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Intensive Archeological Survey For The Proposed Red Oak Interceptor Segment 40RO-1, Red Oak Creek Regional Water System, Ellis County, Texas

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Intensive Archeological Survey For The Proposed Red Oak Interceptor Segment 40RO-1, Red Oak Creek Regional Water System, Ellis County, Texas

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INTENSIVE ARCHEOLOGICAL SURVEY FOR THE
PROPOSED RED OAK INTERCEPTOR SEGMENT 40RO-1,
RED OAK CREEK REGIONAL WATER SYSTEM,
ELLIS COUNTY, TEXAS



Cox | McLain Environmental Consulting, Inc. Archeological Report 170
(CMEC-AR-170)



April 27, 2018

INTENSIVE ARCHEOLOGICAL SURVEY FOR THE
PROPOSED RED OAK INTERCEPTOR SEGMENT 40RO-1,
RED OAK CREEK REGIONAL WATER SYSTEM,
ELLIS COUNTY, TEXAS

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Under
Texas Antiquities Permit 8221

Cox | McLain Environmental Consulting, Inc. Archeological Report 170
(CMEC-AR-170)



April 27, 2018

Management Summary

The Trinity River Authority has proposed the construction of approximately 1.2 miles of 48-inch sewer line along Red Oak Creek in Ellis County, Texas. The proposed interceptor would extend from just east of Farm-to-Market Road 342/South Central Boulevard to the Red Oak Creek Regional Water System Plant in Red Oak, and would be constructed within a 100-foot-wide combined temporary and permanent easement. The entire line is proposed for open trenching, except at Shawnee Road near the north end of the project, where the pipeline will be bored. Depths of impacts are expected to be no greater than 15 feet. An existing pipeline is located within the 100-foot-wide easement. The proposed archeological area of potential effects for this project is approximately 15 acres in size.

The Trinity River Authority is a subentity of the State of Texas; therefore, the Antiquities Code of Texas (9 TNRC 191) applies to the project. Additionally, Section 106 of the National Historic Preservation Act, as amended (16 USC 470; 36 CFR 800) applies due to the necessity of a Section 404 Permit for the project.

On November 28, 2017 and March 9, 2018, intensive and reconnaissance archeological surveys with mechanical trenching were completed in order to evaluate potential impacts associated with the proposed project to archeological sites or deposits. Two previously recorded archeological sites are located within or immediately adjacent to the project easement and were revisited. Melissa M. Green (Principal Investigator) and Brett Lang of Cox|McLain Environmental Consulting, Inc. carried out the survey for the Trinity River Authority under Texas Antiquities Permit 8221, as required under the Antiquities Code of Texas.

Ground visibility ranged from 0 to 50 percent across the majority of the project corridor, with some areas exhibiting 80 to 100 percent ground visibility due to sparse vegetation in wooded areas, a worn two-track road, and clearing for geotechnical drilling. Eleven shovel tests were excavated within the corridor, including two shovel tests in the vicinity of site 41EL150, an early twentieth-century scatter; no archeological deposits, materials, or features were observed or encountered during the survey. Site 41EL151, recorded as bison bone eroding out of the creek bank, was also revisited; one shovel test and three backhoe trenches were excavated in the vicinity of the site but no evidence of it was observed. It is believed that both of these sites have been destroyed.

All materials (notes, photographs, administrative documents, and other project data) generated from this work will be housed at the Center for Archeological Studies at Texas State University where they will be made permanently available to future researchers as per 13 TAC 26.16–17.

If any unanticipated cultural materials or deposits are found at any stage of clearing, preparation, or construction, the work should cease in that area and Texas Historical Commission personnel should be notified immediately. During evaluation of the finds and coordination with the Texas Historical Commission, clearing, preparation, and/or construction could continue in any other areas along the corridor where no such deposits or materials are observed.

The Texas Historical Commission concurred with the findings and recommendations of this report on April 10, 2018.

INTENSIVE ARCHEOLOGICAL SURVEY FOR THE PROPOSED RED OAK INTERCEPTOR SEGMENT 40RO-1, RED OAK CREEK REGIONAL WATER SYSTEM, ELLIS COUNTY, TEXAS

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1.0 Introduction

Overview of the Project

The Trinity River Authority of Texas (TRA) proposes the construction of approximately 1.2 miles (1.9 kilometers) of 48-inch sewer line along Red Oak Creek in Red Oak, Ellis County, Texas. The proposed interceptor would extend from just east of Farm-to-Market Road (FM) 342/South Central Boulevard to the Red Oak Regional Water System Plant in Red Oak and would be constructed within a 100-foot-wide (30.4-meter-wide) combined temporary and permanent easement (**Figure 1**). The entire line is proposed for open trenching, except at Shawnee Road near the north end of the project, where the pipeline will be bored. Depths of impacts are expected to be no greater than 15 feet (4.5 meters). An existing pipeline is located in the 100-foot-wide (30.4-meter-wide) easement. The proposed archeological area of potential effects (APE) for this project is approximately 15 acres (6.0 hectares) in size.

The purpose of the investigation described in this document is to identify archeological resources within the footprint of the proposed sewer line corridor in Ellis County, Texas. Cox|McLain Environmental Consulting (CMEC) was contracted by CH2M Hill, the engineering contractor to the TRA, to conduct the archeological survey prior to construction.

Melissa M. Green (Principal Investigator) and Brett Lang of CMEC performed the fieldwork on November 27, 2017 and March 9, 2018. Seventeen shovel tests were placed within the corridor, eight of which were placed in the vicinity of previously recorded sites 41EL150 and 41EL151. These sites were previously recorded as being in or immediately adjacent to the current 100-foot-wide easement; shovel testing and mechanical trenching were conducted to determine whether these sites still exist.

Regulatory Context

This investigation was conducted in fulfillment of the TRA's obligations as a political subdivision of the State of Texas under the Antiquities Code of Texas (9 TNRC 191). Texas Antiquities Permit 8221 was assigned to this project by the Texas Historical Commission (THC). The project is also subject to Section 106 of the National Historic Preservation Act (NHPA), as amended (16 USC 470; 36 CFR 800). All materials generated from this work will be permanently housed at the Center for Archeological Studies (CAS) at Texas State University.

Structure of the Report

Following this introduction, Chapter Two presents environmental parameters for the study area; Chapter Three presents a brief cultural context, including a summary of previous archeological research in and near the APE; Chapter Four discusses research goals, relevant methods, and the regulatory considerations underlying them; Chapter Five presents the results of the survey; Chapter Six summarizes the findings and provides recommendations; and Chapter Seven lists references.

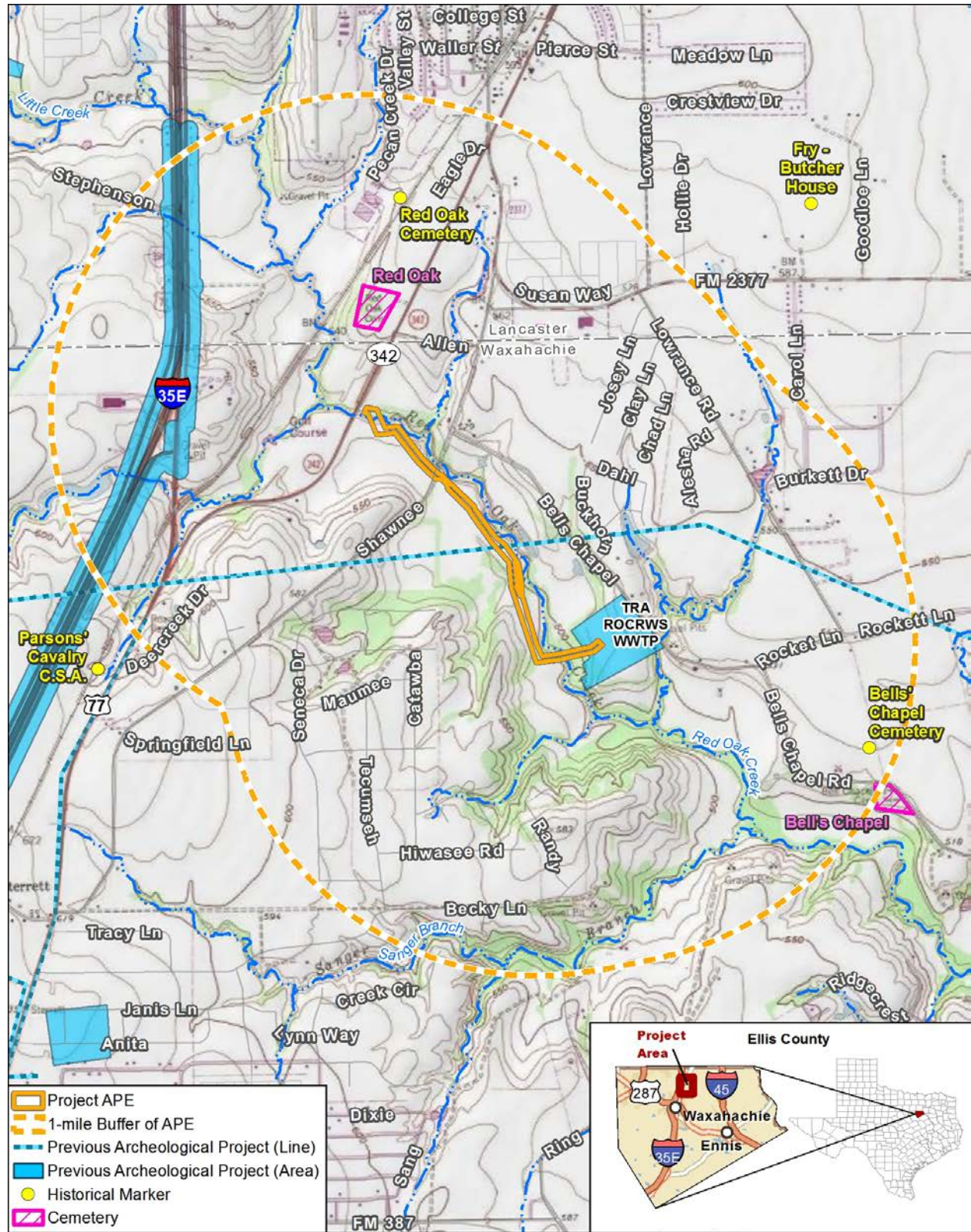


Figure 1
Location of Archeological APE
Red Oak Creek Interceptor

0 2,500 Feet
 0 700 Meters

Data Sources: THC (2017), TARL (2017), NHD (2014)
 Basemap Sources: USGS Lancaster and Waxahachie 7.5' Quadrangles (1981, 1978)

COX | McLAIN
 Environmental Consulting

Prepared for: TRA
 Prepared by: SL

1 in = 2,500 feet
 Scale: 1:30,000
 Date: 4/23/2018

G:\Projects\TRARed_Oak\Arch_Figure 1_APE_20171023.mxd

2.0 Environmental Context

Topography and Drainage

The 15-acre APE is located at elevations between approximately 495 and 521 feet (150.8 and 158.8 meters) above mean sea level in north-central Ellis County, Texas. The project area falls in the Texas Blackland Prairies ecoregion of Texas, which is characterized by fine-textured, clayey soils and predominately prairie potential vegetation (Griffith et al. 2004).

