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September 3, 2007

**VIA OVERNIGHT DELIVERY**

Mr. Dane L. Finerfrock  
Director  
Division of Radiation Control  
Department of Environmental Quality  
168 North 1950 West  
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Salt Lake City, UT 84114-4850



Re: Cell 4B Cultural Resource Technical Proposal for Evaluative Testing

Dear Mr. Finerfrock:

Enclosed you will find one (1) CD, and two (2) hard copies, of the White Mesa Mill Cell 4B Technical Proposal for Evaluative Testing in the proposed Cell 4B tailings area. I would appreciate you forwarding one of the copies to the Utah State Historic Preservation Office as soon as possible. The other hard copy and the CD are for your files. The Report was prepared for Denison Mines (USA) Corp. by Abajo Archaeology, in support of the Cell 4B tailings license amendment request.

If you have any immediate questions please feel free to contact me at 303 389-4160.

Yours very truly,

**DENISON MINES (USA) CORP.**

A handwritten signature in black ink, appearing to read "Harold R. Roberts".

Harold R. Roberts  
Executive Vice President, US Operations

cc: Ron F. Hochstein  
Dave C. Frydenlund  
Steven D. Landau

**TECHNICAL PROPOSAL FOR EVALUATIVE TESTING AT FOURTEEN  
ARCHAEOLOGICAL SITES ON THE PROPOSED DENISON MINES (USA)  
CORPORATION WHITE MESA MILL CELL 4-B,  
SAN JUAN COUNTY, UTAH**

**Jonathan D. Till**

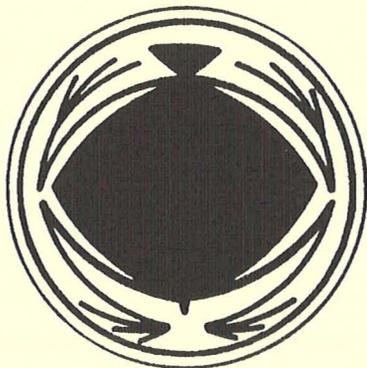
**With Contributions By:**

**Mark C. Bond**

**William E. Davis**

**Deborah A. Westfall**

**September 2009**



**ABAJO ARCHAEOLOGY**

TECHNICAL PROPOSAL FOR EVALUATIVE TESTING AT FOURTEEN ARCHAEOLOGICAL  
SITES ON THE PROPOSED DENISON MINES (USA) CORPORATION WHITE MESA MILL  
CELL 4B, SAN JUAN COUNTY, UTAH

Prepared For:

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and

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September, 2009

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## **CHAPTER 1: INTRODUCTION**

This chapter serves to orient the reader to the proposed project. Chapter 1 will: introduce Denison Mines' proposal to develop Cell 4B and summarize the scope of work for this archaeological testing project; describe the location and environment of the proposed project area; and provide brief descriptions of the archaeological sites in the proposed project area.

### **Scope of Work**

Denison Mines (USA) Corp. proposes to construct Tailings Cell 4B on their White Mesa Mill facility. The proposed cell has long been planned, but not constructed. The proposed cell would be excavated, lined, and used in the permanent storage of uranium ore tailings from the mill facility. It is understood that these construction activities could pose adverse effects to any historic properties in the project area.

Abajo Archaeology has conducted a cultural resource inventory (archaeological survey) of the area proposed for the construction and development of Cell 4B (Till 2009). A total of 14 sites were located in the project area as a result of the archaeological survey. In order to understand the nature and extent of the subsurface deposits at each of these sites, Mr. Harold Roberts, Executive Vice President, and Mr. David Turk, Radiation Safety Officer, both of Denison Mines (USA) Corp, requested that Abajo Archaeology develop and conduct a testing program for sites in, or immediately adjacent to, the proposed project area. The testing program for this project is being prepared for the client, Denison Mines (USA) Corp., and for submittal to Mr. Dane Finerfrock, Division of Radiation Control, Department of Environmental Quality, State of Utah. It is also being submitted to Ms. Lori Hunsaker (Deputy Preservation Officer, State Historic Preservation Office) and Mr. Kelly Beck (Utah Public Lands Policy Coordination Office) for review.

Specifically, the testing program developed here proposes to: (1) evaluate the condition and interpretability of all components, features, and/or deposits; (2) establish the types and frequency of cultural features; (3) determine the distribution and extent of cultural features within each site; and (4) determine the research significance of each site, based on the results of (1) through (3).

### **Location and Environment**

The proposed Cell 4B project area is situated on the crest and gently sloped flanks of two finger ridges on the north end of White Mesa (Figures 1 and 2). The mesa's western and eastern margins drop precipitously into Cottonwood and Recapture canyons, respectively. The project area has an approximate rhomboid shape that covers an area of about 55.7 acres (22.5 hectares) in Sections 32 and 33 of Township 37 South, Range 22 East (Figure 3).

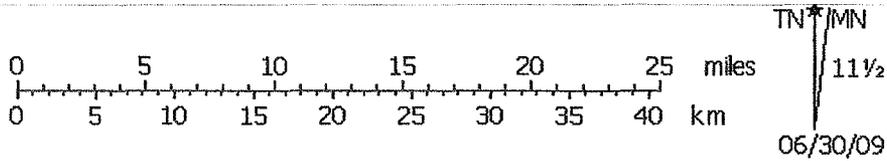
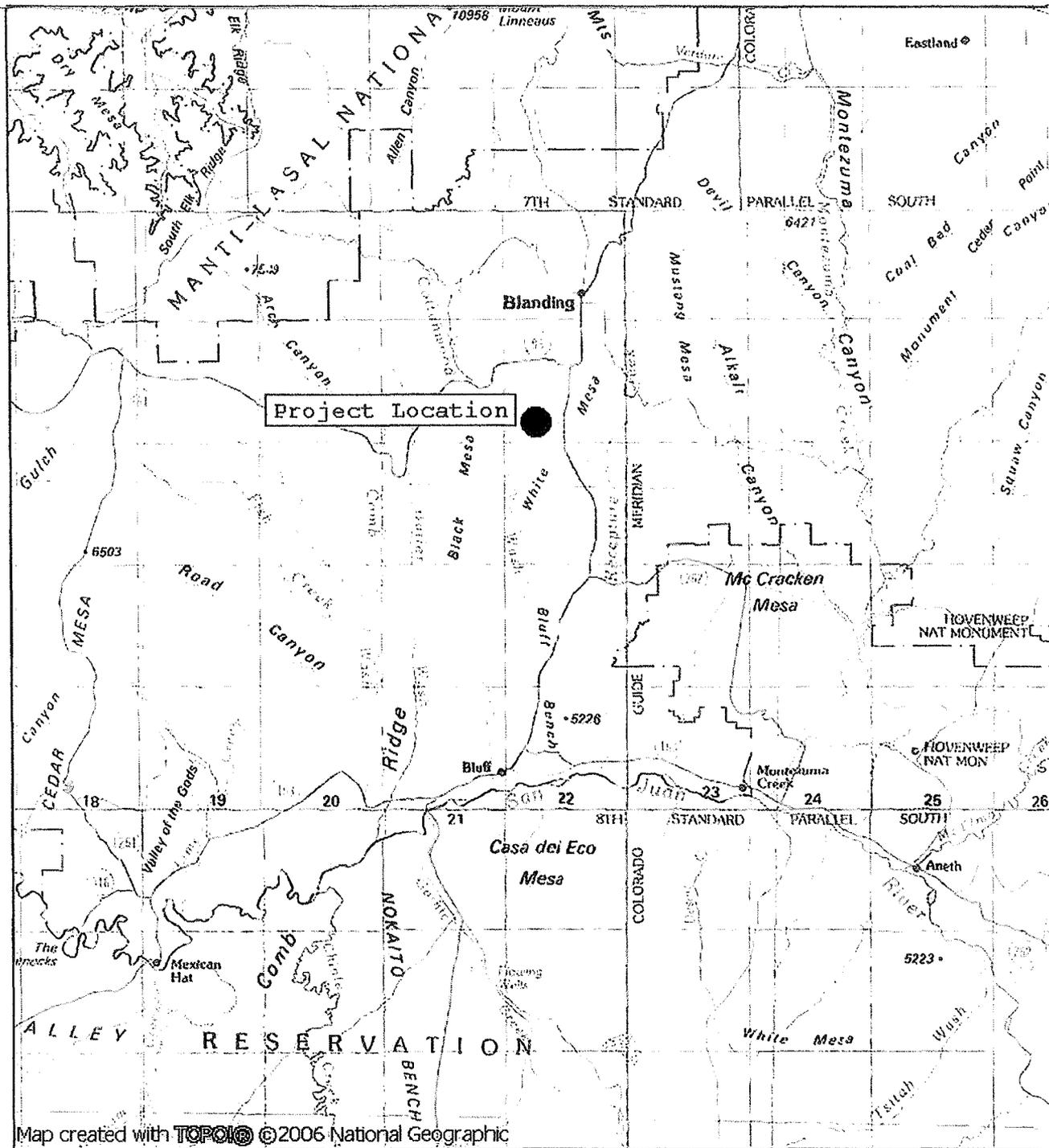


Figure 1. Project Location Map. Denison Mines White Mesa Mill. San Juan County Utah



Figure 2. Project Area Photo. From north edge of project looking southeast.



### Archaeological Site Descriptions

Fourteen sites were found within, or immediately proximate to, the proposed Cell 4B project area. These sites are: 42Sa6391, 42Sa6392, 42Sa6393, 42Sa6397, 42Sa6431, 42Sa6757, 42Sa8014, and 42Sa28128-42Sa28133. Thorough descriptions of the sites are found in the project's archaeological survey report (Till 2009). Table 1 summarizes the sites in the project area by temporal component and suggested function. The text in the rest of this chapter briefly describes the surface manifestations of each site and the history of investigations at each.

#### 42Sa6391

The site occupies the crest of a low, sandy finger-ridge on the north side of the project area (Figure 3). The site was initially identified by Thompson (1977) and subsequently tested by the Antiquities Section (Lindsay 1978 and Nielson 1979). During these testing activities, the adjacent 42Sa6393 was mistakenly folded into 42Sa6391. For the purposes of this investigation, we separate the testing results for these separate areas, maintaining Thompson's original site designations and locations.

Soon after the site's initial documentation, the Antiquities Section excavated two backhoe trenches to test the site (Lindsay 1978 and Nielson 1979). These trenches revealed the location of two pit structures and a cist. The results of these excavations are discussed in greater detail in Chapter 3.

As it currently appears on the surface, 42Sa6391 consists of a scatter of lithic and pottery artifacts (Figure 4). The scatter is contained within an area that measures about 40 m north/south by 30 m east/west. A 3/4-in. steel pipe, representing an earlier site datum, indicates that the site had been previously documented. The faint traces of at least one, and perhaps two, of the previously excavated backhoe trenches just east of the site datum are just barely discernable.

The artifact scatter comprises pottery, lithic debitage, one chipped stone tool (a biface), and pecked and ground stone tools. As noted earlier, there is a scatter of sandstone rock on the site, suggesting the presence of subsurface architecture.

The pottery assemblage suggests an association with the early to middle Pueblo II period (Till 2009:31). Alternatively, there might be both late Pueblo I and Pueblo II components on the site.

The diversity of artifact types suggests that a variety of activities occurred on the site, which may indicate the site was used as a habitation. This proposition is further corroborated by the presence of pit structures documented in the test units by the Antiquities Section.

Table 1. Sites by Component and Function, White Mesa Mill Cell 4B Survey

Site Number	Components	Suggested Function	Comments
42Sa6391	Pueblo II	habitation	May have two pit structures.
42Sa6392	Pueblo II	seasonal habitation	Small adobe feature may be indicated.
42Sa6393	Pueblo II	habitation	Based on artifact scatters, two or three households may be indicated.
42Sa6397	Basketmaker III	unknown	Small adobe feature may be indicated. Given the artifact scatter, it seems likely that domestic features are present.
	possible Pueblo II	unknown	
42Sa6431	Basketmaker III	unknown	Known features include a burial, a hearth, and a lens of burned adobe.
	Pueblo II	habitation	A midden with a diverse assemblage of materials is present that suggests the presence of a habitation.
42Sa6757	Basketmaker III	habitation	Previously excavated by Abajo Archaeology (Davis 1985). Portions of the midden are still intact. Small subsurface features may still be present.
42Sa8014	Pueblo I	seasonal habitation	Previously excavated by Abajo Archaeology (Davis 1985). Small subsurface features may still be present.
42Sa28128	Pueblo II and/or Pueblo III	limited activity	The remains of ephemeral structures or small subsurface features may be present.
42Sa28129	Basketmaker III and/or Pueblo I	limited activity	The remains of ephemeral structures or small subsurface features may be present.
	Pueblo II	limited activity	
42Sa28130	Pueblo II	limited activity	The remains of ephemeral structures or small subsurface features may be present.
42Sa28131	Unknown historic	camp	The remains of ephemeral structures or small subsurface features may be present.
42Sa28132	possible Basketmaker III	limited activity	The remains of ephemeral structures or small subsurface features may be present.
42Sa28133	Unknown Aboriginal	limited activity	The remains of ephemeral structures or small subsurface features may be present.
42Sa28134	Unknown Aboriginal	limited activity	The remains of ephemeral structures or small subsurface features may be present.

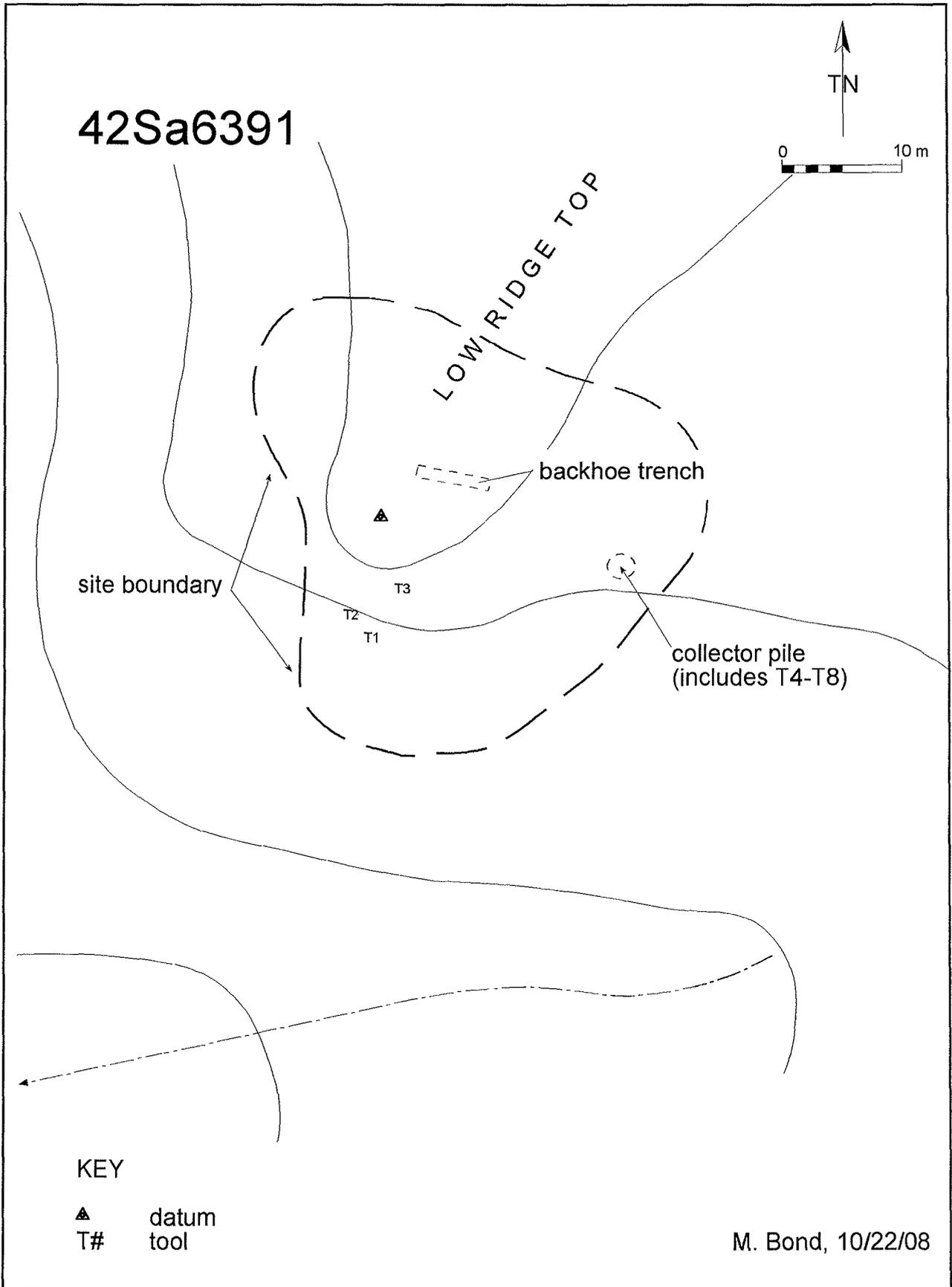


Figure 4, Site 42Sa6391, Survey Map

42Sa6392

Perched on a slight west-facing slope below the crest of a finger-ridge, this scatter of cultural debris is south of its neighbor, the previously discussed site, 42Sa6391 (Figure 3). Site 42Sa6392 was first documented by Thompson (1977) and subsequently confused with a site located just to the south, 42Sa6431, during test excavations that were conducted by the Antiquities Section (Nielson 1979) (see Till 2009:22, 31).

The site currently manifests as a scatter of lithic and pottery artifacts and includes a small concentration of jacal (Figure 5). The site occupies an area measuring approximately 40 m in diameter, although the centrally located cluster of jacal materials is smaller, covering an area that measures about 5 m in diameter. The pottery assemblage may indicate a primary use of this location during the years that span the early to middle Pueblo II periods.

Feature 1 consists of a concentration of jacal and sandstone rubble. The concentration lies in the approximate center of the artifact scatter and measures about 5 m in diameter. The variety of artifact types on the site suggest that a diversity of activities took place at 42Sa6392. Additionally, Feature 1 may be the remains of surface architecture. While sediment depth is unknown, it is quite possible that the site harbors one or more subsurface architectural features.

42Sa6393

East of 42Sa6391, and north of 42Sa6397, this site is a scatter of artifacts, which is located just west of the crest of a finger-ridge on the north end of the project area (Figure 3). This site was initially recorded by Thompson (1977), and tested by the Antiquities Section in spring of 1978 (Lindsay 1978). However, Antiquities Section archaeologists apparently combined it with nearby site 42Sa6391. Further compounding the problem, the site designation "42Sa6393" was applied to a locus of cultural materials well to the south of Thompson's 42Sa6393. Apparently, Thompson's site 42Sa6397 was misidentified as 42Sa6393 (Till 2009:22, 34-35).

Two parallel backhoe trenches were excavated and reported by the Antiquities Section to test this location for significant subsurface cultural materials (Lindsay 1978; Nielson 1979). Nielson (1979) reports the presence of a pit structure in one of the trenches, though which trench is not known. While making a baseline map of the site for this proposal, archaeologists observed that a third trench was excavated on the site, but had not been reported. These observations are discussed in greater detail in Chapter 3.

Currently, the site consists of a scatter of lithic and pottery artifacts (Figure 6). The site measures approximately 60 m north/south by 45 m east/west. Two concentrations of artifacts (Artifact Clusters 1 and 2) were noted on the west side of the site. In addition, the two backhoe trenches and their associated backdirt piles are still very evident. The pottery assemblage suggests that the site dates to the early to middle Pueblo II period. However, it is also possible that the

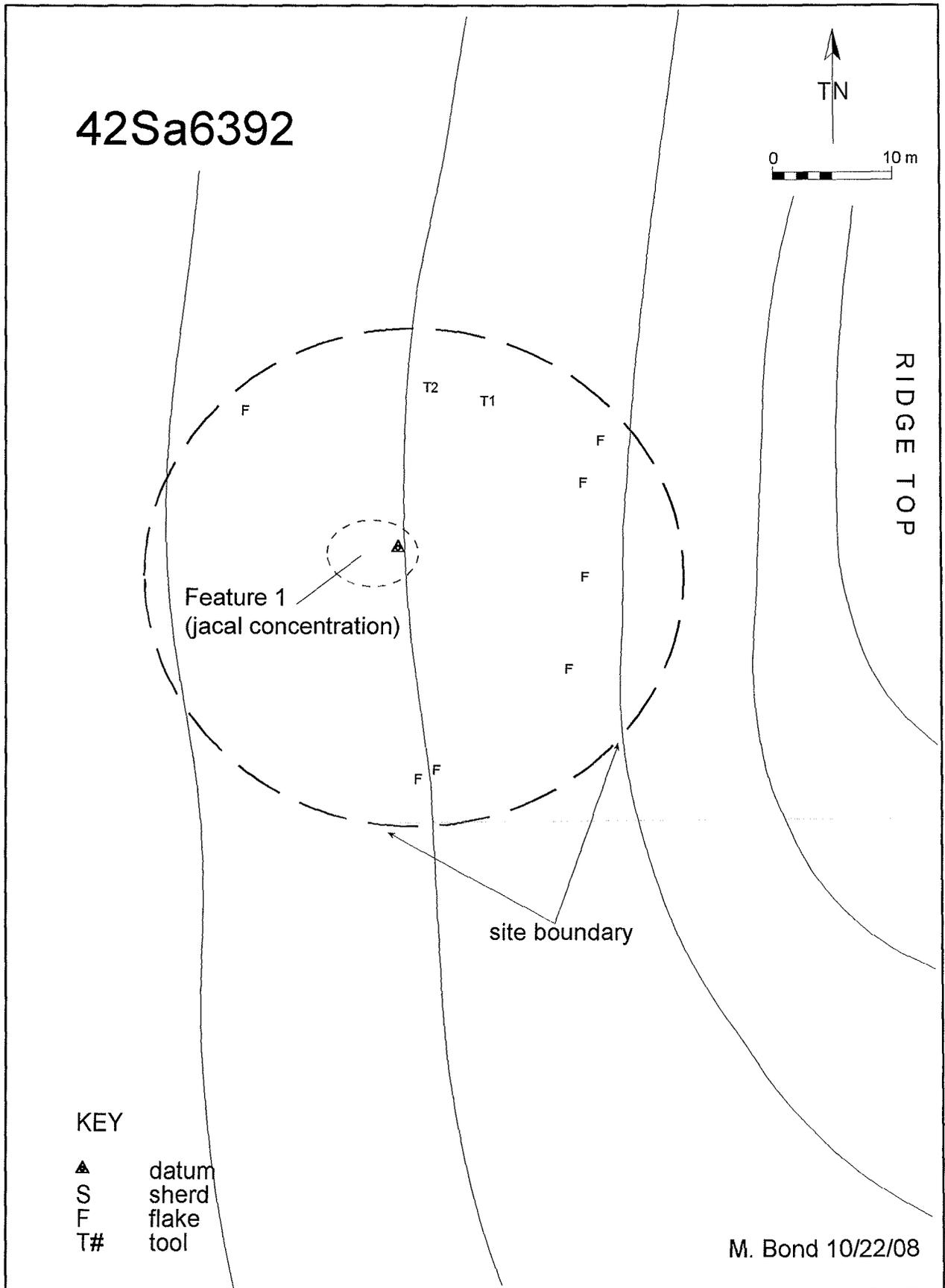


Figure 5, Site 42Sa6392, Survey Map

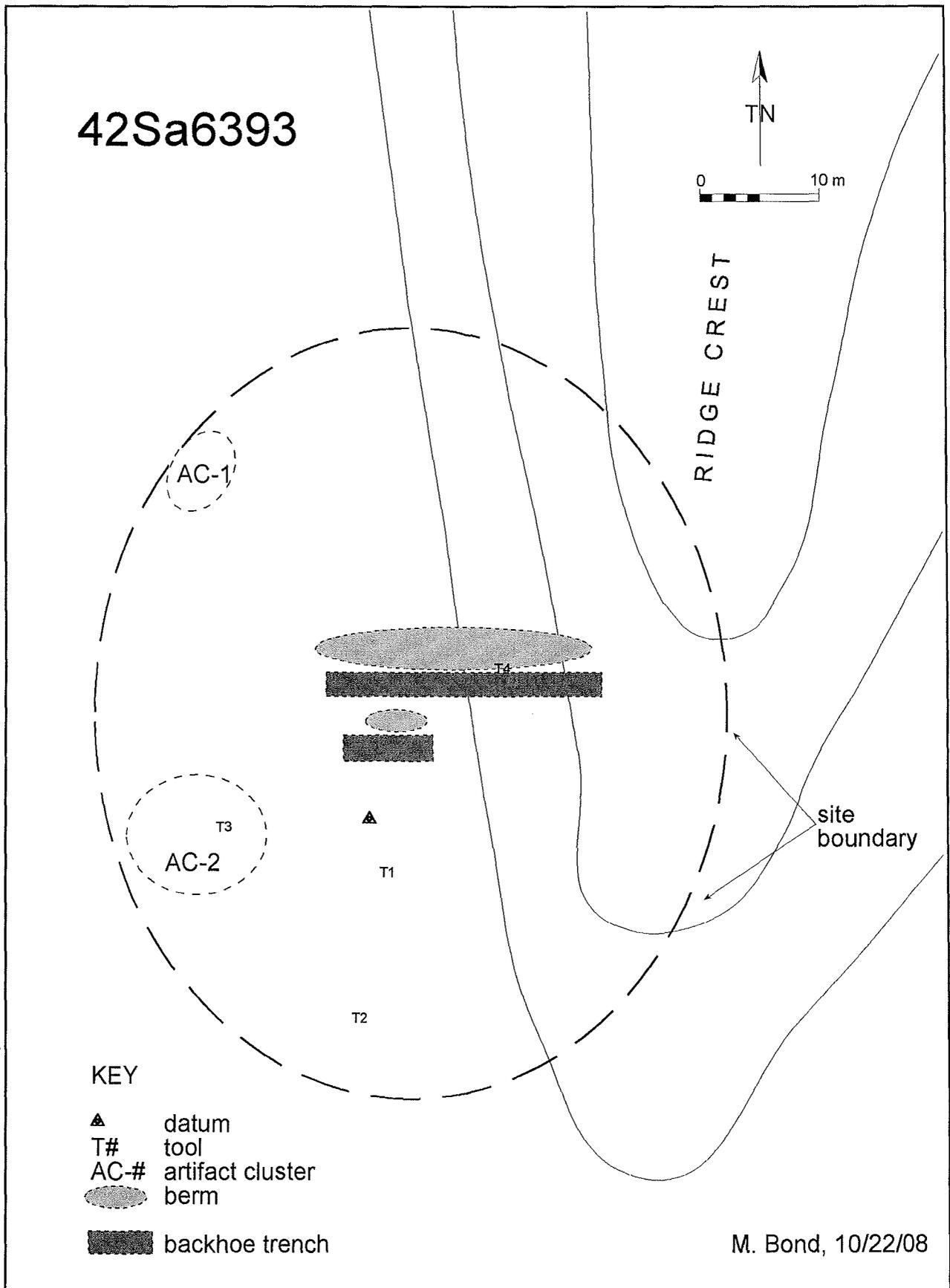


Figure 6. 42Sa6393, Survey Map

site has a late Pueblo I component as well as a middle Pueblo II component.

