



INDEX OF TEXAS ARCHAEOLOGY

Open Access Gray Literature from the Lone Star State

Volume 2017

Article 136

2017

Intensive Archeological Survey Of The Lorena Tirz #1 East Phase 1 Trunk Line City Of Lorena, McLennan County, Texas

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Intensive Archeological Survey Of The Lorena Tirz #1 East Phase 1 Trunk Line City Of Lorena, McLennan County, Texas

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Cultural Resources Survey

INTENSIVE ARCHEOLOGICAL SURVEY OF THE LORENA TIRZ #1 EAST PHASE 1 TRUNK LINE CITY OF LORENA, MCLENNAN COUNTY, TEXAS

October 10, 2017

Final Report – Public Copy

Terracon Project No. 96167902

Antiquities Permit No. 7903

Ann M. Scott, PhD, RPA, Principal Investigator



Prepared for:

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Austin, Texas

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

ABSTRACT

Lorena Tax Increment Reinvestment Zone (TIRZ) #1 East has proposed the TIRZ #1 East Phase 1 Trunk Line project, which is the construction of an approximately 15,800-linear-foot wastewater line in northeast Lorena, McLennan County, Texas. The project engineer, Kasberg Patrick and Associates LP, retained Terracon Consultants, Inc. to conduct a systematic, intensive pedestrian survey of the approximately 18.14-acre project area. Because Lorena TIRZ #1 East, a public private partnership with the City of Lorena, a political subdivision of the State of Texas, sponsored the project, the proposed undertaking is subject to compliance with the Antiquities Code of Texas and oversight from the Texas Historical Commission. In addition, the survey meets the standards for compliance under Section 106 of the National Historic Preservation Act of 1966, as amended, should a US Army Corps of Engineer permit be necessary or federal funding be utilized for the project. The cultural resources survey was carried out in advance of ground disturbance under Texas Antiquities Permit Number 7903, issued to Ann M. Scott, PhD, RPA, Principal Investigator. Fieldwork was carried out by Dr. Scott, with assistance from Project Archeologist Caitlin Gulihur, MA, and Archeological Technician Juan Morlock. Records from the project will be curated at the Center for Archaeological Studies at Texas State University.

The 15,800-linear-foot by 50-foot wide alignment (18.14 acres) was considered the Area of Potential Effect (APE). Survey of the APE consisted of systematic pedestrian coverage, including discretionary shovel tests. The work was carried out on March 14-16, May 11, and July 19, 2017. Two alignment changes occurred during the project. Those changes were subject to the same intensive pedestrian survey methodology. In total, 20,000 linear feet, with a 50-foot wide alignment (23 acres), was surveyed. Several hundred linear feet of the project area were agricultural fields with ground visibility of at least 50 percent. Thirty-five shovel tests were excavated in areas that had less than 30 percent ground visibility or placed in areas previously undisturbed; three of those shovel tests contained artifacts. The three shovel tests contained historic artifacts, such as glass, ceramics, plastics, and metal fragments associated with historic site 41ML320. As a result of the survey, one new historic-period site was recorded, 41ML320, which had already been noted during review of historic maps and aerial imagery. Site 41ML320 is an historic homestead. The site comprises a historic artifact scatter, two rubble piles, and a well/cistern. The eligibility for the National Register of Historic Places or potential for designation as a State Antiquities Landmark of site 41ML320 is undetermined. After 41ML320 was recorded, the project alignment was revised, and no portion of site 41ML320 is within the current project APE. Therefore, there are no historic properties present in the alignment. It is Terracon's recommendation that there are no historic properties eligible for State Antiquities Landmark designation or National Register of Historic Places inclusion that will be affected by construction of the proposed trunk line. In the unlikely event that human remains are discovered during construction, construction should cease in the vicinity of the remains and Terracon, the Texas Historical Commission's Archeology Division, or other proper authorities should be contacted.

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INTENSIVE ARCHEOLOGICAL SURVEY OF LORENA TIRZ #1 EAST PHASE 1 TRUNK LINE, CITY OF LORENA, MCLENNAN COUNTY, TEXAS

Terracon Project No. 96167902

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1.0 INTRODUCTION

This report presents the findings from an intensive pedestrian survey of an approximately 20,000-linear-foot alignment with a 50-foot wide construction corridor, for proposed TIRZ #1 East Phase 1 Trunk Line for the Lorena Tax Increment Reinvestment Zone (TIRZ) #1 East, City of Lorena, McLennan County, Texas (Appendix A, Exhibit 1). The proposed project consists of a 15,800-linear-foot by 50-foot-wide construction corridor equaling approximately 18.14 acres. The approximately 23-acre survey was performed on behalf of Lorena TIRZ #1 East, a public private partnership with the City of Lorena, a political subdivision of the State of Texas. Therefore, the project is under the purview of the Texas Historical Commission (THC) in compliance with the Antiquities Code of Texas. In addition, the survey meets the standards for compliance under Section 106 of the National Historic Preservation Act of 1966, as amended, should a US Army Corps of Engineer permit be necessary or federal funding be utilized for the project. All work described herein was performed under Texas Antiquities Permit Number 7903, issued to Ann M. Scott, PhD, RPA Principal Investigator, and in adherence to Title 13, Chapter 26 of the Texas Administrative Code. The work was carried out on March 14-16, May 11, and July 19, 2017.

The Texas Antiquities Permit was originally issued for an approximately 14,500-linear-foot alignment with a 50-foot wide construction corridor for the Phase 1 Trunk Line (Appendix A, Exhibit 2). After the permit was issued, during the fieldwork, the alignment of the Trunk Line was altered (Appendix A, Exhibit 3) and the additions were subject to pedestrian survey. A total of approximately 20,000 linear feet, with a 50-foot wide construction corridor (23 acres), was surveyed as part of this project (Appendix A, Exhibit 4).

Abiding by standards set forth by the Council of Texas Archeologists (CTA), this report includes descriptions of the project area, environmental setting, cultural and historical contexts, methods, results, and recommendations. The report was authored by Caitlin Gulihur, Project Archeologist, and Ann M. Scott, Principal Investigator.

2.0 AREA OF POTENTIAL EFFECT

The currently proposed project area, which is the same as the area of potential effect (APE), is an approximately 15,800-linear-foot corridor that has a 50-foot-wide construction area. The acreage of the APE is 18.14 acres, however, approximately 23 acres were surveyed due to

alignment changes during the field effort. The project area is located west of Old Temple Road in northeast Lorena, Texas (Appendix A, Exhibits 5 and 6). The project begins near the intersection of Old Temple Road and I-35. The alignment crosses several properties, including several agricultural fields, before ending near Bull Hide Creek at Cooksey Lane. The majority of the wastewater line will be placed by open trenching, however, directional boring will be utilized in areas where that method is not feasible.

3.0 ENVIRONMENTAL SETTING

Environments are composed of various interconnected elements such as underlying bedrock geology, soil, flora, fauna, and climate. It is important to consider environmental conditions of the past and present when assessing cultural resources.

In general terms, the project area is located near the transition between two large-scale biotic provinces or biomes, the Cross Timbers and the Northern Blackland Prairie (Griffith et al. 2007). Each of these biomes is characterized by a distinct set of physical and biological properties, and the transitional zone is also known to have endemic plant and animal communities as (Blair 1950). These transitional zones are known as ecotones, and they typically support relatively increased biological richness and diversity (Crumley 1994). Locally, the site is in the Northern Blackland Prairie ecoregion. The Cross Timbers ecoregion begins west of the site. More specifically, the APE is nestled in the gently sloping plain and floodplain south of Bull Hide Creek in the Brazos River Basin.

3.1 Geology

A factor that greatly contributes to the site setting is its location within the Balcones Fault Zone, which is a southwest to northeast aligned group of normal faults situated at the contact between the Edwards Plateau and the Gulf Coastal Plains. The fault system was most active during the Miocene as the Gulf subsided and pulled the Gulf Coastal Plain from the adjacent Edwards Plateau, and the normal fault created a physiographic feature known as the Balcones Escarpment (Spearing 1991; Swanson 1995). In this area, the Balcones Escarpment marks the boundary between the adjacent biomes, it affects weather patterns on either side, and its local topography creates ecological refuges for flora and fauna. The escarpment, however, is a relatively complex mosaic of underlying bedrock, some of which contain voids capable of holding vast amounts of freshwater and others containing chert that is used for stone tool-making.

The bedrock geology of the project area is identified as Austin Chalk (Phanerozoic | Mesozoic | Cretaceous-Late periods [Gulfian]) (Kau) consisting of limestone, mudstone, interbedded calcareous clays, and massive chalk (Barnes 1992).

3.2 Soils

Soil formation is a function of local climate, biology, parent material, topography, and time, and so it is clearly tied to environment as defined above. Accordingly, soil can serve as a proxy for

environmental conditions of the present and past. Defining soils as they are relevant to investigations of cultural resources, however, is useful because of how they are characterized and mapped by the Natural Resources Conservation Service, formerly Soil Conservation Service. Though agricultural in nature, county soil surveys provide a description of soil characteristics, including depth, color, inclusions, etc., which can be used to elucidate site formation processes.

