



13 March 2023

Jacob Bell, P.E.
Walker Partners
823 Washington Avenue, Suite 100
Waco, Texas 76701

RE: Burleson Quadrangle Archeological Investigation, Baylor University, McLennan County, Texas

INTRODUCTION

Integrated Environmental Solutions, LLC (IES) was contracted by Walker Partners to conduct a geophysical survey within the vicinity of a purported grave marker, previously known as the Indian Princess marker, which has been documented as an unverified grave location purported to exist within the Burleson Quadrangle (Quad) at Baylor University (University) in Waco, McLennan County, Texas. The geophysical survey was conducted using electromagnetic induction and magnetometer methods within eastern half of the Quad encompassing a 148 by 98-ft area (0.33-acre [ac] 14,375-square foot [ft²]) (**Attachment A, Figure 1**). As a result of the geophysical survey, a potential grave anomaly, approximately 6 feet (ft) long and 3 ft wide (18 ft²) and located approximately 10 ft north of the former memorial marker location, was identified through data interpretation. On 20 December 2022, IES investigated the potential grave anomaly through mechanical trenching within an approximate 150 ft² area surrounding the potential grave anomaly (**Attachment A, Figure 2**). The following describes the pertinent regulations, methodology, results, and recommendations of the investigation.

PERTINENT REGULATIONS

Texas Health and Safety Code

Under the provisions of the Texas Health and Safety Code (THSC), as amended by Texas Senate Bill (SB) 1630, the owner of a property on which an unknown cemetery is discovered or on which an abandoned cemetery is located may not construct improvements on the property in a manner that would disturb the cemetery until the human remains interred in the cemetery are removed under a written order issued by the state registrar or the state registrar's designee (THSC Section 711.004[f]). Currently, the purported grave within the Quad is considered an unverified cemetery. The THSC defines an unverified cemetery as "a location having some evidence of interment but in which the presence of one or more unmarked graves has not been verified." Per the THSC, a person who discovers an unverified cemetery shall file notice of evidence of the discovery with the THC. The unverified cemetery within the Quad was reported to the THC on 09 September 2021. Statutory language within the THSC is limited regarding unverified cemeteries with obligations for compliance mostly applicable only to unknown or abandoned cemeteries, which are different categories of cemetery than the unverified cemetery within the Quad.

MECHANICAL EXCAVATION METHODS

To determine the presence of the potential grave anomaly, a targeted mechanical excavation was conducted based on the data acquired through the geophysical survey. Mechanical surface scraping was then conducted within an approximate 150 ft² area surrounding the approximate 18 ft² potential grave anomaly. Mechanical scraping was conducted using a backhoe with a 24-inch (in)-wide smooth bucket. All mechanical excavations were monitored by two archeologists and Occupational Health and Safety Administration (OSHA) competent persons with previous experience conducting this type of investigation in the region. Vegetation, organic matter, and surface soils were incrementally skimmed from the ground surface until undisturbed subsoil was encountered. Grave shafts are commonly identified during archeological investigations by soil stains that differ in color, texture, and consistency from the surrounding undisturbed soil matrix. Therefore, specific attention was paid to identifying and investigating soil variations. If evidence of a human burial was observed, mechanical excavation was to immediately halt so that any potential human remains were not disturbed. Prior to this survey, it was anticipated that the Quad has been extensively disturbed through repeated historic and modern construction activities, including the installation of utilities. As a result, the level or depth of disturbed fill was undetermined prior to this investigation.