The diversity of the site's assemblage suggests that a variety of activities occurred on the site. Paired with the presence of a pit structure discovered in one of the backhoe trenches, these data suggest that the site may have functioned as a habitation for at least one of the temporal components.

#### 42Sa6397

Site 42Sa6397 lies on the same ridge crest as 42Sa6393 (Figure 3). The site was originally recorded by Thompson (1977), but was erroneously tested under the site number 42Sa6393 by the Antiquities Section in 1978 (Dykman 1978b). Confusing the issue further, Nielson (1979:51-52) reports that he revisited 42Sa6397 and determined that testing or further mapping of the site was not required. We can only speculate that Nielson encountered 42Sa28132, which is indeed a sparse scatter of artifacts. Till (2009:37-40) describes the history of site number conflation in greater detail in the project's recent archaeological survey report.

The Antiquities Section excavated seven backhoe trenches to test the site for significant stratigraphy or subsurface features. Two of the trenches located subsurface cultural features, both of which were classified as "storage pits" (Dykman 1978b). These testing activities are discussed further in Chapter 3.

The site measures about 60 meters in diameter (Figure 7). Cultural materials consist of a scatter of pottery, chipped stone debitage, and a number of lithic tools. Two concentrations of cultural materials were defined and are referred to as Artifact Clusters 1 and 2 (AC-1 and AC-2). A concentration of burned jacal, Feature 1, is contained within AC-1. Previous investigations on the site are apparent by the presence of a steel, 3/4 pipe datum. The faint remnants of the seven backhoe trenches, which were apparently backfilled, are barely visible. A collector pile in AC-2 includes plain gray pottery and a neckbanded sherd. Additionally, a collector pile at the site datum includes pottery and lithic artifacts.

The site's pottery assemblage suggests at least two components: a substantial Basketmaker III component and a relatively minor Pueblo II component. However, the site's occupation may be more complex. Neckbanded pottery, and the red ware, may signal an intermediate occupation during the Pueblo I period.

The function of the site is difficult to assess. The relatively small number of artifacts in the surface assemblage may indicate one or more brief occupations of the location. Earlier test excavations failed to locate evidence of pit structures. However, such a feature may have been missed by the test trenches. The discovery of two small pit features by the Antiquities Section, and the presence Feature 1, suggest the likelihood that other significant subsurface features remain to be identified.

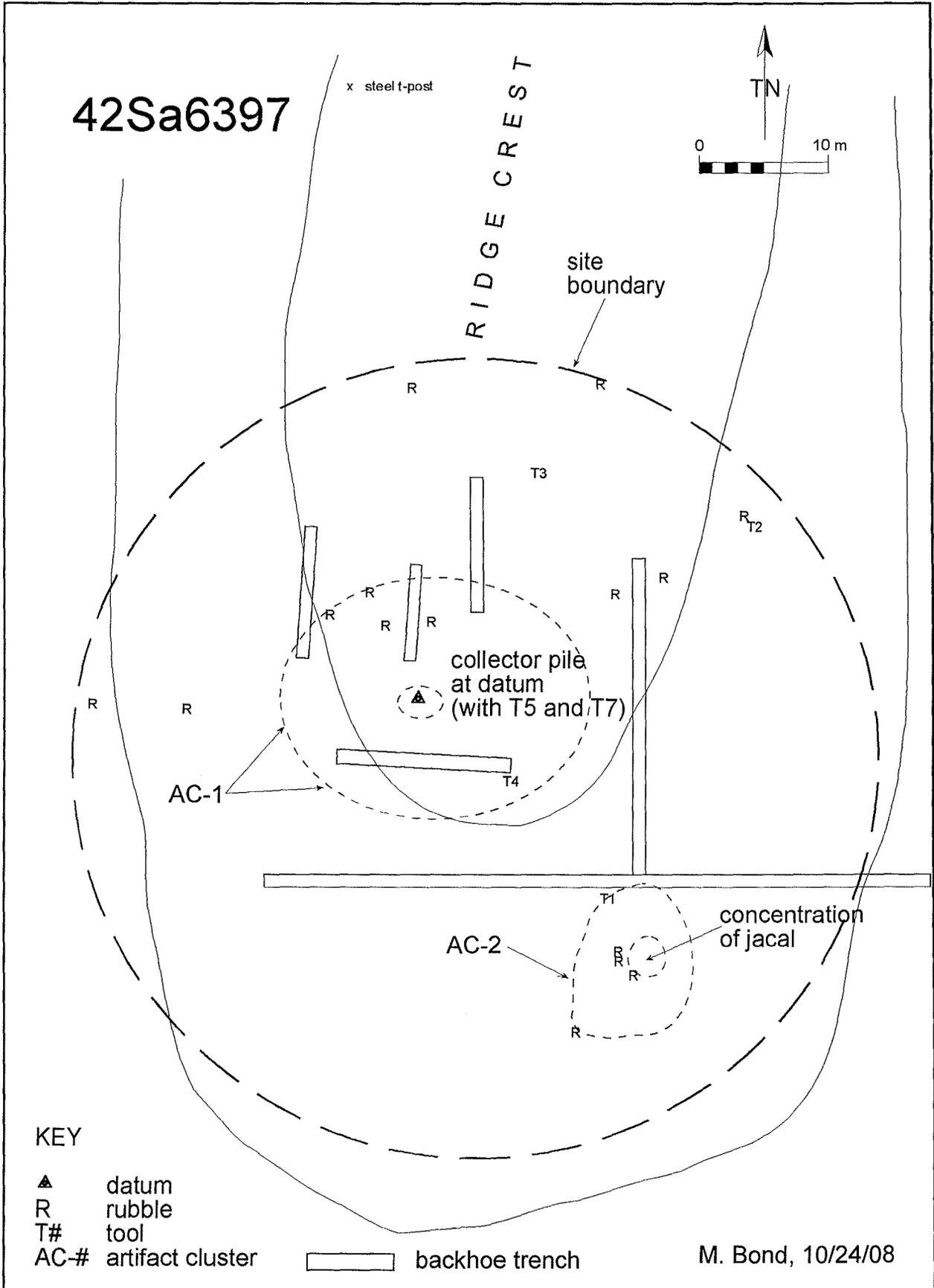


Figure 7. Site 42Sa6397, Survey Map

42Sa6431

Site 42Sa6431 occupies the crest of a finger-ridge and the ridge's terminal southern end, and covers an area that measures approximately 120 m north/south by 60 m east/west (Figure 3). Subsequent to Thompson's (1977) initial documentation of the site, Antiquities Section archaeologists tested the site with a set of backhoe trenches, but did so under another site number, 42Sa6392 (Nielson 1979:30-46). Furthermore, it is evident that other backhoe trenches were excavated on the site, but after the work by Nielson (Till 2009:42-47). To date, no documentation for this second set of test trenching has been found. Previous testing activities are discussed further in Chapter 3. It will suffice here to note that Nielson (1979) located three subsurface features: a hearth, a burial, and the remains of a possible jacal structure.

The site, as Bond mapped it for the current project, consists of a scatter of lithic and pottery artifacts as well as a midden area (Feature 1) and a concentration of jacal (Feature 2) (Figure 8). Bond also observed a dispersed scatter of plain gray pottery in the vicinity of the datum, and east of it. This scatter is in the same location as the Basketmaker materials that Nielson observed and tested in 1978.

The site's pottery assemblage suggests two components: a Basketmaker III component and an early to middle Pueblo II component. It is reasonable to suggest at least a seasonal habitation function for both components.

42Sa6757

This site is located along a ridge slope near the north end of the project boundary (Figure 3). Site 42Sa6757 has previously undergone data recovery efforts (Davis 1985). Research shows that 42Sa6757 was a Basketmaker III habitation with at least one pit structure that may have been a year-round dwelling, and other smaller structures that may have served as seasonal habitations or food processing facilities (Figure 9).

Excavation of the site documented a total of five features, including two pit structures, two very small habitations or field houses, and a hearth (Davis and others 1985:128-164). The hearth is situated on the north end of the site's midden. This cultural deposit is partially buried under 3 to 5 cm of aeolian sediments. The midden is fairly shallow and does not appear to be more than 15 cm thick. This area was tested by backhoe trenches, but otherwise not systematically sampled.

42Sa8014

Site 42Sa8014 is located near the base of the same ridge slope that 42Sa6757 occupies (Figure 3). This site has also been subjected to data recovery efforts (Davis 1985). Site 42Sa8014 was probably a late Pueblo I seasonal habitation. The site consists of a small pit structure and an associated cist (Figure 10).

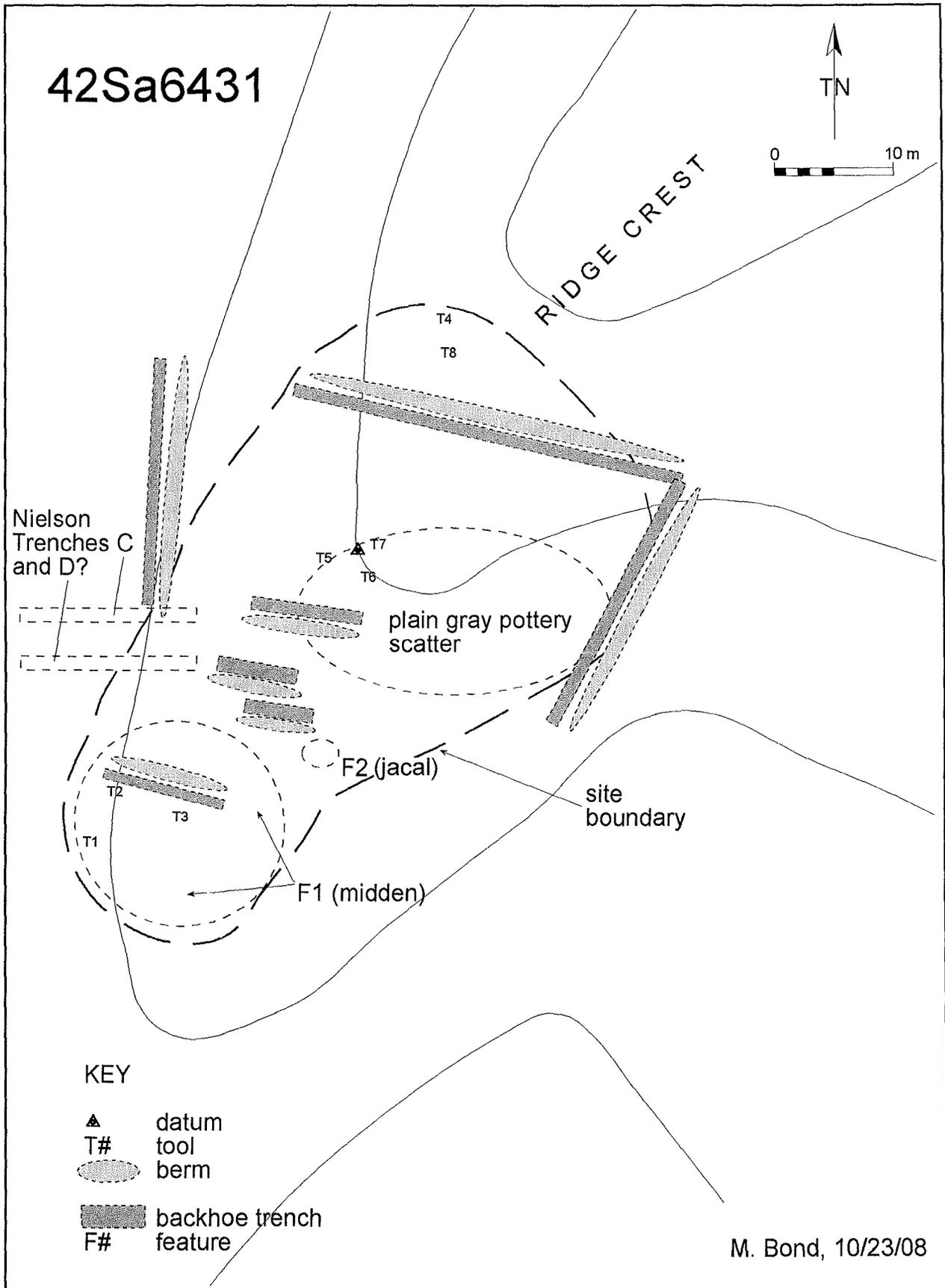


Figure 8. Site 42Sa6431, Survey Map

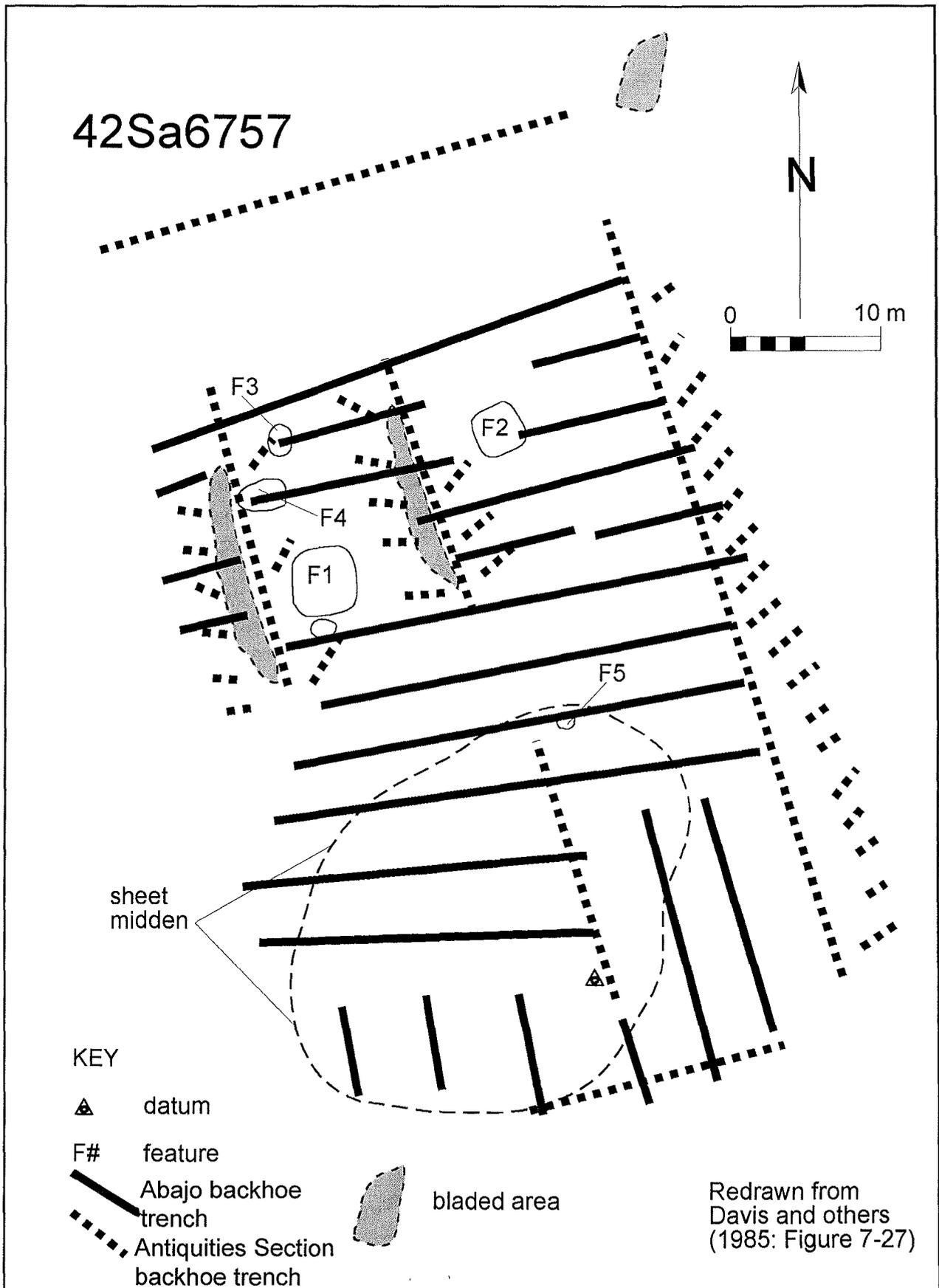


Figure 9. Site 42Sa6757, Post-Excavation Map

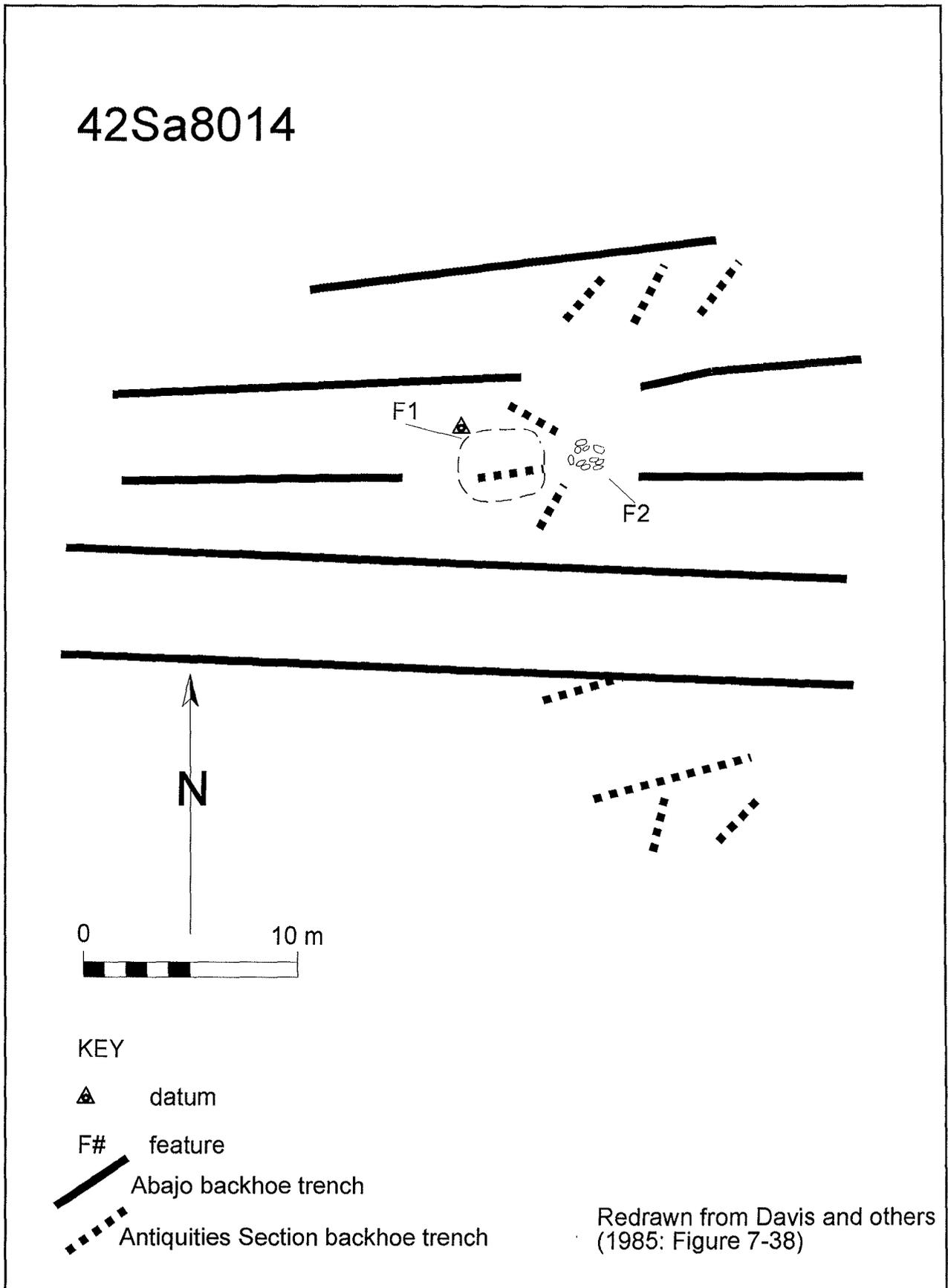


Figure 10. Site 42Sa8014, Post-Excavation Map

Two features were located and excavated on the site. One of the features is a pit structure while the other is a slab-lined cist. Pottery assemblages associated with both features suggest that the two were probably contemporaneous. One absolute date, a C-14 sample from the floor of Feature 1, yielded a date of 1455±130 B.P. Considering the pottery assemblages, this seems far too early to accurately represent the feature's occupation. Bond (1985:274) recommends that the site dates to the late Pueblo I period. Based on the pottery assemblage, it seems likely that the site was in use sometime during the late ninth and/or early tenth century.

#### 42Sa28128

The site is situated on a relatively flat plain a few hundred meters east of a low, sandy ridge crest (Figure 3). Site 42Sa28128 consists of a scatter of lithic and pottery artifacts. Located in the southeast corner of the project area, the scatter appears to be contained within an area that measures 30 m N/S x 20 m E/W (Figure 11).

Cultural materials on the site include a scatter of pottery sherds, debitage, and several ground stone tools. The only temporally diagnostic artifact recorded on the site is a corrugated jar body sherd. This item suggests that the site dates to after about A.D. 950. The surface treatment of the white ware sherds is consistent with this assessment. However, given that the temporal assignment is based only on a few sherds, this assessment is tentative. Considering the site's size, location, and focus on ground stone, the site may have been the locus of specialized activities such as food processing.

#### 42Sa28129

The site is situated on a very slight rise in an otherwise flat terrain and is approximately 100 meters west of 42Sa28128 (Figure 3). Site 42Sa28129 consists of a scatter of lithic and pottery artifacts. The site is approximately 100 m west of Site 42Sa28128. Like that site, 42Sa28129 is small and is contained within a 30 x 30 m area (Figure 12).

Cultural materials documented on the site include pottery, lithic debitage, and several ground stone tools. The small pottery assemblage suggests that the site probably dates to the Pueblo II period or later; however, one or more earlier components (dating to the Basketmaker III and/or Pueblo I periods) may also be indicated. The small artifact assemblage and the site's setting suggest that this location harbored a limited activity site.

#### 42Sa28130

The site comprises of a scatter of pottery and lithic artifacts (Figure 3). Located on relatively flat terrain with a slight slope to the southeast, the scatter is confined to a small area that measures approximately 10 m north/south by 30 m east/west (Figure 13).