Six soils are mapped in the APE and are presented in Appendix A, Exhibit 7. The soil geomorphology of the APE is primarily associated with shoulders, backslope, and summits of ridges (Miller and Greenwade 2001; USDA NRCS 2017).

3.3 Vegetation and Wildlife

Flora and fauna of the ecotone include species that are representative of both the Texas Cross Timbers and the Texas Blackland Prairies as well as endemic species (Blair 1950). Major game species of the region include whitetail deer, javelina, and several species of bird, and pronghorn and bison were periodically present further back in history. The region's natural vegetation is typically a grassland-woodland-forest mosaic (Ellis et al. 1995).

The natural vegetation of the region was dominated by tallgrass prairie on uplands. Deciduous bottomland woodland and forest were common along rivers and creeks (Diamond and Smeins 1993). The Blackland Prairie is characterized by a high degree of plant community diversity. This diversity, which is in part represented by four major prairie community types, is attributable to the ecoregion's variety of soil orders and their variation in texture and soil pH (Diamond and Smeins 1985).

The Blackland Prairie was a disturbance-maintained system. Prior to European settlement (pre-1825 for the southern and pre-1845 for the northern half) important natural landscape-scale disturbances included fire and periodic grazing by large herbivores, primarily bison, and to a lesser extent, pronghorn. Fire and infrequent but intense, short-duration grazing suppressed woody vegetation and invigorated herbaceous prairie species. Bison herds, though reported for the Blackland Prairie, were far smaller than those found further west in the mixed and shortgrass prairies (Strickland and Fox 1993). Their impact was probably local with long intervals between grazing episodes. Bison were probably extirpated in the region by the 1850s.

3.4 Current and Past Climates

Lorena has a climate classified as warm temperate (hot summers and cool winters), with precipitation ranging from 35 to 40 inches in an average year. Precipitation is less in the western part of the ecoregion and greater in the east (Bailey 2014).

Because most cultural resources originate in the period of time between the Last Glacial Maximum and the colonization of the western hemisphere by emigrants of the European continent, it is necessary to consider past climates, too. Since past climatic conditions cannot be observed (i.e., measurements did not begin in this region until the late 19th century), proxy data

must be relied upon to reconstruct past conditions. Proxy data do not directly reflect past environments, but they can be used to infer conditions under which they form (Ellis et al. 1995).

Based on fossil pollens (Bousman 1998), phytoliths (Joines 2005), microfaunal remains (Toomey 1993), soil chemistry (Nordt et al. 2002), and speleothems (Musgrove et al. 2001), it is pretty clear that climatic conditions of the past approximately 20,000 years have steadily become warmer and increasingly arid with several punctuated episodes. The transition from the Pleistocene to the Holocene at approximately 11,700 years ago was marked by an increase in warmth and aridity. In addition to increased warmth and aridity, the Holocene has been characterized by increasing seasonal variation of temperatures and precipitation. Peak warmth and aridity occurred during the mid- to late-Holocene Altithermal. Following the Altithermal, conditions similar to the early-Holocene returned, but warmth and aridity increase to the present.

4.0 CULTURAL HISTORY

Generally, the cultural chronology of Central Texas can be divided into three periods, prehistoric, protohistoric, and historic. The protohistoric effectively marks the boundary between the prehistoric and historic periods, and is characterized by the initial introduction of Europeans into the western hemisphere. The following description of Central Texas' cultural history is a gross compilation of a vast suite of data and interpretations (cf. Collins 1995, 2004).

4.1 Prehistoric

The prehistoric people of Central Texas were primarily hunter-gatherers. Through the last 75-plus years of archaeological research in the region, identifiable and repeated patterns in artifact assemblages have indicated major shifts in subsistence strategies and technology through time. As a result, the prehistoric period now has three subdivisions: Paleoindian, Archaic, and Late Prehistoric.

The Paleoindian period (ca. 12,500-8800 years ago) includes the earliest human occupation of North America, which extends back into the late Pleistocene. During this time, people hunted large game, but they generally had a broad diet. This included plant foods, small game, in addition to megafauna that went extinct with the close of the Pleistocene (i.e., mammoth, mastodon, bison, horse, camel, etc.). Technological traditions further subdivide the Paleoindian period into Early and Late.

The Archaic period (ca. 8800-1250 years ago) of Central Texas was the longest period in prehistory, and it is generally marked by the introduction of hot rock cooking in addition to the proliferation of a wide variety of diagnostic projectile points. Cooking with fire-heated rocks developed with increased reliance on plant foods, which may have been a response to diminishing game resources and ultimately climatic change or variation. This is not to say that human agency did not play an important role in the shift of economic and subsistence strategies. The Archaic

period is subdivided into Early-, Middle-, and Late-Archaic periods, each with a slight variation in response to cultural shifts and ambient conditions.

The Late Prehistoric (ca. 1250-250 years ago) was a relatively brief period, but it was marked by a shift in weapon technology: the introduction of the bow-and-arrow. Like the Archaic, the Late Prehistoric people utilized hot rock cooking to process plants to edible forms. There also appeared to be increasing contact among groups, which resulted in increased trade of materials and evident competition over resources.

4.2 Protohistoric and Historic

Spanish Entradas (expeditions) mark the onset of European influence in the New World. These explorations effectively scouted the new land and resulted in the settlement and establishment of missions spread throughout what has become northern Mexico and Texas. The Spanish entered into the region along the *El Camino Real de los Texas*. During this time, European populations and influence steadily increased as native populations steadily diminished.

In January 1850, McLennan County was formed by the Texas legislature, with Waco established as the county seat in August of that year (Symrl 2016). The county originally included both its current area as well as a large stretch of land to the northwest. It was reduced to its current boundaries when Bosque County was formed in 1854. Large cotton plantations were common in the areas near the Brazos River, while livestock were raised in the prairie land. In the 1880s, agriculture was driving force of the county's economy, with cotton as the major crop. During the same period, the construction of several railroad lines through Waco spurred growth. The economy was again spurred by World War II and the growth of the industrial segment of the county. Today, agriculture, education, and manufacturing are important parts of the McLennan County economy. Census data from 2014 counted approximately 243,440 people living in the county, with over 129,180 of those living in Waco (Symrl 2016).

Lorena was established in 1881, with the construction of a railroad between Hillsboro and Taylor. In 1884, the town had a population of 150; by 1896, the population had rose to 500 (Smyrl 2010). Banking, especially centered around loans for farming, was a major part of the economy of Lorena from the 1890s until the mid-1920s. By the 1950s, the population of Lorena had fallen to 242. With the construction of I-35 in the 1950s and 1960s, both the economy and the population received a boost. The town was incorporated in 1959 (Symrl 2010). In the mid-1960s, the population was around 430, and had grown to roughly 1,430 by 2000.

5.0 METHODS

The methods described below were employed to identify and characterize cultural resources present within the APE to the extent practicable. Desktop review focused on identifying previously known cultural materials, while fieldwork was used to both search for unknown cultural resources and gather more information based on the desktop review.

5.1 Desktop Review

To search for known cultural resources within and in proximity to the APE, reviews of the Texas Archeological Sites Atlas (Atlas), the list of State Archeological Landmarks, and the National Register of Historic Places were conducted. Historic-period maps and aerial images that include the project area were reviewed for evidence that the location contained buildings or other features that may be considered historic (at least 50 years old).

5.2 Intensive Pedestrian Survey

To examine the approximately 23-acre project area for previously unknown cultural resources, and to gather additional information based on the desktop review, an intensive pedestrian survey was conducted. Overall, the project area was covered in short grasses in pasture and agricultural fields; the southwestern end of the alignment had poor ground surface visibility, but several hundred linear feet had good ground visibility (Appendix B, Photo 1). The portion of the alignment between Birdie Lane and Southwinds Drive was active rangeland and contained cattle. The ground visibility in this portion of the alignment was generally good, with visibility as high as 60 percent (Appendix B, Photo 2). This portion of the alignment was also disturbed not only from the cattle, but also from past brush clearing; areas were also waterlogged. The portion of the alignment east of Southwinds Drive had poor visibility, generally 0 percent (Appendix B, Photo 3). The northwestern end of the alignment also had generally poor ground surface visibility and gently sloping topography (Appendix B, Photo 4). The ground surface in the survey area and APE was systematically inspected by two archaeologists walking parallel transects spaced not more than 5 meters (16 feet) apart, for 100 percent coverage of the alignment. Shovel tests were placed in areas that appeared to be previously undisturbed or had less than 30 percent visibility, which best describes the northeastern end of the project area (Appendix A, Exhibit 8c).