MECHANICAL EXCAVATION RESULTS

At the location of the potential grave anomaly, an approximate 150 ft² area measuring a maximum of 17.5 ft by 22 ft was systematically scraped to assess for the presence of a grave shaft or human remains (see **Attachment A; Figure 2**). During the mechanical scraping, construction fill that ranged from approximately 2 to 2.5 ft (60 to 76 centimeters [cm]) in thickness was encountered just below surface (**Attachment B; Photograph 1**). Within the construction fill, a small circular pit feature approximately 1.8 ft (54 cm) in diameter and 0.5 ft (15 cm) in thickness was encountered at the southeastern end of the location of the geophysical anomaly (**Attachment B; Photographs 2 and 3**). This pit contained a dense, burned concentration of slag, coal, or other black rock in addition to small fragments of brick, glass, and chips of yellow paint. At similar depths to this feature, a speckling of the black slag/coal or other black rock within the soil matrix were observed extending to the northwest. The concentration and lighter speckling of magnetic material corresponds with the amplitude of the geophysical data, which had a higher amplitude at the southeastern end and lower amplitude at the northwestern end. Due to the similarities in horizontal composition between the geophysical anomaly and the burned concentration, it was determined that the geophysical anomaly is not associated with a Native American burial. The mechanical scraping then proceeded below the fill in search of natural soil. Within apparent natural soils, a concentration of Native American artifacts comprised of approximately three stone tools or tool fragments, 12 stone flakes, a prehistoric ceramic sherd, a nutshell, and two small fragments of bone were encountered (**Attachment B; Photographs 4 and 5**). These artifacts were located approximately 0.5 ft (15 cm) below the circular feature and within 3 ft (91 cm) or less from the sidewalk edge and a buried utility tunnel. The lithic artifacts and a single ceramic sherd were the first artifacts encountered and were clearly identifiable as Native American, but it was uncertain if they pertained to a burial as no burial pit or associated funerary items were observed. To investigate the presence or absence of a burial, the concentration of artifacts was carefully exposed by hand excavation with trowels and wooden tools. No mechanical scraping was conducted at that time. After further examination of the feature, two small, highly deteriorated bone fragments were encountered. Bone Fragment (BF) 1 was identified by the presence of an approximate 0.8 in (2 cm) long by 1 cm wide fragment with a concaved surface and a minute number of visible osteons. A soil stain approximately 1.2 in (3 cm) long extended linearly from the fragment. Bone Fragment 2 was identified directly adjacent to BF1, but was even more degraded than BF1 and comprised of an approximate 2.4 in (6 cm) by 1.2 in (3 cm) wide soil stain with flaking of more consolidated bone less than 0.25 in (0.5 cm) in size present within the stain. Due to the deteriorated state of BF1 and BF2, they could not be removed from the soil without complete disintegration of the specimens. The poor condition made the classification of species indistinguishable, but it was clear that they were not associated with any articulated skeletal remains (**Attachment B, Photograph 6**). Once the bone fragments were encountered, due to the location of the finding within the purported location of a Native American grave the decision was made to cease work until further actions could be discussed.

To determine the age of the artifacts and bone fragments, the collected nutshell was sent to Beta Analytic Testing Laboratory to obtain a C-14 radiocarbon date. The nutshell was determined to be modern (post 1950 AD) and not associated with the artifacts. It is highly likely the nutshell came from the modern deposits positioned above and around the prehistoric artifacts as they were located in a dynamic setting beneath and adjacent to modern construction fill and other modern disturbances. IES analyzed the ceramic sherd for diagnostic attributes, but was unable to identify any on the small specimen. As an additional attempt to determine the age of the artifacts, the prehistoric ceramic sherd was sent for C-14 radiocarbon testing. Beta Analytic completed the bulk processing of the sherd and obtained a C-14 radiocarbon of 1166 to 1268 AD (**Attachment C**). Based on the obtained C-14 date and the presence of prehistoric pottery, it is assumed that the site could pertain to an unidentified Plains Village group. Much of North Central Texas is within the far southern extension of the Plains Village tradition, which generally spanned from between 1000 and 1300 AD during the Late Prehistoric Period. However, no confident cultural affiliation can be assigned at this time due to the limited information gathered. Given the site's age, it is possible that even if more data is collected, no specific prehistoric group could be assigned to the site. Based on these data, it has been confirmed that the archeological deposits encountered during the mechanical scraping are not associated with the purported nineteenth century burial event.