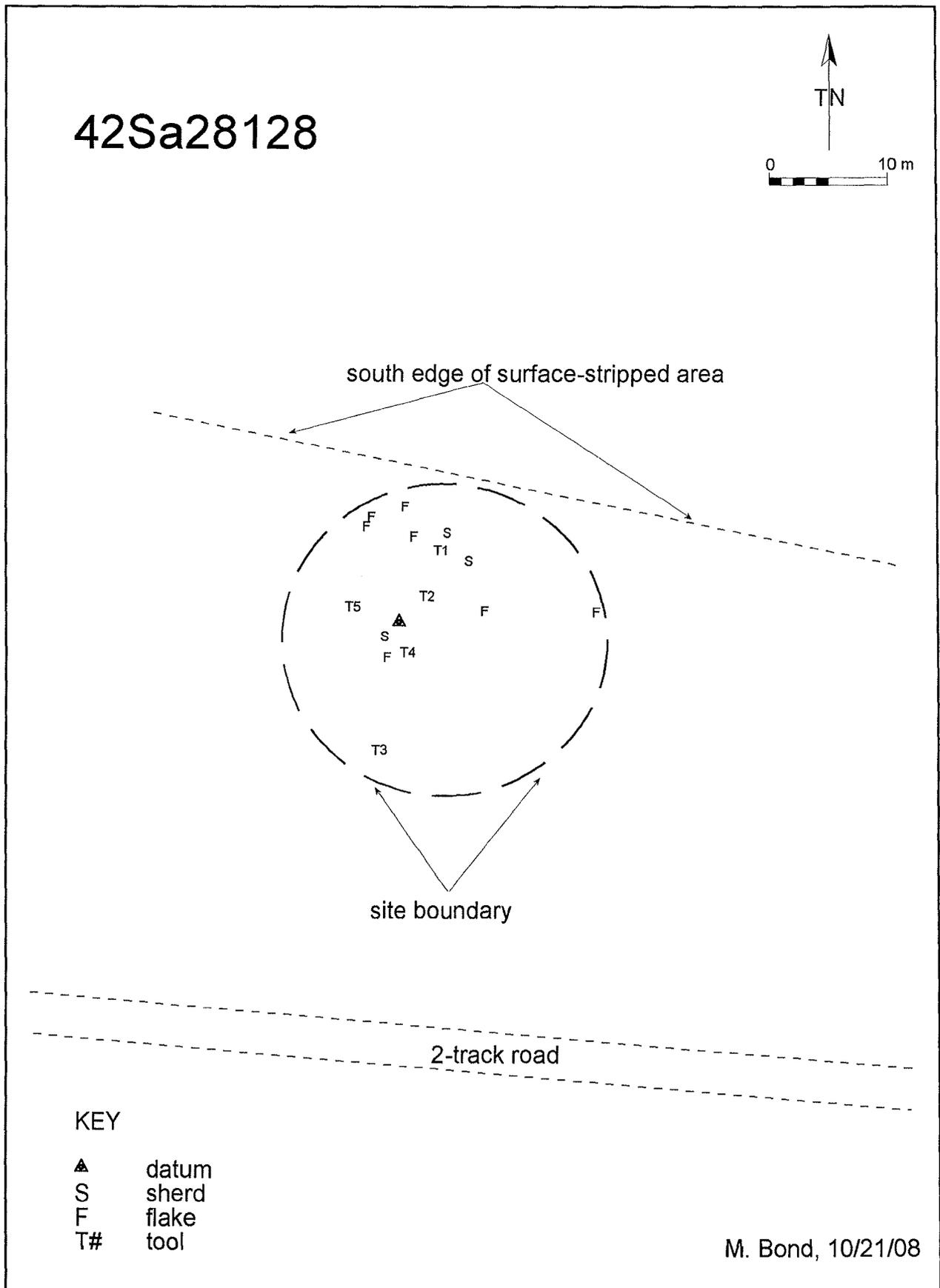


Figure 11. Site 42Sa28128, Survey Map

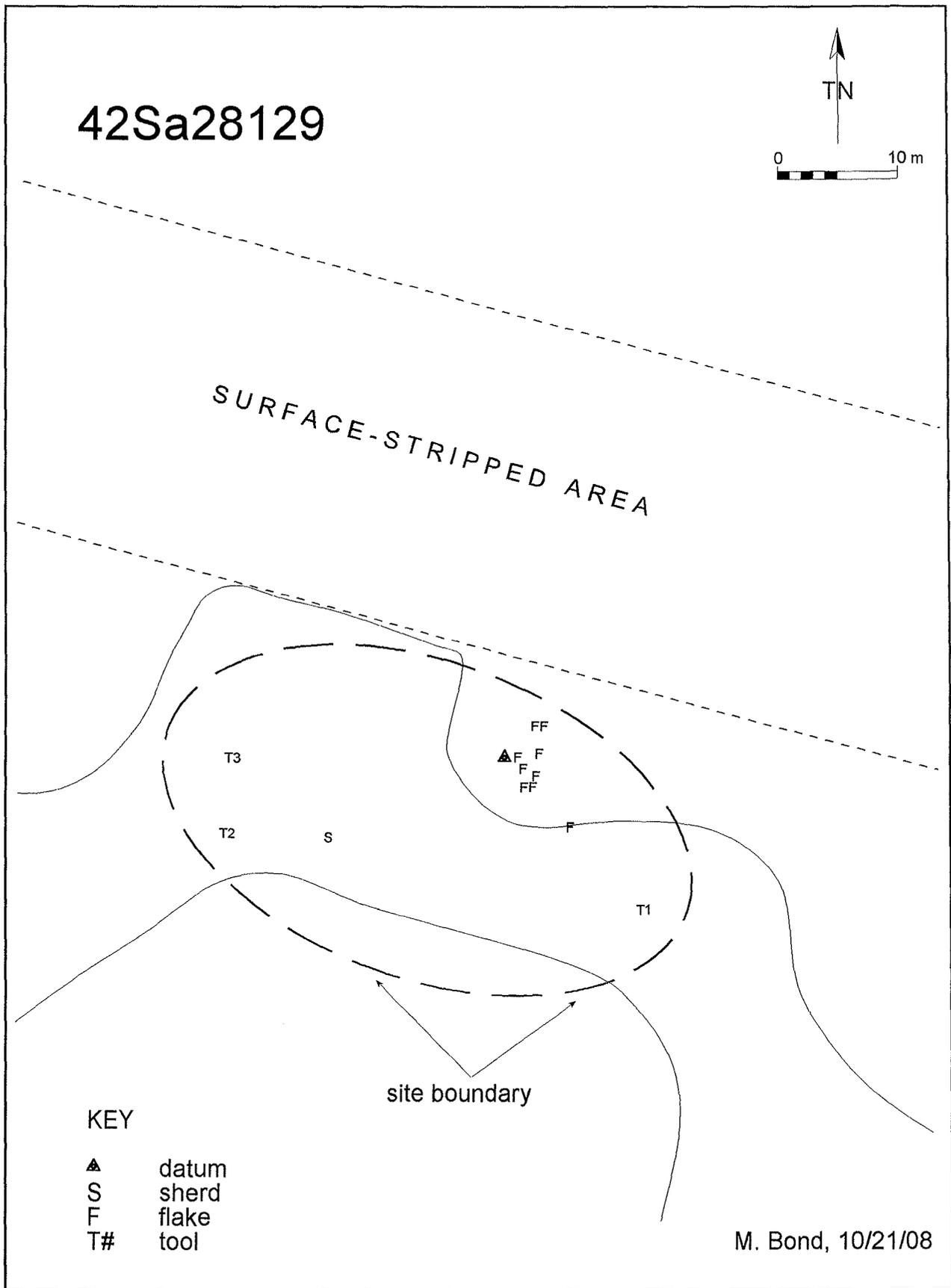


Figure 12. Site 42Sa28129, Survey Map

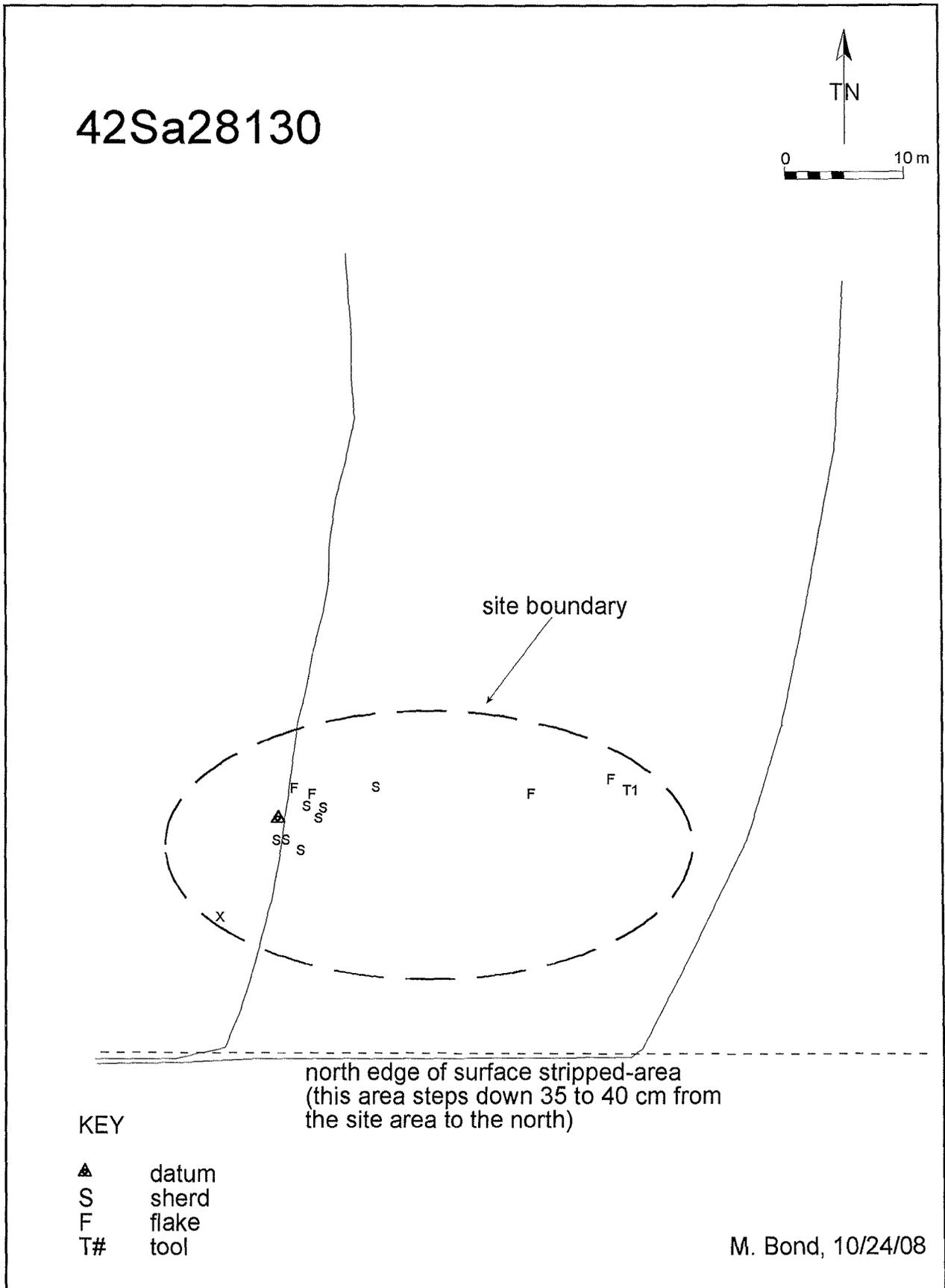


Figure 13. Site 42Sa28130, Survey Map

Site 42Sa28130 is the third in a cluster of four small sites in the southeastern corner of the project area. The very small pottery assemblage at 42Sa28130 suggests that the site may date to the Pueblo II period. The site may have been the locus of specialized activities such as food-processing.

#### 42Sa28131

The site's topographic location might be described as the bottom of a small valley, or alluvial bottomland, along the north edge of the project boundary (Figure 3). The site is an historic camp with a single feature (Feature 1) and a few historic artifacts (Figure 14). The whole site measures about 5 by 14 m, incorporating a fenceline to the north.

Feature 1, a campfire, is lined with small sandstone slabs and measures 1.2 m in diameter. The artifact assemblage includes fragments of sanitary-seal tin cans and a rifle cartridge. The rifle cartridge is a 2 1/8-inch long, British .303 cartridge with a rebated rim. It has a VPT 42 headstamp, dating its creation in 1942. The cartridge probably came to the United States soon after the cessation of World War II.

The historic artifacts suggest that the site might date to A.D. 1945. The cultural affiliation of the site is difficult to assess. It could have resulted from Anglo, Ute, or Navajo farmers, hunters, ranchers, or passers-though.

#### 42Sa28132

The site is situated on the slope of a finger-ridge, the crest of which is just to the west (Figure 3). Site 42Sa28132 consists of a small, prehistoric artifact and rock scatter (Figure 15). The artifacts include a few items of lithic debitage and several plain gray jar body sherds. The artifact scatter is primarily concentrated in an area that measures approximately 15 m in diameter. The site may well be associated with the early component (possibly Basketmaker III) on nearby 42Sa6397, which lies just north on the crest of the finger-ridge.

Considering the exclusion of other pottery types, this small assemblage tentatively suggests a Basketmaker III occupation of the site. It is possible that activities conducted in this locus were associated with the apparent Basketmaker III component at nearby 42Sa6397. Though small, the concentration of cultural materials, which include artifacts and rock, in this location is likely indicative of one or more subsurface features.

#### 42Sa28133

The site is located on a small "bench" or flat step, on the slope of a finger-ridge, the crest of which lies east of the site (Figure 3). This site consists of a very small scatter of lithic artifacts and several pieces of sandstone (Figure 16). All items are confined to an

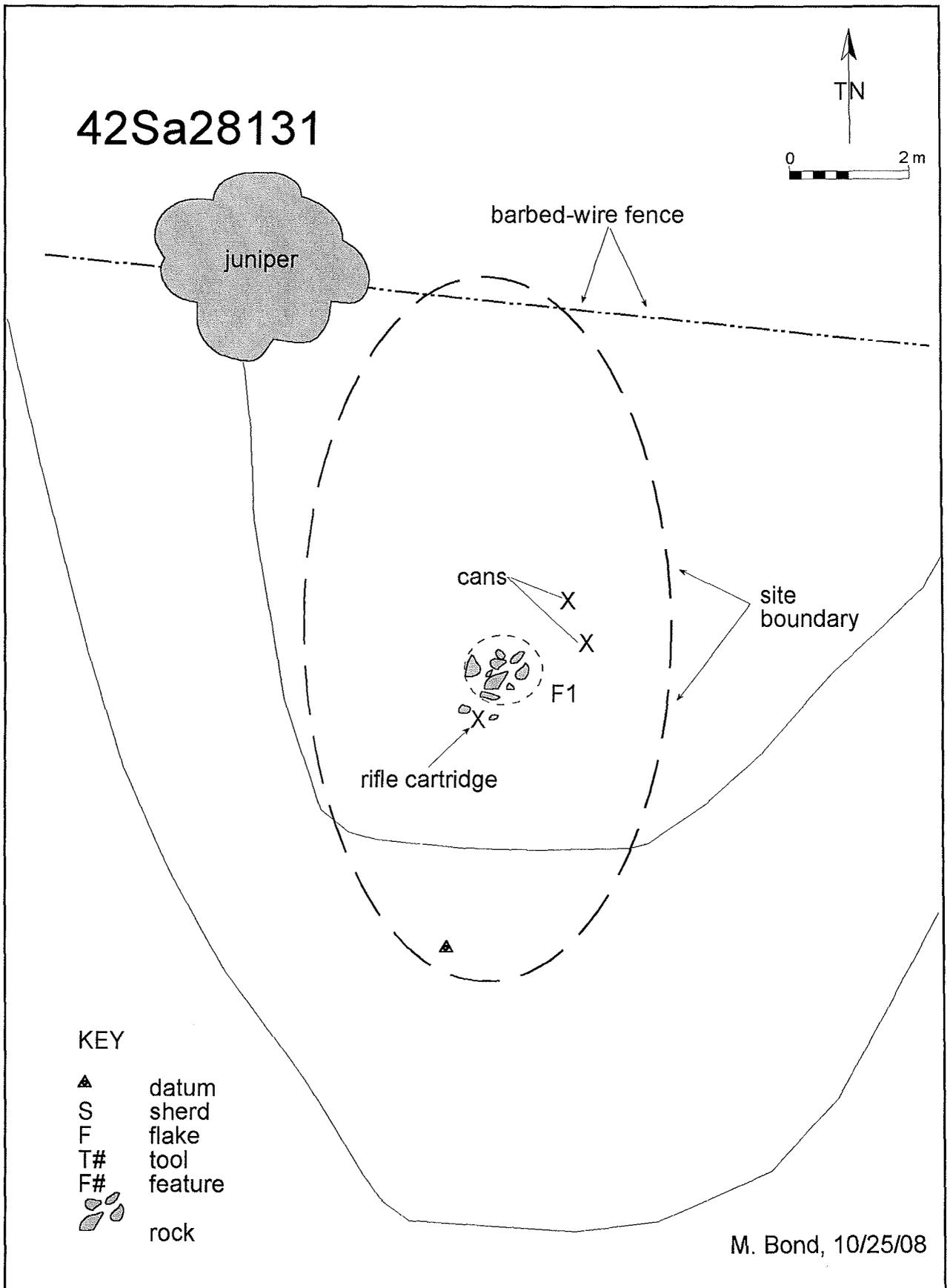


Figure 14. Site 42Sa28131, Survey Map

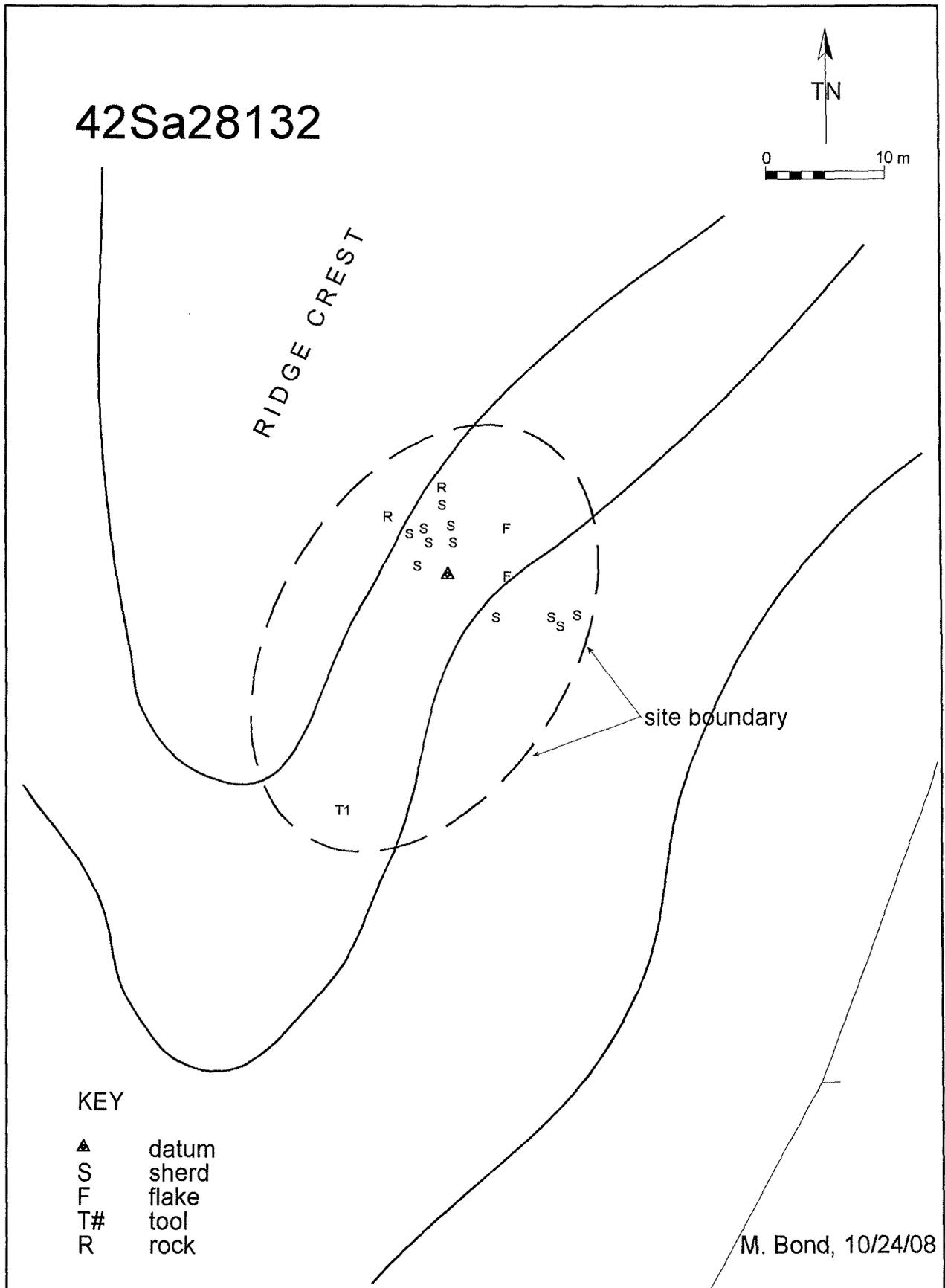


Figure 15. Site 42Sa28132, Survey Map

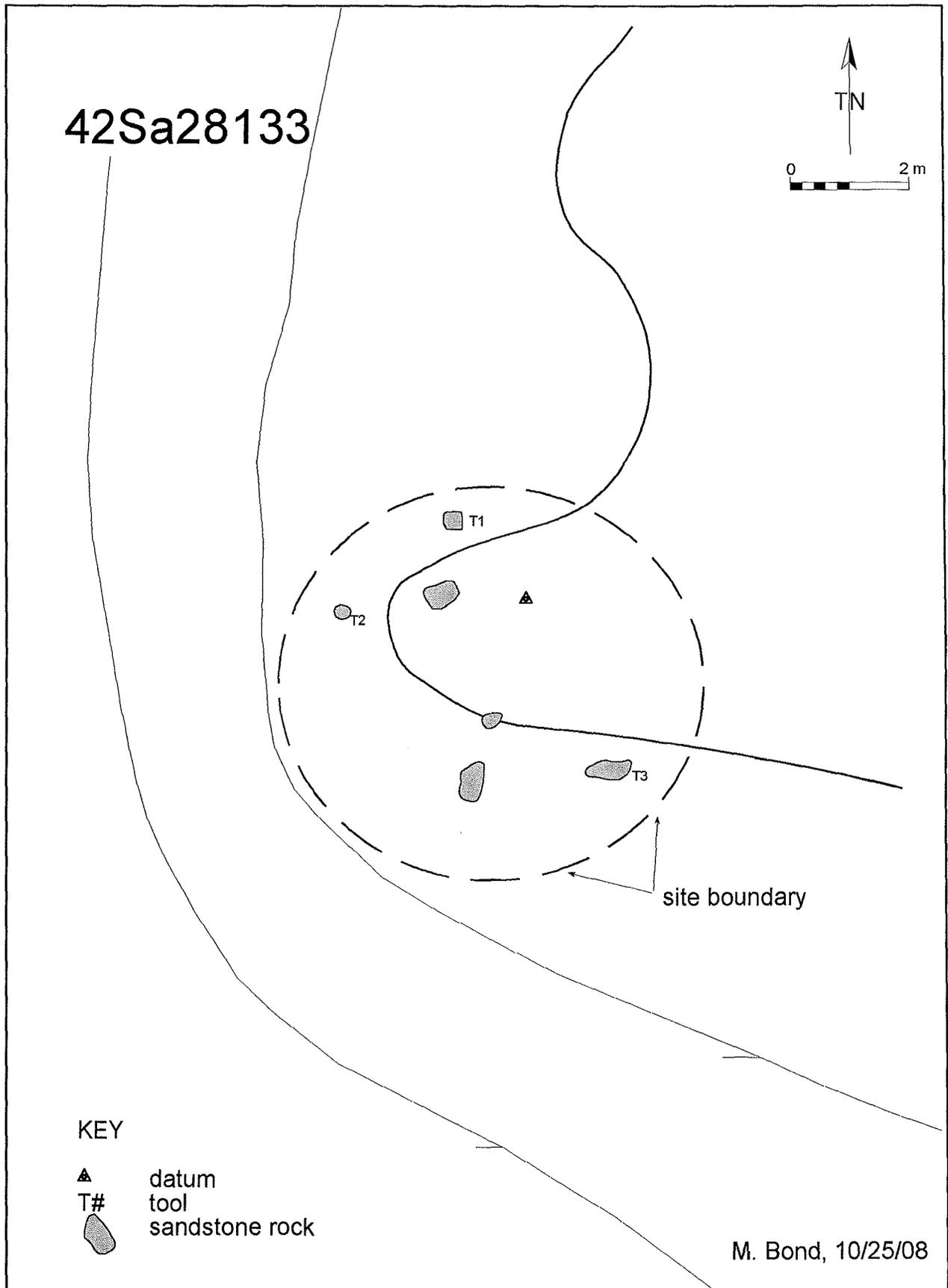


Figure 16. Site 42Sa28133, Survey Map

area measuring 5 m in diameter. No diagnostic artifacts are present that might indicate the site's age.

None of the artifacts found on the site is temporally diagnostic. It is possible that the site represents the locus of a limited activity site such as a food-processing facility.

#### 42Sa28134

The site occupies the crest of a small finger-ridge that rises just slightly above the grassy flats of White Mesa (Figure 3). This site consists of a small scatter of lithic artifacts that measures about 10 meters in diameter (Figure 17). The artifacts include several pieces of lithic debitage and two ground stone tools.