Shovel tests were excavated to varying depths that targeted Holocene-aged soils. Sediment was excavated in arbitrary 20-cm levels to depth and was passed through ¼-inch hardware mesh. Characteristics and contents of shovel tests were recorded with photographs, forms and notes, and a hand-held global positioning system (GPS) unit; upon completion of excavation and documentation the unit holes and artifacts, if present, were backfilled.

5.3 Artifact Analysis

Artifacts encountered through the course of investigations were described and photographed on-site, and then returned to their respective places. The importance of the artifacts is in their capacity to relate temporal and other information about the former occupants of the site, and as such they are categorized according to their material and subdivided by unique or diagnostic characteristics.

5.4 National Register of Historic Places and State Antiquities Landmark Criteria

For a historic resource to be deemed eligible for inclusion in the National Register of Historic Places (NRHP), the resource must be at least 50 years old and must possess significance and

integrity. The quality of significance in American history, architecture, archaeology, 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 the 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 likely to yield, information important in our prehistory or history (36 CFR 60.4).

Additionally, the State of Texas affords important cultural resources a level of protection beyond that of NRHP status if the resource meets the criteria for listing as a State Antiquities Landmark (SAL). SAL criteria are divided into four categories based on the type of resource: archaeological site, shipwreck, cache and collection, and historic structure. The criteria for archaeological sites are:

- 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 interest 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 (Title 13, Rule 26.10).

6.0 RESULTS

6.1 Desktop Review

A review of the Texas Archeological Sites Atlas database with emphasis on 0.5-mile buffer indicates that no previously known sites might be located within the APE and survey area and that only a small portion of the APE and project area has been previously surveyed. No State Antiquities Landmarks (SALs), Registered Texas Historic Landmarks (RTHLs), or NRHP properties are present in the buffer search. In addition, no mapped cemeteries or historical markers are present in the search area.

Historic-period topographic maps dating back over 100 years cover the project area. Several years were examined including 1890, 1918, 1957, 1970, 1975, 1993, and 2013. The 7.5-minute quadrangle maps from 1957, 1970, and 1975 show two structures near the APE. Historic aeriels were also reviewed, the earliest of which was dated 1941. Others were dated 1952, 1955, 1964, 1970, 1975, 1982, 1988, 1996, 2004, and 2015. The 1941 aerial shows at least one structure, which seems to be present in aeriels through 1964.

6.2 Intensive Pedestrian Survey

The intensive pedestrian survey resulted in the excavation of thirty-five shovel tests in areas which were undisturbed with less than 30 percent visibility (Appendix B, Photo 5). One historic-period archeological site, 41ML320, was recorded (see Appendix A, Exhibits 8b and 8c).

The soil in the shovel tests was predominately clay (clay loam). Shovel tests were terminated at 50-60 centimeters below surface due to increasing amounts of calcium carbonate nodules. Artifacts were encountered in three shovel tests. The three positive shovel test contained historic artifacts associated with the historic-period archaeological site. See Appendix C for details in the Shovel Tests Log.

6.2.1 Site 41ML320

Site 41ML320 was encountered in the northeastern part of the original alignment, in the location that it was expected to occur based on historic aerial photographs from 1941 to 1964 and topographic maps (see Appendix A, Exhibit 8c). Site 41ML320 was named the Southwinds site. The topography is a flat terrace setting, located above an unnamed drainage (Appendix B, Photo 6). Site 41ML320 is characterized as an historic homestead. Historic artifacts and features occurred on the surface, mixed with grasses. The artifacts occurred in an area that was roughly 70 meters by 40 meters. Only a small portion of the site occurred within the original APE; features occurred outside of the original APE (Appendix A, Exhibit 9). Three shovel tests were excavated within the original APE in order to determine the depth of cultural deposits (Appendix B, Photo 7). Deposits are restricted to the upper 20 centimeters below the ground surface. No artifacts were recovered below 20 centimeters below surface.

Features at the site included two rubble piles, a well or cistern, and the foundation of a house, located outside of the original APE (Appendix B, Photo 8). The rubble piles were composed of soil, concrete, bricks, wood fragments, and metal fragments, overgrown with grass. The well or cistern appeared to be unlined, and was covered in modern times (Appendix B, Photo 9). The house foundation was an area of raised, flattened ground where aerial photographs indicated the house was located. Within the original APE, historic artifacts from the mid-twentieth century were encountered in the shovel tests. These artifacts included glass fragments, wire nails, plastic fragments, and a ceramic handle fragment (Appendix B, Photos 10-12). No marker's marks were observed on artifacts. No diagnostic features or artifacts were observed at the site.

When the project was redesigned and the alignment was changed, site 41ML320 is now located entirely outside the current APE (see Appendix A, Exhibit 9). No cultural materials were observed within the revised alignment in the vicinity of site 41ML320. No archival research was done on the site, given its location outside of the current project APE. The eligibility for NRHP listing or designation as a SAL for site 41ML320 is undetermined.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Terracon archaeologists conducted an intensive pedestrian survey of approximately 20,000 linear feet (approximately 23 acres) in advance of the proposed TIRZ #1 East Phase 1 Trunk Line in Lorena, McLennan County, Texas. Thirty-five shovel tests were excavated, and one historic-period archeological site, 41ML320, was recorded.

Site 41ML320 is a historic homestead. A small portion of the site was located within the original project alignment; however, when the project was redesigned and the alignment was changed, site 41ML320 is now located outside the current project APE. Because the site is located outside the project APE and the alignment has been modified to avoid it, archival and deed research was not undertaken. Therefore, the eligibility of site 41ML320 is undetermined.

It is Terracon's opinion that there are no historic properties in the current APE eligible for listing on the NRHP or designation as a SAL. Therefore, Terracon recommends that the project be allowed to proceed as future construction of the proposed trunk line will not affect historic properties. However, if development is planned in the future, or if the project is redesigned in a way that it will impact site 41ML320, Terracon recommends that more intensive archaeological work and archival research would be necessary to assess the site for NRHP inclusion or SAL designation.

In the unlikely event that human remains or intact cultural resources are discovered after THC's review, activities should cease in the vicinity of the discovery and Terracon, the Texas Historical Commission's Archeology Division, or other proper authorities should be contacted.

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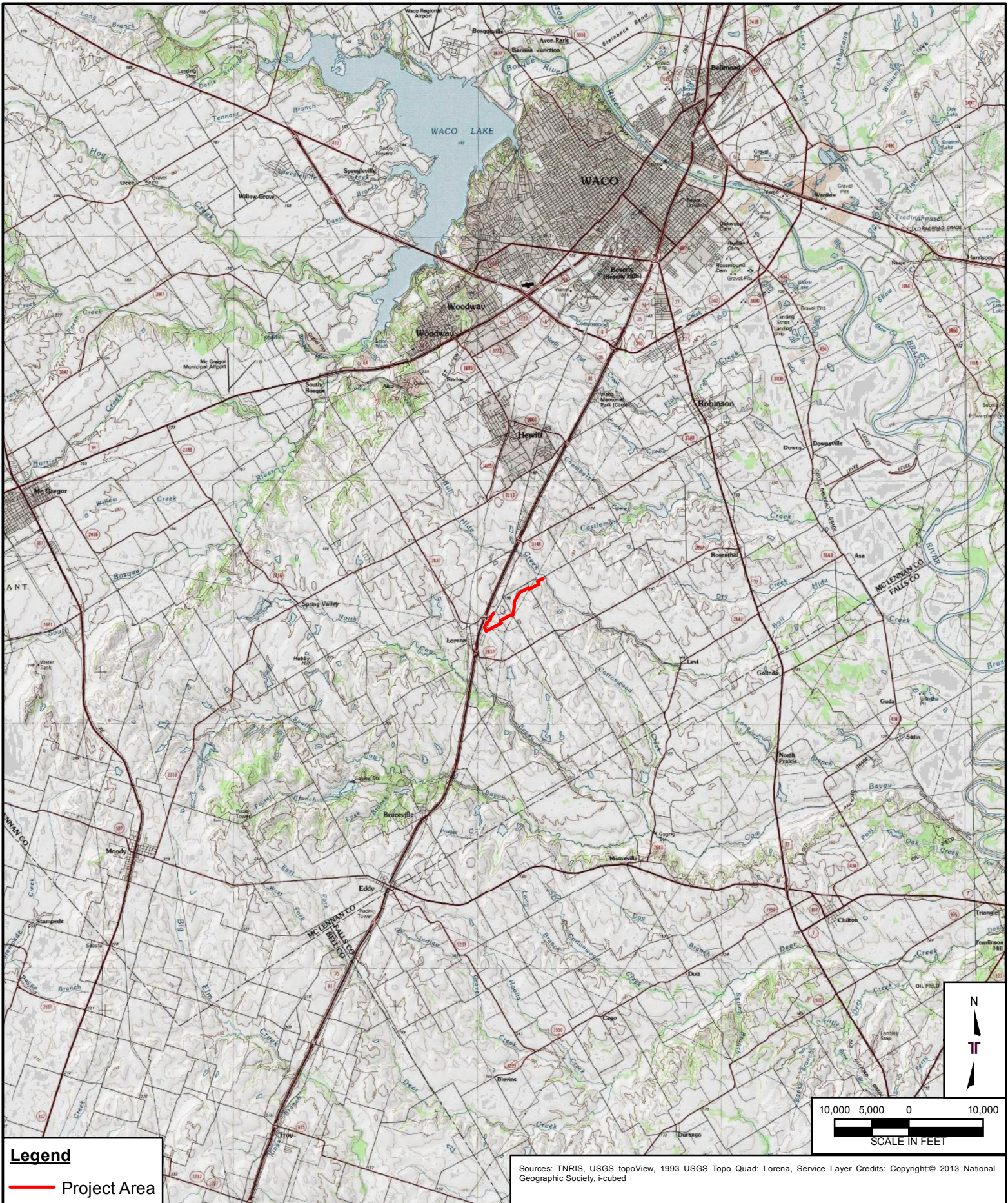
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Texas at Austin.

