

COUNCIL OF TEXAS ARCHEOLOGISTS

Standards and Guidelines Committee

Intensive Terrestrial Survey Guidelines

March 30, 2020

I. INTRODUCTION AND PREAMBLE

The standards and guidelines contained herein were developed by the Council of Texas Archeologists (CTA) Standards and Guidelines Committee, additional subject-specific ad hoc sub-committees, and input from the CTA membership at large. The guidelines were initially approved by CTA membership on April 5, 2019 and the accepted version has been reviewed by the Texas Historical Commission (THC) Archeology Division. The current version includes their comments and suggested revisions. The guidelines below should be considered minimum acceptable standards for discovery level of investigations. The goal for these guidelines is to ensure any potential survey area has undergone adequate due diligence to identify the potential presence of archeological sites, presence/absence of cultural material has been fully assessed, boundaries for archeological sites have been accurately recorded and delineated, and that field data collection will be sufficient to support any findings from the survey level investigation. These guidelines will be revised and added to as additional techniques and methods for discovery of archeological sites become more prevalent and/or standardized.

1. Professional Qualifications

Archeological investigations must be supervised by an archeologist who meets the U.S. Secretary of the Interior's Professional Qualification Standards for Archeology (48 FR 22716 or 36 CFR Part 61); or meets the requirements for Principal Investigator defined in Title 13, Part II of the Texas Administrative Code, Chapter 26 Subchapter A, Rule §26.4.

II. NEAR SURFACE INTENSIVE SURVEY

These standards should be considered the minimum acceptable for terrestrial surveys less than 200 acres in size. Specific project circumstances may suggest variance from these standards; such conditions should be discussed with the THC Archeology Division prior to implementing the survey and should be clearly described and defended in the plan of work and the report of investigations. For project areas larger than 200 acres, survey methodologies should be discussed with the THC Archeology Division prior to implementing the survey.

1. Background Research

Archeologists must conduct background research prior to field investigations. At a minimum this shall include searches of the Texas Historical Commission and the Texas Archeological Research Laboratory records or the equivalent Texas Archeological Sites Atlas Database for previously recorded archeological sites and historic properties and for previous archeological work. A 1-km search radius works well in many locations, but this search distance can be increased as necessary to best provide a context for the proposed survey. The background research should also include pre-field review of historic maps and aerial imagery of the project area to identify locations of historic structures and features that should be investigated.

2. Survey Transect Interval

The maximum interval between transects should not be greater than 30 m.

3. Shovel Testing

Shovel tests (STs) are excavated in settings that have potential for shallowly buried cultural materials. STs are 30 cm in diameter or on a side and are dug in levels no thicker than 20 cm with sediments screened through ¼-inch mesh unless high clay or water content requires that they be troweled through. STs are excavated to the lesser of:

- a) the bottom of Holocene deposits in depositional areas;
- b) subsoil in upland areas; or
- c) a minimum depth of 80 cm.

If the impacts from the proposed action/undertaking are anticipated to be deeper than 80 cm, then deeper mechanical investigations (see Deep Prospection Standards) or geophysical remote sensing may be warranted. Locations of all STs should be recorded regardless of whether cultural materials were recovered from the ST.

The following should be used to calculate the minimum number of shovel tests to excavate a project area. Site delineation shovel tests are excavated in addition to survey shovel tests and should not be used to satisfy the minimum number indicated below.

- a) Linear surveys.
 - i) Linear projects are defined as at least 10 times longer than they are wide and require at least one transect for every 30 m of width or fraction thereof. At least one ST is required per 100 linear meters (m) of each transect (equivalent to at least 16 ST per mile).
 - 1) For example, a project within a 150-foot-wide (46-m-wide) corridor that is one mile in length (1.61 kilometers) would require two survey transects with a minimum total of 32 STs.
 - ii) Divergence from strict transect lines and spacing is encouraged to investigate landforms, visible features, or other high probability areas and/or to avoid a surface restrictive feature (e.g., bedrock, creek, pavement) that prevents sub-surface exploration in an effort to redirect efforts to investigating landforms with a high potential to contain sites.

The overall shovel test density should remain in keeping with the overall project dimensions. Investigations should avoid relying solely on preset locations for shovel tests.