Site 42Sa28134 is difficult to assess for its temporal association. However, like the other three small sites in this corner of the project area, this site may represent the remains of a limited activity site, such as a food-processing feature.

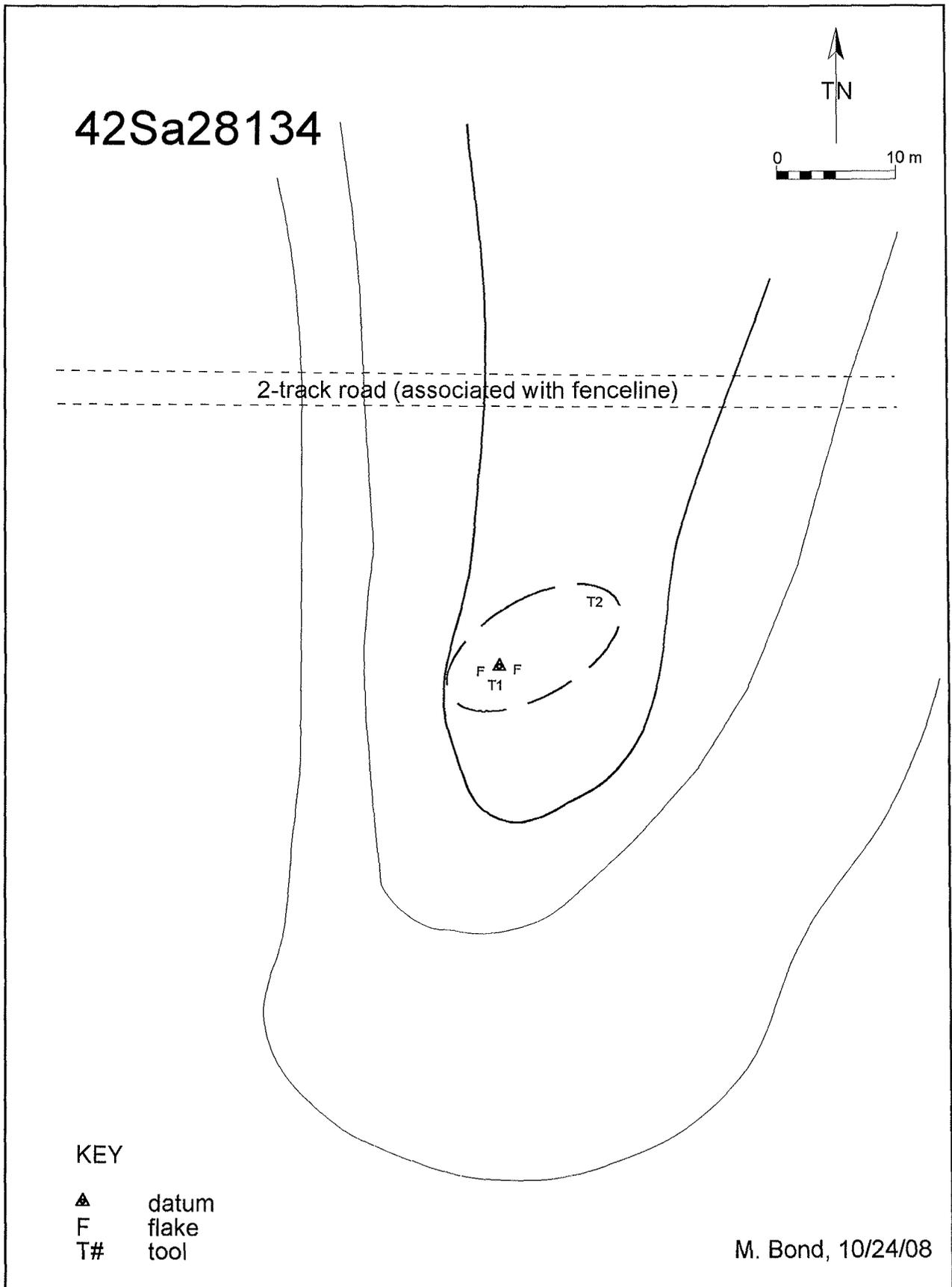


Figure 17. Site 42Sa28134, Survey Map

## CHAPTER 2: RESEARCH CONTEXT

This chapter of the testing proposal outlines the potential directions for research. It does so first by providing a cultural historical overview of the area. The chapter then discusses previous archaeological work in the immediate vicinity of the proposed Cell 4B project area. The chapter concludes with a list of research issues that test excavations, and later data recovery efforts, might address.

### Cultural-Historical Overview

Several current, textbook syntheses of prehistory in the North American Southwest are widely available, and serve to put the proposed project into a temporally deep and spatially broad context (e.g. Cordell 1997; Kantner 2004). Perhaps of more immediate interest are several overviews that consider southeastern Utah and the encompassing Mesa Verde region (Hurst 1992; Lipe and others 1999; Rohn 1989). All of these documents should be consulted for information regarding the broad patterns of cultural development in the region surrounding the project area. Additionally, several locally oriented syntheses have been recently written that cover the culture history of the project area, including one composed for this project's survey (Till 2009). We suggest that interested readers refer to these overviews for background information regarding the culture history in the vicinity of the project area. As a convenient reference for the general archaeological patterns through time, we include Table 2.

### Previous Archaeological Research in the Proposed Project Area

The White Mesa Mill property (Figure 18; also see Davis and others 2003: Figure 1) has been the subject of varying degrees of scrutiny by archaeologists in the recent past. Several archaeological surveys on the property have documented scores of sites on the mill property (e.g. Berge 1975; Casjens and Seward 1980; Fike and Lindsay 1976; Thompson 1977). Many of these sites have subsequently been tested and excavated (Agenbroad and others 1981; Berge 1983; Casjens 1980a; Davis 1985; Lindsay 1978; Nielson 1979; Sargent 1979; Till, in prep.). Excavated site data on the mill property are reported here in Table 3. The importance of these data is not to be trivialized—this data set constitutes one of the larger bodies of excavated site data in the Four Corners region, and has the great potential to inform archaeological research in ways that right-of-way projects cannot.

A relatively recent Class I inventory of this material by Davis and others (2003) summarizes some of the gross survey data generated by these earlier efforts. Their summary indicates that the highest proportion of components documented on White Mesa date to the Pueblo II period (32%), followed by Pueblo I period components (24%), Pueblo III period components (15%), and Basketmaker III period components (14%) (Davis and others 2003: Table 2).

While preparing the survey report for this project, we compiled a site database that considered temporal components and functions (Till 2009:15-18). Using this database, Tables 4 and 5 illustrate the frequencies of components and how these components cross-tabulate with

Dates	Periods	Distinctive Characteristics
AD 1300 to 1600	Pueblo IV	Large plaza-oriented pueblos in Rio Grande and Western Pueblo areas; low kiva to room ratio; kachina cult widespread; corrugated replaced by plain utility types; B/w pottery declines relative glaze ware types.
AD 1150 to 1300	Pueblo III	Also known as the "great pueblo" period; large pueblos; high kiva to room ratios; cliff dwellings; towers; triwalls; corrugated gray and elaborate B/w pottery, plus red or orange pottery in some areas; abandonment of the Four Corners region by 1300.
AD 900 to 1150	Pueblo II	Also associated with the "Chaco phenomenon," which refers to an apparent general settlement pattern consisting of a community center and dispersed households or "unit pueblos." A community center will include some configuration a great house, great kiva, bermed middens, and roads; unit pueblos are composed of a kiva and a surface masonry roomblock; corrugated gray ware becomes the predominant cooking pottery.
AD 750 to 900	Pueblo I	Large villages in some areas; habitations consist of a "protokiva" (i.e. pithouse) plus surface roomblock of jacal or simple masonry; great kivas; cooking pottery is dominated by neckbanded gray ware; initial development and use of red ware pottery.
AD 500 to 750	Basketmaker III	Habitation is formal pithouse with surface storage pits, cists, or rooms; dispersed settlement with occasional small villages; occasional great kivas; development of first true cooking pottery, which is "plain gray"; bow and arrow generally replaces the atlatl; beans added to cultigens.
AD 50 to 500	Basketmaker II (late)	Habitation is shallow pithouse plus storage pits or cists; dispersed settlement with small low density villages in some areas; pottery, if present, is a self-tempered "mud ware"; atlatl and dart; corn and squash by no beans; upland dry-farming in addition to floodplain farming.
1500 BC to AD 50	Basketmaker II (early)	Long-term seasonal use of caves for camping, storage, and burial; camp and limited activity sites in open; no pottery; atlatl and dart; corn and squash; cultivation may be primarily floodplain or run-off based.
6500 BC to 1500 BC	Archaic	Subsistence based on wild foods; high residential mobility; low population density; shelters and open sites; altatl and dart.
pre-6500 BC	PaleoIndian	Subsistence based on wild foods, but with a focus on large game animals, many of which are now extinct; high residential mobility; low population density; distinctive spear and/or dart points; no apparent ground stone technology.

\*Adapted from Lipe (1994)



Table 3. Excavated Site Data, White Mesa Mill						
Site Number	Site Name	Excavation Status	Component	Possible Function	Company	Author (Date)
42Sa6396		Excavated	BMIII PII	Habitation Habitation	Abajo Archaeology	Davis (1985)
42Sa6403		Excavated	BMIII	Seasonal Habitation	Abajo Archaeology	Davis (1985)
42Sa6757		Excavated	BMIII	Habitation	Abajo Archaeology	Davis (1985)
42Sa8014		Excavated	PI	Seasonal Habitation	Abajo Archaeology	Davis (1985)
42Sa9937	Aromatic Village	Excavated	early PII	Habitation	BYU/CRMS	Talbot and others (1982)
42Sa7754	Three Meter Isle	Excavated	early to middle PII	Habitation	Antiquities Section	Casjens (1980)
42Sa6385	Radon Ridge	Excavated	PII	Habitation	Antiquities Section	Casjens (1980)
42Sa6437	Proton Point	Excavated	PIII	Habitation	Antiquities Section	Casjens (1980)
42Sa6388	Half-Life house	Excavated	early PI PII	Habitation Limited Activity	Antiquities Section	Casjens (1980)
42Sa6387	Isotope Slope	Excavated	PII	Possible Habitation	Antiquities Section	Casjens (1980)
42Sa6697	Reactor Ridge	Excavated	early PI PII	Habitation Limited Activity/Burial	Antiquities Section	Casjens (1980)
42Sa6386	J/Psi Point	Excavated	early PI	Habitation	Antiquities Section	Casjens (1980)
42Sa6686	Plasma Point	Excavated	PI	Habitation	Antiquities Section	Casjens (1980)
42Sa6436	Tailings Terrace	Excavated	PI early PII	Habitation Limited Activity	Antiquities Section	Casjens (1980)
42Sa6435	Alpha House	Excavated	early to middle PII	Habitation	Antiquities Section	Casjens (1980)
42Sa6404	Barium Bottoms	Excavated	PI PII	Limited Activity Limited Activity	Antiquities Section	Casjens (1980)
42Sa6383		Tested	PI	Unknown	Antiquities Section	Casjens (1980)
42Sa6685		Tested	PII-PIII	Limited Activity	Antiquities Section	Casjens (1980)
42Sa7753		Tested	early PI	Limited Activity	Antiquities Section	Casjens (1980)
42Sa7870		Tested	early PI	Unknown	Antiquities Section	Casjens (1980)
42Sa8015		Tested	PII-PIII	Unknown	Antiquities Section	Casjens (1980)
42Sa8017		Tested	BMIII-PIII	Limited Activity	Antiquities Section	Casjens (1980)
42Sa6382		Tested	early PI PII	Unknown Unknown	Antiquities Section	Casjens (1980)
42Sa6381		Excavated	middle PIII	Seasonal Habitation	Plano	Agenbroad and others (1981)
42Sa6698		Excavated	BMIII PII	Habitation Seasonal Habitation	Plano	Agenbroad and others (1981)
42Sa6420		Tested	PI PII	Unknown Unknown	Plano	Agenbroad and others (1981)
42Sa6384		Excavated	BMIII	Habitation	Antiquities Section	Sargent (1979)
42Sa27732		Excavated	late PIII	Habitation	Abajo Archaeology	Till (in prep.)

function. Table 4 generally mirrors the results obtained by Davis and others (2003), indicating that Pueblo II period sites are the most prevalent, followed in frequency by Pueblo I, Basketmaker III, and Pueblo III periods sites. However, it also suggests that many of these sites were in use during important "transitional" times between the highly generalized Pecos periods. Thus, under scrutiny, many of the sites may derive from the late Basketmaker III/early Pueblo I and late Pueblo I/early Pueblo II transitions.

Table 5 may indicate an important trend in settlement strategy as it is correlated with time. Very tentatively, it appears as though there is a 2:1 ratio of habitation sites to limited activity sites for the Basketmaker III, Pueblo II, and Pueblo III periods. In contrast, there is a 1:1 ratio of these site types in the Pueblo I period. However, Table 5 shows that the sample size of pure Pueblo I period sites is fairly small relative to the less-defined "PI to PII" range of sites. A greater understanding of the chronology of these sites may have significant bearing on understanding changing settlement patterns through time. These changes may indicate significantly different strategies for inhabiting and using the mesa's interior, which in turn, may have significant implications for social structure and strategy as they are correlated with larger historical trends in Puebloan history.

#### **Toward a Consideration of Research Issues**

Table 6 presents a summary of previous research designs developed for data recovery projects on White Mesa. The research themes shown in Table 6 suggest a set of research domains that may be appropriate for a larger research program associated with the Cell 4B project. Such research domains might include: environment and subsistence, chronology, settlement, social organization, and technology. Each of these is briefly described below. We include these only as suggestions for future mitigation work on the property.

The domain "environment and subsistence" would recognize the close relationship between environmental variables, such as climate and soils, and subsistence data, which would include a variety of data sources (e.g. archaeobotanical data, food production technology and strategies, and food residues). Historic settlement data may also be very informative when considering such a research domain.

"Chronology" explicates the nature of the data that help archaeologists discern the occupation and use of the White Mesa landscape through time. Absolute dating techniques such as dendrochronology may yield ideal and precise measures of time. However, relative dating techniques such as pottery assemblage dating may also provide very useful information. To this end, we suggest that some of our concerns may be "instrumental" in nature: the improvement of our capacity to use such relative means as pottery typologies may be one of the goals of research associated with the project. Furthermore, in addition to "when" a site was occupied, a question under the chronology research domain may ask "how long" a site was occupied.

"Settlement" issues may address site-specific questions, local site distribution problems, and region-wide issues that address large-scale abandonment and resettlement. We suggest that all scales of such

Table 4. Site Components by Count and Percent, White Mesa Mill		
Period	N	%
Archaic	2	0.8
Late Archaic to BMII	2	0.8
BMIII	14	5.8
BMIII to PI	24	10.0
PI	17	7.1
PI to PII	30	12.4
PII	35	14.5
PII to PIII	33	13.7
PIII	11	4.6
BMIII to PII	8	3.3
PI to PIII	8	3.3
BMIII to PIII	5	2.1
Pueblo, not further specified	2	0.8
Unknown Aboriginal	42	17.4
Historic, not further specified	5	2.1
Historic Navajo	1	0.4
Historic Ute	1	0.4
Historic Anglo	1	0.4
<b>TOTAL</b>	241	100.0

Table 5. Site Components by Possible Function, White Mesa Mill

Period	Habitation		Seasonal Habitation		Camp		Limited Activity		Granary		Quarry		Unknown		Not Described		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
	Archaic							2	100.0									2
Late Archaic to BMII							2	100.0									2	100.0
BMIII	9	64.3			1	7.1	4	28.6									14	100.0
BMIII to PI	20	83.3					4	16.7									24	100.0
PI	8	47.1	1	5.9			8	47.1									17	100.0
PI to PII	27	90.0	1	3.3			2	6.7									30	100.0
PII	23	65.7	1	2.9			9	25.7	1	2.9	1	2.9					35	100.0
PII to PIII	28	84.8					4	12.1	1	3.0							33	100.0
PIII	7	63.6					4	36.4									11	100.0
BMIII to PII	6	75.0					2	25.0									8	100.0
PI to PIII	7	87.5					1	12.5									8	100.0
BMIII to PIII	4	80.0					1	20.0									5	100.0
Pueblo, not further specified							2	100.0									2	100.0
Unknown Aboriginal	4	9.5			3	7.1	20	47.6	4	9.5	1	2.4	10	23.8			42	100.0
Historic, not further specified					2	40.0							1	20.0	2	40.0	5	100.0
Historic Navajo					1	100.0											1	100.0
Historic Ute					1	100.0											1	100.0
Historic Anglo					1	100.0											1	100.0
TOTAL	143	59.3	3	1.2	9	3.7	65	27.0	6	2.5	2	0.8	11	4.6	2	0.8	241	100.0

Table 6. Research Problems/Hypotheses Developed for Excavation Projects Near the White Mesa Mill	
Davis (1985) <sup>1</sup>	
1	Subsistence and settlement practices vary through time on White Mesa.
2	Site function differs across White Mesa.
3	Habitation structures and other features have functionally distinct areas within them.
4	The archaeological record reflects the socio-behavioral processes through which prehistoric communities were organized.
5	Evidence for trade and other relations with foreign cultural groups exists on White Mesa.
6	Although White Mesa pottery is of the Mesa Verde ceramic tradition, most of the pottery made on White Mesa was locally made.
7	The quality of lithic craftsmanship is governed by the material utilized, not by the technology of the knapper.
8	There were paleoenvironmental/climatic shifts during the Anasazi occupation on White Mesa.
Casjens (1980) <sup>2</sup>	
1	Natural climatic conditions changed through time.
2	Human habitation affected the natural environment.
3	Although limited, Pre-Basketmaker III occupation occurred in the White Mesa area.
4	The relative amounts of cultigens, weedy plants and wild foods varied through time, and correlated with environmental change and technology.
5	The population curve varied as environment (carrying capacity) varied and as economic technology was adapted to varying climatic conditions.
6	Periods of higher population density show either a diversity in site types and settlement patterns as more niches were exploited, or a more specialized adaptation as greater reliance was placed on one resource.
7	Some sites were seasonally or intermittently inhabited.
8	Sites were located near important economic resources.
9	Sites of different types were inhabited at the same time.
10	Much of the activity took place in "use areas" outside of the structures; such activities might include cooking and roasting, eating, food preparation (grinding and butchering), stone tool fabrication and sharpening, and pottery making.
11	Dates of pottery styles and architectural styles do not agree exactly with Mesa Verde dates for these styles.
12	Changes in architecture (room types) and site layout reflect changes in community organization.
13	Local quarries or sources supply most necessary materials for tools and pottery.
14	While the inhabitants were largely self-sufficient, they were part of a much larger trading sphere in which exotic materials were distributed.
15	The White Mesa inhabitants had trading and possibly other (ideological) relationships with large sites nearby.
Firor, Greubel, and Reed (1998) <sup>3</sup>	
1	Cultural affiliation and chronology—suggests the possibility of formulating a phase-based system for White Mesa.
2	Site structure—primarily concerned with the identification of how different areas were used within a given site.
3	Site function—determines the primary function of a site, presumably a determination that could be of use at the wider landscape level.
4	Subsistence—seems to simply propose to examine the subsistence data gleaned from the site.
5	Settlement patterns—seems primarily concerned with issues of "mobility and scheduling," and implicitly tackles the issue of "site typology" (which gets back to "site function" above).
6	Social organization—appears to be mostly concerned with "residential organization" or the "composition of groups occupying any unit of space" (i.e. activity area, household, community, etc.).
7	Technology—takes an inductive approach (i.e. generate data, then look for informative patterns); also chooses to focus on lithic technology and correlate it with site type and time period. For the latter, Alpine actually generates a few hypotheses: 1) lithic artifact assemblage signatures will vary between field houses and residences and 2) BM assemblages will differ considerably from Pueblo.
8	Extra-regional relationships—Alpine poses this basic hypothesis: evidence for long-distance trade will tend to have been with other Anasazi groups, not Fremont.
9	Seasonality—inductive, instrumental research (i.e. important for settlement/subsistence research domains, so will look for data in architecture, floral, and faunal data).
<sup>1</sup> The research design in Davis (1985:29-33) presented as a "list of research problems." These are reproduced here, verbatim. These problems are essentially hypotheses, and are presented with expectations if they are true.	
<sup>2</sup> Casjens (1980:44-64) produced a set of hypotheses that are repeated verbatim above. These statements are followed by "tests" that outline how the hypotheses should be addressed.	
<sup>3</sup> Firor and others (1998:14-22) list a set of "problem domains." The commentary following each heading is our understanding of how the particular problem domain was to be approached by Alpine's research. For the most part, few hypotheses were actually presented.	

a research domain will need to be addressed by the Cell 4B project, though not for each individual site.

Similarly, "social organization" will operate to cover issues that are site-specific as well as trends that are regional. Such a domain might encompass questions that grapple with demographics, but may also address the esoteric concerns of problems that delve into ideology.

"Technological" concerns will address detailed examinations and analyses of features and artifacts that heretofore have been understudied or perhaps not studied at all. These problems will not be addressed simply for the sake that they are there; rather, such studies will only be proposed if they are pertinent to addressing other domains in the proposed research design.

Finally, in anticipation of the data recovery project on the White Mesa Mill property, we want to underscore our belief that a good mitigation program will include a strong educational component. To that end, and to the extent that we can, Abajo Archaeology will propose a public component that may include such efforts as a project web site or blog, a museum exhibit at Blanding's Edge of the Cedars Museum, a series of public presentations, and perhaps some activities with local avocational groups that involve artifact processing and/or analysis.

### CHAPTER 3: TESTING METHODOLOGY

This chapter serves to cover a wide range of subjects, all of which are pertinent to the subject of how Abajo Archaeology will conduct archaeological testing on sites found within the proposed Cell 4B project area. Chapter 3 first describes the theoretical framework under which Abajo Archaeology will approach this testing program. The chapter then describes the general procedures that will be used to investigate the sites, as well as Abajo's response to human burials. Site-specific testing procedures, described by individual site, are then proposed. Following this discussion, we propose methods for off-site blading. The chapter then turns to the analysis of artifacts (e.g. pottery and lithic materials) and ecofacts (e.g. animal bone and pollen and macrobotanical samples), and the methods and techniques used to catalog and analyze these items. A brief section of the curatorial techniques and arrangements precedes the final section, which outlines a time-table for Abajo Archaeology's proposed testing program.

#### Theoretical Orientation

The basic theoretical orientation that underlies the archaeological testing efforts for this project can be described as scientific. We affiliate our efforts with the over-arching field of North American anthropology, and follow a processual archaeology approach to our field work, laboratory research, and reporting (sensu Binford 1962; Cordell 1994). Attributes of this approach include an expectation of explanation for observed patterns in the archaeological record, an assumption that archaeological materials represent elements of the prehistoric society that created these materials, and that these social elements are interrelated and compose the social whole. Considering the whole as a system, a change in one or more elements results in the patterned and predictable change in other elements.

Having said this, we recognize that most of the results of our test excavations will be of limited scientific value, at least in terms of explanation. Rather, these same results will be used to create, at a later date, a research design for future data recovery (i.e. excavation) efforts at these sites.

#### General Testing Procedures

To the end of preparing this proposal, Abajo Archaeology first generated base-line maps for each site. After obtaining permission from the landowner, fieldwork to create these maps was done from July 27 through August 12, 2009. The work was done under the supervision of archaeologists Jonathan Till and Mark Bond; Till and Bond were assisted by Vaughn Hadenfeldt and Lois Young. As each base-line map was created, the field crew established a 4-meter metric grid on each site. Wooden grid stakes were placed along one or more cardinal axes within the site. Each base-line map will be used to guide, control, and report test excavations on the site being investigated. Further, these grids will be useful in later data recovery efforts.

The 4-meter grid on each site will also assist archaeologists in their efforts to provenience artifacts and ecofacts from the site in

question. Abajo Archaeology will use a provenience system derived from the Dolores Archaeological Project (Wilshusen and others 2000) and Crow Canyon Archaeological Center (2001). This system is widely used in the Mesa Verde region; the use of the provenience system in this context will help make this body of data comparable with a much larger data set within the area. The system basically assigns a unique number, a "provenience designation" or "PD," to a specific horizontal and vertical context on a site. Artifacts and features that are found in that context are documented in association with that particular number. Artifact processing and cataloging procedures are discussed further in another section of this chapter.

Several techniques, varying in intensity and destructiveness, will be used to conduct subsurface test investigations. The techniques may include auger probes, shovel probes, small test trenches that measure no more than 1 square meter in area, backhoe trenches, and even road maintainer scrapes. With a few exceptions, the general order of testing activities on each site will be: 1) auger/shovel probes; 2) test unit and, when called for, backhoe excavation; 3) road maintainer scrapes. These activities are described below.