USDA NRCS, Soil Survey Staff

2017 Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/>. Accessed May 2017.

APPENDIX A

Exhibit Maps



Legend
 — Project Area

Sources: TNRIS, USGS topoView, 1993 USGS Topo Quad: Lorena, Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

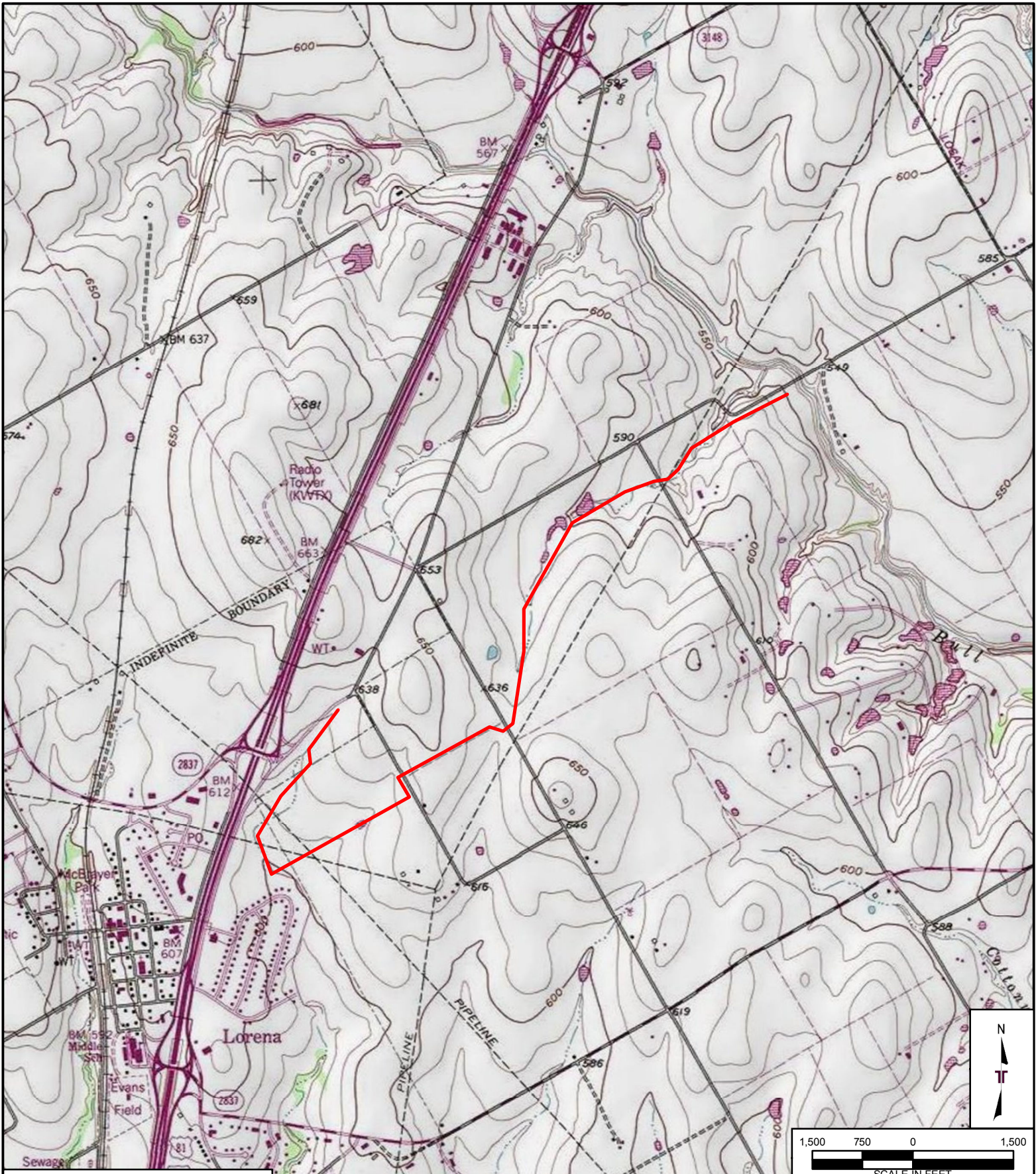
Project Mgr: AMS
 Drawn By: Terracon
 Checked By: JC
 Approved By: JH

Project No: 96167902
 Scale: AS SHOWN
 File No.: 96167902
 Date: Jul 25, 2017

Terracon
 Consulting Engineers & Scientists
 5307 INDUSTRIAL OAKS BLVD. - #160 AUSTIN, TX 78735
 PH. (512) 442-1122 FAX. (512) 442-1181

General Project Area
 Lorena TIRZ #1 East Phase I Trunk Line
 Lorena, McLennan County, Texas

EXHIBIT
 1



Legend
 — Original Project Boundary

Sources: TNRS, USGS topoView, 1993 USGS Topo Quad: Lorena, Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

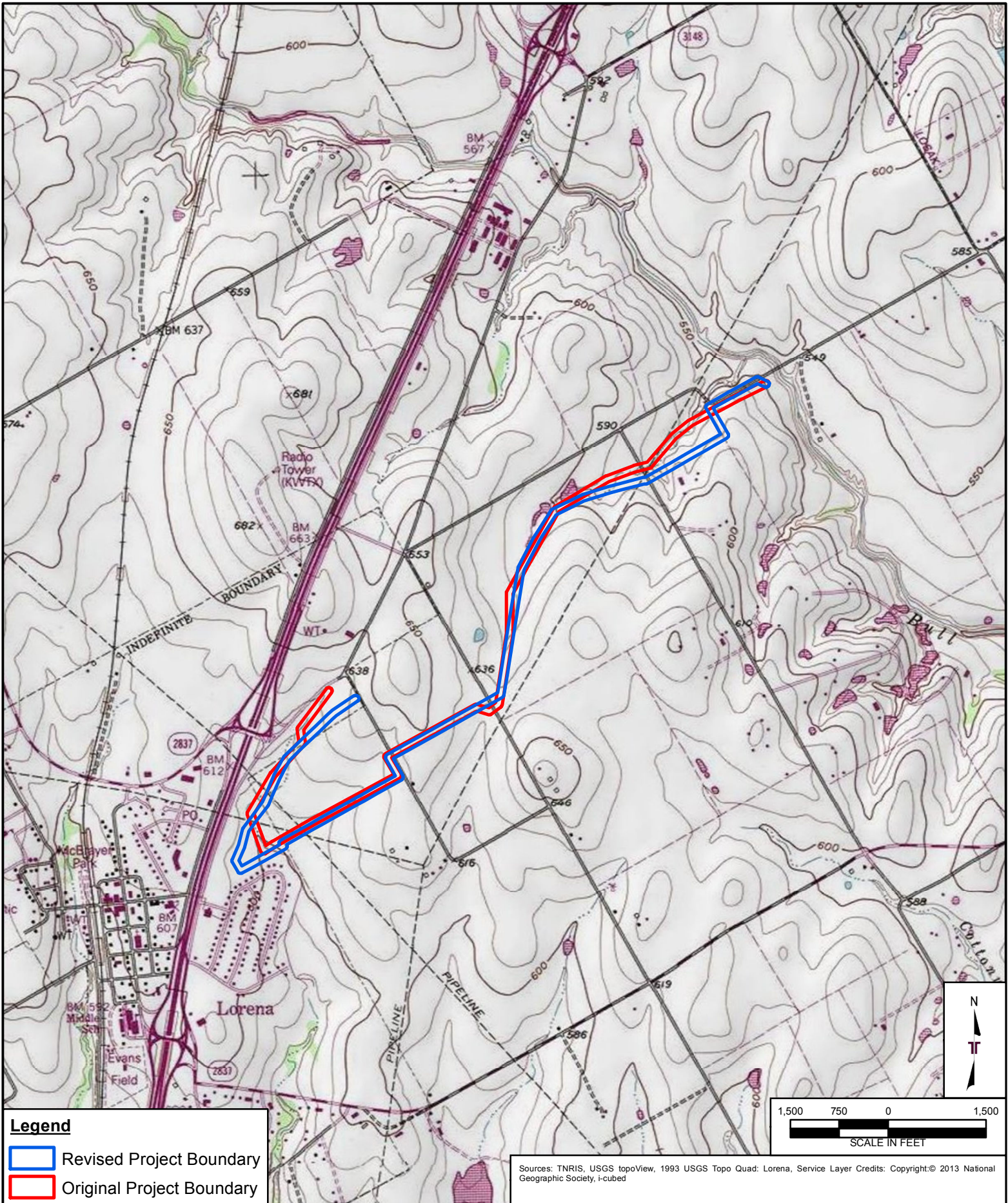
Project Mngr: AMS
 Drawn By: Terracon
 Checked By: JC
 Approved By: JH