Geology and Soils

Geologically, the APE is underlain by Late Cretaceous Austin Chalk (U.S. Geological Survey [USGS] 2017a). According to Natural Resources Conservation Service (NRCS) data, the proposed interceptor project is mapped on eroded Austin silty clay on 2 to 5 percent slopes, frequently and occasionally flooded Frio silty clay on 0 to 1 percent slopes, Lewisville silty clay on 1 to 3 percent slopes, and wet Trinity clay and occasionally flooded Trinity clay on 0 to 1 percent slopes (NRCS 2017).

Vegetation and Land Use

According to the Texas Parks and Wildlife Department's *Vegetation Types of Texas* map and accompanying descriptions, the vegetation of the project area is mapped as "Crops" (McMahan et al. 1984:19). The designation "Crops" is characterized by cultivated cover or row crops that provide food and/or fiber for humans or domestic animals. It also can portray grasslands associated with crop rotations. Much of the area around the APE was once agricultural; however, it is rapidly becoming more urbanized. Along the creek, the vegetation is riparian with mixed hardwoods and grasses. The project area is located on undeveloped land on the terraces above the Red Oak Creek floodplain in north-central Ellis County.

3.0 Cultural Context

Archeological Chronology

The APE lies within the western part of the north-central Texas archeological region (Perttula 2004a). The standard cultural chronology for the region has changed little in the last two decades; thus, the periods and date ranges established by Peter and McGregor (1988), Prikryl (1990), and Yates and Ferring (1986) still apply (**Table 1**). The general prehistoric framework for north-central Texas is similar to that used in other areas of Texas, and indeed throughout much of North America. The framework has the first unequivocal human occupations occurring approximately 11,500 radiocarbon years before present (BP), or approximately 13,000 calendar years ago, and most of the prehistoric record is contained within a long Archaic period lasting nearly 8,000 years.

Table 1: Archeological Chronology for North central Texas	
Period	Years Before Present (BP)*
Paleoindian	11,500–9,000
Archaic	9,000–1,300
Early Archaic	9,000–6,000
Middle Archaic	6,000–4,000
Late Archaic	4,000–1,300
Late Prehistoric	1,300–400
Late Prehistoric I	1,300–700
Late Prehistoric II	700–400
Protohistoric	400–200
Historic	200–50

Sources: After Peter and McGregor (1988), Prikryl (1990), and Yates and Ferring (1986).
 *Based on uncalibrated radiocarbon dates, which are typical in Texas archeology (see Perttula 2004a:14, Note 1).

Paleoindian Period

The Paleoindian occupation is the least known period in the prehistory of north-central Texas, due primarily to three factors: the light population density of Paleoindian peoples, the great age of the occupation (up to 13,000 calendar years), and taphonomic factors such as severe erosion and deep sedimentation, depending on location (Ferring 1989, 2001; Holliday 2004). Although initially seen as narrowly specialized big-game hunters, Paleoindian groups such as Clovis are being reevaluated in light of recent discoveries such as the Aubrey site north of Dallas-Fort Worth. At Aubrey, investigators found evidence of a more balanced, flexible subsistence strategy, with remains of big game such as bison and mammoth along with fish, birds, and other small game (Ferring 2001). Generally, Paleoindian people are thought to have been more mobile than subsequent populations, utilizing lithic and other resources from broad geographic areas.

Archaic Period

Usually divided into three roughly equal parts, the Archaic Period encompasses the bulk of north-central Texas prehistory. The Archaic record is clouded by mixed deposits (Hofman et al. 1989; Prikryl 1990) and possible large-scale erosion in the middle of the period (as has been documented further to the west by Blum and colleagues [1992]). Still, the available data show that Archaic peoples were more likely than their predecessors to make projectile points and other stone tools out of local raw materials, potentially indicating more spatially restricted territories and/or subsistence areas and perhaps reflecting seasonal rounds through a specific series of resource-gathering zones (Ferring and Yates 1997; Peter and McGregor 1988). Generally, the size of the population is thought to have increased throughout the Archaic Period, perhaps in response to stabilizing climatic conditions.

Late Prehistoric Period

The Late Prehistoric Period is defined technologically, as the beginning of the period is typically marked by the appearance of arrow points and ceramics. Aside from the addition of these extremely important technologies, the overall trajectory of subsistence lifeways in the Late Prehistoric is usually thought to represent a continuation of trends seen in the later part of the Archaic, with an even more dramatic focus on very local resources and broad-spectrum foraging (Ferring and Yates 1997). In the latter part of the period (Late Prehistoric II), the picture shifts, with ceramic and lithic evidence indicating links to Plains populations to the north and west (Prikryl 1990).

Protohistoric and Historic Periods

The beginning of the Protohistoric Period is marked by the first appearance of Europeans in Texas: the Spanish explorers, priests, and speculators who began moving into the state from colonies to the south and west in the sixteenth and seventeenth centuries A.D. Although technically historic (i.e., characterized by the use of writing), this earlier phase is often separated from the more formally designated Historic Period due to the relative infrequency of direct Spanish incursions into north-central Texas, in contrast to the high-profile early Spanish occupations in south and south-central Texas (Campbell 2003). Even without the missions, military outposts, and other facilities characteristic of the Spanish presence to the south, the effects of trade, disease, and other factors on native populations were still dramatic, and indigenous groups of the Protohistoric Period are little known apart from sporadic finds of European trade goods at native sites (Stephenson 1970).

The last two centuries are considered the Historic Period. In brief, the landscape and material culture of north-central Texas during this time are characterized by the overwhelming dominance of European-derived populations, the expansion of railroads, the discovery and exploitation of petroleum resources, the supplanting of small tenant farming by mechanized agriculture and urban sprawl, and various waves of commercial and industrial development—the most recent example being the rise of the service and information economy (Campbell 2003).

For further general background information, particularly regarding prehistoric periods, the reader is referred to the major reports mentioned above, as well as to Perttula's statewide synthesis, *The Prehistory of Texas* (Perttula 2004b). Although the latter does not include a chapter devoted specifically to north-central Texas archeology, the introductory chapter includes an invaluable side-by-side comparison of cultural chronologies from all of the archeological regions in Texas (Perttula 2004a: Table 1.1). For later periods, the reader is referred to Randolph B. Campbell's *Gone to Texas*:

A History of the Lone Star State (2003), now considered the standard comprehensive overview of historical events, demographic changes, social movements, industrial developments, and other aspects of Texas history.

Previous Investigations and Previously Identified Cultural Resources

A search of the Texas Archeological Sites Atlas (Atlas) maintained by the THC and the Texas Archeological Research Laboratory was conducted in order to identify archeological sites, historical markers or Official Texas Historic Markers, Recorded Texas Historic Landmarks, properties or districts listed in the National Register of Historic Places (NRHP), State Antiquities Landmarks (SALs), cemeteries, or other cultural resources that may have been previously recorded in or near the APE, as well as previous surveys undertaken in the area. A larger 1-mile study area around the APE was also examined.

According to the Atlas survey coverage data search, the project APE has not been previously surveyed and no previously recorded cultural resources are mapped within the APE. Five archeological sites (two of which [41EL150 and 41EL151] are adjacent to the APE), as well as the Red Oak Cemetery and its associated historical marker have been recorded within the APE or within the 1-mile study area surrounding the APE (THC 2017; see **Figure 1**). Available details regarding each resource are presented in **Table 2**.

Table 2: Cultural Resources in and within 1 mile of the APE	
41EL52, B.F. Grandstaff Site	3 prehistoric graves eroding from a caliche gravel pit; limited excavation and removal of remains in 1956
41EL150	No site information available; undetermined eligibility
41EL151	Prehistoric, possible bison kill; charcoal, bison bone, and 1 flake found in creek cutbank; impacted by previous sewer installation; undetermined eligibility
41EL198	No site information available; undetermined eligibility
41EL245	Historic; partially filled cistern constructed of FERRIS bricks; determined ineligible
Red Oak Cemetery and Historical Marker	Originally the Kemble Cemetery, a family plot for Abraham and Mary Kemble dating to 1867; family gave land to Liberty Baptist Church (now First Baptist Church Red Oak) in 1892, which became a public cemetery at the beginning of the twentieth century. As of 205, there were 2,723 interments (Tipton 2017).

In addition to these resources, three cultural resources surveys are mapped within the 1-mile study area surrounding the APE (THC 2017). In 2007, AR Consultants, Inc. conducted an intensive pedestrian survey for TRA for the 25-acre Red Oak Creek Wastewater Treatment Plant where the current project APE terminates; no archeological materials, deposits, or sites were identified (Todd 2007). A combination reconnaissance and intensive pedestrian survey of the Interstate Highway (IH)-35 corridor was conducted in 2009 for the Texas Department of Transportation (TxDOT) by Geo-Marine, Inc. (now Versar, Inc.); no archeological materials, deposits, or sites were identified (Tiné 2009). A linear survey that crosses the project corridor near the location of site 41EL150 was noted on the Atlas; however, no additional information on that survey was available.