Most sites will be tested with auger probes. This excavation technique will use an auger bit measuring 8 inches in diameter. The augers themselves may be hand-tools or power-tools (i.e. gas-powered augers). Auger probes will be excavated at two-meter intervals. We suggest that field archaeologists may occasionally decide to excavate shovel probes, in lieu of the more narrow-diameter auger probes, to better identify the presence or absence of cultural deposits. Data that will be recorded for each auger and/or shovel probe include observations of sediment texture, color, the presence and/or absence of cultural materials, and the nature of other inclusions in the sediment. When possible, archaeologists will note the depths at which soil changes occur. Fill from auger and shovel probe excavations will be screened through  $\frac{1}{4}$ -inch mesh. All artifacts retrieved from auger and shovel probes will be provenienced according to their individual auger or shovel probe, but no vertical subdivision will be made in this provenience (provenience methodology is described at the end of this section). These artifacts will be collected for cataloging and, at later dates, analysis and curation. The frequencies of artifacts retrieved from these probes and other test excavations will help archaeologists generate estimates for the anticipated amounts of artifacts from these sites. This knowledge will in turn be used to determine how much time will be needed for particular analysis tasks, and what down-the-line curation needs may be anticipated. Upon their completion, auger and shovel probes will be backfilled for reasons of safety.

Several sites have middens and/or artifact concentrations that may represent formal trash deposits. In a few instances, architecture is indicated by the presence of jacal fragments on the surface. In the cases where formal trash deposits or architectural remnants are indicated, we propose the emplacement of hand-excavated test units. Data from these units will help archaeologists understand the nature and extent of these deposits.

Hand-excavated test units will measure no more than 1 square meter in area. Such excavations will be conducted full-cut, i.e., with

no vertical subdivision. The fill from the test units will be screened through ¼-inch mesh. Like auger and shovel probes, cultural materials will be collected and provenienced with their associated test units. Again, data pertinent to the stratigraphy observed in each test unit will be recorded. In those instances where cultural stratigraphy is noted, one or more profiles will be drawn and photographed.

We also recommend that during testing archaeologists have the discretion to hand-excavate occasional test units to better identify cultural features or stratigraphy discovered in auger probes. Test units are not specified for 42Sa28128, 42Sa28129, 42Sa28130, 42Sa28132, and 42Sa28134; we suggest that one test unit be allowed to investigate and characterize the sediments at each of these sites.

The general locations of subsurface features discovered by hand- or auger-excavated means will be delineated with pin flags. We propose that flagging be done particularly on those sites slated for scraping with a road maintainer.

When used, the road maintainer will systematically scrape sediments from the surfaces of sites, or in areas immediately surrounding sites, to remove plow zone sediments that can obscure subsurface feature outlines. The depths for road maintainer scrapes can be finely adjusted to suit the context. We recommend that in any given pass of a road maintainer over an area, that the amount of fill removed will not exceed 10 cm. Indeed, in many situations, a scraping "pass" will probably not exceed 5 cm. At all times, an archaeologist will monitor the road maintainer's activities. Artifacts observed in scraped fill or back-dirt, and not in the context of an archaeological feature, will be retrieved and provenienced with a general, sub-surface PD (provenience designation) number established for that particular site.

When subsurface features are located, scraping will cease in that location. Artifacts retrieved in association with the feature will be assigned a general PD for that particular feature. Relatively small features, such as hearths, will be tested for depth with a soil probe/auger (which will not exceed 1 in. in diameter). Other features may be subject to the use of a judgmental, hand-excavated unit to test for integrity and extent. Sites to be scraped with a road maintainer are explicitly noted in Table 6 and in the section on Site-specific Testing below.

Abajo Archaeology proposes the initial use of a road maintainer at the two previously investigated sites, 42Sa6757 and 42Sa8014. With the exception of 42Sa6757 and 42Sa8014, road maintainers will only be used after a site has been investigated with all other testing techniques outlined above. With the exception of 42Sa6757 and 42Sa8014, a surface collection of all artifacts in those gridded portions of the site to be scraped will be made; these artifacts will be provenienced according to their location within the 4-m grid established on the sites. Again, a monitoring archaeologist will be present whenever a road maintainer is used.

We also propose the use of a backhoe at several sites to re-open backhoe trenches that had been previously excavated by the Antiquities Section to test the sites. An archaeologist will be present to monitor all backhoe excavations. The details of these activities are discussed

below in the Site-specific Testing section. We do note that any artifacts observed in the course of these particular excavations will be collected, but assigned only a general provenience. For backhoe work, this provenience will be according to the particular trench; for road maintainer work, only a "general site" provenience will be assigned unless the artifact(s) is associated with a specific feature.

Before concluding this section, we should discuss our approach to human remains. Previous research at prehistoric sites on White Mesa have documented a moderate number of human burials (e.g. Casjens 1980; Davis 1985; Firor and others 1998). In the event that human remains are encountered, excavators will treat the remains with sensitivity and respect in the spirit of the Native American Graves Protection and Repatriation Act (NAGPRA). If human burials are encountered, Abajo archaeologists will cease excavation in the vicinity of the remains and contact the San Juan County Sheriff and Medical Examiner, as well as the Division of State History.

### **Site-specific Testing**

This section details the testing procedures that we propose for the sites in the Cell 4B project area. Six of the 14 sites were previously recorded, tested, and were determined to contain significant deposits. Two of these sites, 42Sa6757 and 42Sa8014, were subjected to data recovery efforts (Davis 1985). We will recommend that the surfaces of these two sites be bladed to determine the presence and/or extent of subsurface architectural elements that may have been missed by previous excavation work. The four other sites, 42Sa6391, 42Sa6393, 42Sa6397, and 42Sa6431 were tested and determined to contain significant deposits; however, the data gathered from these sites are insufficient to determine the number of subsurface features, the depth of midden deposits, and the frequencies of artifacts within particular assemblages. We believe that the immediate on-site activities that we propose for these four sites are relatively low-impacting, but will provide us with the information we need to produce a research design for data recovery.

The remaining sites in the project area, including 42Sa6392 and 42Sa28128 through 42Sa28134, have not been tested for significance or extent. Given the depth of sediments and previous excavations on the larger White Mesa Mill property (e.g. Casjens 1980; Davis 1985), it seems likely that all of these sites will harbor significant deposits even if at relatively minimal levels. For this reason, the testing program that we propose for these sites will simultaneously consider significance and extent, and will require a degree of reflexivity to respond to the presence of subsurface features if such are discovered.

Table 7 summarizes the testing activities proposed on all 14 sites within the Cell 4B project area.

#### 42Sa6391

Both Dykman (1978) and Nielson (1979) conducted test excavations at 42Sa6391. Figures 19 and 20 illustrate the locations of their backhoe trench excavations, Trenches A and D. Both trenches documented

Table 7. Proposed testing activities for sites in the Cell 4B project area					
Site	Previously tested?	Number of auger probes	Number of test units	Number of backhoe trenches to be re-excavated	Surface-scraping on site?
42Sa6391	yes	114	1		Scraping may occur outside auger-probe area.
42Sa6392	no	34	2		Scraping may occur outside auger-probe area.
42Sa6393	yes	135	3	3	Scraping may occur outside auger-probe area. Midden areas will be avoided.
42Sa6397	yes	105	2		Scraping may occur outside auger-probe area.
42Sa6431	yes	204	3	4	Scraping may occur outside auger-probe area. Midden area(s) will be avoided.
42Sa6757	yes				That portion of the site that is north of the midden area should be scraped.
42Sa8014	yes				The entire surface of the site should be scraped.
42Sa28128	no	95			Probable.
42Sa28129	no	84			Probable.
42Sa28130	no	89			Probable.
42Sa28131	no	38	1		Probable.
42Sa28132	no	57			Probable.
42Sa28133	no	42	2		Probable.
42Sa28134	no	73			Probable.
TOTALS		1070	14	7	

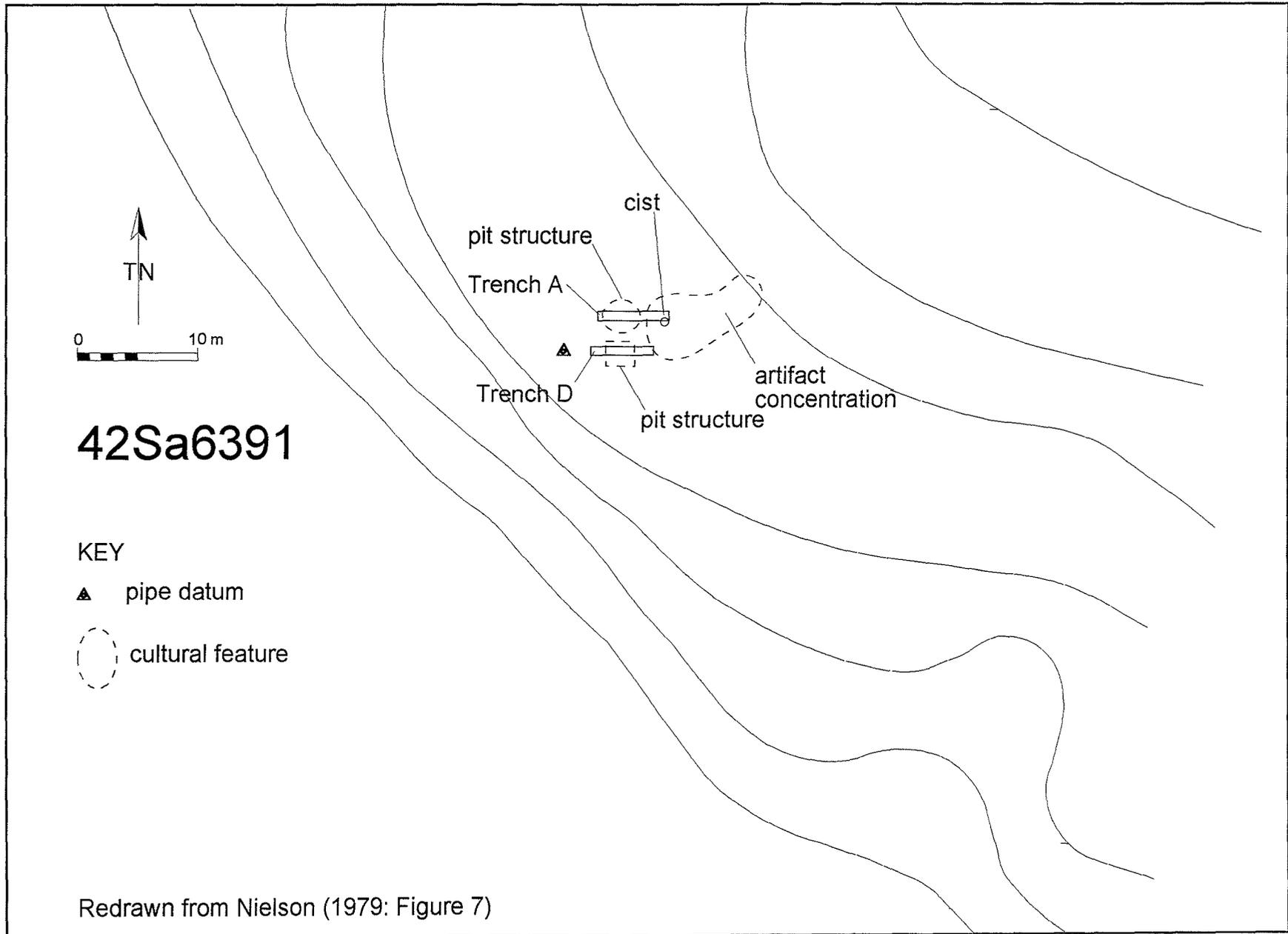


Figure 19. Site 42Sa6391, Antiquities Section Testing Map

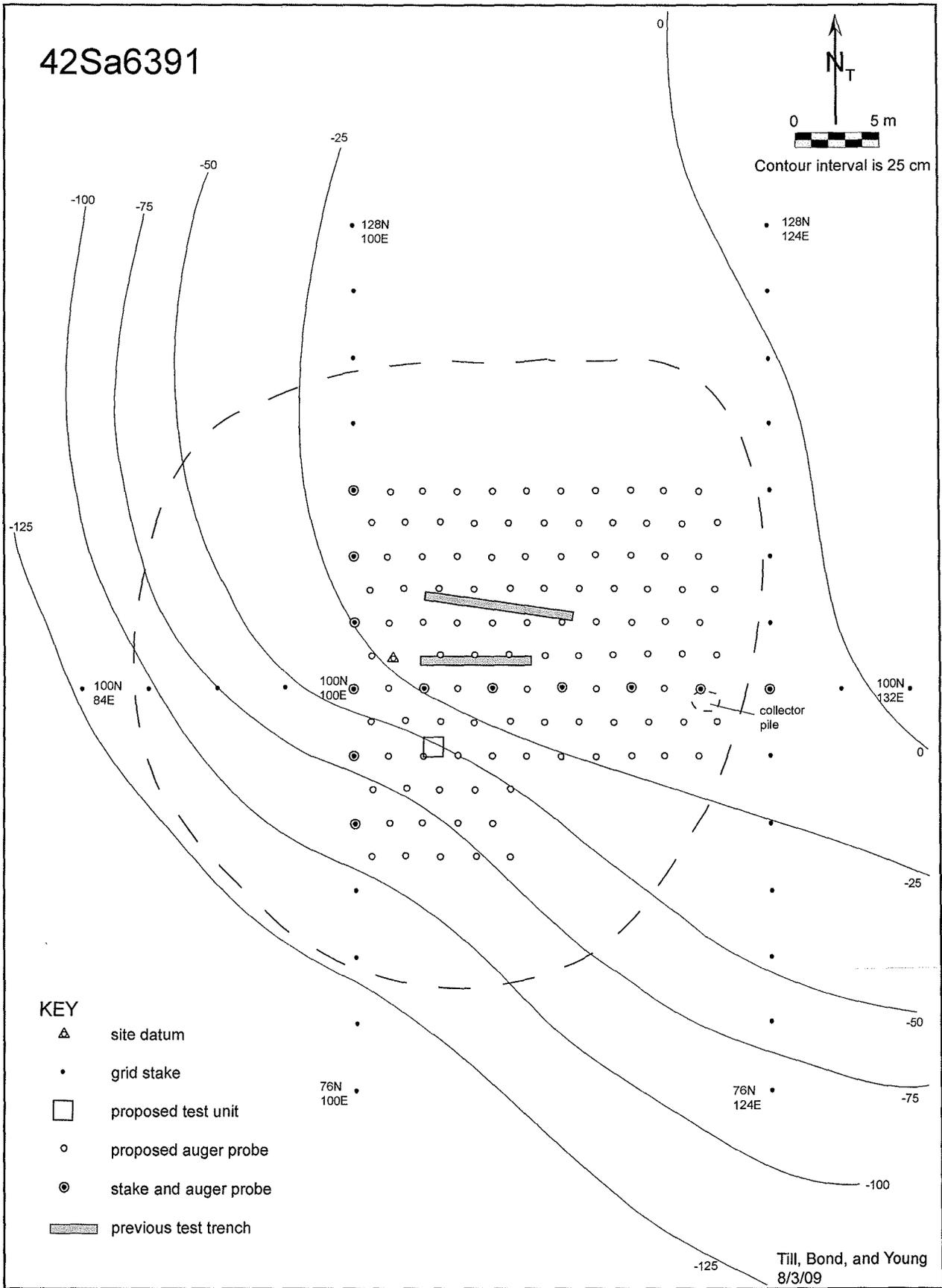


Figure 20. Site 42Sa6391, Proposed Testing Activities Map

evidence of pit structures, which are illustrated in Figures 21 and 22. Both backhoe trenches were evidently backfilled.

Testing activities proposed for 42Sa6391 will primarily consist of the excavation of auger probes. Figure 20 shows the proposed placement of auger probes on the site. We also recommend the excavation of a single 1- by 1-m test unit in the location of the highest artifact density on the site, which is just south of the pit structures exposed in the test trenches (Figure 20). While the surface signature of these materials do not necessarily indicate that a midden is present in this location, it is quite possible that the site's surface has been collected—a nearby collectors' pile demonstrates that such activities may have occurred on the site.

After the excavation of the shovel probes and test unit, we recommend the use of a road maintainer to strip the surface sediments in the area immediately outside that portion of the site that had been augered, and perhaps including the two north-most rows of auger probes.

#### 42Sa6392

As noted earlier, test excavations have previously occurred under this number; however, the site number was misapplied, and instead used in association with the location that is actually 42Sa6431. The salient point here is that 42Sa6392 was never actually tested.

We propose that testing activities include the excavation of both auger probes and two small test units. We suggest the excavation of a 0.5- by 2.0-m test unit in the location of Feature 1 to better describe its nature and extent as a cultural feature. We also recommend excavation of a 1- by 1-m test unit in a small area of relatively high artifact density. The proposed locations of these test excavations are presented in Figure 23.

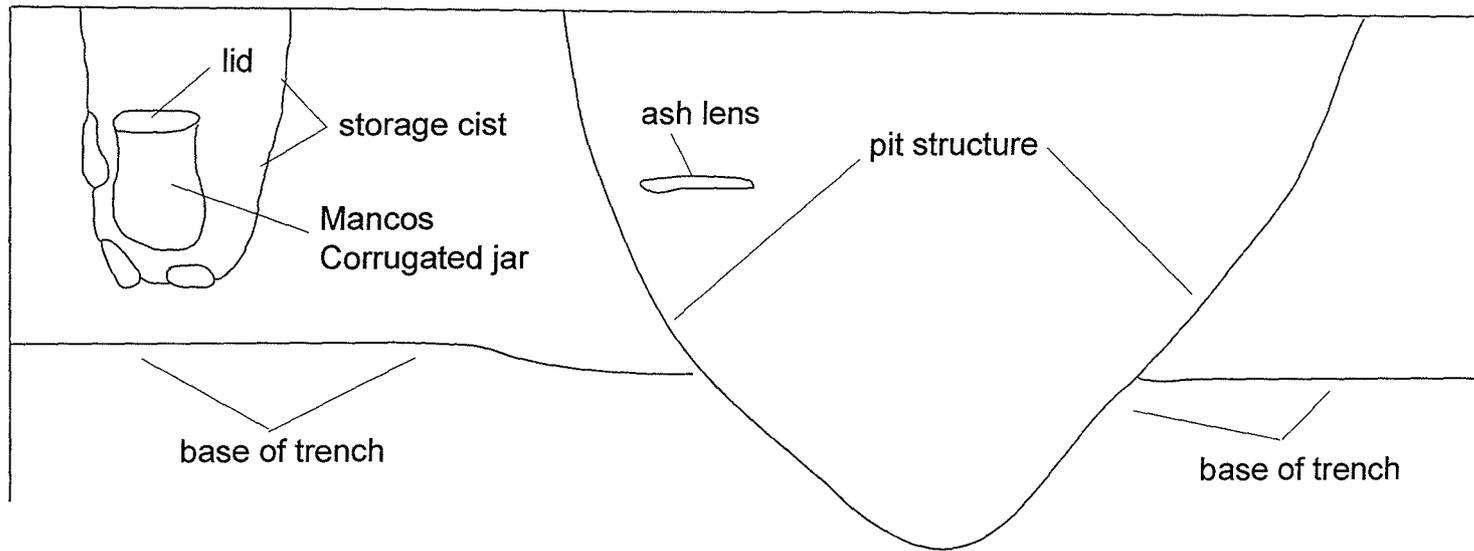
Upon the conclusion of these excavations we recommend the use of a road maintainer to strip the surface sediments in the area immediately outside that portion of the site that had been augered.

#### 42Sa6393

The Antiquities Section conducted excavations at this site in 1978 (Dykman 1978b; Nielson 1979). The reports from these excavations indicate that two backhoe trenches were excavated on the site. When the site was documented for this project's survey report, two trenches were apparent. However, archaeologists preparing the site's base-line map for this proposal observed the faint remains of what appears to be a third, backfilled trench. Figures 6 and 24 illustrate the location of these trenches. Nielson states that one pit structure was located in Trench C (Figure 25); however, it is not apparent which of the three trenches is Trench C. Neither trench appears to have been backfilled, and both appear to have since filled with slumped sediments.

We recommend that a backhoe be used to remove these slumped sediments to determine the exact location of the pit structure. An

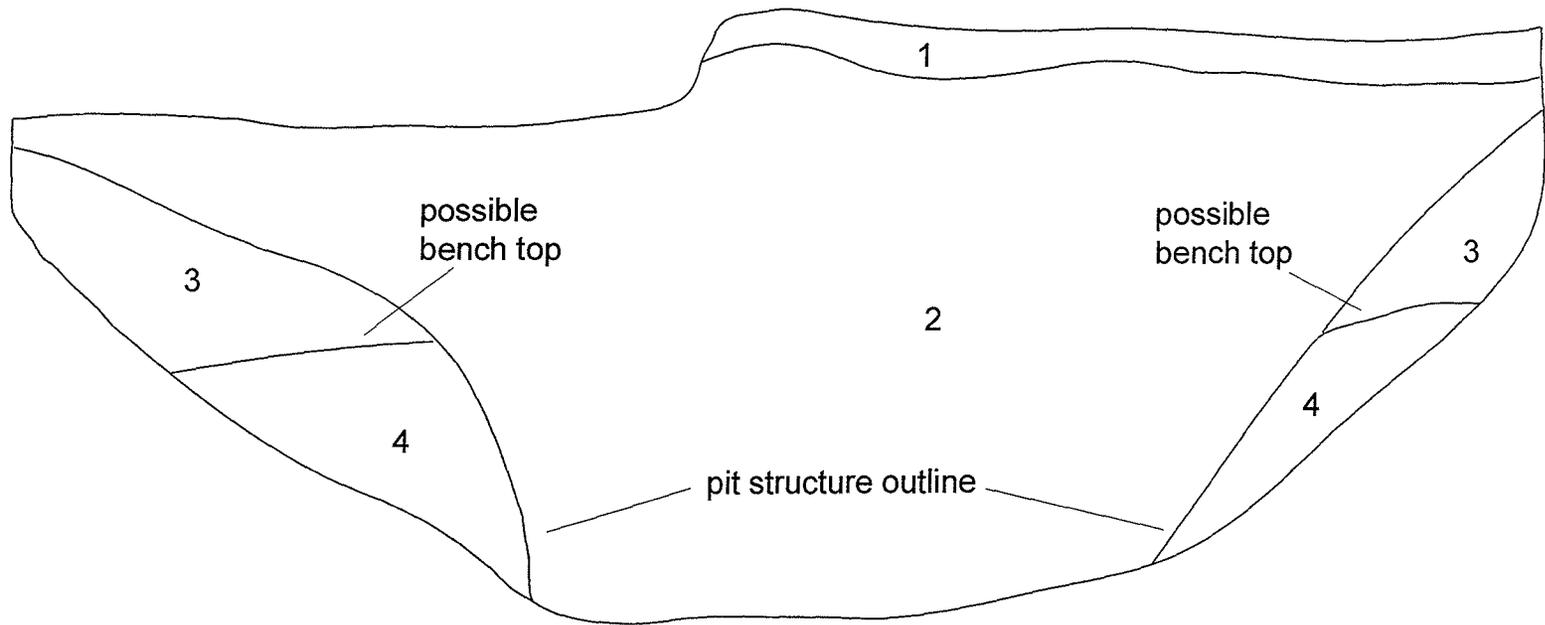
42Sa6391  
Trench A Profile  
South Wall



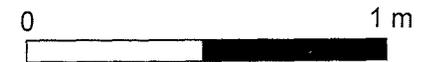
Redrawn from Lindsay (1978: Figure 21)

Figure 21. Site 42Sa6391, Trench A Profile

42Sa6391  
Trench D, South Wall Profile



- KEY
- 1 Plow zone
  - 2 Fill
  - 3 Mixed sand and caliche
  - 4 Caliche



Redrawn from Nielson (1979: Figure 10)