CONCLUSIONS

As limited subsurface investigations were performed to investigate the identified geophysical anomaly, few conclusive determinations can be developed at this time. What can be concluded from the investigations are the following:

- 1) The geophysical anomaly identified in proximity to the purported grave marker does not pertain to a grave.
- 2) No definitive human remains, burial pit, or other grave-related artifacts were identified during the investigation of the geophysical anomaly.
- 3) The artifacts encountered during the investigation represent a site where stone tool production, resource processing, and general habitation occurred by an undetermined precontact prehistoric group during the twelfth and thirteenth centuries.
- 4) Cultural material encountered during the investigation indicates the site may possess significant archeological data potential.

- 5) The geophysical survey conducted using electromagnetic induction and magnetometer methods within the eastern half of the Quad (encompassing a 148 by 98-ft area (0.33-ac; 14,375-ft²) (see **Attachment A, Figure 1**), found no other potential grave anomalies.

RECOMMENDATIONS

- 1) THSC Legal Consultation: IES recommends that the University consult with their legal representation to ensure that its obligations under the THSC have been fulfilled.
- 2) Prepare an Unanticipated Discovery Plan and Procedure: Due to the purported grave location and the presence of archeological deposits within the Quad, IES recommends that a Plan and Procedures for the Unanticipated Discovery of Cultural Resources and Human Skeletal Remains be developed to provide guidance for field procedures and notifications if additional cultural resources or human skeletal remains are encountered during construction.

We appreciate the opportunity to assist on this project. If you have any questions, please contact me by telephone at (972) 562-7672 or via email at kstone@intenvsol.com.

Sincerely,

Integrated Environmental Solutions, LLC

A handwritten signature in black ink, appearing to read 'K Stone', with a stylized flourish at the end.