- b) Area (non-linear) surveys.
 - i) For projects less than 25 acres in area, at least 2 STs should be excavated per acre.
 - ii) For projects between 25 and 200 contiguous acres in size, at least 50 STs should be excavated for the first 25 acres plus at least one ST per every five acres over 25 acres.
 - 1) For example: a 30-acre survey would require a minimum of 51 STs; a 35-acre survey would require a minimum of 52 STs; a 199-acre survey would require a minimum of 85 STs.
 - iii) For project areas larger than 200 acres, survey methodologies should be discussed with the THC Archeology Division prior to implementing the survey. In some cases, a predictive model may be appropriate to stratify the project area into zones having different field tactics.

EXCEPTIONS TO STANDARD SHOVEL-TESTING GUIDELINES: Shovel testing should be conducted for all project areas; however, some locations may preclude or limit the usefulness of shovel tests. Some of these areas may include:

- a) upland or erosional settings with exposed bedrock;
- b) on slopes greater than 20 percent (ca. 11 degrees); and/or
- c) in settings with evidence of significant ground disturbance.

All such locations should be clearly delineated on maps, photo-documented, and discussed in the report. Ground surface visibility alone is not justification for excluding sub-surface investigations. All areas must be shovel-tested regardless of surface visibility unless multiple lines of evidence, including both desktop and field observations, can demonstrate no potential for buried deposits. A minimum of one ST must be excavated and photo-documented for each excluded area, regardless of surface visibility, to assess the potential for buried deposits where artifacts may not be visible on the surface and/or demonstrate the nature and extent of significant ground disturbance. Please note that the intent is not to reduce the level of effort (excavating fewer STs than prescribed for the project area), but rather to redistribute STs to areas where there is greater potential for buried cultural materials.

4. Defining Site and Isolated Find Boundaries

All project research designs or scopes of work should include a clear definition of what constitutes an archeological site and an isolated find. It is expected that any cultural materials identified during survey greater than 50 years of age would at least minimally be designated as an isolated find. When defining site boundaries, a combination of natural and cultural features, and archival documentation should be incorporated into site definition.

In consideration of site definitions, all artifact scatters should be delineated as sites through shovel testing and in-field observations. To delineate site boundaries in settings having the potential for shallowly buried cultural materials, positive STs should be excavated in a cruciform pattern at intervals no greater than 15 m until two negative STs are found in each direction or topographic limits (e.g., landform boundaries, streams) are reached. Site boundaries should be recorded from the location of the first negative ST, unless an additional ST between the first negative and last positive is conducted and is also negative. All surficially

discovered sites or isolated finds must be accompanied by ST investigations to verify whether additional sub-surface deposits are associated and site boundaries properly delineated. For larger sites, additional STs may be necessary to define boundaries beyond just the four cardinal directions.

5. Field Recording

The following paragraphs discuss specific guidelines pertaining to in-field photography and geospatial data collection.

PHOTOGRAPHY: The following discussion assumes all field images will be captured in a digital format. All field photographs should be captured with the subject in focus with a camera capable of at least 5 MP[1] images. Although most cameras natively capture images in a lossy JPG format, a lossless format, such as TIFF or RAW, is often required for curation and images should be captured in this format, if possible. The locations of all photographs should be captured either through a GPS or should be capable of being plotted on a 1:12,000 map.

- a) All archeological sites should be photographed from a minimum of two angles with as consistent of lighting as possible. Photographs of all cultural features and other representative natural features of interest should be captured for each site.
- b) Representative photographs of project area conditions should be captured for all projects.

GEOSPATIAL DATA: Survey corridor boundaries and locations of all subsurface excavations including STs should be recorded in the field. An accurate site map that can be easily referenced to a 1:24,000 scale quadrangle map is required for all recorded archeological sites. Required information on all maps includes locations of all STs, excavations, site overview photographs, individual artifacts or artifact clusters, cultural features, and relevant natural or other landscape (e.g., roads, buildings) features. GPS locations are often recorded in combination with or in place of pace/tape and compass mapping of sites and project areas. For field projects employing GPS as the only mapping technique, the GPS data should be recorded and reported with the instrument and field methods used to collect the data in order to provide an estimate for the data accuracy.

- a) Most baseline consumer-grade GPS units collect with a 3–5 m accuracy, while WAAS[2]-enabled units are capable of 1–3 m accuracy in the best conditions. Submeter-accurate GPS data should be collected on sites when recording point-provenienced artifacts and features, and these data should be reported along with error measurements.

In-Field Artifact Recording – It is strongly recommended that all artifacts from subsurface contexts and diagnostic surface artifacts be collected. However, if a diagnostic-only or no-collect policy is being implemented, the following minimum levels of documentation are required for the in-field documentation of artifacts:

- a) For both no-collect and collection strategies, quantities of artifacts or estimates of materials in surface scatters should be recorded for all sites and the locations of artifact concentrations plotted on site maps. Research designs and reports need to be clear on sampling methodology employed.
- b) For any limited or non-collection strategy, artifact field documentation should be sufficient to achieve the analysis proposed and discussed in the scope of work or research design and draft

report. Field documentation methodologies should allow for determining the appropriate regional, temporal, or stylistic elements for each of the documented artifact classes.