Figure 22. Site 42Sa6391, Trench D Profile

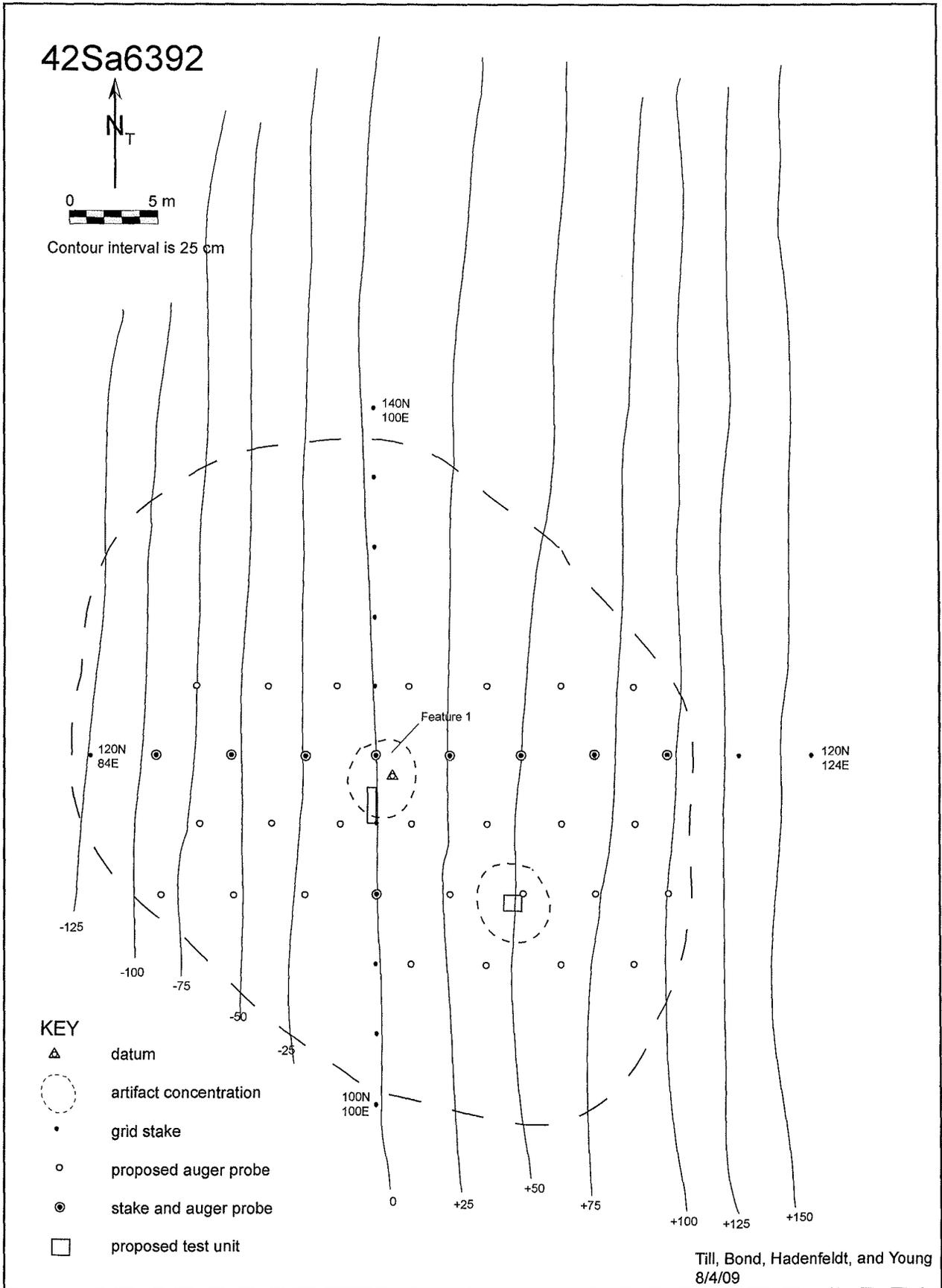


Figure 23. Site 42Sa6392, Proposed Testing Activities Map

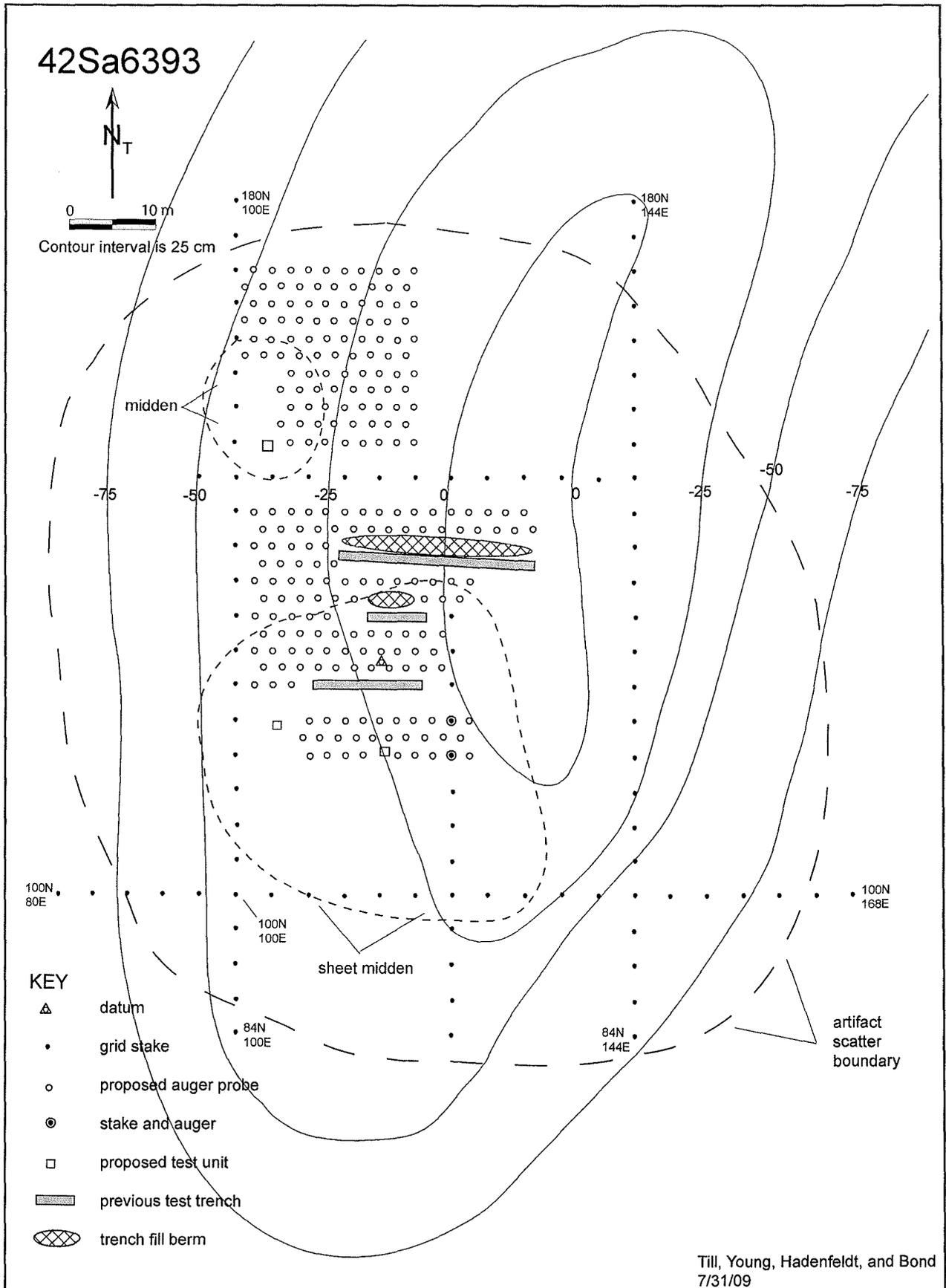
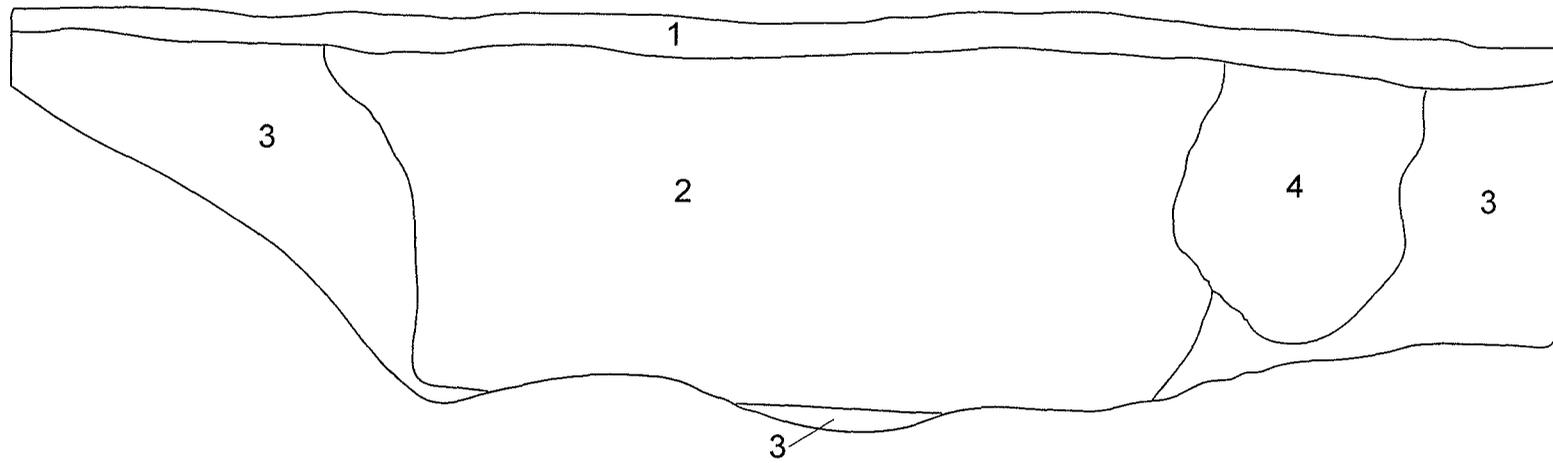


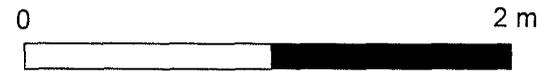
Figure 24. Site 42Sa6393, Proposed Testing Activities Map

42Sa6393  
Trench C Profile  
North Wall



KEY

- 1 Plow zone sediments
- 2 Structure fill
- 3 Sterile sediments
- 4 Rodent burrow sediments



Redrawn from Nielson (1979: Figure 8)  
Note: Recorded by Nielson as 42Sa6391

Figure 25. Site 42Sa6393, Trench C Profile

archaeologist will monitor the removal of the old trench fill. Figure 25 shows the locations of the proposed auger probes.

We recommend the use of a road maintainer to surface-scrape the areas outside the gridded portion of the site, but only after other testing activities have already occurred.

#### 42Sa6397

As noted earlier, this site was misidentified as 42Sa6393, and was tested with that number (Dykman 1978b). The Antiquities Section excavated seven backhoe trenches on the site (Figures 7 and 26). Two of the trenches documented two possible storage features. All of these trenches have been backfilled.

We recommend the excavation of auger probes and a small test unit on the site. The test unit, measuring 0.5- by 2.0-m, will be placed over Feature 1, a concentration of jacal. We also recommend that intensive, 1- by 1-m grids of auger probes be placed over AC-1 and AC-2, both of which are artifact concentrations. Figure 27 illustrates the proposed testing strategy for 42Sa6397.

If no features are located through the above measures, we recommend the use of a road maintainer to scrape the surface of the site, except in those locations where the possible storage features had been found. However, prior to surface-scraping, surface artifacts will be collected according to their 4- by 4-m grid locations.

#### 42Sa6431

As noted earlier, this site was tested by the Antiquities Section under the mistaken designation of 42Sa6392. At least two sessions of testing are apparent for the site, though at the time of this writing only one document recording testing activities has been found (Nielson 1979). The first set of archaeological testing activities involved the placement of nine test trenches (Figure 28). These trenches were excavated by hand, backhoe, or some combination thereof. These excavations located three features: a hearth, a burial, and a lens of charcoal and daub. Cultural materials collected include 39 Chapin Gray and Plain Gray pottery sherds, an assemblage that is indicative of the Basketmaker III period.

The trenches and/or units that Nielson excavated in July of 1978 are now practically impossible to discern. These excavations were apparently backfilled—a few alignments were barely detectable by the differential desiccation of cheatgrass. Relocation of the trenches was made even more difficult by the fact that at least one other set of backhoe trenches were excavated on the site, evidently after Nielson's initial testing efforts.

This second testing event, which apparently involved the excavation of seven backhoe trenches, is readily apparent on the site. As is the case with 42Sa6393, these trenches were not backfilled and are accompanied by parallel berms of backdirt (Figures 8 and 29). These features are still readily apparent on the site's surface, but have

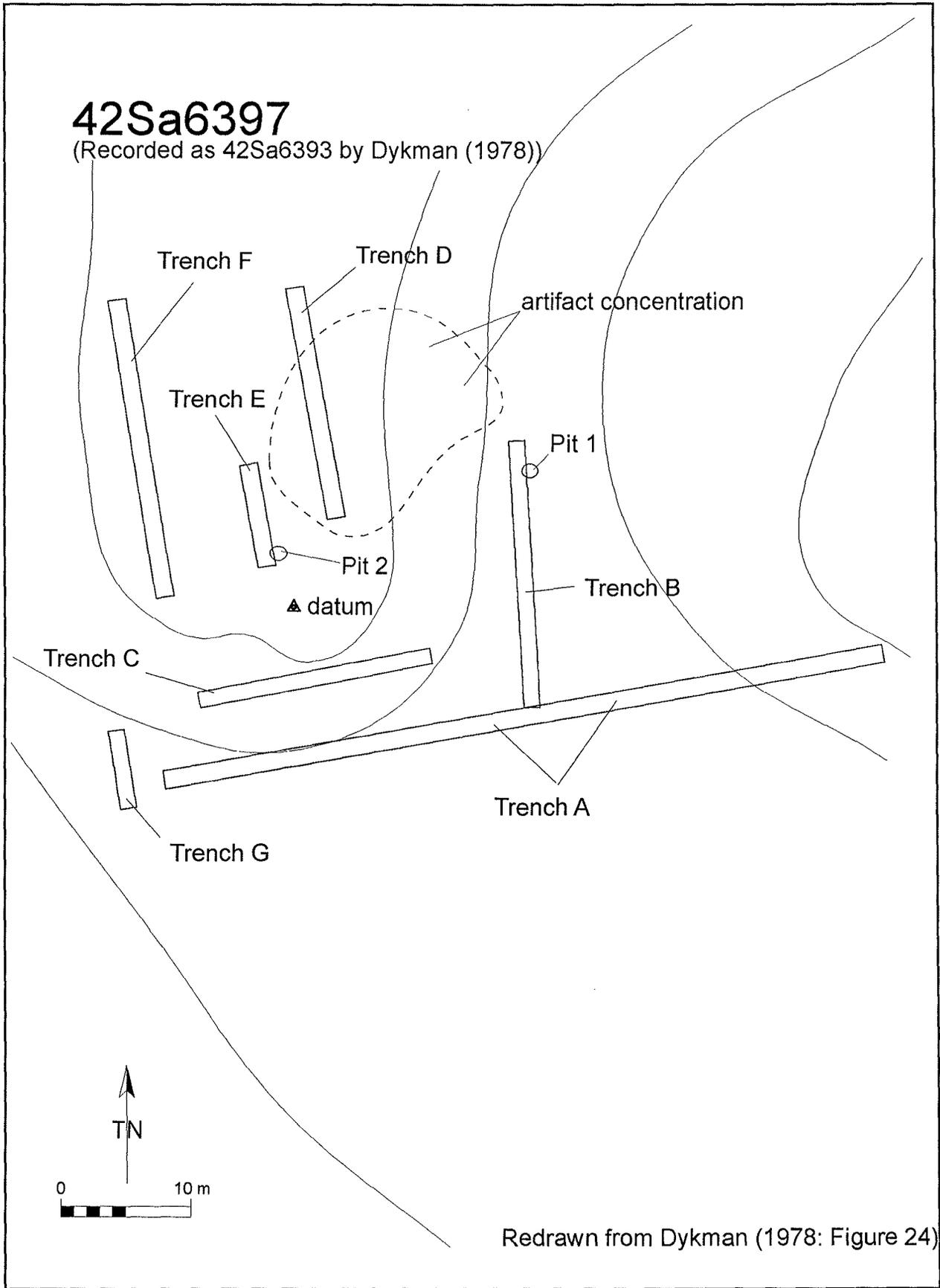


Figure 26. Site 42Sa6397, Antiquities Section Testing Map

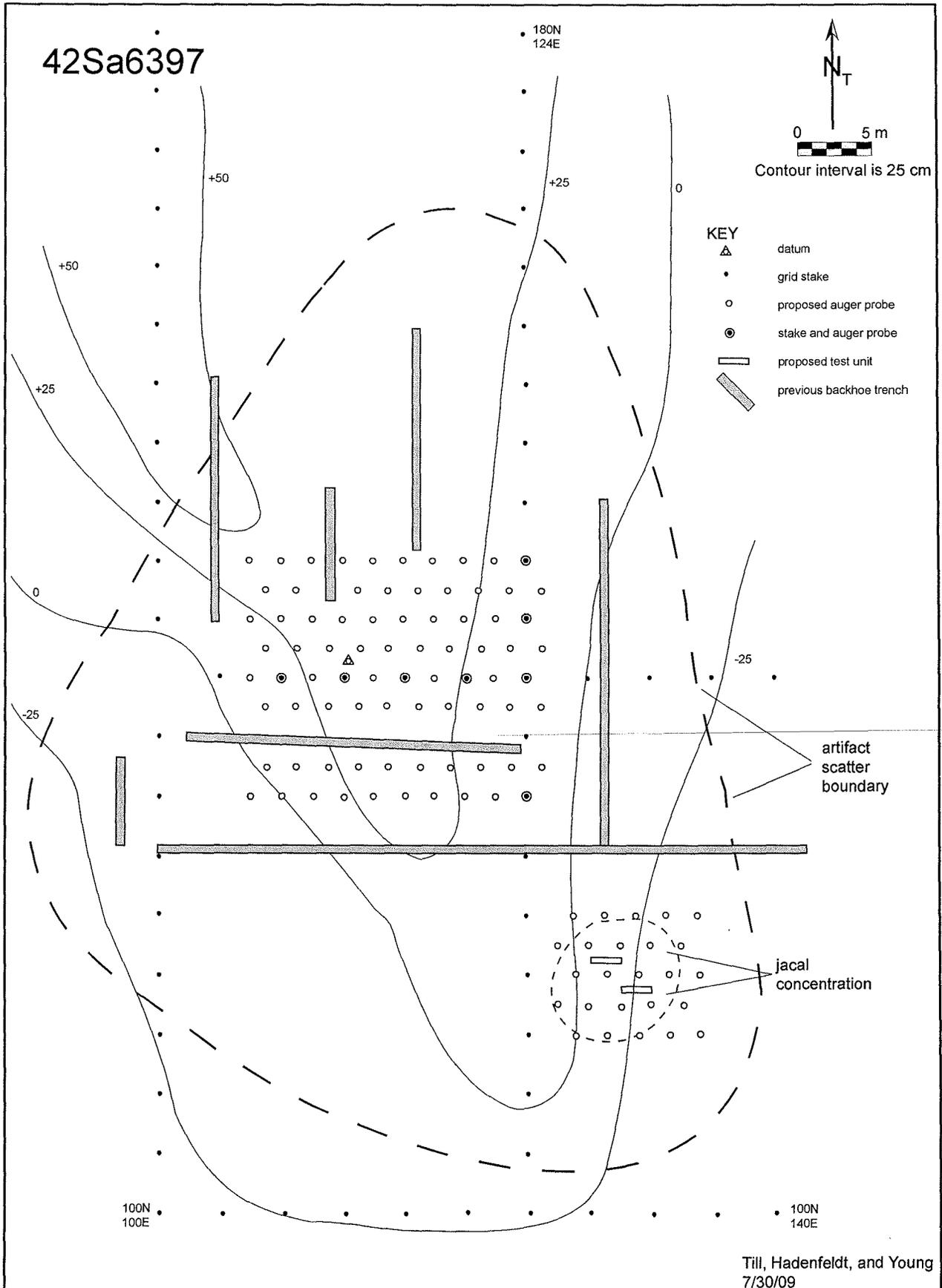


Figure 27. Site 42Sa6397, Proposed Testing Activities Map

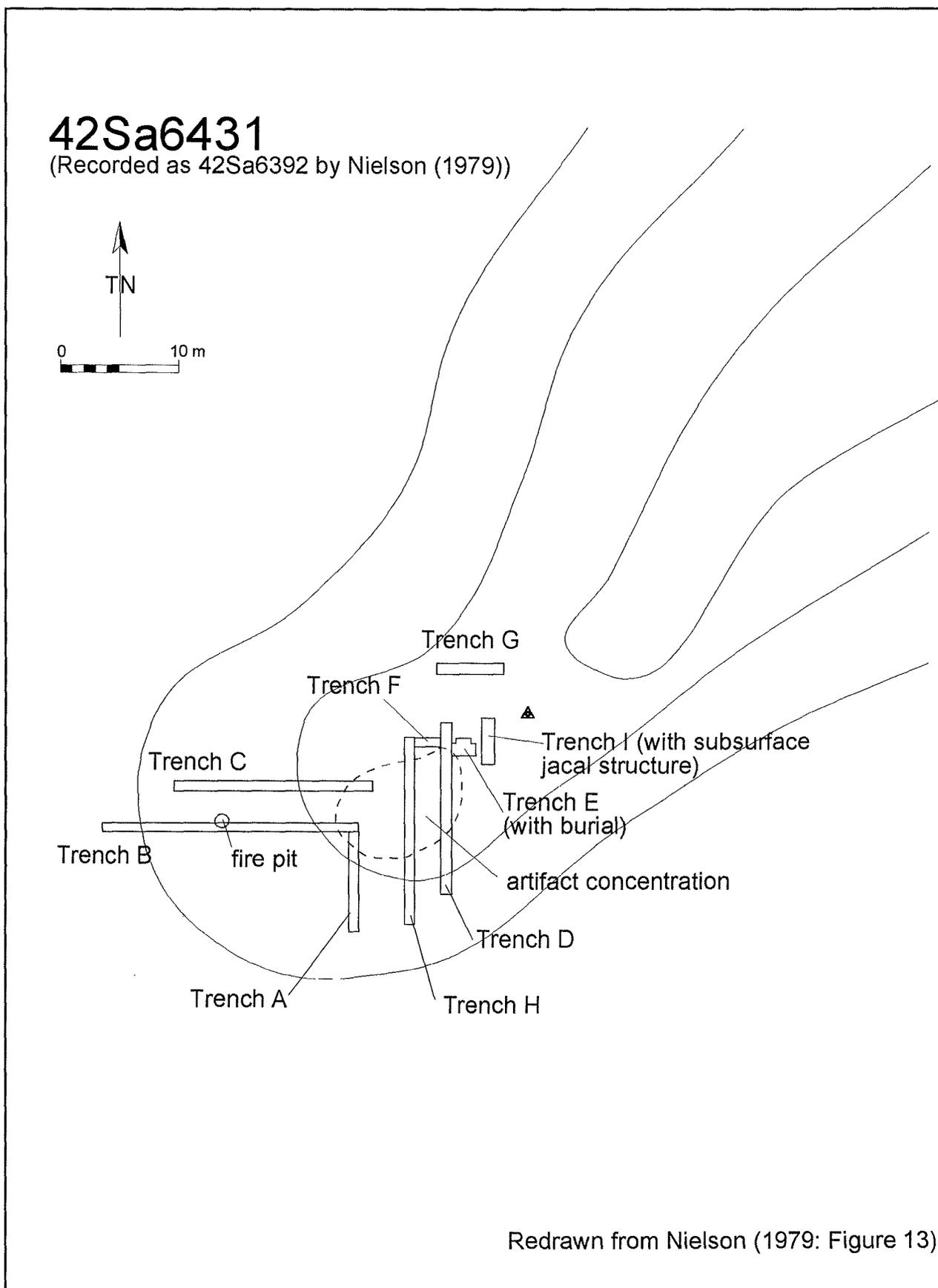


Figure 28. Site 42Sa6431, Antiquities Section Testing Map

filled in considerably to the point where the stratigraphic profiles are no longer discernable.

Due to the lack of reported information on this second set of trenches, we propose that a backhoe be used to remove the fill of these trenches so that the profiles might be examined again (those trenches illustrated in Figure 29). We recommend that an archaeologist be present while the trenches are re-excavated. After the trenches have been opened, the profiles of each will be examined. If significant cultural deposits are observed, at least one profile of the trench will be drawn. No screening of the fill will occur; however, any artifacts observed will be collected and documented in association with the particular trench of origin.

We also recommend the excavation of auger probes and four test units on the site (Figure 29). Working in conjunction with auger probes, the two 1- by 1-m units in Feature 1, an apparent formal midden, will assist archaeologists in describing the nature of the cultural fill and in determining its extent. A hand-excavated trench, measuring 0.5- by 2.0-m, placed over Feature 2 will help verify and describe this concentration of jacal as a cultural feature. Finally, a single 1- by 1-m unit in the Basketmaker III artifact concentration will help describe the nature of these deposits and their extent. The reader will note a gap in the auger probes in this portion of the site. This gap reflects the approximate location of previous testing activities (Figure 28). Figure 29 illustrates the proposed testing strategy for 42Sa6431.

We recommend the use of a road maintainer to surface-scrape the areas outside the gridded portion of the site, but only after other testing activities have already occurred. No surface-scraping will occur in the vicinities of the possible check dams (see Figure 29).

#### 42Sa6757

This site has already undergone data recovery (Davis 1985). As noted in Till (2009:69) the potential exists for the site to harbor other, smaller features previously undiscovered by backhoe-excavated test trenches. We recommend that the northern portion of the site, which harbored all of the site's structural features, be systematically surface-stripped with a road maintainer (Figure 9). This activity would be closely monitored by an archaeologist. Upon the discovery of new features, surface stripping in the immediate vicinity of the feature will cease. Newly discovered features may be tested using methods outlined in this proposal. Small features, such as hearths or cists, may be tested for depth with a soil sampler or probe that measures no more than 1 inch in diameter.