4.0 Research Goals and Methods

Purpose of the Research

The present study was carried out to accomplish three major goals:

1. To identify all historic and prehistoric archeological resources located within the APE defined in Chapter One
2. To perform a preliminary evaluation of the identified resources' potential for inclusion in the NRHP and/or for listing as a SAL (typically performed concurrently)
3. To make recommendations about the need for further research concerning the identified resources based on the preliminary NRHP/SAL evaluation and with guidance on methodology and ethics from the THC and the Council of Texas Archeologists (CTA)

Section 106 of the National Historic Preservation Act

Section 106 of the NHPA of 1966, as amended (16 USC 470; 36 CFR 800), directs federal agencies and entities using federal funds to “take into account the effect of their undertakings on historic properties” (36 CFR 800.1a), with “historic property” defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior” (36 CFR 800.16).

In order to determine the presence of historic properties (with this phrase understood in its broad Section 106 sense) an APE is first delineated. The APE is the area in which direct impacts (and in a federal context, indirect impacts as well) to historic properties may occur. Within the APE, resources are evaluated to determine if they are eligible for inclusion in the NRHP and to determine the presence of any properties that are already listed on the NRHP. To determine if a property is significant, cultural resource professionals and regulators evaluate the resource using these criteria:

...The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

- a. that are associated with events that have made a significant contribution to the broad patterns of our history; or
- b. that are associated with the lives of persons significant in our past; or
- c. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- d. that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

Note that significance and NRHP eligibility are determined by two primary components: integrity *and* one of the four types of association and data potential listed under 36 CFR 60.4(a–d). The criterion most often applied to archeological sites is the last—and arguably the broadest—of the four; its

phrasing allows regulators to consider a broad range of research questions and analytical techniques that may be brought to bear (36 CFR 60.4[d]).

Occasionally, certain resources fall into categories which require further evaluation using one or more of the following Criteria Considerations. If a resource is identified and falls into one of these categories, the Criteria Considerations listed below may be applied in conjunction with one or more of the four National Register criteria listed above:

- a. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- b. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with productive life; or
- d. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- g. A property achieving significance within the past 50 years if it is of exceptional importance. (36 CFR 60.4)

Resources that are listed in the NRHP or that are recommended eligible for the NRHP are treated the same under Section 106, and are generally treated the same at the state level as well.

After cultural resources within the APE are identified and evaluated, effects evaluations are completed to determine if the proposed project has no effect, no adverse effect, or an adverse effect on these resources. Effects are determined by assessing the impacts that the proposed project will have on the characteristics that make the property eligible for listing in the NRHP as well as its integrity. Types of potential adverse effects considered include physical impacts, such as the destruction of all or part of a resource; property acquisitions that adversely impact the historic setting of a resource, even if built resources are not directly impacted; noise and vibration impacts evaluated according to accepted professional standards; changes to significant viewsheds; and cumulative effects that may occur later in time. If the project will have an adverse effect on cultural resources, measures can be taken to avoid, minimize, or mitigate this adverse effect. In some instances, changes to the proposed project can be made to avoid adverse effects. In other cases, adverse effects may be unavoidable, and mitigation to compensate for these impacts will be proposed and agreed upon by consulting parties.

Antiquities Code of Texas

Because the City of Arlington is a political subdivision of the State of Texas, the project is subject to the Antiquities Code of Texas (9 TNRC 191), which requires consideration of effects on properties designated as—or eligible to be designated as—SALs, which are defined as:

...sites, objects, buildings, structures and historic shipwrecks, and locations of historical, archeological, educational, or scientific interest including, but not limited to, prehistoric American Indian or aboriginal campsites, dwellings, and habitation sites, aboriginal paintings, petroglyphs, and other marks or carvings on rock or elsewhere which pertain to early American Indian or other archeological sites of every character, treasure imbedded in the earth, sunken or abandoned ships and wrecks of the sea or any part of their contents, maps, records, documents, books, artifacts, and implements of culture in any way related to the inhabitants, prehistory, history, government, or culture in, on, or under any of the lands of the State of Texas, including the tidelands, submerged land, and the bed of the sea within the jurisdiction of the State of Texas. (13 TAC 26.2)

Rules of practice and procedure for the evaluation of cultural resources as SALs and/or for listing on the NRHP, which is also explicitly referenced at the state level, are detailed at 13 TAC 26. An archeological site identified on lands owned or controlled by the State of Texas may be of sufficient significance to allow designation as a SAL if at least one of the following criteria applies:

1. the site has the potential to contribute to a better understanding of the prehistory and/or history of Texas by the addition of new and important information;
2. the site's archeological deposits and the artifacts within the site are preserved and intact, thereby supporting the research potential or preservation interests of the site;
3. the site possesses unique or rare attributes concerning Texas prehistory and/or history;
4. the study of the site offers the opportunity to test theories and methods of preservation, thereby contributing to new scientific knowledge; and
5. there is a high likelihood that vandalism and relic collecting has occurred or could occur, and official landmark designation is needed to ensure maximum legal protection, or alternatively, further investigations are needed to mitigate the effects of vandalism and relic collecting when the site cannot be protected. (13 TAC 26.10)

For archeological resources, the state-level process requires securing and maintaining a valid Texas Antiquities Permit from the THC, the lead state agency for Antiquities Code compliance, throughout all stages of investigation, analysis, and reporting.

Survey Approach and Methodology

CMEC conducted intensive survey per Category 2 under 13 TAC 26.20 and using the definitions in 13 TAC 26.3. Field methods and strategies complied with the requirements of 13 TAC 26.14, as elaborated by the THC and the CTA.

Shovel tests were placed along the project easement in areas where ground surface visibility was below 30 percent, soils appeared to be of sufficient depth to contain subsurface cultural materials, historic maps indicated high potential for historic archaeological sites, and/or previous disturbances

appeared to have been minimal. All shovel tests were excavated in natural levels to subsoil or at least 60 centimeters (24 inches), whichever was encountered first. Excavated matrix was screened through 0.635-centimeter (0.25-inch) hardware cloth as allowed by moisture and clay content. Deposits were described using conventional texture classifications and Munsell color designations. Detailed notes supplemented by digital photographs were taken and included location markers, contextual integrity, vegetation, topography, hydrology, land use, soil exposures, general conditions at the time of the survey, and field techniques employed. Any deviations from THC and CTA standards are explicitly justified.

Mechanical trenching was proposed at the location of site 41EL151. Three trenches were proposed within the pipeline easement at the north end of the corridor, one at each of the proposed bridge footings on the creek banks. Although the depth of impacts would extend to approximately 9.14 m (30 feet) below the surface, the maximum depth of the excavated trenches was limited to the length of the bucket arm, approximately 5 meters (16.4 feet). The typical width of the trenches was 1.06 meters (42 inches), and the length averaged 5 meters (17 feet). Access into the trenches was not allowed to ensure safety from potential cave-ins. Where the environmental setting allowed, the minimum recommended length for trenches was 3 meters (10 feet), and the length could be extended based on in-field observations. If cultural remains were found during mechanical trenching, a small hand-dug excavation unit was to be placed over the deposit, as allowed by soil conditions and trench safety protocols.

5.0 Results

Review of Historical Photographs and Maps

A review of available historic aerial photographs and topographic maps on Google Earth Pro™, the Nationwide Environmental Title Research (NETR) website, and the USGS Historical Topographic Map Explorer was undertaken to determine how the project APE has been utilized over time (Google Earth 2017, NETR 2017, USGS 2017b). The earliest aerial photographs available, produced in 1968, revealed that the area was mostly covered by agricultural fields with FM 342, Shawnee Road, and Bells Chapel Road extant. Subsequent aerial photographs (1972, 1979, 1995, 2001, 2003–2005, and 2008–2016) show that the APE has not changed significantly over time, although the area becomes less agricultural and more forested along the creek, and minor residential development increases along Bells Chapel Road (NETR 2017). The large pond immediately south of and relatively parallel to the APE first appears on the 2001 Google Earth aerial imagery (Google Earth 2017).

The earliest topographic maps available date to 1954, 1958, and 1963, and show that no structures or disturbances are present within the APE. The 1961, 1973, 1978, and 1979 maps show structures and gravel pits along Bells Chapel Road, just north of the APE (NETR 2017; USGS 2017b).

Survey Results

The intensive pedestrian survey was conducted on November 28, 2017 and mechanical trenching at site 41EL151 was conducted on March 9, 2018. Both days were bright, sunny, and a little breezy, with temperatures in the 70s most of the day allowing for good field conditions. Survey began on the southeast end of the 1.2-mile-long corridor at the wastewater treatment plant, and moved northwest along the corridor (**Figure 2a-b**). Since the corridor crosses Red Oak Creek twice, once at the south end and once at the north end, time was needed to move from one access point to another along the route. Right-of-entry was granted to 100 percent of the combined permanent and temporary 100-foot-wide right-of-way.

Ground visibility ranged from 0 to 50 percent across the majority of the project corridor, with some areas exhibiting 80 to 100 percent ground visibility due to sparse vegetation, a worn two-track road, and clearing for geotechnical drilling. Due to the time of year that the survey occurred, leaf litter was particularly heavy in some of the wooded areas, though visibility was still high since vines and grasses that would have hindered both visibility and progress were light. In more open areas, tall, thick grasses were encountered while short, sparse grasses mixed with briars, variably dense underbrush, and young saplings and trees were encountered in wooded areas. One small drainage flowing to the southwest crosses the APE near its center mark and enters the large man-made ski lake on the west side of the APE (see **Figure 2a**). Shovel tests RO05 and RO06 were placed on either side of this small but incised (about 3.5 feet or 1 meter deep) drainage (**Figure 3**).