Project No: 96167902
 Scale: AS SHOWN
 File No.: 96167902
 Date: Jul 25, 2017

Terracon
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Original Project Boundary Submitted to THC
 Lorena TIRZ #1 East Phase I Trunk Line
 Lorena, McLennan County, Texas

EXHIBIT
 2



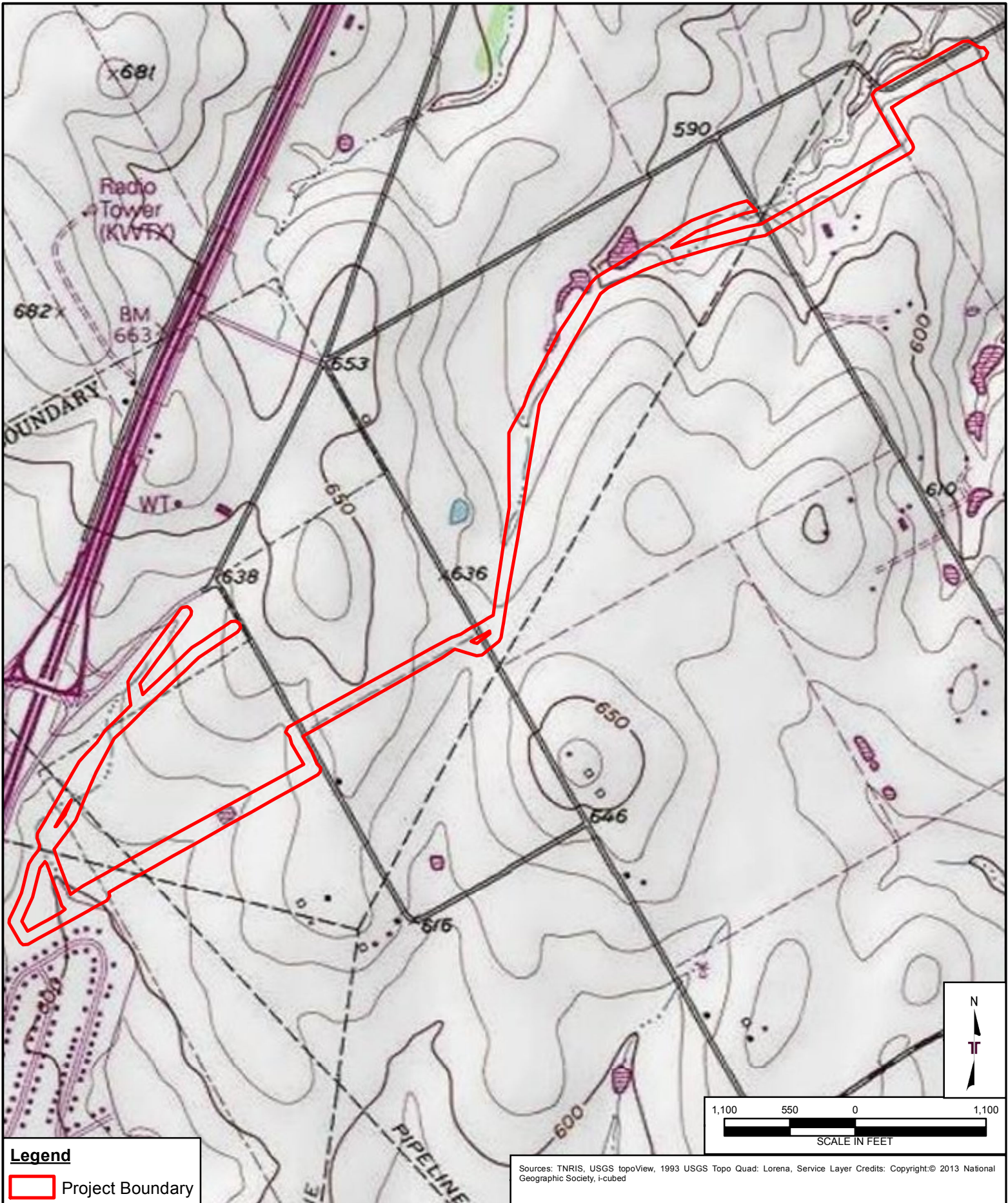
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Drawn By:	Terracon
Checked By:	JC
Approved By:	JH

Project No:	96167902
Scale:	AS SHOWN
File No.:	96167902
Date:	Jul 25, 2017

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Original and Revised Project Boundaries
 Lorena TIRZ #1 East Phase I Trunk Line
 Lorena, McLennan County, Texas

EXHIBIT
 3



Legend

Project Boundary

Sources: TNRRIS, USGS topoView, 1993 USGS Topo Quad: Lorena, Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

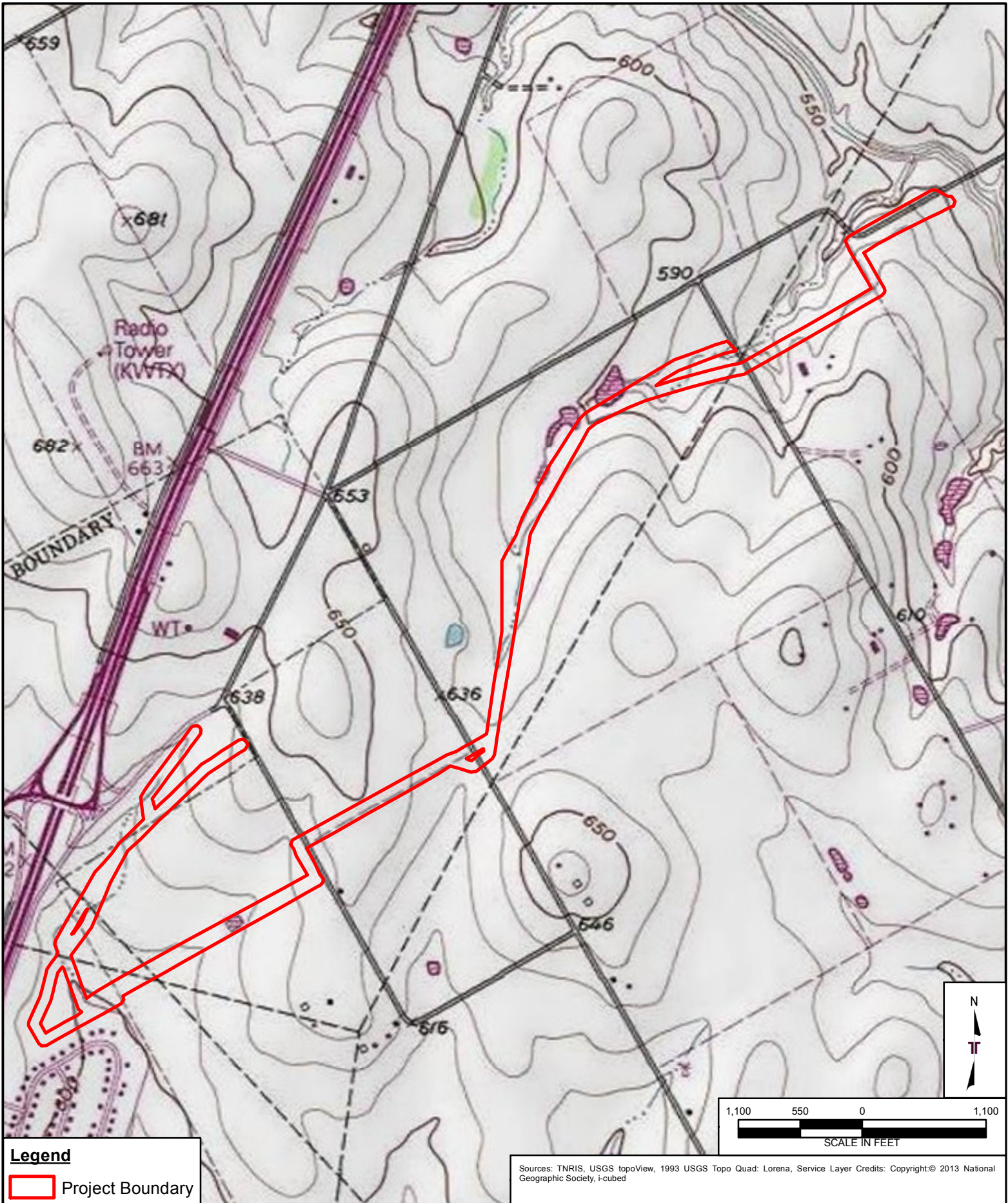
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Drawn By:	Terracon
Checked By:	JC
Approved By:	JH