The midden area in the southern portion of the site has not been systematically characterized. As the depth and extent of this cultural stratigraphy is known (see Davis 1985:164), further testing is not warranted.

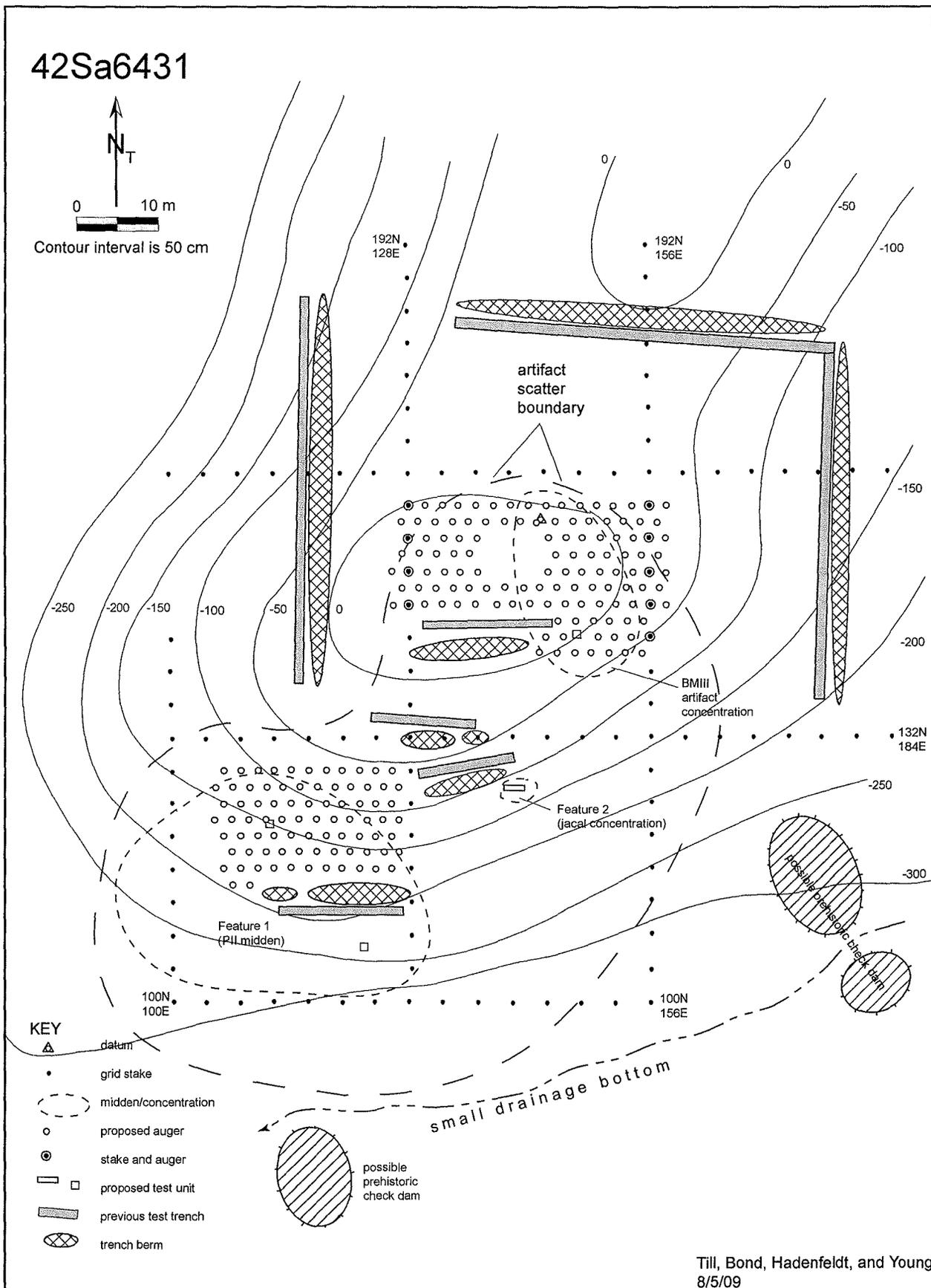


Figure 29. Site 42Sa6431, Proposed Testing Activities Map

42Sa8014

As with the preceding site, 42Sa8014 has already been subjected to intensive excavation (Davis 1985; also see Figure 10). We suggest that the surface sediments of the entire site be stripped systematically with a road maintainer. This activity will be closely monitored by an archaeologist. Upon the discovery of a new feature, surface stripping in the immediate vicinity of the feature will cease. Newly discovered features may be tested using methods outlined in this proposal. Small features, such as hearths or cists, may be tested for depth with a soil sampler or probe that measures no more than 1 in. in diameter.

We suggest the establishment of an off-site datum prior to surface-stripping activities. It is likely that the site's datum will be destroyed by a road maintainer. Therefore, a new off-site datum would facilitate the documentation of new features, if any, relative to the site's old datum.

42Sa28128

This site consists of a small scatter of pottery and lithic artifacts. We propose that a grid of auger probes be established on the site. We also recommend that a single, 0.5- by 1.0-m test unit be excavated on the site to better characterize and examine the site's stratigraphy. Figure 30 illustrates the proposed testing strategy for 42Sa28128.

If no features are located through the above measures, we recommend the use of a road maintainer to remove the site's surface sediments. However, surface artifacts will first be collected according to their 4- by 4-m grid location.

42Sa28129

This site consists of a small scatter of pottery and lithic artifacts. We propose that a grid of auger probes be established on the site. We also recommend that two, 0.5- by 1.0-m test units be excavated on the site to better characterize and examine the site's stratigraphy. One unit would be placed in the west portion of the site, while the second unit would examine the stratigraphy in the area closer to the site's datum. Figure 31 illustrates the proposed testing strategy for 42Sa28129.

If no features are located through the above measures, we recommend the use of a road maintainer to remove the site's surface sediments. However, surface artifacts will first be collected according to their 4- by 4-m grid location.

42Sa28130

This site consists of a small scatter of pottery and lithic artifacts. We propose that a grid of auger probes be established on the site. We also recommend that two, 0.5- by 1.0-m test units be excavated

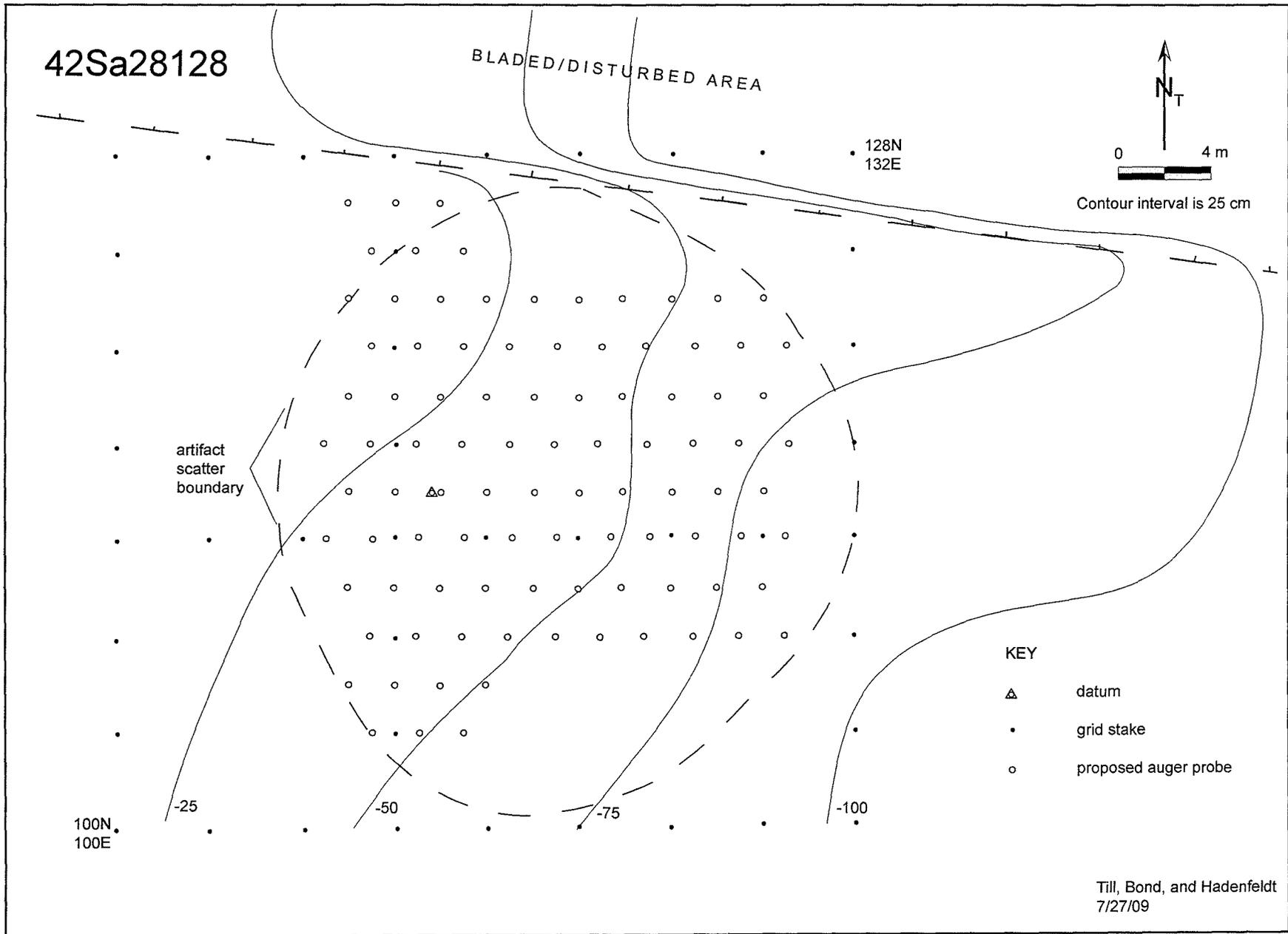


Figure 30. Site 42Sa28128, Proposed Testing Activities Map

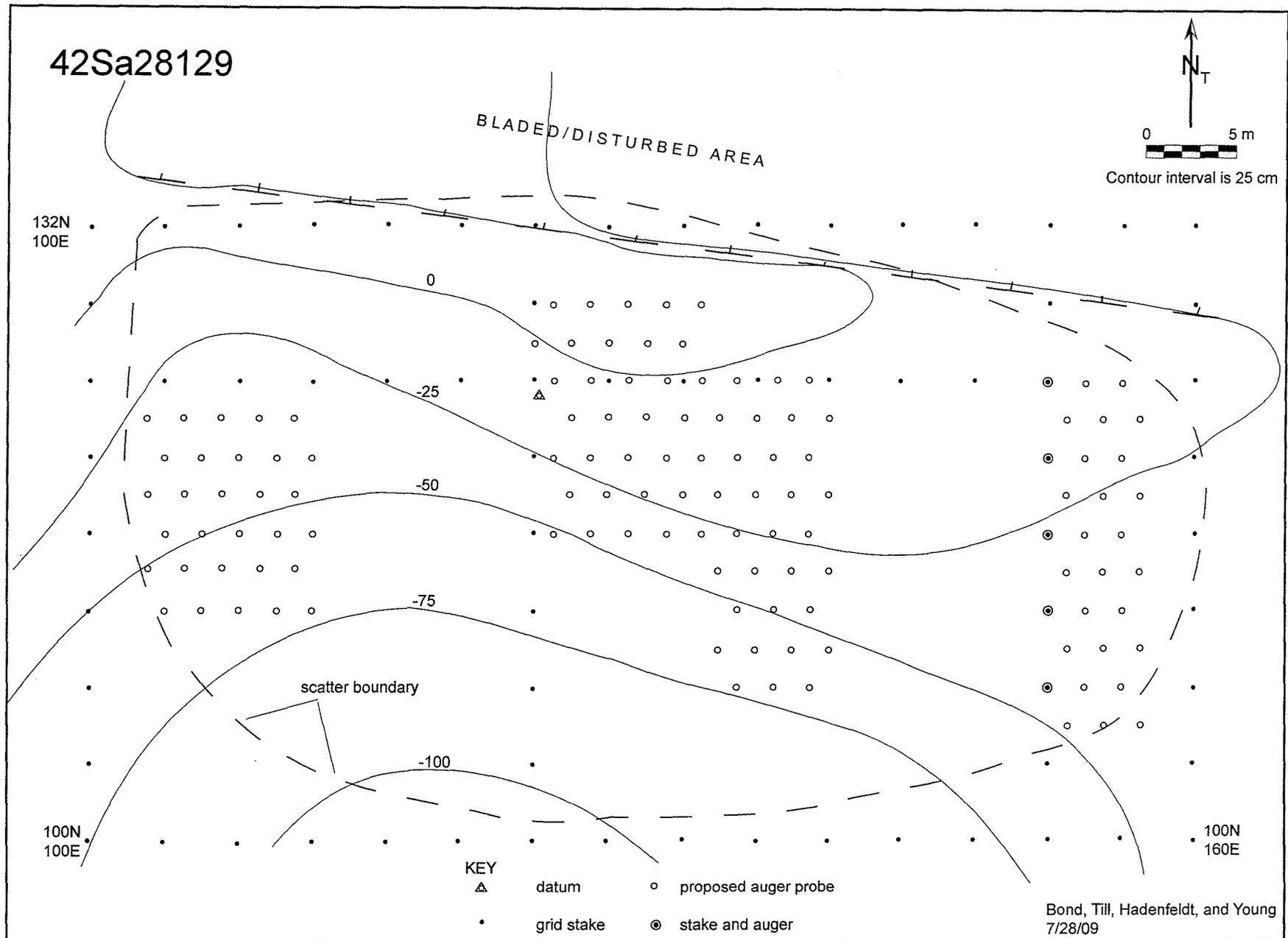


Figure 31. Site 42Sa28129, Proposed Testing Activities Map

on the site to better characterize and examine the site's stratigraphy. One unit would be placed in the west portion of the site, while the second unit would be placed in the eastern portion of the site. Figure 32 illustrates the proposed testing strategy for 42Sa28130.

If no features are located through the above measures, we recommend the use of a road maintainer to remove the site's surface sediments. However, surface artifacts will first be collected according to their 4- by 4-m grid location.

#### 42Sa28131

This is the only historic site in the project area. We suggest the excavation of a grid of auger probes. We also recommend the placement of a 0.5- by 2.0-m test unit be placed over one-half of the hearth feature to better describe and ascertain the nature of its associated stratigraphy and structure. Figure 33 illustrates the proposed testing strategy for 42Sa28131.

#### 42Sa28132

This site consists of a small scatter of pottery and lithic artifacts, as well as a scatter of rock. We propose that a grid of auger probes be established on the site. We also recommend that a single, 0.5- by 1.0-m test unit be excavated on the site to better characterize and examine the site's stratigraphy. We suggest that this unit be established in the northern portion of the site in the vicinity of the several rocks on the site's surface. Figure 34 illustrates the proposed testing strategy for 42Sa28132.

If no features are located through the above measures, we recommend the use of a road maintainer to remove the site's surface sediments. However, surface artifacts will first be collected according to their 4- by 4-m grid location.

#### 42Sa28133

The site consists of a small scatter of lithic tools and several pieces of sandstone. As Till (2009:61) suggests, this location may represent the remains of a food-processing facility, such as a mealing room or bin. Considering the small size of the site, we recommend the excavation of a grid of auger probes placed at one-meter intervals within the site boundary, and a larger grid of auger probes placed at two-meter intervals around the site's perimeter. We also suggest the excavation of a test trench, measuring 0.5- by 2.0-m, through the approximate center of the rock scatter. Figure 35 illustrates the proposed testing strategy for 42Sa28133.

If no features are located through the above measures, we recommend the use of a road maintainer to remove the site's surface sediments. However, surface artifacts will first be collected according to their 4- by 4-m grid location.