Disturbances appear to be restricted to near the ground surface, except in the existing pipeline portion of the corridor. These shallower disturbances included push piles from vegetation removal for geotechnical drilling, animal burrowing, small- to medium-sized tree falls, a two-track road along the corridor, past agricultural practices, and erosion resulting from all of the above.

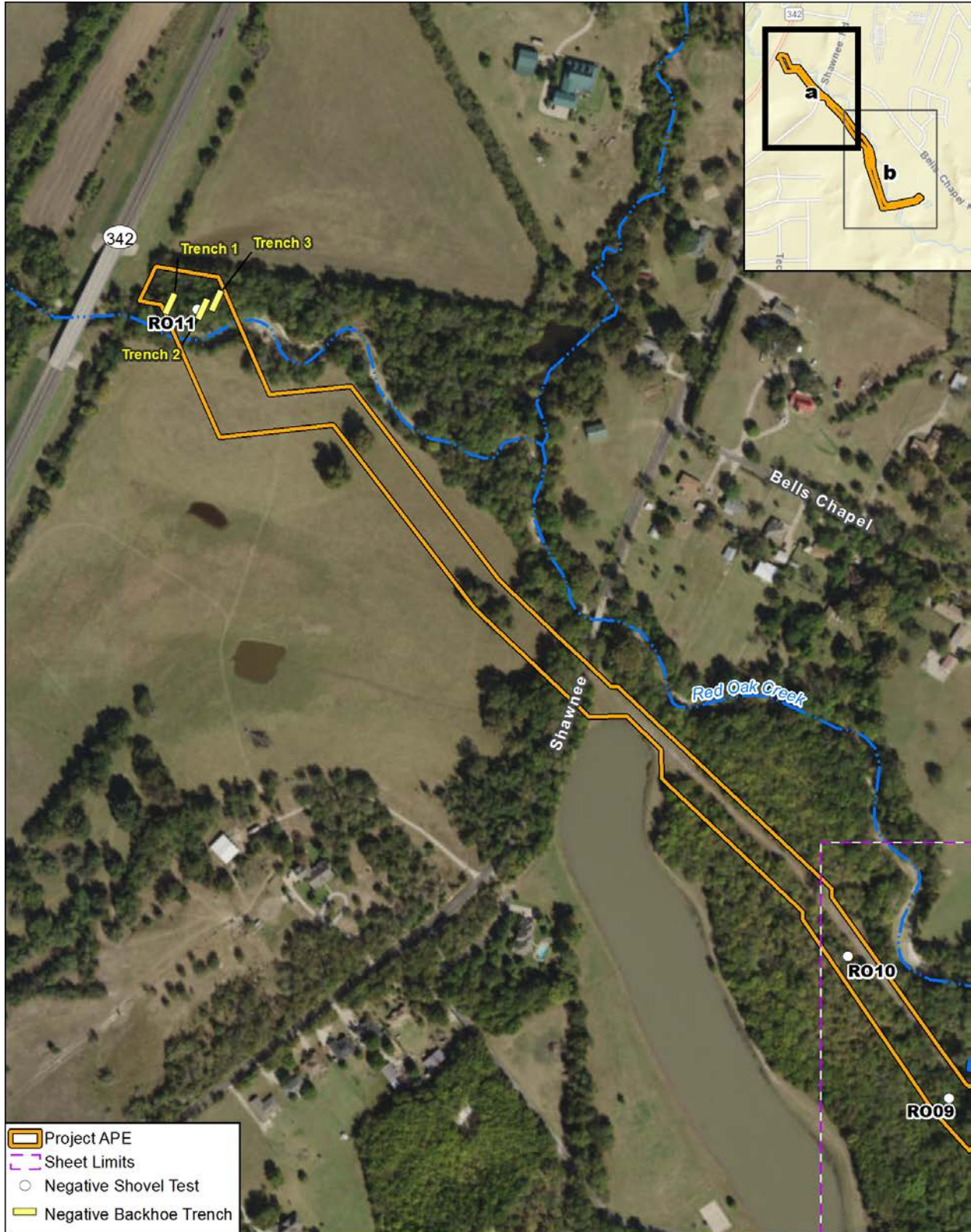


Figure 2a
Survey Results

Red Oak Creek Interceptor

0 400 Feet
0 125 Meters

Data Sources: CMEC (2018), THC (2017), NHD (2014)
Aerial Source: TOP (2015)

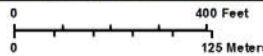
		Prepared for: TRA	1 in = 400 feet
		Prepared by: MCS	Date: 4/23/2018

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Figure 2b
Survey Results

Red Oak Creek Interceptor



COX | McLAIN
Environmental Consulting

Data Sources: CMEC (2018), THC (2017), NHD (2014)
Aerial Source: TOP (2015)

Prepared for: TRA	1 in = 400 feet
Prepared by: MCS	Scale: 1:4,800
	Date: 4/23/2018

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Figure 3. Small incised drainage midway along corridor; view south.

Eleven shovel tests were excavated along the corridor. Generally, the profiles for shovel tests indicated that the soils mapped in the APE are consistent, with very dark brown or very dark grayish brown clay A Horizons over black or brown clay B Horizons with some gravels and calcium carbonates occurring with depth (**Figures 4 and 5**). Specific details of each shovel test are found in **Table 3**.



Figure 4. Example of a shallow shovel test profile, ST RO01.

Table 3: Shovel Test Results		
ST #	Depth (cm)	Description
RO01	0-15 15-35 35-55	Very dark brown (10YR 2/2) clay Very dark brown (10YR 2/2) clay with 25% light yellowish brown (10YR 6/4) clay Black (10YR 2/1) clay with 5% pea-sized limestone gravel and 5% caliche; terminated at subsoil
RO02	0-10 10-35 35-55	Very dark brown (10YR 2/2) clay Very dark brown (10YR 2/2) clay with 25-40% light yellowish brown (10YR 6/4) clay, degraded limestone Black (10YR 2/1) clay with snail shells and 2% caliche; terminated at subsoil
RO03	0-50 50-70	Very dark brown (10YR 2/2) clay Dark yellowish brown (10YR 3/4) clay with 20% brown (10YR 4/3) sandy clay; terminated at subsoil
RO04	0-30 30-50	Very dark grayish brown (10YR 3.2) clay Brown (10YR 4/3) clay with 10% pea-sized gravels and 2% snail shells; terminated at subsoil
RO05	0-30 30-50	Very dark brown (10YR 2/2) clay Very dark grayish brown (10YR 3/2) clay with 1% snail shells; terminated at subsoil
RO06	0-65 65-70	Very dark grayish brown (10YR 3/2) clay Dark brown (10YR 3/3) clay with 2% gravels; terminated at subsoil
RO07*	0-70	Very dark grayish brown (10YR 3/2) clay with 2% snail shells; terminated at subsoil
RO08*	0-45	Very dark grayish brown (10YR 3/2) clay; terminated at subsoil
RO09	0-70	Very dark grayish brown (10YR 3/2) clay with 1% snail shells in the top 20 cm; terminated due to large root
RO10	0-65 65-70	Very dark grayish brown (10YR 3/2) clay with 1% gravels in top 20 cm Dark brown (10YR 3/3) clay; terminated at subsoil
RO11**	0-40 40-70	Dark brown (10YR 3/3) clay with 1% snail shells Dark brown (10YR 3/3) clay with 10% calcium carbonate that increased with depth; terminated due to subsoil
RO12*	0-30	Dark brown (7.5YR 3/2) compact clay
RO13*	0-34	Black (10YR 2/1) damp, compact clay
RO14*	0-30	Dark brown (7.5YR 3/2) compact clay
RO15*	0-3 3-38	Black (10YR 2/1) damp, compact clay Very dark brown (10YR 2/2) damp, compact clay
RO16*	0-30	Dark brown (7.5YR 3/2) compact clay
RO17*	0-20 20-35	Very dark grayish brown (10YR 3/2) damp, compact clay with 10% pea-sized gravel Disturbed, very dark grayish brown (10YR 3/2) mixed with brown (10YR 4/3) damp clay; lots of mottling with some desiccated limestone and pea-sized gravel conglomerate

*shovel test in vicinity of 41EL150

**shovel test in vicinity of 41EL151



Figure 5. Example of a deeper shovel test profile, ST RO07.



Figure 6. East bank of Red Oak Creek at south crossing; view facing east northeast.



Figure 7. South bank of Red Oak Creek at north crossing; view southeast.

41EL150 Revisit

Other than the mapped location, no information about site 41EL150 was available in the Atlas database. However, information was found in the final report for the Superconducting Super Collider (Yedlowski et al. 1998). The centroid for the site is mapped just north and outside of the current 100-foot-wide easement between two large meanders of the creek (see **Figure 2b** and **Figure 8**). The site was recorded in 1991 during an initial Super Collider footprint survey. It was reported as an early twentieth-century historic site based on the seven artifacts (2 ceramics, 3 glass shards, and 2 architectural items—no additional information was given) observed in the backdirt from the installation of the existing pipeline in the easement. A walkover and visual inspection of the area both in and on either side of the easement was undertaken; this inspection yielded no evidence of any cultural remains other than a few modern aluminum cans and plastic bottles. In addition, eight shovel tests were excavated in the vicinity of the site's mapped location; no archeological artifacts, features, or unusual soil deposits were encountered in any of these shovel tests. These shovel tests are detailed in **Table 3**. Because no artifacts or features were observed or encountered, it is believed that the site has been destroyed.

The only detail of interest was a scatter of small clam shells across the easement in this location. Since these shells were the only items observed, a sample was taken for identification. The Asian clam (*Corbicula* spp.) is an invasive species first reported in the United States in Oregon in 1938 and was first observed in Texas in 1966 (Ryan Blankenship and Garrett Weiberg; personal communication, December 1, 2017). This was the first observed occurrence of these clam shells in the APE, although additional small scatters were also noted along the corridor as the survey moved north toward Shawnee Road.



Figure 8. Location of Site 41EL150 as mapped on Atlas; view northwest.