Project No:	96167902
Scale:	AS SHOWN
File No.:	96167902
Date:	Jul 25, 2017

Terracon
 Consulting Engineers & Scientists
 5307 INDUSTRIAL OAKS BLVD. - #160 AUSTIN, TX 78735
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Total Area Surveyed
Lorena TIRZ #1 East Phase I Trunk Line Lorena, McLennan County, Texas

EXHIBIT
4



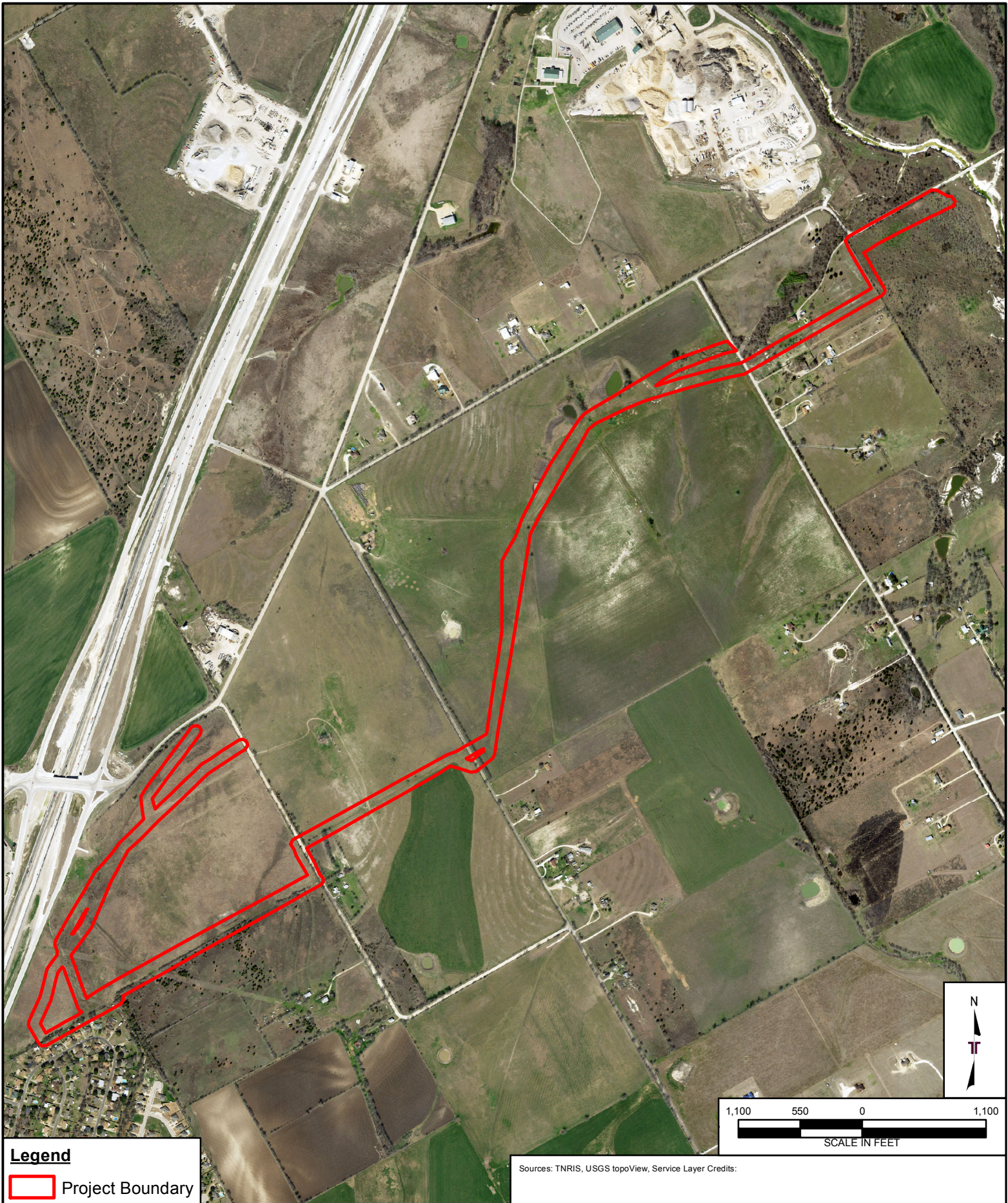
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Approved By:	JH

Project No.	96167902
Scale:	AS SHOWN
File No.:	96167902
Date:	Jul 25, 2017

Terracon
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1993 USGS Topographic Map: Lorena
 Lorena TIRZ #1 East Phase I Trunk Line
 Lorena, McLennan County, Texas

EXHIBIT
 5



Legend

Project Boundary

Sources: TNRS, USGS topoView, Service Layer Credits:

Project Mngr:	AMS
Drawn By:	Terracon
Checked By:	JC
Approved By:	JH

Project No.	96167902
Scale:	AS SHOWN
File No.:	96167902
Date:	Jul 25, 2017

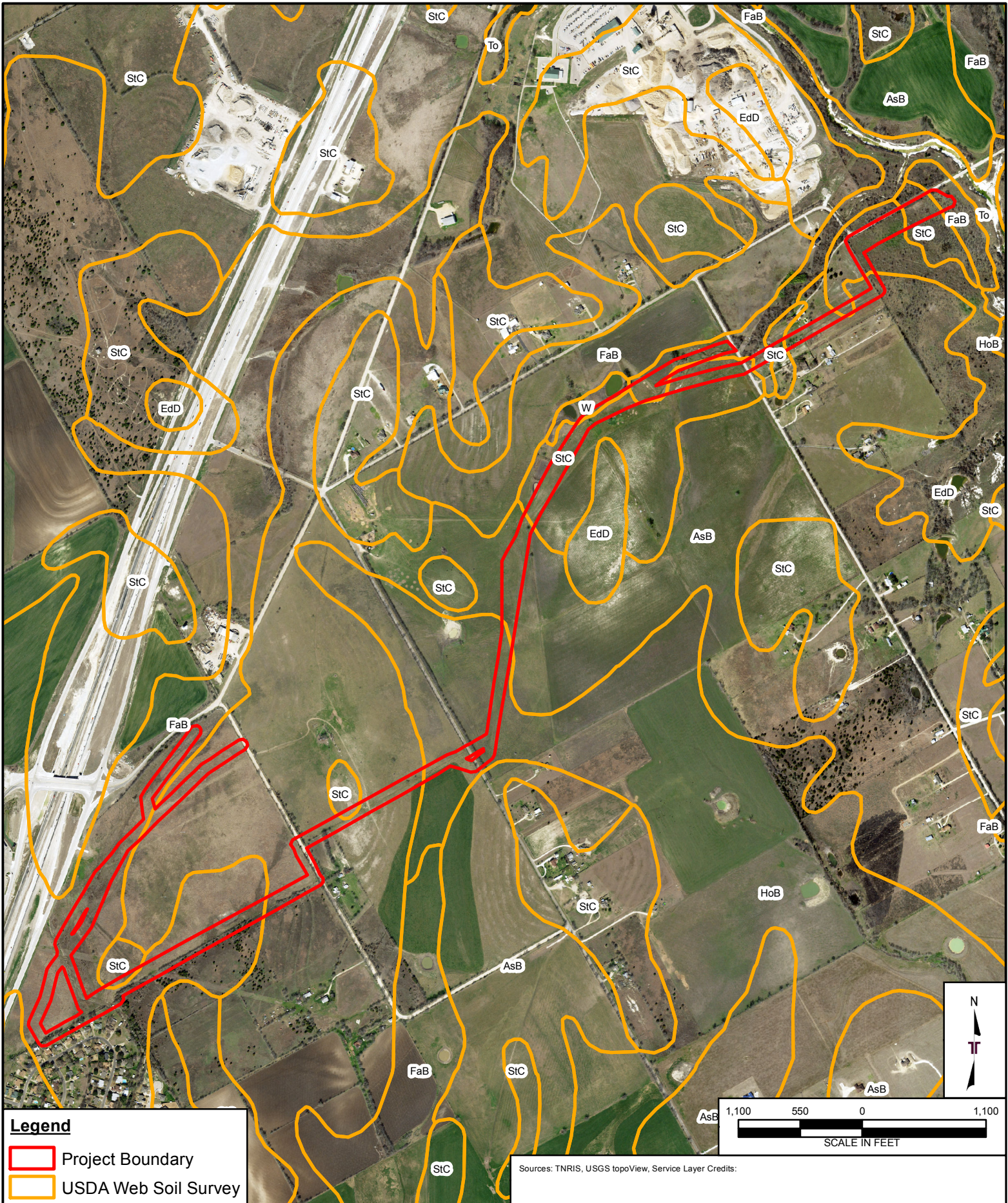
Terracon
 Consulting Engineers & Scientists
 5307 INDUSTRIAL OAKS BLVD. - #160 AUSTIN, TX 78735
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2015 Aerial Photograph