Kevin Stone, MA, RPA
Cultural Resources Director

ATTACHMENT A

Figures

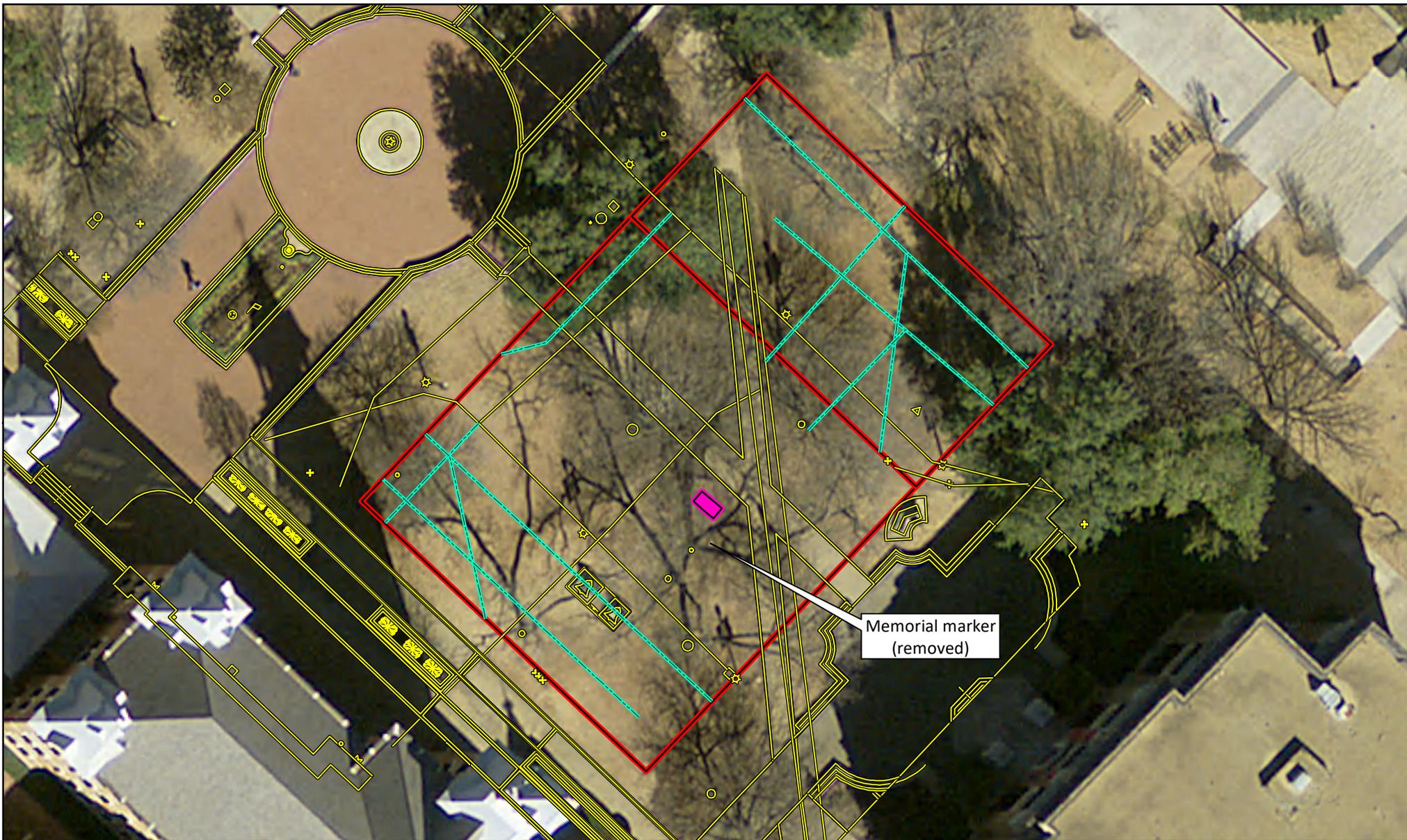
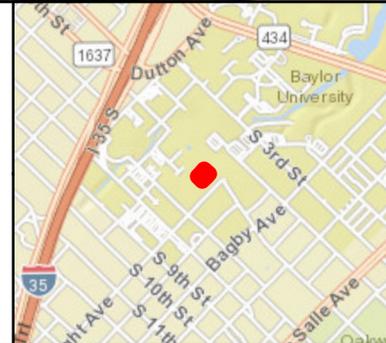
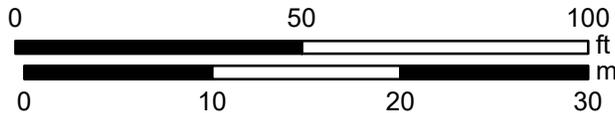


Figure 1
Burleson Quadrangle
Geophysical Survey Anomalies

-  Geophysical Survey Area
-  Site Plan
-  Infrastructure Related Geophysical Anomalies
-  Potential Grave



County: McLennan
State: Texas
Date: 10/25/2022
Coordinate System: NAD 83 UTM Zone 14N
Source: USDA Stratmap imagery (2018)