41EL151 Revisit

Recorded during the initial Super Collider footprint survey in 1991, site 41EL151 was a prehistoric site of undetermined age along Red Oak Creek. It was identified by the occurrence of a feature containing burned bone and charcoal, located approximately 4 meters below the ground surface in the north cutbank of Red Oak Creek (**Figures 9 and 10**), and one secondary thinning flake and bone observed in the backdirt from the installation of the pipeline (Yedlowski et al. 1998). The bone was identified as bos/bison, and a few of the rib fragments collected exhibited cut marks. Due to the ongoing construction of the pipeline at that time, more detailed examination of the feature was not possible. However, three radiocarbon samples were collected from the feature in the cutbank. None of the samples provided sufficient organic carbon for conventional radiometric dating, but one sample was pretreated for Accelerator Mass Spectrometer (AMS) dating. The results yielded a measured ^{14}C age of 1250 ± 60 B.P., a $^{13}\text{C}/^{12}\text{C}$ ratio of -26.6 ‰ , and a conventional ^{14}C age of 1220 ± 60 B.P. The tree-ring calibration for this sample yielded a calendrical date intercept of A.D. 800, with 1 sigma calibrated results of A.D. 720–735 and A.D. 760–885 with a 68 percent probability (Jurney 1998:513).

No evidence of site 41EL151 was observed during this revisit. Jurney mentions that the face of the cutbank had recently (in 1991) been “exposed by increased stream flow during January and February of that year” (Jurney 1998:513). Large stream flows in the subsequent 26 years have continuously eaten away at the bank, and overburden has slumped considerably, particularly in the proposed construction easement. One shovel test (RO11) was excavated above the mapped location of 41EL151 (see **Figure 2a**), but no artifacts were encountered; details can be found in **Table 3**.

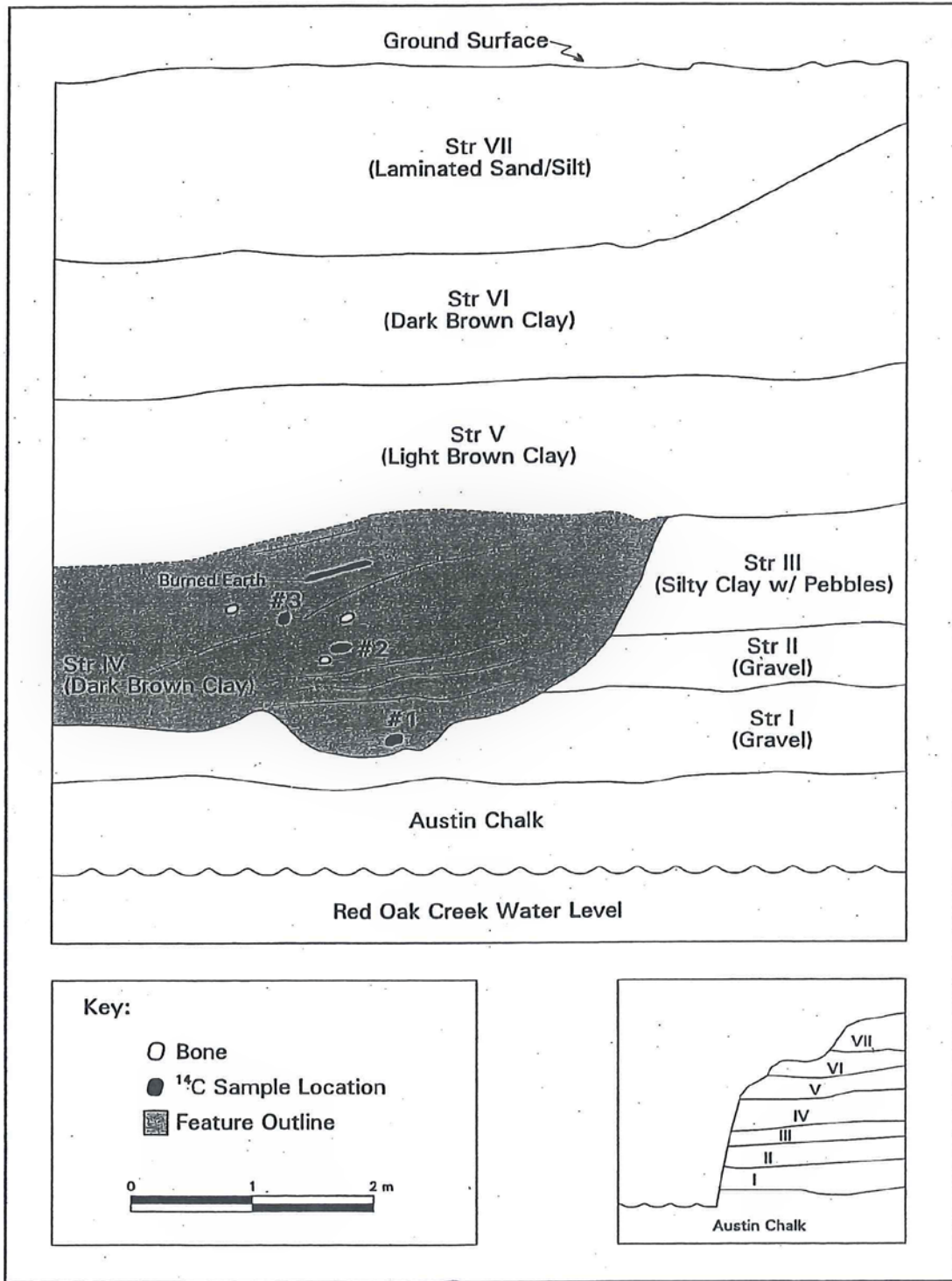


Figure 9. Schematic representation of the observed stratigraphic profile of Red Oak Creek with Site 41EL151 shown (from Yedlowski et al. 1998).



Figure 10. Location of Site 41EL151 in creek bank as mapped on Atlas; view northwest. This location is between Trenches 2 and 3.

In addition to the shovel test, three backhoe trenches were excavated in the easement; one west of the current pipeline and two east of the current pipeline (see **Figure 2a**). Trench 1 was placed at the western edge of the easement, with the anticipation of locating more of the large stain designated 41EL151 in 1991; Trench 2 was placed just east of the current pipeline, and Trench 3 was placed at the eastern edge of the corridor. All three trenches were approximately 5 meters long, approximately 1.06 meters (42-inch bucket) wide, and excavated to a depth of at least 510 centimeters the below surface (5.10 meters or 16.7 feet, or the extent of the bucket arm). If site 41EL151 extended beyond the original pipeline trench sighting, it should have been encountered within this depth. The water table was encountered in two of the three trenches. No evidence of the stain, artifacts, or faunal materials originally encountered were observed or found in any of these trenches. Details for each trench is presented in **Table 4**. Profile photographs were taken for each trench and are found as **Figures 11–13**.

A burned, basin-shaped non-cultural feature was encountered in the east wall of Trench 1, located roughly at the center of the trench. The non-cultural feature was at a depth of 1 meter, and extended about 30 centimeters down (to a depth of roughly 130 centimeters below the surface). A ring of charcoal outlines the feature with light sand underlain by ash and a thin rind of burned soil. Other than the organics mentioned in the wall profile or feature, no artifacts were observed within or near

this deposit. It is thought to be the result of a natural tree or vegetation burn due to what was likely a root extending off of the base of the non-cultural feature (see **Figure 11**).

It is believed that impacts from the previous installation of the wastewater pipe destroyed the larger part of the site, as it was located within the construction area at that time. If any portion of the site remains, it is most likely a small deposit located outside of the current trenching areas. However, erosion and slumping along the creek bank have likely removed any additional deposits. No evidence of a paleosol or archeological materials were noted in the cutbank within or outside of the easement. It is believed that the site has been destroyed.

Table 4: Backhoe Trench Results		
Trench #	Depth (cm)	Description
1	0-130 130-274 274-427 427-510	Very dark grayish brown (10YR 3/2) sandy clay Very dark brown (10YR 2/2) clay Dark brown (10YR 3/3) clay with caliche and snail shells Dark grayish brown (10YR 4/2) clay with 20% grayish brown (10YR 5/2) clay
	100-130	Basin-shaped burned feature about 92 cm long in E wall with charcoal, ash, and burned clay but no artifacts = likely natural tree burn
2	0-150	Very dark grayish brown (10YR 3/2) sandy clay
	150-200	Dark grayish brown (10YR 4/2) compact silt
	200-390	Brown (10YR 5/3) compact silt
	390-530	Brown (7.5YR 5/3) sandy clay with some pea gravels and coarse sand
	530-550	Brown (7.5YR 4/2) coarse sand; water table seep at 543 cmbs
3	0-180	Very dark grayish brown (10YR 3/2) sandy clay
	180-215	Very dark gray (7.5YR 3/1) sandy clay with 10% pea-sized gravels
	215-380	Brown (7.5YR 4/3) sandy clay with 25% brown (10YR 5/3) sandy loam
	380-455	Dark brown (7.5YR 3/2) sandy clay with 20% brown (10YR 5/3) sandy clay
	455-510	Yellowish brown (10YR 5/4) sand with coarse sand at 505-510 cmbs; water table seep at 510 cmbs



Figure 11. East wall profile in Trench 1 showing natural burned feature at 1 meter deep; view east.



Figure 12. East wall profile in Trench 2; view east.



Figure 13. West wall profile in Trench 3; view west.

6.0 Summary and Recommendations

On November 28, 2017 and March 9, 2018, archeological pedestrian survey augmented by shovel testing and mechanical trenching were conducted along the 1.2 miles of proposed wastewater line. Disturbances along the corridor APE were minimal and restricted to surficial and shallow soils, with the notable exception of the previous pipeline installation within the APE. Ground visibility was typically high, except for some areas where leaf litter obscured the ground surface. Historic aerial photographs indicated that little to no occupation or utilization have occurred directly within the project APE. No archeological artifacts, features, or deposits were encountered or observed on the surface or during subsurface investigations.