Lorena TIRZ #1 East Phase I Trunk Line
 Lorena, McLennan County, Texas

EXHIBIT

6



Legend

- Project Boundary
- USDA Web Soil Survey

Sources: TNRIS, USGS topoView, Service Layer Credits:

Project Mngr:	AMS
Drawn By:	Terracon
Checked By:	JC
Approved By:	JH

Project No.	96167902
Scale:	AS SHOWN
File No.:	96167902
Date:	Jul 25, 2017

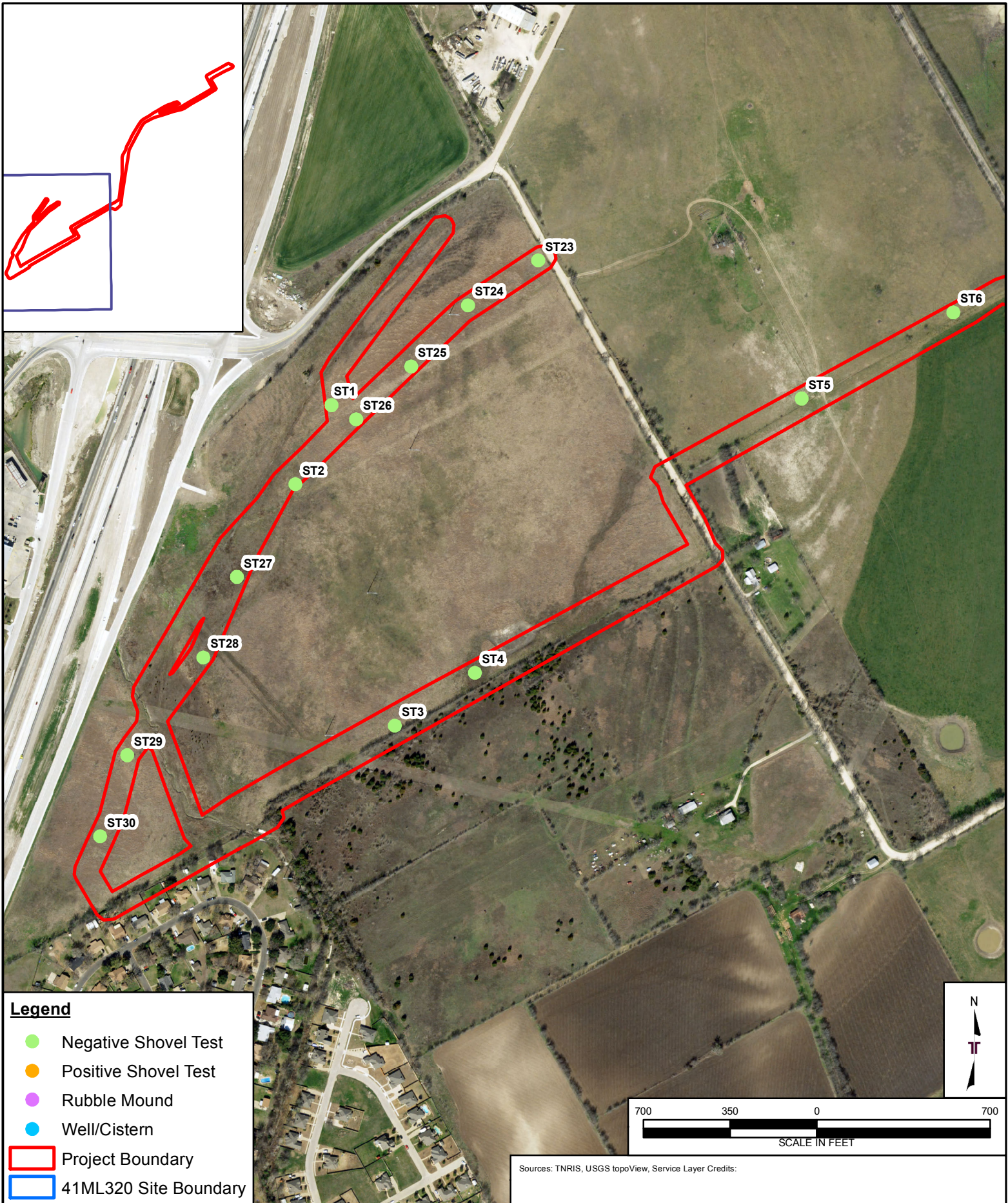
Terracon
 Consulting Engineers & Scientists
 5307 INDUSTRIAL OAKS BLVD. - #160 AUSTIN, TX 78735
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USDA Soils Map

Lorena TIRZ #1 East Phase I Trunk Line
 Lorena, McLennan County, Texas

EXHIBIT

7



Project Mngr: AMS
 Drawn By: Terracon
 Checked By: JC
 Approved By: JH

Project No. 96167902
 Scale: AS SHOWN
 File No.: 96167902
 Date: Aug 1, 2017

Terracon
 Consulting Engineers & Scientists
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 PH. (512) 442-1122 FAX. (512) 442-1181

Results Map

Lorena TIRZ #1 East Phase I Trunk Line
 Lorena, McLennan County, Texas

EXHIBIT
 8a

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Cultural Resources Services

Lorena TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

October 10, 2017 ■ Terracon Project No. 96167902



APPENDIX B

Photographs

Cultural Resources Services

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Terracon Project No. 96167902 ■ Photos taken March 14-16, May 11, July 19, 2017



Photo 1. Southern end of alignment. Note areas of good ground surface visibility. View to the northeast.



Photo 2. Typical central portion of alignment. Note ground disturbances and visibility. View to the north.

Responsive ■ Resourceful ■ Reliable

Cultural Resources Services

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Terracon Project No. 96167902 ■ Photos taken March 14-16, May 11, July 19, 2017



Photo 3. Alignment east of Southwinds Drive. Note poor ground visibility. View to the east.



Photo 4. Typical northeastern portion of alignment. Note poor ground visibility and sloping topography. View to the southwest.

Responsive ■ Resourceful ■ Reliable

Cultural Resources Services

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Terracon Project No. 96167902 ■ Photos taken March 14-16, May 11, July 19, 2017



Photo 5. Shovel Test 10.



Photo 6. Site 41ML320, looking towards unnamed drainage. View to the south.

Cultural Resources Services

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Terracon Project No. 96167902 ■ Photos taken March 14-16, May 11, July 19, 2017



Photo 7. Site 41ML320. Shovel showing location of Shovel Test 11. Rubble pile in foreground. View to the south.



Photo 8. View from house location at 41ML320. Note two rubble piles and well/cistern. View to the south.

Responsive ■ Resourceful ■ Reliable

Cultural Resources Services

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Terracon Project No. 96167902 ■ Photos taken March 14-16, May 11, July 19, 2017



Photo 9. Well/cistern at 41ML320. Note bricks. View to the north.



Photo 10. Artifacts from Shovel Test 11, 0-20 cmbs. Note glass fragments, wire nail, and plastic hose.



Photo 11. Artifacts from Shovel Test 12, 0-20 cmbs. Note wire nails, glass fragments, ceramic sherds, and plastic fragments.



Photo 12. Artifacts from Shovel Test 13, 0-20 cmbs. Note ceramic fragment, glass fragments, and large nail/railroad spike.

APPENDIX C

Shovel Test Log

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST01	0-50	-	100%	10YR 3/1 Very dark gray	Clay; more crumbly at top 10cm	.05%	Very plastic black clay
ST01	50-60	-	-	10YR 4/2 Dark grayish brown	Clay	0%	Plastic black clay to mottled brown; Calcium carbonates appearing.
ST02	0-50	-	100%	10YR 3/1 Very dark gray	Clay; more crumbly at top 10cm	.05%	Very plastic black clay; little if any gravels
ST02	50-55	-	-	10YR 4/1 Dark gray	Clay	0%	Mottled dark gray horizon; Calcium carbonates appearing in this level.
ST03	0-50	-	100%	10YR 3/1 very dark gray	Clay; more crumbly at top 10cm	.05%	Plastic black clay
ST03	50-60	-	-	10YR 4/1 dark gray	Clay	0%	Mottled dark gray horizon with calcium carbonates appearing.
ST04	0-50	-	100%	10YR 3/1 very dark gray	Clay; crumbly at top	1%	Plastic black clay with few gravels and possible calcium carbonates
ST04	50-60	-	-	10YR 4/1 dark gray	Clay	0%	Mottled dark gray horizon on top of water table from nearby pond. Few calcium carbonates.