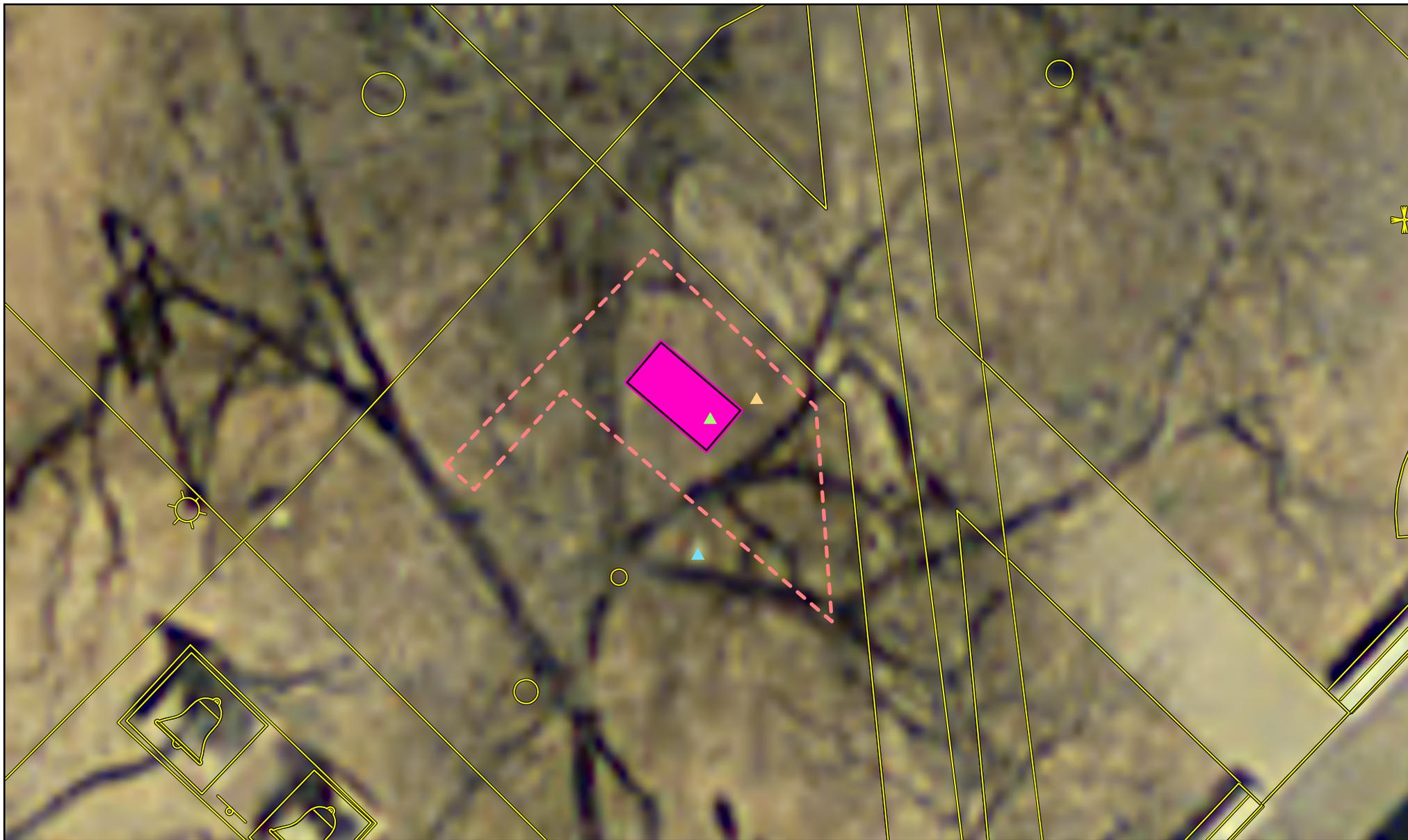
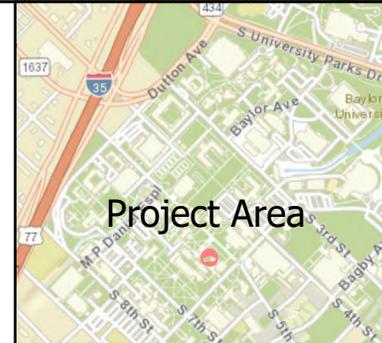
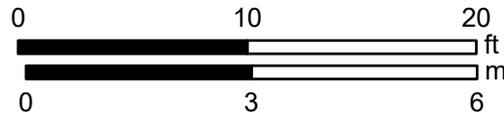


Figure 2
Burleson Quadrangle
Geophysical Survey Anomalies &
Mechanical Scraping Results

County: McLennan
 State: Texas
 Date: 2/21/2023
 Coordinate System: NAD 83 UTM Zone 14N
 Source: USDA Stratmap imagery (2018)

-  Site Plan
-  Geophysical Anomaly
-  Mechanical Scraping Area
-  Construction Fill Feature
-  Prehistoric Artifact Concentration
-  Indian Princess Marker



ATTACHMENT B

Photographs



Photograph 1: Soil profile within mechanical scrape area. View to the south.