In addition to the survey, previously recorded sites 41EL150 and 41EL151 were revisited. Shovel tests were excavated in the vicinity of each site, and additional intensive pedestrian walkovers and close visual examinations were conducted at the sites. No evidence of either site remained in surficial or subsurface contexts. Site 41EL150 was identified by the presence of seven artifacts found in the trench spoil from the installation of an existing wastewater pipeline within the current APE. It is quite likely that the site was destroyed during that installation, or that other materials have been removed through maintenance of the corridor by the landowner, local Red Oak Creek Regional Water System Plant staff, or from subsequent flooding events. Likewise, site 51EL151 was impacted by the installation of the existing wastewater pipeline in 1991. No evidence of any intact portions of the site was observed in the trenches or shovel tests excavated nearby. It is likely that the majority of the site was destroyed and has been further damaged by the continuous eroding of the creek bank in which bones eroding were originally observed.

Although no archeological materials were recovered, all notes, photographs, administrative documents, and other project data generated from this project will be housed at CAS where they will be permanently available to future researchers.

If any unanticipated cultural materials or deposits are found at any stage of clearing, preparation, or construction, the work should cease in that area and THC personnel should be notified immediately. During evaluation of the finds and coordination with the THC, clearing, preparation, and/or construction could continue in any other areas along the corridor where no such deposits or materials are observed.

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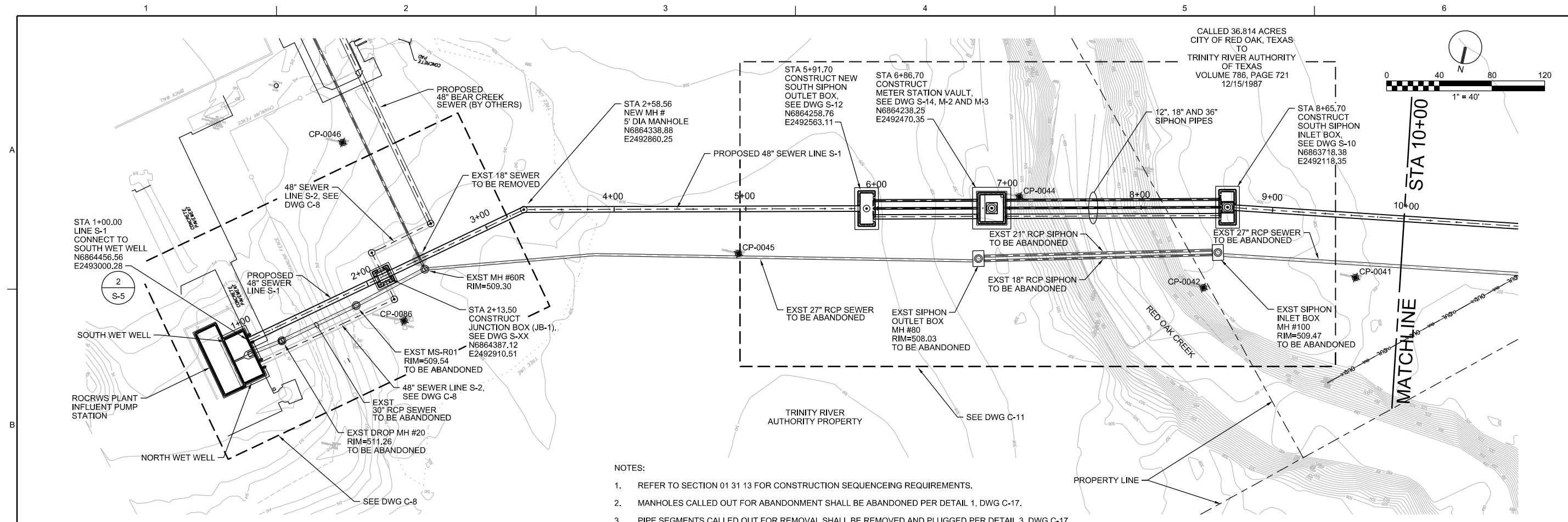
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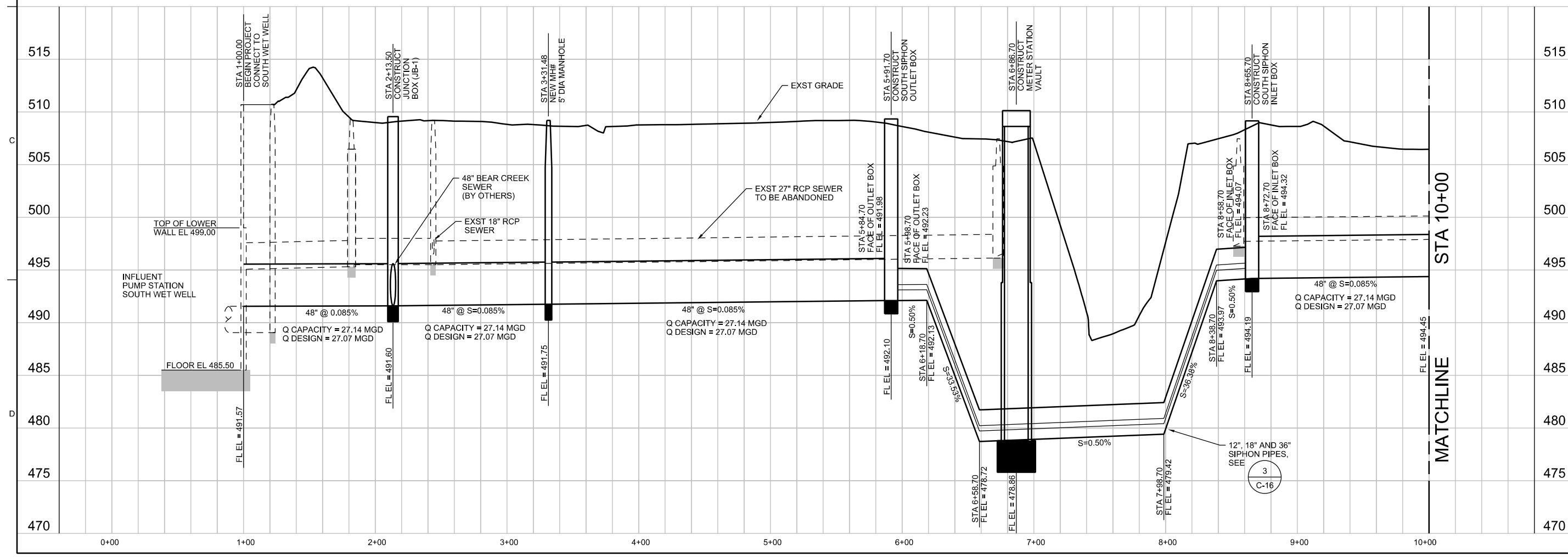
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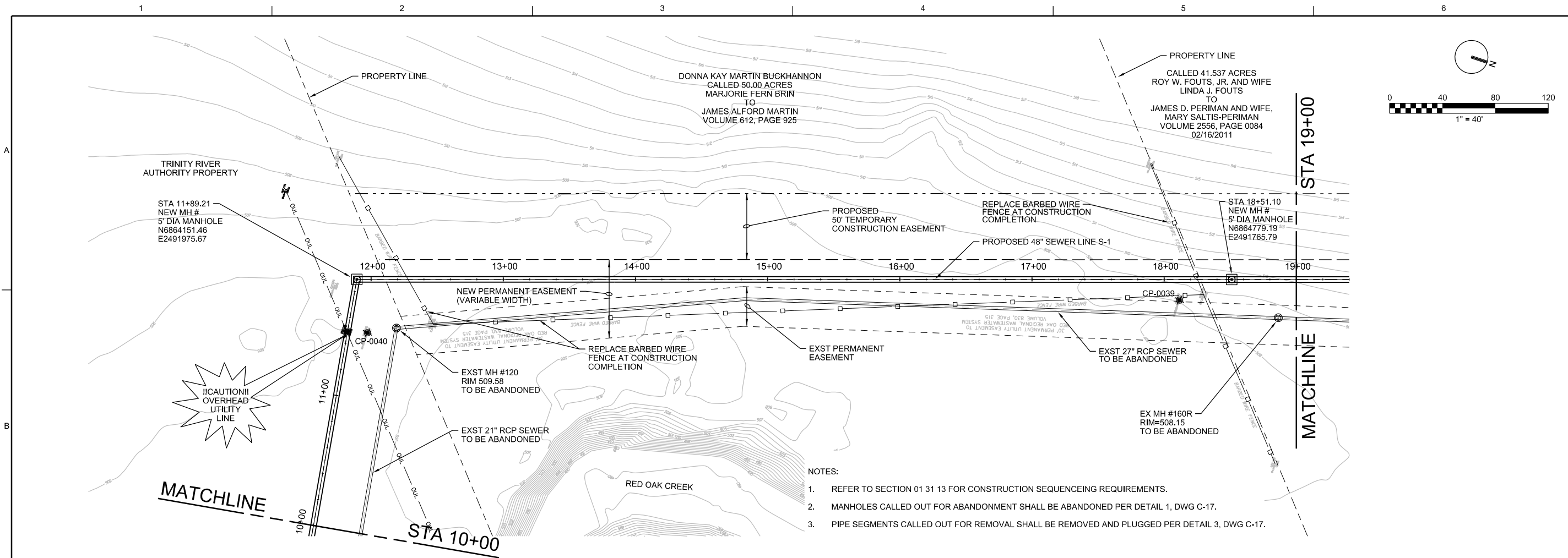
Appendix A
Project Designs



