical Park.* Submitted to the National Park Service, Jean Lafitte National Historical Park and Preserve, New Orleans.

Goodwin, R. Christopher, Jill-Karen Yakubik, Peter A. Gendel, Kenneth Jones, Debra Stayner, Cyd H. Goodwin, Galloway W. Selby, and Janice Cooper
1985 *Preserving the Past for the Future: A Comprehensive Archaeology and Historic Sites Inventory of Jefferson Parish, Louisiana*. (22-1000). R. Christopher Goodwin and Associates, Inc. New Orleans. Unpublished Manuscript on file at the Louisiana Division of Archaeology, Baton Rouge.

Gulf South Research Institute (GSRI)
1976 *Environmental Evaluation of Proposed Pipeline Construction in Lafourche Parish, Louisiana.*(22-0160) Gulf South Research Corporation, Baton Rouge. Submitted to the Louisiana Resources Company, Tulsa, OK. Manuscript on file at the Louisiana Division of Archaeology, Baton Rouge.

Jackson, Edwin H.
1977 *The Bowie Site (16LF17)*. (22-4460). Unpublished Manuscript on File at Tulane University, New Orleans, and the Louisiana Division of Archaeology, Baton Rouge.

Jungeblut, Philip, Ben Davis, Michael Carpenter, Katie Jungeblut, and Sara Hahn
2020 *Phase I Cultural Resources Investigation of the Proposed West Bank and Vicinity Hurricane and Storm Damage Risk Reduction System Flood Side Bottomland Hardwoods-Wet (BLH-West) and Swamp Mitigation Project, Lafourche Parish, Louisiana*, Contract No. W912P819D0007. (22-648). Coastal Environments, Inc., Baton Rouge. Submitted to the US Army Corps of Engineers, New Orleans District.

Louisiana Division of Archaeology

2021 *Fieldwork Guidelines for Cultural Resource Investigations.* Divisions of Archaeology and Historic Preservation, Office of Cultural Development, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge. Electronic Manuscript accessed 1/11/2023, Field Standards 2021 (state.la.us).

Louisiana Office of State Land

1858a Plat Map of Township 15 South Range 19 East. Digital Map accessed 12/3/22 https://wwwslodms.doa.la.gov/WebForms/DocumentViewer.aspx?docId=523.00194&category=H#1.

1858b Map of Township 14 South Range 19 East. Digital Map accessed 12/3/22 https://wwwslodms.doa.la.gov/WebForms/DocumentViewer.aspx?docId=523.02486&category=H#1.

Leslie, Paul

1997a *Historic Structures Inventory form 29-00171*. Manuscript on file at the Louisiana Division of Historic Preservation, Baton Rouge.

1979b *Historic Structures Inventory form 29-00172*. Manuscript on file at the Louisiana Division of Historic Preservation, Baton Rouge.

1979c *Historic Structures Inventory form 29-00173*. Manuscript on file at the Louisiana Division of Historic Preservation, Baton Rouge.

1979d *Historic Structures Inventory form 29-00174*. Manuscript on file at the Louisiana Division of Historic Preservation, Baton Rouge.

Mathews, S. Dayton

1984 So*il Survey of Lafourche Parish, Louisiana*.US Department of the Interior. Soil Conservation Service, Louisiana State Soil and Water Conservation Committee, US Printing Office, Washington D. C.

McGuire, Tom

2008 *History of the Offshore Oil and Gas Industry in Southern Louisiana Volume II: Bayou Lafourche – Oral Histories of the Oil and Gas Industry*. Louisiana State University, Center for Energy Studies. MMS Contract No. 1435-01-02-CA-85169 . US Department of the Interior, Minerals Management Service, Gulf Mexico OCS Region, New Orleans.

Neuman, Robert W.

1984 *An Introduction to Louisiana Archaeology*. Louisiana State University Press, Baton Rouge.

New Orleans Notarial Archives (NONA)

1812 Broutin, Narcisse, n.p. Notarial Records, 16 February 1812.

1820 Lavergne, Hughes, n.p. Notarial Records, 15 February 1820.

New Orleans States (NOS)
1934 Orleans Looms as Oil Center.

NOAA (National Oceanic and Atmospheric Administration)
2013 *Precipitation-Frequency Atlas 14 of the United States Volume 9, Version 2.0*: *Southeastern States Alabama, Arkansas, Florida, Georgia, Louisiana Mississippi*. Electronic document accessed 11/11/23. HDSC Current PF Documents (weather.gov).
2023a *Climate at a Glance County Temperature Rankings: Lafourche Parish*. Electronic document access 1/17/23). https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/rankings.
2023b *Climate at a Glance County Temperature Rankings: Lafourche Parish*. Electronic document access 1/17/23). https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series.

Ryan, Thomas, N.
1982 *Cultural and Morphological Changes in the Upper Barataria Basin Ca. 900-1700 AD*. (22-1018) US Geological Society of America, New Orleans. Submitted to the US Army Corps of Engineers, New Orleans District. Manuscript on file at the Louisiana Division of Archaeology, Baton Rouge.

Saucier, Roger T.
1994 *Geomorphology and Quaternary Geologic History of the Lower Mississippi Valley*. Mississippi River Commission. US Army Corps of Engineers Waterways Experiment Station, Vicksburg.

Superior Council Records (SCR)
1752 November 11, 1752, in *Louisiana Historical Quarterly* 21:1230.

Swanton, John Reed
1911 *Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico*. Bureau of American Ethnology Bulletin. 43:1-387.

White, David A., Steven P. Darwin, and Leonard B. Thien
1983 Plants and Plant Communities in Jean Lafitte National Historical Park, Louisiana. *Tulane Studies in Zoology and Botany* 24:101-129.

Websoil Survey
2022 Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed 10/19/2022.

Weinstein, Richard A., and Sherwood M. Gagliano
1985 The Shifting Deltaic Coast of the Lafourche Country and its Prehistoric Settlement. In *The Lafourche Country: The People and the Land*, edited by Philip D. Uzee, pp. 122-149. Center for Louisiana Studies, University of Southeastern Louisiana, Lafayette.