Photograph 2: Burned concentration of non-prehistoric materials at location of geophysical anomaly.



Photograph 3: Profile of burned concentration.



Photograph 4: Ceramic sherd recovered.



Photograph 5: Lithic artifacts recovered. Lithic flakes at top with tool and tool fragments at bottom.



Photograph 6: Plan view of prehistoric artifact concentration.

ATTACHMENT C
C-14 Dating Results



Beta Analytic
TESTING LABORATORY

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

February 20, 2023

Mr. Christopher Goodmaster
Integrated Environmental Solutions, LLC
101 South Locust Street
Suite B-03
Denton, TX 76201
United States

RE: Radiocarbon Dating Results

Dear Mr. Goodmaster,

Enclosed is the radiocarbon dating result for one sample recently sent to us. As usual, specifics of the analysis are listed on the report with the result and calibration data is provided where applicable. The Conventional Radiocarbon Age has been corrected for total fractionation effects and where applicable, calibration was performed using 2020 calibration databases (cited on the graph pages).

The web directory containing the table of results and PDF download also contains pictures, a cvs spreadsheet download option and a quality assurance report containing expected vs. measured values for 3-5 working standards analyzed simultaneously with your samples.

The reported result is accredited to ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 standards and all pretreatments and chemistry were performed here in our laboratories and counted in our own accelerators here in Miami. Since Beta is not a teaching laboratory, only graduates trained to strict protocols of the ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 program participated in the analysis.

As always Conventional Radiocarbon Ages and sigmas are rounded to the nearest 10 years per the conventions of the 1977 International Radiocarbon Conference. When counting statistics produce sigmas lower than +/- 30 years, a conservative +/- 30 BP is cited for the result unless otherwise requested. The reported $\delta^{13}C$ was measured separately in an IRMS (isotope ratio mass spectrometer). It is NOT the AMS $\delta^{13}C$ which would include fractionation effects from natural, chemistry and AMS induced sources.

When interpreting the result, please consider any communications you may have had with us regarding the sample. As always, your inquiries are most welcome. If you have any questions or would like further details of the analysis, please do not hesitate to contact us.

Thank you for prepaying the analysis. As always, if you have any questions or would like to discuss the results, don't hesitate to contact us.

Sincerely,

Digital signature on file

Ronald E. Hatfield President



REPORT OF RADIOCARBON DATING ANALYSES

Christopher Goodmaster

Report Date: February 20, 2023

Integrated Environmental Solutions, LLC

Material Received: February 09, 2023

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
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Beta - 655573	04.142.031_Sample2	830 +/- 30 BP	IRMS $\delta^{13}C$: -28.8 o/oo
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(95.4%)	1166 - 1268 cal AD	(784 - 682 cal BP)
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Submitter Material: Potsherd Residue

Pretreatment: (bulk sherd organics) acid washes

Analyzed Material: Bulk sherd organics

Analysis Service: AMS-Standard delivery

Percent Modern Carbon: 90.18 +/- 0.34 pMC

Fraction Modern Carbon: 0.9018 +/- 0.0034

D14C: -98.17 +/- 3.37 o/oo

$\Delta^{14}C$: -106.09 +/- 3.37 o/oo (1950:2023)

Measured Radiocarbon Age: (without d13C correction): 890 +/- 30 BP

Calibration: BetaCal4.20: HPD method: INTCAL20

Results are ISO/IEC-17025:2017 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the ¹⁴C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB. References for calendar calibrations are cited at the bottom of calibration graph pages.