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST05	0-35	-	100%	10YR 5/2 grayish brown	Silty loam	0%	Homogeneous silty loam with slight clay content to transition to more carbonates below.
ST05	35-45	-	-	10YR 5/2 grayish brown	Silty loam with calcium carbonates	10% calcium carbonates	Small nodules of calcium carbonates
ST06	0-30	-	100%	10YR 3/1 Very dark gray	Clay loam	0%	Clay loam but not very plastic
ST06	30-40	-	-	10YR 4/1 dark gray	Clay loam	10% calcium carbonates	Mottled gray horizon with an increase in calcium carbonates
ST07	0-25	-	100%	10YR 3/1 Very dark gray	Clay loam	0%	Not very plastic
ST07	25-40	-	-	10YR 4/1 dark gray	Clay loam	1%	More plastic clay with few calcium carbonates. Mottles gray horizon
ST08	0-55	-	100%	10YR 3/1 Very dark gray	Clay	0%	Homogeneous with some calcium carbonate tiny nodules at 35 cm, low density. Stopping at moist clay. Near agricultural ditch.
ST09	0-15	-	100%	10YR 3/2 Very dark grayish brown	Clay loam	0%	Very compacted soil from cattle, on slope near stock pond.

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST09	15-40	-	-	10YR 4/2 Dark grayish brown	Clay loam	0%	Homogeneous; Very few calcium carbonates; was a gradual boundary from above
ST10	0-55	-	100%	10YR 3/2 Very dark grayish brown	Clay loam	Up to 15%	Homogenous; Last 10-15 cm increasing gravel and calcium carbonates
ST11	0-20	+	100%	10YR 3/1 Very dark gray	Clay loam	1%	5 pieces clear glass including 1 container base; 1 piece aqua glass; 6 pieces brown glass including 1 crown top bottle, 1 burned – beer bottle?; 1 piece black plastic; 1 wire nail; 1 wire spring; 1 blue plastic hose, extremely weather hardened.
ST11	20-40	-	-	10YR 3/1 Very dark gray	Clay loam	5%	Homogeneous; calcium carbonate nodules increasing
ST11	40-50	-	-	10YR 3/1 Very dark gray	Clay loam	10%	Abundant small calcium carbonate nodules throughout this level; bottom of ST near water table
ST12	0-20	+	100%	10YR 3/1 Very dark gray	Clay loam	<1%	2 wire nails; 2 pieces milk glass mason jar liners; 1 piece aqua glass; 2 pieces flat clear glass; 1 ceramic handle fragment; plastic wrapper fragments
ST12	20-40	+	-	10YR 4/2 dark grayish brown	Clay loam	1%	Plastic wrapper fragments in upper 5cm of level; sterile after that

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST12	40-50	-	-	10YR 4/2 dark grayish brown	Clay loam	<1%	Increased calcium carbonate specks; becoming more moist due to water table
ST13	0-20	+	100%	10YR 3/1 very dark gray	Clay loam	<1%	1 railroad spike/large nail; 2 large glass fragments; 2 small clear glass fragments; 1 piece brown container glass. Artifacts contained to upper 10cm.
ST13	20-40	-	-	10YR 4/2 dark grayish brown	Clay loam	<1%	More calcium carbonate specks. Terminated due to large root.
ST14	0-20	-	100%	10YR Brown 5/3	Loam	80-90%	Terminated due to hitting decomposing bedrock
ST15	0-30	-	100%	10YR Brown 5/3	Loam	80-90%	Terminated due to hitting decomposing bedrock from 20-30 cm
ST16	0-55	-	100%	10YR 4/2 Dark grayish brown	Loam	0%	Homogenous with few calcium carbonate specks
ST16	55-60	-	-	10YR Brown 5/3	Loam	0%	Lighter color horizon with small calcium carbonate nodules; gradual transition
ST17	0-50	-	100%	10YR 3/1 Very dark gray	Clay loam	<5%	Terminated at beginning of mottle horizon – 10YR 4/1 Very dark gray

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST18	0-25	-	100%	10YR 4/1 Dark gray	Clay	<1%	Homogeneous until yellowish decaying bedrock appeared. Terminated due to bedrock.
ST19	0-15	-	100%	10YR 4/1 Dark gray	Coarse silty clay	80% small gravels	Homogeneous until decaying bedrock appeared. Terminated due to bedrock.
ST20	0-35	-	100%	10YR 3/1 Very dark gray	Clay	<1%	Mostly homogenous until gradual smooth lower boundary with lower layer
ST20	35-50	-	-	10YR 4/1 Dark gray	Clay	1-5%	Increasing calcium carbonates. Mottle color-10YR 7/3 Very pale brown
ST21	-	-	80%	-	-	-	Terminated due to decomposing bedrock at surface
ST22	0-25	-	100%	10YR 4/1 dark gray	Silty clay	<1%	Decomposing bedrock from 20-25cm. Terminated due to bedrock.
ST23	0-25	-	70%	Not recorded	Clay loam	0-5%	Lots of grass roots, fairly compact clay
ST23	25-50	-	-	Not recorded	Clay loam	0-5%	Mottled compared to strat above

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST24	0-40	-	98%	0-39cmbs: 10YR 2/2 very dark brown 40cmbs: 10YR 4/2 dark greyish brown	Clay	<1%	Little if any gravels; dried clay matrix. Mottles begin at 38 cmbs, soil change at 40cmbs. Terminated due to soil change and presence of calcium carbonates.
ST25	0-20	-	70%	10YR 3/2 Very dark greyish brown	Silty clay	<1%	Compact clay with grass roots, minimal calcium carbonates
ST25	20-42	-	-	10YR 4/2 Dark greyish brown	Silty clay	0-5%	Very gradual transition; increase in calcium carbonates in this strat
ST26	0-45	-	95%	10YR 2/2 Very dark brown	Clay	<1%	Few gravels. Dry clay. Top 20-25 cmbs were less compact. After 25, very compact. Terminated due to compact soil.
ST27	0-30	-	70%	7.5YR 2.5/1 Black, with mottles of 10YR 6/1 Grey	Clay	0-5%	Grass roots. Mottled with very compact clay and a lighter (2.5YR 7/3 pale yellow) soil.
ST27	30-45	-	-	10YR 3/1 Very dark grey	Clay	5-10%	Significant increase in calcium carbonate content, also a large animal burrow.
ST28	0-25	-	100%	10YR 3/2 Very dark greyish brown	Clay	<1%	Moist clay. Gradual transition to lower layer.
ST28	25-45	-	-	10YR 4/2 Dark greyish brown	Clay	<1%	Lighter in color with depth. Increase in calcium carbonates with depth. Terminated due to calcium carbonates.

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST29	0-25	-	100%	10YR 2/2 Very dark brown	Clay	<1%	Dry clay, gradual transition to lower boundary. Lower boundary is less a change in color than an increase of density in mottles.
ST29	24-45	-	-	Mottle color: 10YR 4/2 Dark greyish brown	Clay	<1%	Increasing mottles with depth, increasing calcium carbonates with depth. Terminated due to calcium carbonates.
ST30	0-10	-	70%	7.5YR 2.5/1 Black Mottled with: 10YR 3/2 Very dark greyish brown	Clay	0-5%	Compact mottled clay with grass roots and some calcium carbonates
ST30	10-40	-	-	10YR 3/2 Very dark greyish brown	Clay	5-10%	More compact clay, increase in calcium carbonate nodule size and frequency
ST31	0-40	-	100%	10YR 3/1 Very dark grey	Clay	<1%	Homogenous in color. Increasing calcium carbonates with depth. Terminated due to calcium carbonates
ST32	0-40	-	100%	10YR 3/1 Very dark grey	Clay	<1%	Gradual increase in calcium carbonates with depth. Homogenous color. Terminated due to calcium carbonates
ST33	0-25	-	100%	10YR 6/3 Pale brown	Silty loam	<1%	Hit decomposing bedrock around 20 cmbs.
ST34	0-25	-	100%	10YR 6/3 Pale brown	Silty loam	<1%	Hit decomposing bedrock around 20 cmbs.

Cultural Resources Services (Shovel Test Log)

TIRZ #1 East Phase 1 Trunk Line ■ Lorena, McLennan County, Texas

Shovel Tests from March 14-16, May 11, July 19, 2017 ■ Terracon Project No.

96167902



ST ID #	Depth cmbs	+/-	Ground cover	Munsell & Color	Texture	% Gravels	Comments
ST35	0-25	-	100%	10YR 3/2 Very dark greyish brown	Silty loam	<1%	Gradual transition to lower layer. Not really a soil color change in lower later, increase in mottles make the soil look lighter.
ST35	25-45	-	-	Mottle color: 10 YR 5/3 Brown	Silty loam	<1%	Increasing mottles and calcium carbonates with depth. Terminated due to calcium carbonates.