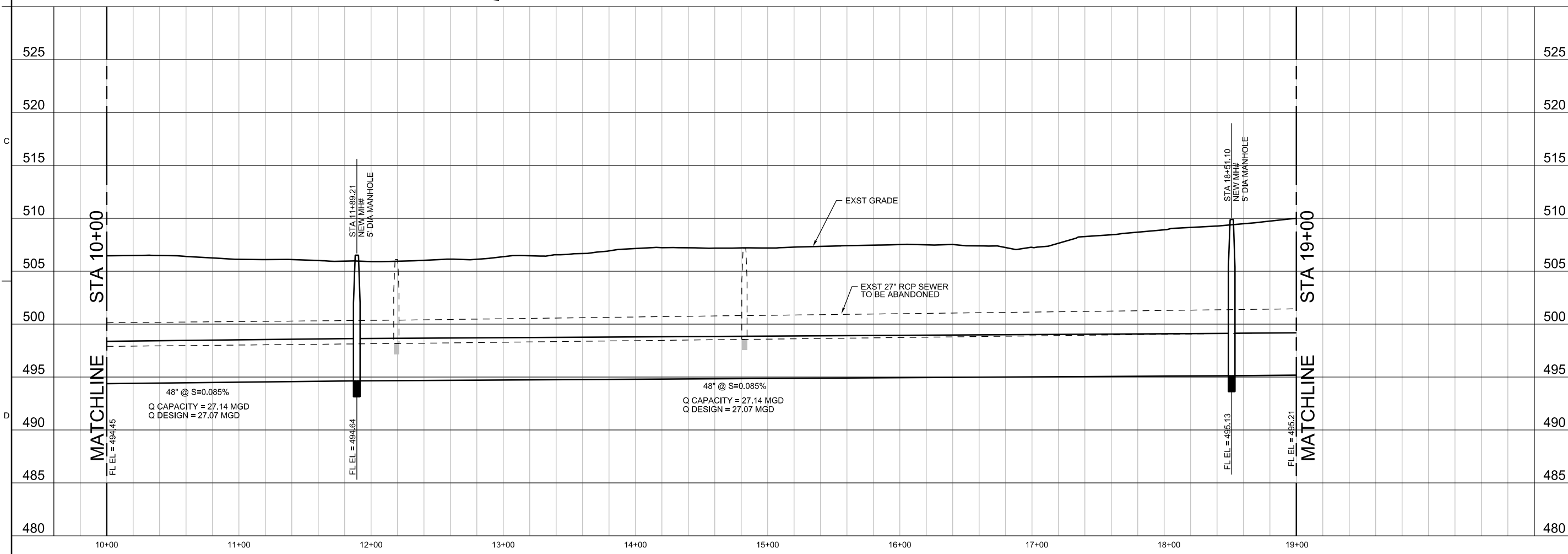
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- REFER TO SECTION 01 31 13 FOR CONSTRUCTION SEQUENCEING REQUIREMENTS.
 - MANHOLES CALLED OUT FOR ABANDONMENT SHALL BE ABANDONED PER DETAIL 1, DWG C-17.
 - PIPE SEGMENTS CALLED OUT FOR REMOVAL SHALL BE REMOVED AND PLUGGED PER DETAIL 3, DWG C-17.



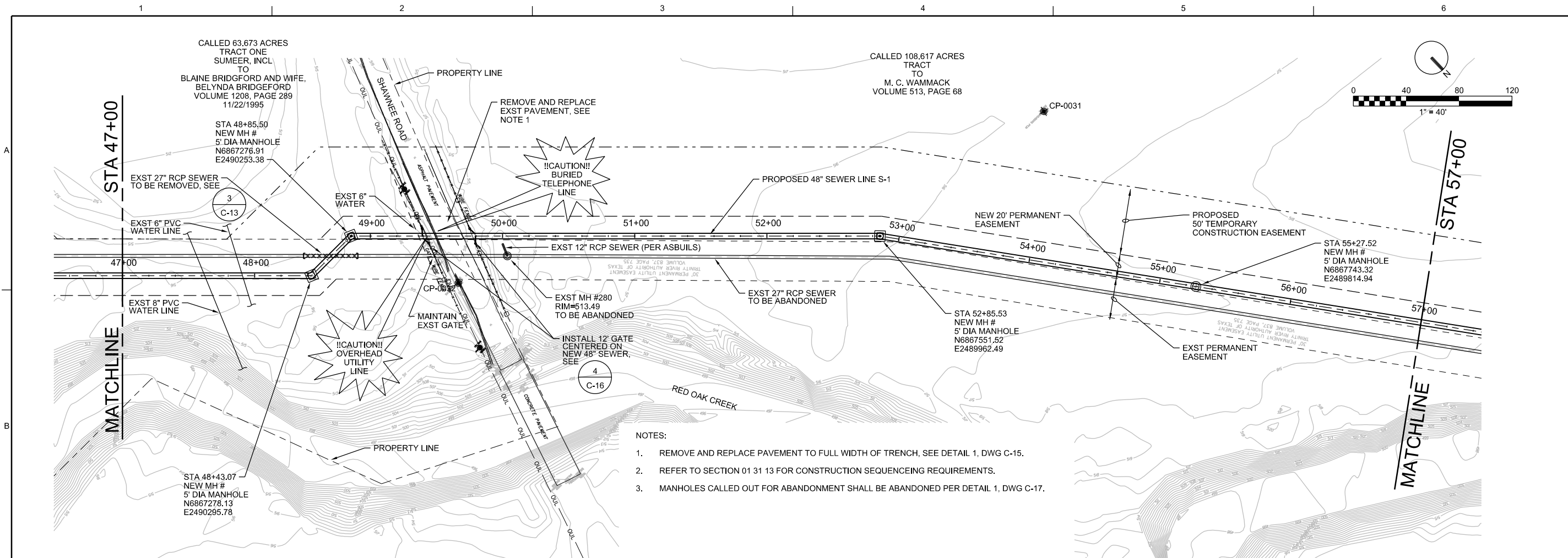
PRELIMINARY THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF KHDIR A. HAMAD PE NO. 104263 ON 08/04/2017. IT IS NOT TO BE USED FOR BIDDING, PERMITTING OR CONSTRUCTION.		W MARTINEZ BY APVD	
A HOLMES CHECK REVISION		DR APVD	
K HAMAD DATE DSGN		NO. DATE	
TRINITY RIVER AUTHORITY OF TEXAS VOLUME 786, PAGE 721 12/15/1987			
Red Oak Interceptor Segment 40RO-1 Red Oak Creek Regional Wastewater System Trinity River Authority of Texas			
ch2m TBPE FIRM NO. 3699 CIVIL			
PLAN AND PROFILE LINE S-1 STA 1+00 TO 10+00			
DESIGN DEVELOPMENT			
1"=40' VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.			
DATE AUG 2017		PROJ 672582	
DWG C-1		SHEET X OF XX	



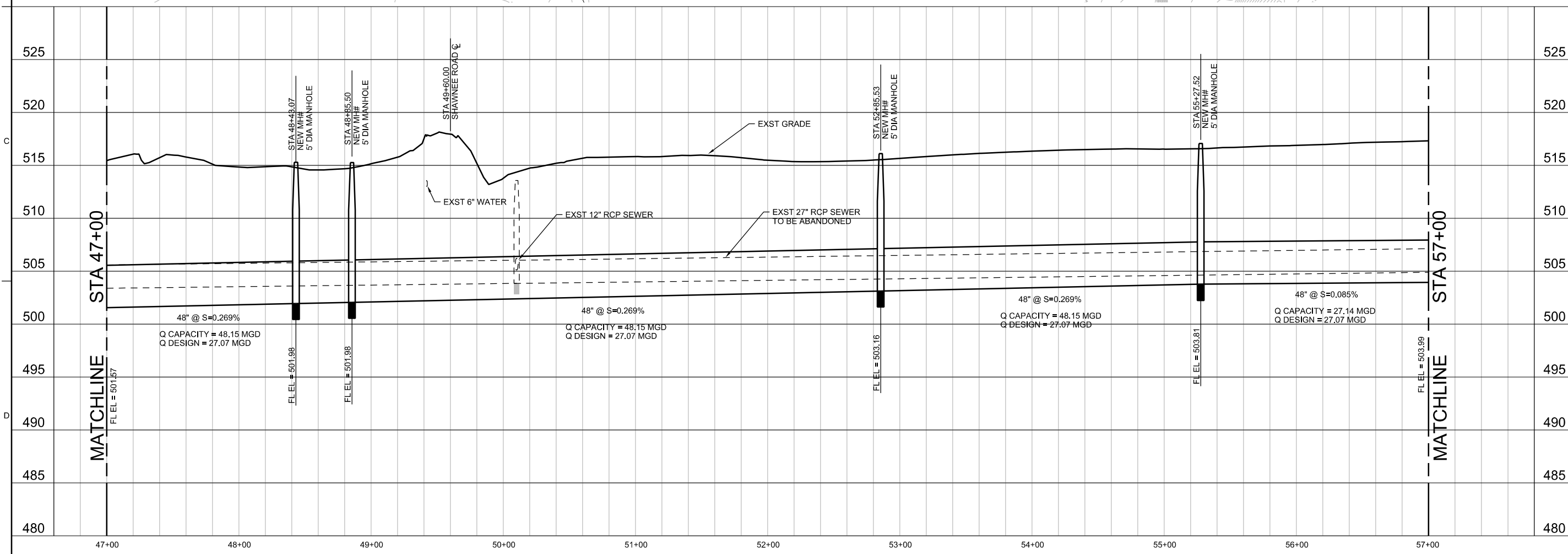
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 - MANHOLES CALLED OUT FOR ABANDONMENT SHALL BE ABANDONED PER DETAIL 1, DWG C-17.
 - PIPE SEGMENTS CALLED OUT FOR REMOVAL SHALL BE REMOVED AND PLUGGED PER DETAIL 3, DWG C-17.