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL20)

(Variables: $\delta^{13}\text{C} = -28.8$ o/oo)

Laboratory number **Beta-655573**

Conventional radiocarbon age **830 ± 30 BP**

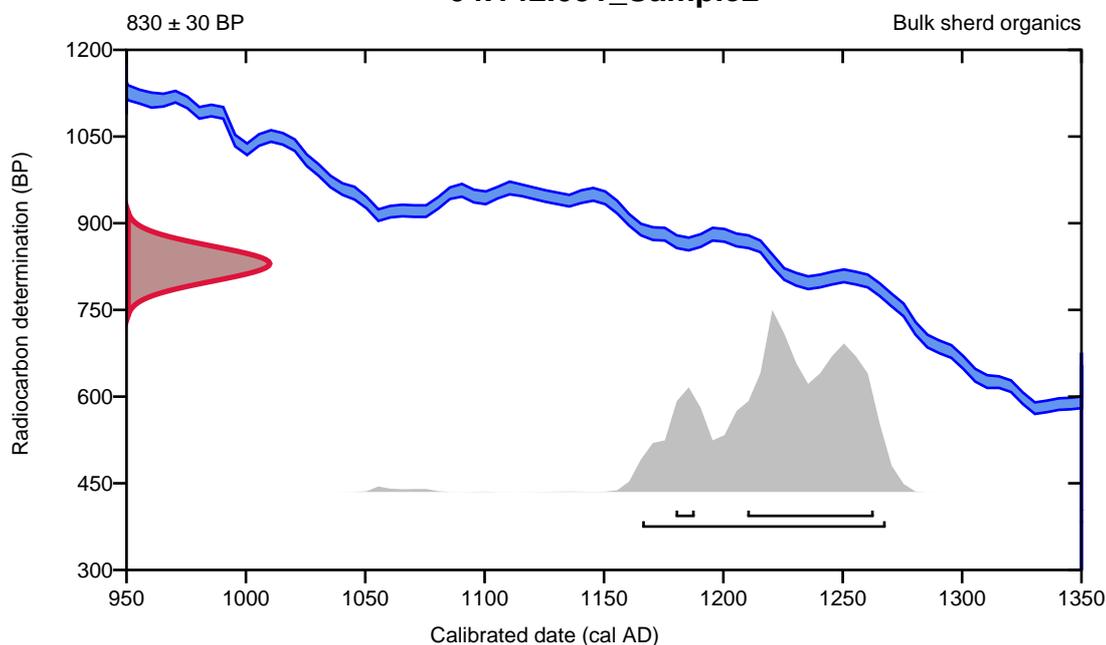
95.4% probability

(95.4%) 1166 - 1268 cal AD (784 - 682 cal BP)

68.2% probability

(61%) 1210 - 1263 cal AD (740 - 687 cal BP)
(7.2%) 1180 - 1188 cal AD (770 - 762 cal BP)

04.142.031_Sample2



Database used
INTCAL20

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. *Radiocarbon*, 51(1), 337-360.

References to Database INTCAL20

Reimer, et al., 2020, *Radiocarbon* 62(4):725-757.



Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date: February 20, 2023
Submitter: Mr. Christopher Goodmaster

QA MEASUREMENTS

Reference 1

Expected Value: 0.44 +/- 0.04 pMC

Measured Value: 0.44 +/- 0.04 pMC

Agreement: Accepted

Reference 2

Expected Value: 129.41 +/- 0.06 pMC

Measured Value: 129.34 +/- 0.35 pMC

Agreement: Accepted

Reference 3

Expected Value: 96.69 +/- 0.50 pMC

Measured Value: 97.29 +/- 0.31 pMC

Agreement: Accepted

COMMENT: All measurements passed acceptance tests.

Validation:


Digital signature on file

Date: February 20, 2023