- c) Photography. For limited and no-collect surveys, all artifacts recovered from shovel tests or other sub-surface investigations should be photographically documented if they are not being collected. In addition, all uncollected diagnostic artifacts and a representative sample of non-diagnostic materials from the surface should be documented in the field. In addition to the standards for photography provided above, the following are specific to artifact documentation:
 - i) All images must include a scale, and preferably, include a color correction card.
 - ii) All sides of diagnostic artifacts must be photographed. For non-diagnostic artifact classes such as container glass, debitage, or burned rock, an image of all material recovered from subsurface tests and a representative sample of surface finds should be included. Photographs must be of sufficient resolution to permit minimal recording of diagnostic attributes (cf. color/width/form)
 - iii) With the exception of photos showing *in situ* artifact contexts, artifact images should be taken on a neutral background or background that effectively complements the artifact color to maximize identification.
 - iv) Images of all diagnostic artifacts and a representative sample of other artifacts must be included in the report or as an appendix. All artifact photos should be curated with the receiving repository.
- d) Additional Site Data. Data suitable for compilation and submission of state site survey forms or site revisits should be recorded as required by Chapter 26, Subchapter A, Rule §26.14f

6. Site Forms and Site Revisit Forms

Site forms and site boundary polygons should be submitted for all sites investigated. In addition, site revisit forms should be submitted for any previously recorded site location that is investigated, regardless of whether cultural deposits are encountered at the previously recorded location. If changes in the site boundary are recommended based on the current investigations, a revised site boundary polygon should also be submitted.

**NEAR-SURFACE INTENSIVE SURVEY
SUMMARY TABLE**

MINIMUM NEAR-SURFACE INTENSIVE SURVEY STANDARDS For Project Areas of 200 Acres or Less							
Transect Interval	Not greater than 30 meters						
<i>Linear Surveys</i>	<ul style="list-style-type: none"> • Must be more than 10 times longer than they are wide • Require one transect for every 30 m of width or fraction thereof • At least one ST is required per 100 linear meters on each transect (16 ST per mile) 						
<i>Area Surveys</i>	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>Size</u></th> <th style="text-align: left; border-bottom: 1px solid black;"><u>Shovel Test Density</u></th> </tr> </thead> <tbody> <tr> <td><25 acres</td> <td>2 per acre</td> </tr> <tr> <td>25–200 acres</td> <td>50 ST for the first 25 acres, plus 1 ST every 5 acres over 25 acres</td> </tr> </tbody> </table>	<u>Size</u>	<u>Shovel Test Density</u>	<25 acres	2 per acre	25–200 acres	50 ST for the first 25 acres, plus 1 ST every 5 acres over 25 acres
<u>Size</u>	<u>Shovel Test Density</u>						
<25 acres	2 per acre						
25–200 acres	50 ST for the first 25 acres, plus 1 ST every 5 acres over 25 acres						
Site Definition	<p>All projects require a clear definition of an archeological site to guide field survey</p> <p>All surficial and near-surface sites need to be investigated through shovel testing¹. Delineation shovel tests should be excavated in a cruciform pattern at 15 m intervals or less until two negatives are encountered in each direction or landform limits are reached.</p>						
Field Recording <i>Projects & Sites</i>	<ul style="list-style-type: none"> • Representative photographs of typical project area conditions required for all projects, including no finds surveys. • Archeological sites require photographs from different angles documenting site setting. • All cultural features and representative other natural features should be photographed • Locations of sites, sub-surface excavations, survey corridors, relevant features, and photograph locations need to be mapped through GPS or other means capable of referencing all data to 1:24,000 scale quadrangle maps 						
<i>Artifacts</i>	<ul style="list-style-type: none"> • Quantities or estimates of cultural material types in surface scatters must be recorded . • All diagnostic artifacts and representative non-diagnostic materials should be documented through photography. • All images must include a scale, and preferably, a color correction card. • All sides of artifacts should be photographed. 						

1. Shovel tests (STs) are excavated in settings that have potential for shallowly buried cultural materials. STs are 30 cm in diameter or on a side and are dug in levels no thicker than 20 cm with sediments screened through ¼-inch mesh unless high clay or water content requires that they be troweled through. STs are excavated to the lesser of:

- a. The bottom of Holocene deposits in depositional areas;
- b. Subsoil in upland areas; or
- c. A minimum depth of 80 cm.

III. SURVEY LEVEL MECHANICAL PROSPECTION

This document is intended to establish minimum standards, and best practices where appropriate, for using mechanical equipment to locate and define the boundaries of buried archeological sites in a terrestrial setting. It includes standards for documentation, but is not intended as a standard for geoarcheological work. It is also not intended to guide the use of mechanical equipment to assess and investigate sites (beyond basic boundary definition during the identification phase). All such activity should be governed by a site-specific plan developed in consultation with the THC.

SAFETY: All mechanical excavation and documentation should be performed in a safe manner in full compliance with all applicable OSHA regulations.

DEPTH: All mechanical excavation should be continued to the lesser of:

- a) the project's vertical APE (Area of Potential Effect);
- b) bedrock;
- c) deposits that represent facies beneath which archeological potential is minimal, such as thick (50 cm+) channel gravels;
- d) deposits that substantially predate the Holocene; or
- e) to the maximum depth that can be reached by an appropriately scaled and powered machine (i.e., 4–5 m below ground surface for trenches; 1 m+ for auger tests).

All judgments regarding whether categories c) and d) are satisfied should be made by senior level personnel (e.g., a trained geoarcheologist or a Project Archeologist [PA] to PI level archeologist with experience in the region).

LOCATION: All mechanical units should be located using consumer-grade GPS (e.g., Magellan receivers, modern cell phone with specialized mapping app). Locations should use an explicit, consistent projection and datum.

Best Practices for location include:

- a) cross-checking GPS locations with aerial imagery;
- b) where possible, location should be recorded using GPS with sub-meter accuracy (e.g., Trimble) or survey equipment (e.g., Total Data Station) set at a known point;
- c) trench orientations/perimeters should be captured with multiple readings; and
- d) measurement error should be recorded and included in reporting.

1. Mechanical Augering

Machine-mounted power augers with a bore diameter of at least 8 inches (20 cm) may be substituted for shovel tests at a 1:1 ratio, provided that all of the spoil is screened to identify artifacts.

Hand augers and hand carried machine augers are useful for gauging sediment depth and identifying buried surfaces (paleosols), but in general are not considered reliable for assessing the presence of cultural material because of their small diameter. Therefore, hand augers and hand carried machine augers are not recommended as a substitute for shovel tests, particularly for determining that a site is not present. However, when machine access is not feasible for environmental reasons (e.g., in a wetland, in

dense hardwoods, on a floodplain segment surrounded by incised channels), hand augering with a 3-inch or 4-inch bucket auger at a 2:1 ratio to the recommended number of shovel tests (two augers per one shovel test) is considered a “reasonable and good faith” alternative.

Best Practices for Mechanical Augering include:

- a) use of a plywood sheet or heavy canvas tarp with a hole in it to sit around the auger and keep the spoil from falling into vegetation;
- b) use of extension bits to reach depths in excess of 1 m; and
- c) screen probe matrix with ¼-inch mesh for cultural materials.

2. Mechanical Trenching (backhoe, trackhoe, gradall, excavator)

While CTA recognizes that trenching is far more damaging to sites than shovel testing and that low impact methods such as remote sensing certainly have their place in archeological investigations, we believe that trenching is the only reliable method to determine whether a buried site is present below shovel test depths. Accordingly, we recommend that mechanical trenches should be used whenever shovel testing is inadequate to evaluate a given setting to the appropriate depth. Trenching is not recommended in lieu of shovel testing but should be employed when shovel tests alone do not reach required depths for a project.

While a trench provides a much better opportunity than a shovel test to identify buried cultural material at a given point on the landscape, individual trenches are not significantly better at providing areal coverage, and one trench cannot substitute for a large number of shovel tests. The same transect spacing should be used for trenching that is used for shovel tests, and trenches should be deployed at a ratio of 1:2 relative to the shovel test schedule in the survey standards. That said, the location of trenches should not be purely mechanistic. The investigator should adjust placement to accommodate terrain, vegetation, and modern cultural features. The density and placement of trenches for projects larger than 100 acres should be tailored to the area of interest by a trained geoarcheologist or a senior-level archeologist with experience in the region and negotiated in advance with THC. Trenches should be a minimum of 24 inches (60 cm) wide, at least 4 m long, and excavated to the appropriate depth, as specified above. Safety benches and access ramps should not be used to inflate the count of trenches for purposes of meeting this standard.

At minimum, trenches in loamy and clayey environments should be either:

- a) excavated by slowly peeling off thin (5 cm or less) subhorizontal layers under close monitoring using a smooth-bladed bucket, with subsequent hand cleaning and inspection of the walls and monitoring and inspection of spoil;
- b) excavated using a smooth-bladed or toothed bucket, with screening of at least one five-gallon bucket from every third excavator bucket load during excavation, and careful cleaning and inspection of the walls on completion; or
- c) excavated using a smooth-bladed or toothed bucket, with controlled hand excavation and screening of a contiguous column measuring at least 30 x 30 cm, and careful cleaning and inspection of the walls on completion. Because artifacts in sandy sediments are difficult to identify in trenches, sample screening (per approaches a or b above) is required for trenches in sandy environments. Minimum documentation standards for trenches should include a basic profile description and a high-quality color photograph of a well-cleaned profile column at least 1 m wide.

Best Practices for trenching include:

- a) use of a wide, smooth-bladed bucket during trenching;
- b) close monitoring and hand investigation of artifacts and features exposed in the floor as trenching occurs;
- c) excavation of a controlled column sample and screening of fill by depth;
- d) close, supervised cleaning of trench walls to identify archeological strata, which can be subtle in section;
- e) orientation of trenches so that profile photographs are uniformly lit;
- f) detailed description of profile using criteria of Schoeneberger et al. 2012 or similar
- g) opportunistic sampling of artifacts and datable materials; and
- h) staggering of trenches along adjacent transects.

3. Site Definition

Where practical, landforms and natural exposures should be employed to identify and constrain the boundaries of deeply-buried sites. Where sites are found at a depth greater than can be reached with shovel testing, a minimum of four trenches or mechanical auger tests should be used for site definition unless other criteria can be used to constrain site size. However, the need to define the boundary at depth should be balanced against disturbance to shallower components, and boundary definition may be deferred to the testing phase where warranted. Mechanical auger holes used for site definition should be substituted for shovel tests on a 1:1 basis.

4. Scraping (bulldozer, front end loader, maintainer/road grader)

While such equipment is often appropriate for prospecting for features (particularly burials) within the boundary of a known site, scraping is not endorsed as a method of site location. Any use of such equipment should be discussed in advance with THC.

References

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and Soil Survey Staff
2012. Field book for describing and sampling soils, Version 3.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

**SURVEY-LEVEL MECHANICAL PROSPECTION
SUMMARY TABLE**

MINIMUM DEEP PROSPECTION STANDARDS For Project Areas of 100 Acres or Less	
Depth	Excavation should continue to the lesser of: <ul style="list-style-type: none"> a) project's vertical APE b) bedrock c) deposits beneath which archeological potential is minimal (thick channel gravels, etc.)¹ d) deposits that substantially predate the Holocene¹ e) maximum depth that can be reached by appropriate machinery (4–5 m)
Equipment²	machine-mounted power auger, backhoe, trackhoe, gradall, excavator
Mechanical Augers³	<ul style="list-style-type: none"> • Minimum of 8-inch (20-cm) bore diameter • substituted for shovel tests at 1:1 ratio • All auger spoil should be screened to identify artifacts
Trenches⁴	<ul style="list-style-type: none"> • Minimum of 24 inches (60 cm) wide and 13 feet (4 m) long, excavated to appropriate depth, and benched according to safety concerns • Substituted for shovel tests at 1:2 ratio⁴ <ul style="list-style-type: none"> • Trenches should be excavated by peeling thin (5 cm) layers with a smooth-bladed bucket under close observation and subsequent cleaning of walls; --or-- • at least one 5-gallon bucket from every 3rd excavator bucket load should be screened, with subsequent cleaning of walls --or-- • controlled excavation and screening of a contiguous column measuring at least 30 x 30 cm

1. Judgments on trench placement should be made by senior-level personnel (e.g., trained geoarcheologist or PI-PA level archeologist with experience in the region) and justified in the report.
2. All deep excavation activities should comply with applicable laws governing workplace safety (OSHA).
3. Front-end loaders, road grader/maintainers, bulldozers, and other heavy equipment intended for blading large areas are not appropriate except in specific circumstances, and their use should be discussed with THC in advance. Hand augers with less than 8-inch bore diameter are generally not adequate for intensive survey due to insufficient sample size.
4. Where available, trenches should be excavated with a smooth-bladed bucket and trench walls should be cleaned and inspected. Reports should include a basic profile description and a high-quality color photograph of a well-cleaned profile column at least 1 m wide.