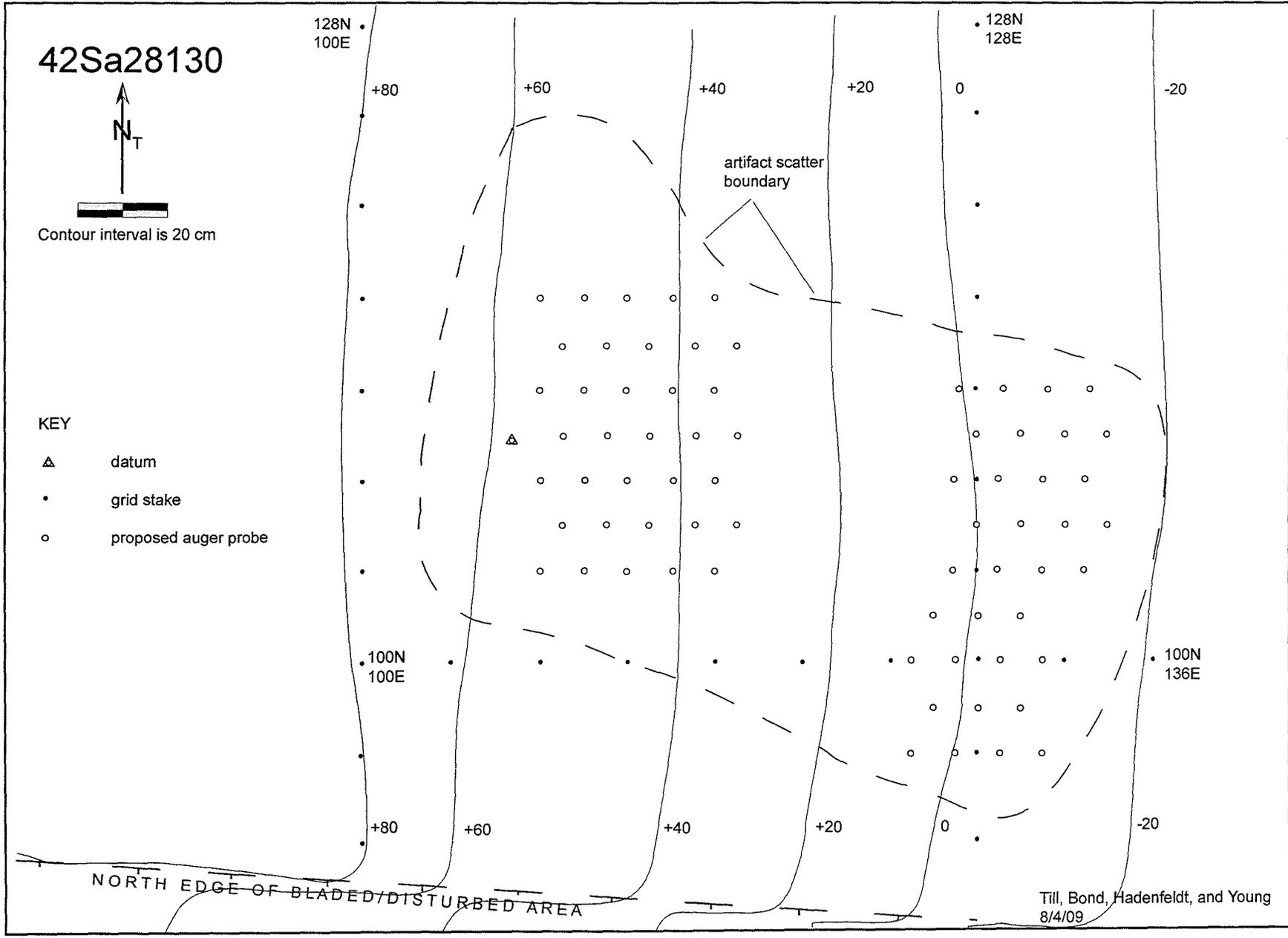


Figure 32. Site 42Sa28130, Proposed Testing Activities Map

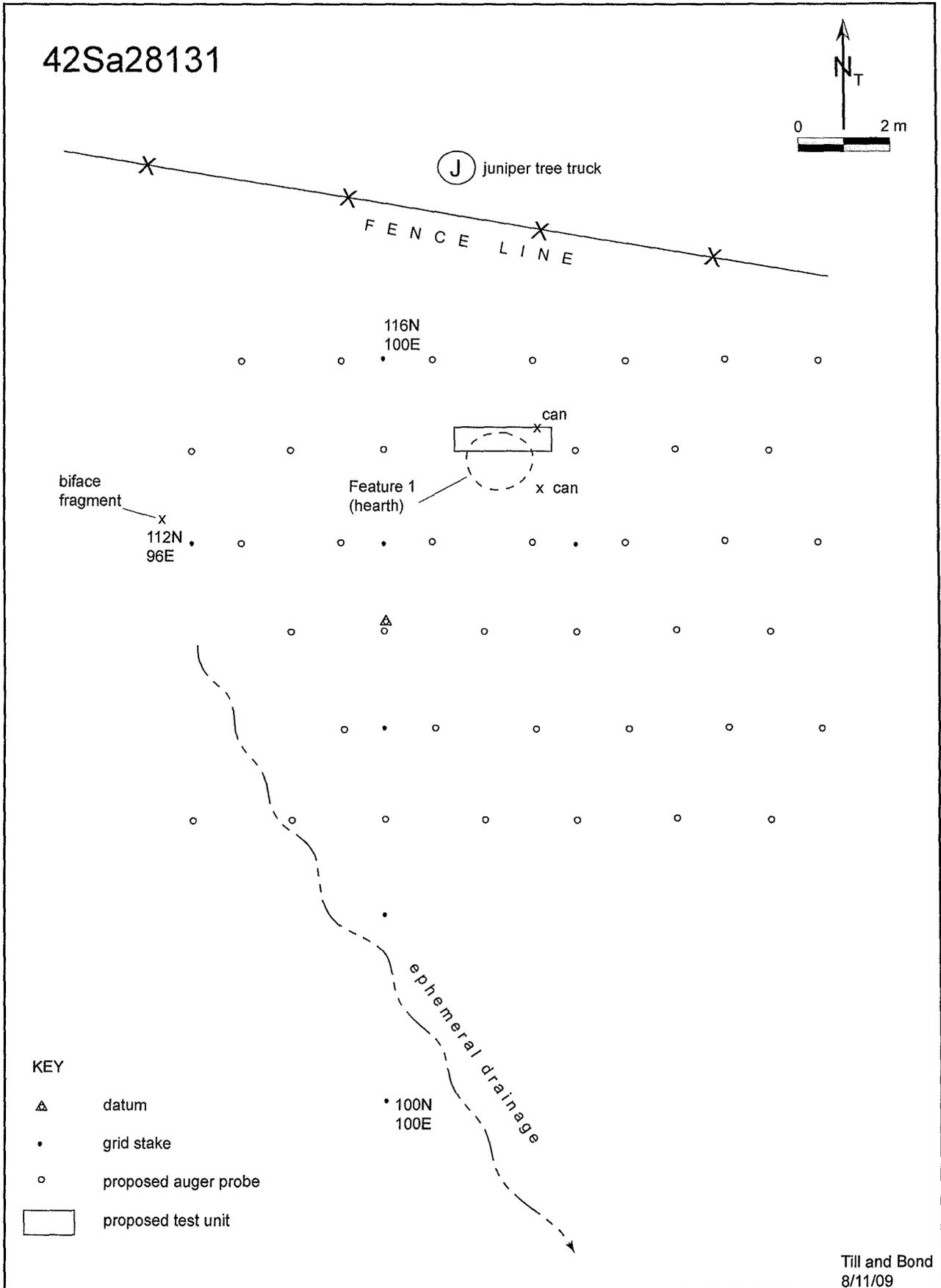


Figure 33. Site 42Sa28131, Proposed Testing Activities Map

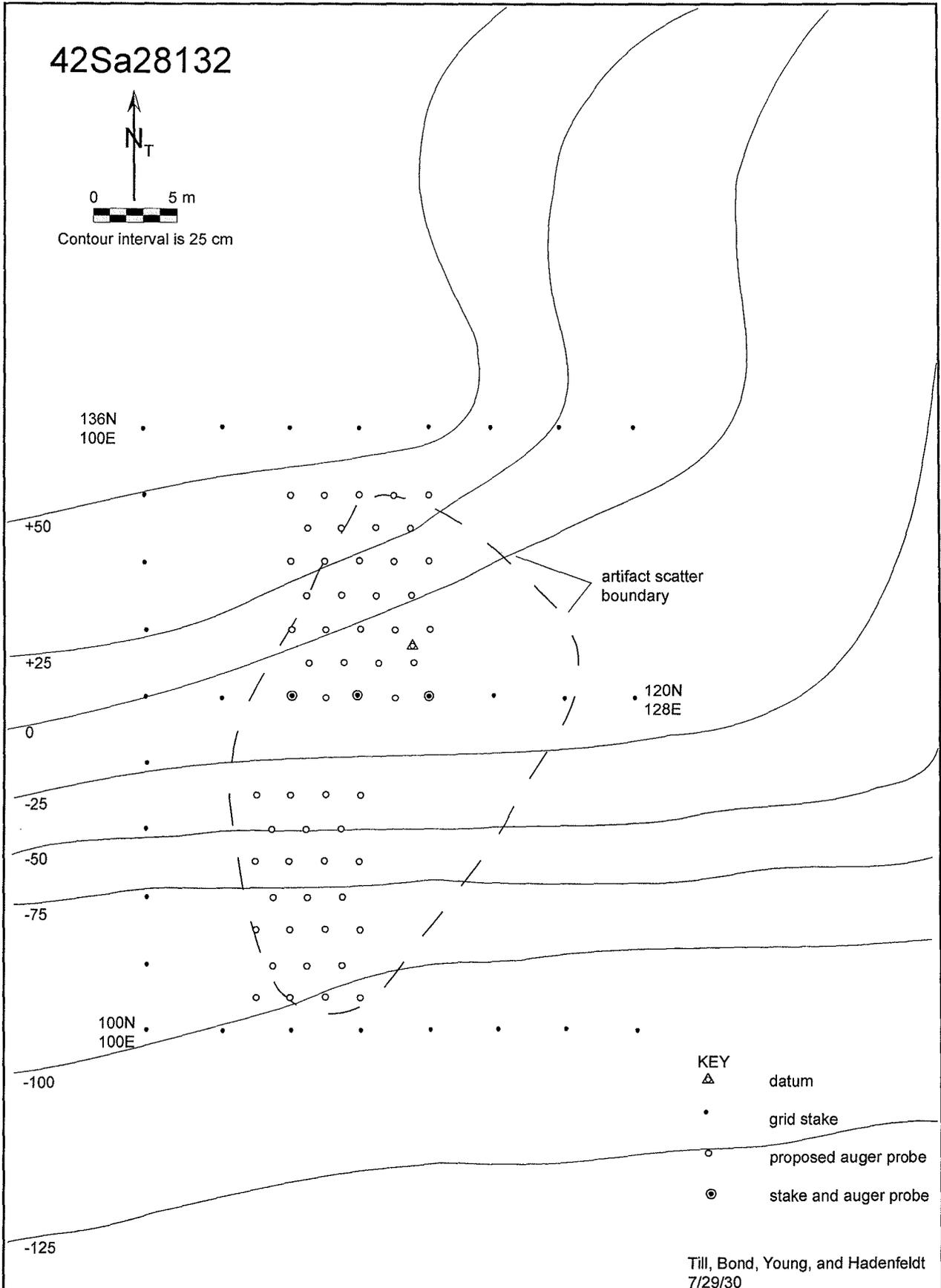


Figure 34. Site 42Sa28132, Proposed Testing Activities Map

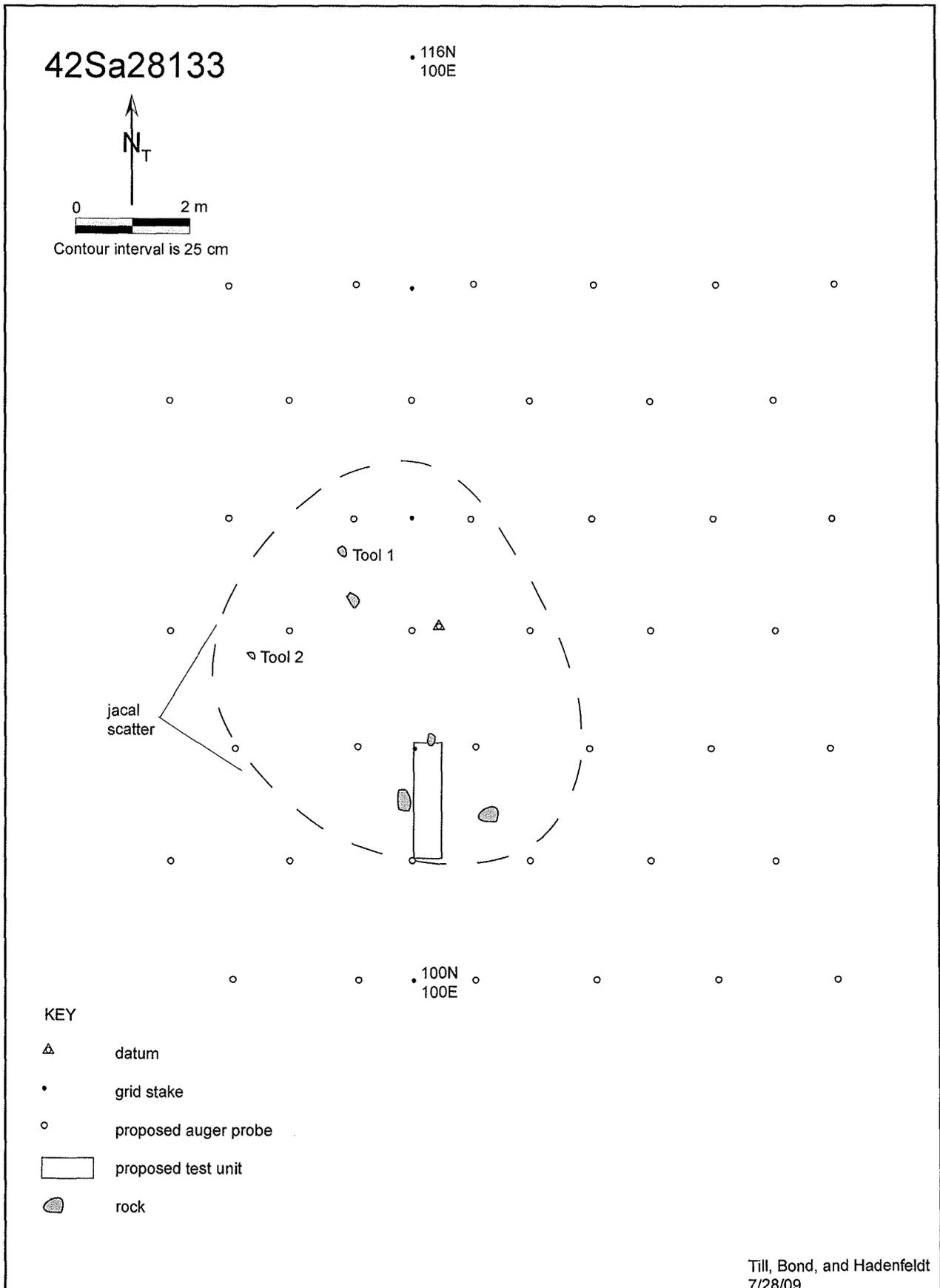


Figure 35. Site 42Sa28133, Proposed Testing Activities Map

42Sa28134

This site consists of a small scatter of lithic artifacts. Considering the small size of the site, we recommend the excavation of a grid of auger probes placed at one-meter intervals within the site boundary, and a larger grid of auger probes placed at two-meter intervals around the site's perimeter. We also suggest the excavation of a test trench, measuring 0.5- by 1.0-m, to characterize the nature and depth of cultural stratigraphy on the site. Figure 36 illustrates the proposed testing strategy for 42Sa28134.

If no features are located through the above measures, we recommend the use of a road maintainer to remove the site's surface sediments. However, surface artifacts will first be collected according to their 4- by 4-m grid location.

#### **Off-site Blading Activities**

Immediately following the formal testing fieldwork outlined above, those sites that are significant will be delineated either with flagged lathe or plastic barrier fence. A road maintainer will then be used to systematically strip the sediments from the off-site acreage in the Cell 4B project area. An archaeologist will be present to walk behind the road maintainer. Whenever prehistoric or historic materials are observed, scraping activities will cease while the archaeologist makes a determination as to the nature of the materials. If features or significant cultural deposits or features are observed, all blading will cease in the vicinity of that cultural occurrence.

Should the cultural materials be proximate to the bounds of a nearby site, then the newly discovered items will be documented with that site. However, it is quite possible that significant subsurface features may be present without having a surface signature (e.g. hearths or burials). If Abajo personnel determine the material to be an archaeological site, blading in that location will cease and the site will be protected with lathe and/or barrier fence. The site will be recorded and an IMACS form for the site will be submitted to the State. The site will be considered further in the project's upcoming research design.

#### **Artifact and Ecofact Analysis**

All artifacts and other specimens recovered from the sites will be brought to the Abajo Archaeology office in Bluff, Utah, at the end of each working day. Artifacts will be cleaned, cataloged, and analyzed. Cataloging methods and techniques will generally follow those described in Crow Canyon Archaeological Center's on-line laboratory manual (Ortman and others 2005). "Field specimen" numbers (FS) will be assigned to artifacts on the basis of their association with particular contexts (described by PD numbers). Catalog data will be entered into a relational database. All artifact databases will share as key fields the site number, the PD number, and the FS number.

Detailed artifact analyses will not be performed for this project. Rather, only quantitative data (such as counts and weights),

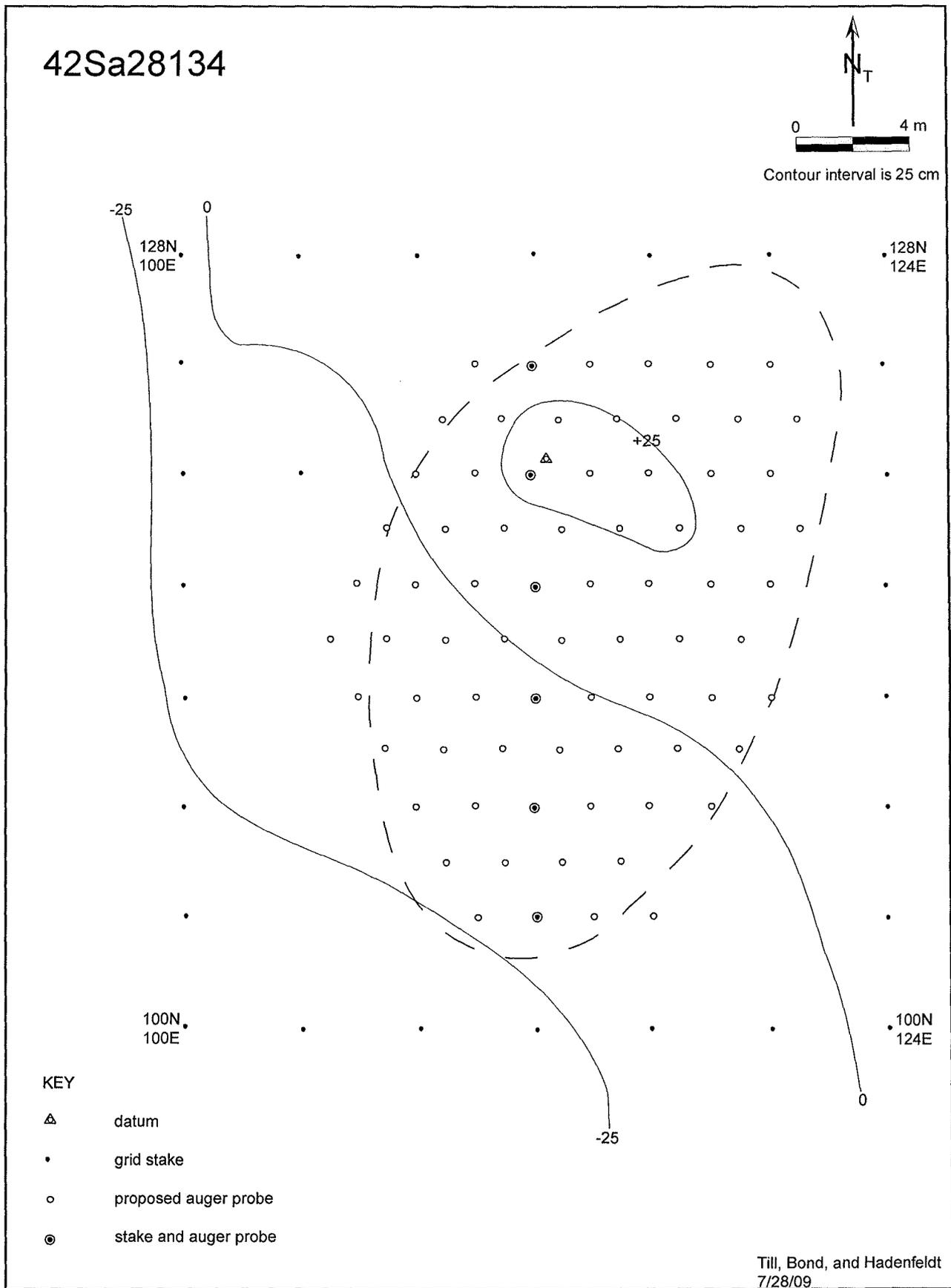


Figure 36. Site 42Sa28134, Proposed Testing Activities Map

generated during cataloging activities, will be gathered and reported. Again, these data will be produced according to Ortman and others (2005). These data will be used to estimate the requirements for further detailed analyses and for curation.

### Reporting and Curation

Upon completion of the field work and analysis, Abajo Archaeology will produce a monograph that reports the testing results and pairs those data with a research design. The research design will use the testing results to outline a data recovery plan for the sites in the proposed Cell 4B project area. Abajo Archaeology will submit this monograph to the Utah Department of Environmental Quality, Division of Radiation Control, the compliance agency responsible for issuing and administering the operation license of the Denison Mines White Mesa Mill. This agency would, in turn, submit the report to the Utah State Historic Preservation Office (SHPO). Abajo will also tender a copy for review to the Utah Public Lands Policy Coordination Office. Additionally, copies of the monograph will be submitted to the Edge of the Cedars Museum, Blanding, Utah and do Abajo's client, Denison Mines (USA) Corp.

In addition to this monograph, all artifacts and other materials associated with the testing project will be curated at the Edge of the Cedars Museum in Blanding, Utah. To that end, artifacts will be packaged in appropriate archival housing at the time of cataloging. The actual curation of materials collected during the testing phase will occur at a later date, when all project materials from data recovery efforts will be tendered to a federally approved curatorial facility.

### Proposed Schedule and Cost Estimate

Table 8 outlines the schedule of work for the proposed project. The fieldwork will take place between September 16, 2009 and October 23, 2009. A total of 30 working days is anticipated to complete the fieldwork. The field crew will consist of the project director, field director and five field archaeologists. After completion of the fieldwork, the artifact rough sort analysis and data entry will take one week to complete. We calculate that the overall cost for this phase of the project will be around \$65,000.

Table 8. Estimated Time Requirements

<b>Fieldwork</b>	<b>Person days/hrs</b>
Principal Investigator	10 Days/80 Hrs
Project Director	30 Days/240 Hrs
Field Director	30 Days/240 Hrs
5 Field Archaeologists	150 Days/1200 Hrs
<b>Artifact Rough Sort Analysis</b>	
Project Director	3 Days/24 Hrs
Lab Assistant	5 Days/40 Hrs

## CHAPTER 4: ORGANIZATIONAL QUALIFICATIONS

### Past Performance

Abajo Archaeology is a cultural resource management and consulting company organized in 1981 to meet the growing need for cultural resource management services in Utah, Arizona, Colorado, New Mexico and surrounding areas. The company is a general partnership owned and operated by William E. Davis and Deborah A. Westfall in Bluff, San Juan County, Utah.

Abajo Archaeology has been recognized by both state and federal land management agencies for its commitment to high standards of performance. Abajo's key archaeologists all hold Master's degrees in Anthropology and have a combined record that exceeds 80 years of professional expertise. The archaeologists all retain qualifications that meet or exceed the Secretary of the Interior's Standards and Guidelines. Through a network of professionals in other disciplines, Abajo Archaeology incorporates studies from botany, geology, geomorphology, hydrology, paleontology, zoology, and physical and cultural anthropology to produce well-rounded, in-depth reports and articles that contribute to current issues of anthropological method and theory.

Abajo Archaeology has demonstrated its professional competence to federal and state agencies and to private industries. These include the U.S.D.I. Bureau of Land Management, National Park Service, and Bureau of Indian Affairs; the U.S.D.A. Forest Service; the Nuclear Regulatory Commission; the Navajo Nation; the Utah Department of Transportation, the Utah Federal Highway Administration; and the respective state land management offices of Utah, Arizona, Colorado and New Mexico. Our combined expertise and capabilities have pleased project sponsors with efficient, cost-effective, and timely completion of documentary research, field investigations, and report preparation pursuant to meeting requirements for legal compliance in accord with project scheduling.

### Key Project Personnel

Abajo Archaeology acts as a central clearinghouse for a group of committed, independent Consulting Archaeologists who have a combined professional experience exceeding 80 years in prehistoric and historic cultural resource management and research. Each Consulting Archaeologist holds a Master's Degree in Anthropology and has experience that exceeds the *Secretary of the Interior's Standards and Guidelines* (48 Federal Register, Part IV).

#### Principal Investigator: William E. Davis

William E. Davis received his M.A. in Anthropology from Northern Arizona University in 1982. Mr. Davis' professional career spans 35 years for archaeological research and cultural resource management consulting services in Utah, Arizona, New Mexico, Colorado, and Wyoming. He has authored over 100 technical reports and has published numerous research reports on High Plains and Southwest archaeology. As

Principal Investigator he is responsible for organizing, implementing, and overseeing all projects. Specific duties include project administration, proposal and research design preparation, fieldwork (survey and excavation), analysis and report preparation, and monitoring of compliance procedures.

Mr. Davis will serve as Principal Investigator for the White Mesa Mill Cell 4B Evaluative Testing Project. He will be responsible for organization, management, and internal control. His duties will include coordination with the Denison Mines personnel and overall logistics and problem control. He will also be available in the field on an as-needed basis. During the research design preparation phase, Mr. Davis will provide input towards the development of research issues/domains, will develop the time/cost schedule and will review and edit the report.

Project Director: Jonathan Till

Jonathan D. Till has engaged in archaeological work and research in the northern Southwest for over 20 years, and in the Mesa Verde region for more than 15 years. Past employers include the Coconino and Kaibab National Forests, the State of Arizona, the Navajo Nation Archaeological Department, and Abajo Archaeology. In addition to archaeological survey and excavation, Till is well-experienced in the material culture of prehistoric Puebloan societies. For the past six years he has worked at Crow Canyon Archaeological Center's research lab, managing the analyses of artifacts from numerous sites, teaching analytical techniques to hundreds of children and adults, and reporting on the results of these analyses. Till holds a B.A. in Anthropology from Grinnell College (1989), and an M.A. in Anthropology and a Certificate in Museum Studies from the University of Colorado (2001). He has authored numerous technical reports, has co-authored several book chapters, and has delivered many professional presentations. His research interests include the so-called "Chaco phenomenon" of the Four Corners region.

Field Director: Mark Bond

Mark C. Bond has engaged in archaeological fieldwork in the Four-Corners Southwestern region for over 30 years. He has participated in southeastern and northeastern Utah archaeological projects for 20 years of that time primarily as a Field Project Supervisor. During the 1981 archaeological excavations at the White Mesa Mill he participated as a crew leader and subsequently directed the analysis of all ceramic artifacts recovered by the project. His report on this analysis represents the ceramic chapter in the final project report. More recently, Bond directed the field crews during the Colorado University (Boulder) Summer Archaeological Field School sessions (1996-2004) at the Bluff Great House Site (42Sa22674) in Bluff, Utah. He has consulted on numerous archaeological field projects and authored numerous technical reports. Bond holds a B.A. in Anthropology from New Mexico State University (1974) and an M.A. in Anthropology from Northern Arizona University (1981).

### Archaeologists

Five field archaeologists will be responsible for completing the day-to-day tasks involved in the test excavations at the White Mesa Mill Cell 4B project. They will be directly accountable to the field director. Persons retained for this position will be required to have a B.A. in Anthropology, in addition to extensive archaeological field experience.

### Resources

Abajo Archaeology's office facility is situated in Bluff, San Juan County, Utah. The office, with 1000 square feet of floor space and storage area, is geared mainly toward the administration of the company, secretarial and bookkeeping functions, and report and proposal preparation. The office also contains a library of anthropological and archaeological journals, books, papers and cultural resource management academic reports by various colleagues and institutions, as well as an extensive map library. The office is equipped with standard laboratory equipment for performing initial artifact analyses, including cleaning, stabilizing, cataloging, recording of attribute data, microscopic examination and photography. Final bagging and ordering of artifacts for museum curation is done in the office, using specialized supplies and equipment. Lastly, the office is equipped with multiple computers to facilitate rapid production of reports, cultural resource inventory forms, and general mathematical functions.

## REFERENCES

- Aganbroad, Larry D., William E. Davis, and E. Steve Cassells  
1981 *1980 Excavations on White Mesa, San Juan County, Utah*. Abajo Archaeology, Bluff, Utah.
- Binford, Lewis  
1962 Archaeology as Anthropology. *American Antiquity* 28:217-225.
- Berge, Dale L.  
1975 Archaeological Survey of the Pinto-Abajo Transmission Line, Southeastern Utah. Brigham Young University, Provo.
- Casjens, Laurel A. (Editor)  
1980 *Archaeological Excavations on White Mesa, San Juan County, Utah, 1979*. Division of State History, Antiquities Section, Salt Lake City, Utah.
- Casjens, Laurel A. and Gregory L. Seward  
1980 *White Mesa Archaeological Survey, Preliminary Report*. Unpublished Report. Unpublished report prepared by the Antiquities Section, Division of State History, State of Utah.
- Cordell, Linda  
1997 *Archaeology of the Southwest*, Second Edition. Academic Press, San Diego, California.
- Davis, William E.  
1985 *Anasazi Subsistence and Settlement on White Mesa, San Juan County, Utah*. Abajo Archaeology, Bluff, Utah.
- Davis, William E., Winston B. Hurst, and Deborah A. Westfall  
2003 *Class I Cultural Resource Inventory of the Proposed White Mesa Mill Site, White Mesa Mill Materials Borrow Area and Two Associated Corridor Routes, Grand and San Juan Counties, Utah*. Abajo Archaeology, Bluff, Utah.
- Dykman, James L.  
1978a Site 42Sa6391 in *Archeological Test Excavations on White Mesa, San Juan County, Southeastern Utah*, edited by La Mar W. Lindsay, pp. 69-77. Unpublished report prepared by Antiquities Section, Division of State History, State of Utah.
- 1978b Site 42Sa6393 in *Archeological Test Excavations on White Mesa, San Juan County, Southeastern Utah*, edited by La Mar W. Lindsay, pp. 78-84. Unpublished report prepared by Antiquities Section, Division of State History, State of Utah.
- Fike, Richard E. and LaMar W. Lindsay  
1976 Archaeological Survey of the Bluff Bench, San Juan River and White Mesa Areas, San Juan County, Utah, 1973-1974. *Antiquities Section Selected Papers*, No. 9.
- Firor, James, Rand A. Greubel, and Alan D. Reed  
1998 *Archaeological Data Recovery at Four Anasazi Sites on White Mesa Along US Highway 191, San Juan County, Utah*. Ms. on file, Utah Department of Transportation, Salt Lake City, Utah.

- Hurst, Winston B.  
 1992 Chapter III: Previous Archaeological Research and Regional Prehistory, pp 11 - 74. In *Cultural Resource Inventory and Evaluative Testing along SR-262, Utah - Colorado State Line to Montezuma Creek, Navajo Nation Lands, San Juan County, Utah* by Mark C. Bond, William E. Davis, Winston B. Hurst, Deborah A. Westfall. Abajo Archaeology, Bluff, Utah.
- Kantner, John  
 2004 *Ancient Puebloan Southwest*. Cambridge University Press, Cambridge.
- Lindsay, LaMar W. (Editor)  
 1978 *Archeological Test Excavations on White Mesa, San Juan County, Southeastern Utah*. Unpublished report prepared by Antiquities Section, Division of State History, State of Utah.
- Lipe, William D.  
 1994 Native American Archaeological Chronology, Greater Four Corners Area. In *Blue Mountain Shadows 13: inside front cover*. San Juan Historical Commission.
- Lipe, William D., Mark D. Varien, and Richard H. Wilshusen (Editors)  
 1999 *Colorado Prehistory: A Context for the Southern Colorado River Basin*. Colorado Council of Professional Archaeologists, Denver, Colorado.
- Nielson, Asa S.  
 1979 *Additional Archaeological Test Excavations and Inventory on White Mesa, San Juan County, Southeastern Utah*. Division of State History, Antiquities Section, Salt Lake City, Utah.
- Rohn, Arthur H.  
 1989 Northern San Juan Prehistory. In *Dynamics of Southwest Prehistory*, edited by Linda Cordell and George J. Gumerman. Smithsonian Institution Press. Washington D.C.
- Sargent, Kay  
 1979 Excavations at 42Sa6384, White Mesa, San Juan County, Utah. Division of State History, Antiquities Section, Salt Lake City, Utah.
- Thompson, Richard A.  
 1977 *An Intensive Cultural Resource Inventory Conducted on White Mesa, San Juan County, Utah*. International Learning and Research, Inc., Cedar City, Utah.
- Till, Jonathan D.  
 2009 Cultural Resource Inventory of the Proposed Denison Mines (USA) Corporation White Mesa Mill Cell 4B, San Juan County, Utah. Abajo Archaeology, Bluff, Utah.
- In prep. *Excavations at Site 42Sa27732, A Pueblo III Period Habitation*. Abajo Archaeology, Bluff, Utah.

Wilshusen, Richard H. (compiler)  
1999 *The Dolores Legacy: A User's Guide to the Dolores Archaeological  
Program Data*. Anasazi Heritage Center, Dolores, Colorado.