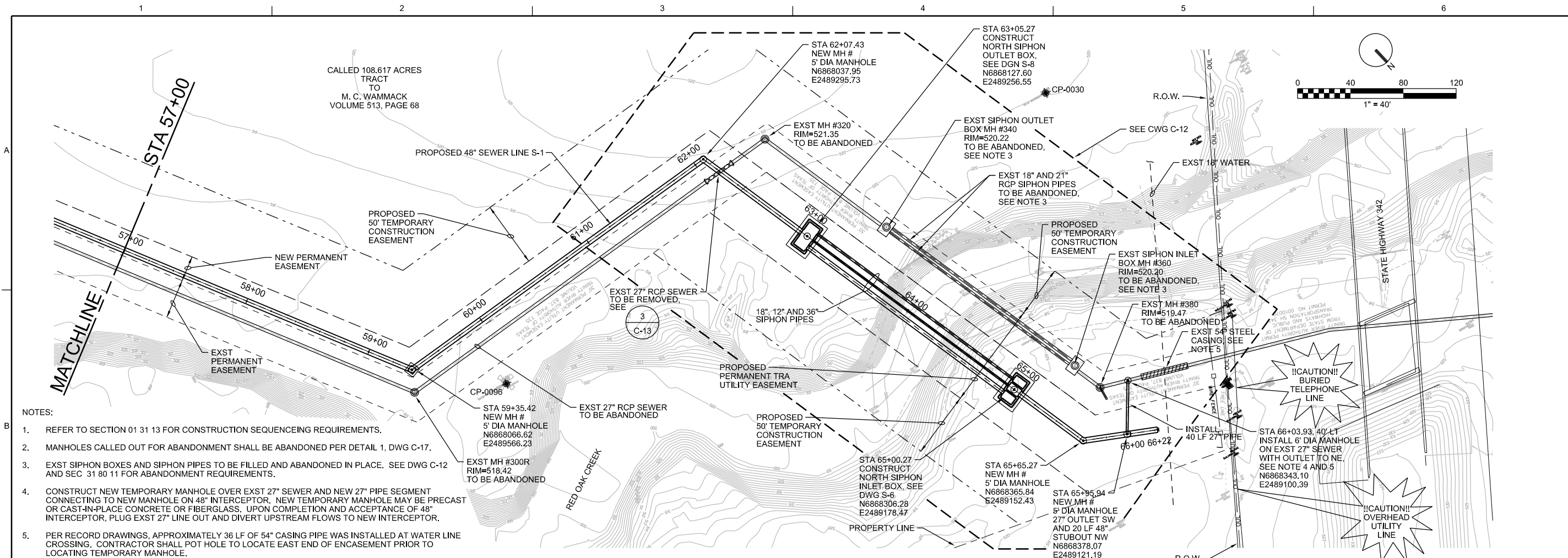
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NO.	DATE	DR	REVISION	BY
		K HAMAD	A HOLMES	W MARTINEZ
<p>Red Oak Interceptor Segment 4RO-1 Red Oak Creek Regional Wastewater System Trinity River Authority of Texas</p>		<p>ch2m TBPE FIRM NO. 3699 CIVIL</p>		
<p>PLAN AND PROFILE LINE S-1 STA 10+00 TO 19+00</p>				
<p>1"=40' VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.</p>				
DATE	AUG 2017			
PROJ	672582			
DWG	C-2			
SHEET	X OF XX			



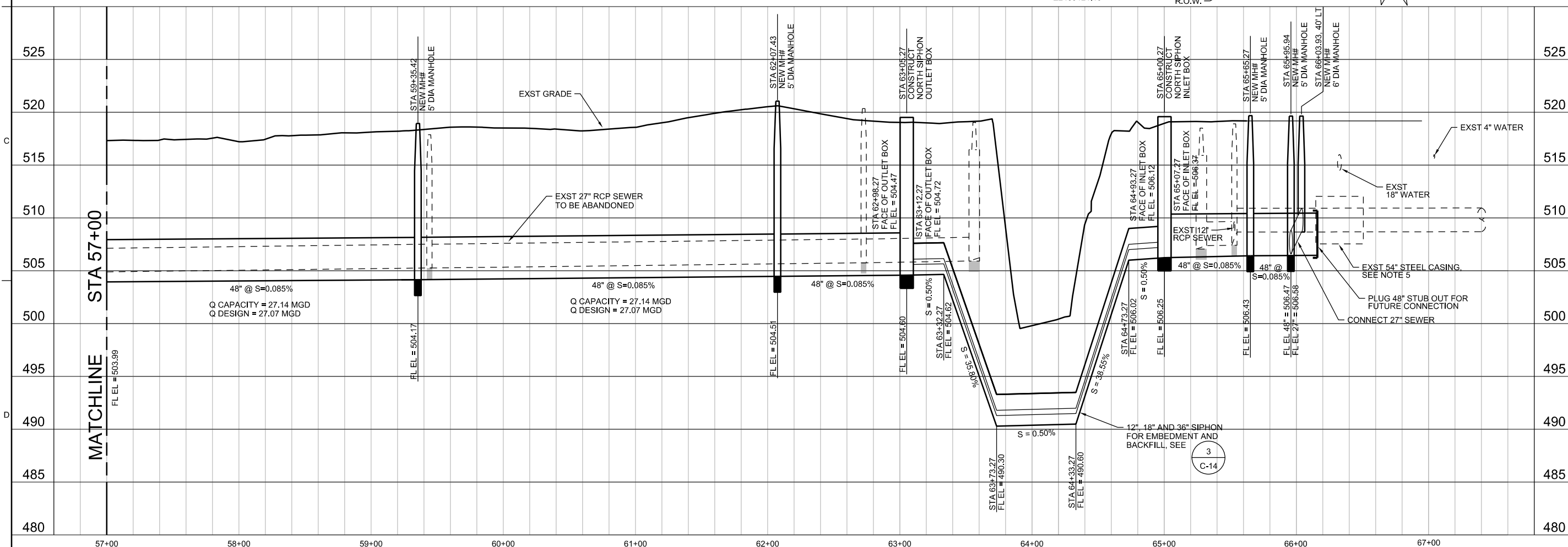
- NOTES:
1. REMOVE AND REPLACE PAVEMENT TO FULL WIDTH OF TRENCH, SEE DETAIL 1, DWG C-15.
 2. REFER TO SECTION 01 31 13 FOR CONSTRUCTION SEQUENCEING REQUIREMENTS.
 3. MANHOLES CALLED OUT FOR ABANDONMENT SHALL BE ABANDONED PER DETAIL 1, DWG C-17.



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NO.	DATE	REVISION	CHK	DR	BY
					W MARTINEZ
ch2m TBPE FIRM NO. 3699 CIVIL		Red Oak Interceptor Segment 4RO-1 Red Oak Creek Regional Wastewater System Trinity River Authority of Texas			
PLAN AND PROFILE LINE S-1 STA 47+00 TO 57+00					
DESIGN DEVELOPMENT					
1"=40' VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.					
DATE	AUG 2017				
PROJ	672582				
DWG	C-6				
SHEET	X OF XX				



- NOTES:
- REFER TO SECTION 01 31 13 FOR CONSTRUCTION SEQUENCEING REQUIREMENTS.
 - MANHOLES CALLED OUT FOR ABANDONMENT SHALL BE ABANDONED PER DETAIL 1, DWG C-17.
 - EXST SIPHON BOXES AND SIPHON PIPES TO BE FILLED AND ABANDONED IN PLACE. SEE DWG C-12 AND SEC 31 80 11 FOR ABANDONMENT REQUIREMENTS.
 - CONSTRUCT NEW TEMPORARY MANHOLE OVER EXST 27" SEWER AND NEW 27" PIPE SEGMENT CONNECTING TO NEW MANHOLE ON 48" INTERCEPTOR. NEW TEMPORARY MANHOLE MAY BE PRECAST OR CAST-IN-PLACE CONCRETE OR FIBERGLASS. UPON COMPLETION AND ACCEPTANCE OF 48" INTERCEPTOR, PLUG EXST 27" LINE OUT AND DIVERT UPSTREAM FLOWS TO NEW INTERCEPTOR.
 - PER RECORD DRAWINGS, APPROXIMATELY 36 LF OF 54" CASING PIPE WAS INSTALLED AT WATER LINE CROSSING. CONTRACTOR SHALL POT HOLE TO LOCATE EAST END OF ENCASEMENT PRIOR TO LOCATING TEMPORARY MANHOLE.



PRELIMINARY
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF KHDIR A. HAMAD PE NO. 104263 ON 08/04/2017. IT IS NOT TO BE USED FOR BIDDING, PERMITTING OR CONSTRUCTION.

NO.	DATE	DR	REVISION	BY	APVD

DESIGNER: K. HAMAD
CHECKER: A. HOLMES
DRAWN BY: W. MARTINEZ

Red Oak Interceptor
Segment 40RO-1
Red Oak Creek
Regional Wastewater System
Trinity River Authority of Texas

ch2m
TBPE FIRM NO. 3699
CIVIL

PLAN AND PROFILE
LINE S-1 STA 57+00 TO 66+34.53

DESIGN DEVELOPMENT

1"=40'
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.

DATE: AUG 2017
PROJ: 672582
DWG: C-7
SHEET: X OF XX

FILENAME: 001-C-1001107_672582.dgn
PLOT DATE: 2017/08/08
PLOT TIME: 5:23:50 AM

Appendix B
Regulatory Correspondence

Missi Green

Subject: FW: Project Review: 201807961

From: Info_Tech@thc.state.tx.us <Info_Tech@thc.state.tx.us>

Sent: Tuesday, April 10, 2018 2:45:32 PM

To: Chris Dayton; reviews@thc.state.tx.us

Subject: Project Review: 201807961

Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas Permit 8221

201807961

Red Oak Interceptor
908 Bells Chapel Road
Waxahachie, TX 75165

Dear Chris Dayton:

Thank you for your submittal regarding the above-referenced project. This response represents the comments of the Executive Director of the Texas Historical Commission (THC), pursuant to review under the Antiquities Code of Texas.

The review staff led by Rebecca Shelton and Justin Kockritz has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- No historic properties present or affected

Archeology Comments

- No effect on archeological sites. However, if buried cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- Property/properties are not eligible for designation as State Antiquities Landmarks
- Draft report acceptable. Please submit another copy as a final report along with shapefiles showing the area where the archeological work was conducted. Shapefiles should be submitted electronically to Archeological_projects@thc.texas.gov.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: rebecca.shelton@thc.texas.gov, justin.kockritz@thc.texas.gov.

Sincerely,



For Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission