INTENTIONAL BURIAL OF SITES AS A PRESERVATION TOOL

Burying sites with fill to preserve them has been a well-established practice in Texas archeology for many years. It seems axiomatic that burying a site will help protect the general structural integrity of the site, as well as the artifacts and other cultural deposits within it. This notion has been a working assumption of many Texas archeologists for several decades, and until 1999, burial of sites was routinely approved by the Texas Historical Commission (THC) Archeology Division as a means of mitigation of adverse effect. However, scientific investigations that have examined the chemical and physical effects of placing fill over buried archeological components caused the THC to reexamine its guidance on intentional site burial.

Researchers working with Texas A&M engineering geologist, Dr. Christopher C. Mathewson, have conducted several pioneering studies on site burial in Texas and other states (cf. Mathewson n,d, 1992, 1993, 1994, 1995; Mathewson and Albertson n.d., 1997; Mathewson and Gonzalez 1991; Mathewson et al. 1991, 1992). In different parts of the state, they buried simulated artifacts under a variety of soil types, to various depths, and subjected them to different conditions. They buried clay pots with stress and fracturing properties similar to those of archeological specimens and also buried metal sheets, glass rods and charcoal. After burial, objects of varying masses were passed over the artificial site deposits, including pedestrian and horse traffic on up to road graders and bulldozers. The interred items were exhumed and examined to determine the degree of damage caused to the different materials by each type of impact. Similar studies have been conducted in other states yielding similar results (c.f., US Army Corps of Engineers Waterway Experiment Station 1988a).

Mathewson's research teams distinguished over a dozen factors that have the potential to affect the preservation of buried archeological materials, including soil pH, moisture regime, microorganism and macroorganism content, oxygen levels, freezing and thawing cycles, compression, and movement (Table 1). One major conclusion of these studies was that the material used for capping deposits must have the same basic physical and chemical properties as the original soil matrix. Otherwise, site contents may be damaged by chemical reactions and structural alterations as the native and imported soils interact over time. The researchers also concluded that burying sites for preservation should be tailored to the soil, artifact content, and proposed impacts involved in each case: "The implementation of site burial as a preservation technique is, therefore, the design and construction of a 'custom-made' engineering cover that will induce the environment most favorable for the protection of discrete site components and/or spatial relationships (Mathewson et al. 1992:12)."

Archeological Material

LEGEND
A = Accelerates Decay
E = Enhances Preservation
N = Neutral/ No Effect

Process	Animal Bone	Shell	Plants	Charcoal	Crystalline Lithics	Granular Lithics	Ceramics	Features	Soil Attributes	Metals	Context	Isotope Content	Topography
Acid Environment	A	A	E	N	N	A	N	N	A	A	N	A	N
Basic Environment	E	E	A	N	N	E	N	N	A	A	N	N	N
Dry (Continuous)	E	E	E	E	N	E	N	N	N	E	N	E	N
Wet Anaerobic (Cont.)	E	E	E	A	A	A	A`	A	A	A	N	A	A
Compression	A	A	A	A	N	N	A	A	A	N	A	N	A
Movement	N	N	N	A	N	N	N	A	A	N	A	N	A
Wet-Dry	A	A	A	A	A	A	A	A	A	A	N	A	A
Microorganisms	A	A	A	A	N	A	N	A	A	N	A	N	N
Wet Aerobic	A	A	A	A	N	A	A	A	A	A	N	A	N
Freeze-Thaw	A	A	A	A	A	A	A	A	A	N	A	A	A
Freeze	A	A	A	A	N	A	A	N	E	N	A	E	N
Thaw	N	N	N	N	N	A	N	N	A	N	A	A	N

Mathewson's matrix shows the post-burial effects of physical, chemical, and biological processes on materials.

Table 1. Mathewson's matrix.

One of Mathewson's studies (Mathewson 1994) was performed for a TxDOT Project in Montague County at the request of the THC to evaluate the effectiveness of site burial as a protective measure. In this case, many tons of fill were deposited to elevate a highway, burying portions of two Late Prehistoric sites. These sites

contained bone, shell, ceramics and lithics from the surface to a depth of 125 cmbs. Controlled experiments were conducted at the Heavy Equipment Training School in Brazos County to measure the artifact breakage due to the effects of strain (displacement) and stress (load). The results of this study indicated that, in some cases, greater compressive breakage was caused by the construction of a 36-inch protective cover than by the cover plus vehicle loading (Mathewson 1994:12). Since then, the THC has been discouraging the use of site burial as a form of mitigation of adverse effect. This confused many archeologists who suddenly saw their recommendations for site burial questioned by THC reviewers.

In some cases, attempts to protect sites have been made not by covering them with soil, but by using concrete – with varying degrees of success. For example, a layer of gunite was installed over the deposits at Bear Creek Shelter at Lake Whitney to protect them from wave erosion (US Army Corps of Engineers Waterway Experiment Station 1988b). Unfortunately, two years after the gunite was installed, large cracks formed and soil loss continued. In another case, an entire Caddo cemetery that was being looted was covered with a large concrete slab that extended well beyond the limits of known graves. No evidence of looting was observed five years after this installation.

Mathewson suggests that site-specific soil engineering studies be conducted to determine the feasibility of site burial, and that maintenance or monitoring programs will also often be required to ensure that the preservation effort is achieving its goals. However, in many cases, the costs involved in such studies could exceed the cost of large-scale excavations. After considering the body of research and the nature of impacts that are typically involved whenever site burial is proposed as a mitigation measure in Texas, the THC offers the following guidance.

Mathewson's studies determined that about 1 to 2 m of fill prevented most physical alterations of artifacts tested when the fill had physical and chemical characteristics similar to those of the original matrix.

Using his conclusions as a guide, the THC believes that site burial should be considered as a substitute for excavation when:

- the proposed impacts are light – limited to foot or golf cart traffic
- the fill used to cap sites is composed of the same type of soil that contains the archeological deposits and
- the fill placed on top of the site is limited to between 1 and 2 m in depth.

For sites on steep slopes, special measures are needed. A case in point is the Richard Beene site at the defunct Applewhite Reservoir, where a 35 ft.-deep spillway trench was cut through the site, exposing the deposits to the elements. Stabilization, drainage modification, and flow monitoring to control runoff and erosion were necessary. Generally, the use of permeable geotextiles or plant cover on slope faces, installation of erosion barriers and artificial drains at water collection points, and in some cases, monitoring wells will be needed. The estimated duration and frequency of impacts will be a major factor in determining the depth of capping, stabilization and drainage modifications on slopes.

If you are convinced that preservation of a site can best be accomplished by burying it with fill, present your proposal to the Archeology Division for review. We will consider requests for site burial on a case-by-case basis. Consult the references listed below and present a rationale derived from the results of these studies (or other similar studies).

Archeology Division, 1999
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