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**EASTERN NAVAJO DINÉ AGAINST URANIUM MINING AND  
SOUTHWEST RESEARCH AND INFORMATION CENTER'S BRIEF  
IN OPPOSITION TO HYDRO RESOURCES, INC.'S APPLICATION FOR A  
MATERIALS LICENSE WITH RESPECT TO:  
COMPLIANCE WITH THE NATIONAL HISTORIC PRESERVATION ACT,  
NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT  
AND  
RELATED CULTURAL RESOURCE ISSUES**

**INTRODUCTION**

As part of their presentations pursuant to 10 C.F.R. § 2.1233, Intervenors Eastern Navajo Diné Against Uranium Mining ("ENDAUM") and Southwest Research and Information Center ("SRIC") hereby submit the following legal brief in support of their opposition to Hydro Resources, Inc.'s ("HRI's") April 13, 1988 materials license application, as amended, and its license. This brief addresses the reasons why HRI's license application fails to satisfy federal law and regulations governing national historic sites, Native American graves and funerary objects, and related cultural resources. It also addresses the failure of the Final Environmental Impact Statement to adequately address the impacts of the project on cultural properties. NUREG-1508, Final Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico (February 29, 1997) ("FEIS") (Hearing Record ACN 9703200270).

This brief is accompanied and supported by the expert testimony of Dr. Klara B. Kelley, Mr. William A. Dodge and Mr. Abie Francisco. Dr. Kelley is a qualified expert

in anthropology and archaeological survey methods.<sup>1</sup> Kelley Testimony is attached hereto as Exhibit 1. Dr. Kelley's testimony explains and provides the factual basis for her opinion that HRI's cultural resource documentation is inadequate, incomplete, fragmented and internally inconsistent. Mr. Dodge is a qualified expert in cultural resource management and historic preservation law and policy.<sup>2</sup> Dodge Testimony is attached hereto as Exhibit 2. Mr. Dodge's testimony explains and provides the factual basis for his opinion that the National Historic Preservation Act ("NHPA") Section 106 review process is incomplete. Mr. Francisco is a qualified expert in Navajo tradition and medicine. Francisco Testimony is attached hereto as Exhibit 3. Mr. Francisco's testimony explains and provides the factual basis for his opinion that the Staff's documentation of traditional cultural properties is inaccurate and under-inclusive. This brief is also accompanied and supported by the testimony of Mitchell Capitan, who has personal knowledge of traditional Navajo cultural uses near the Crownpoint project areas. Capitan Testimony is attached hereto as Exhibit 4.

This brief discusses in greater detail the legal basis for ENDAUM and SRIC's

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<sup>1</sup> Former Presiding Officer B. Paul Cotter Jr. found Dr. Kelley to be qualified in education and experience to give expert opinion concerning cultural resources and resource preservation. Memorandum and Order (Denying Motion for Stay and Request for Prior Hearing, Lifting of Temporary Stay, Denying Motions to Strike and for Leave to Reply) at 4 (April 2, 1998).

<sup>2</sup> Mr. Dodge was found, by former Presiding Officer B. Paul Cotter Jr., to be qualified in education and experience to give expert opinion concerning cultural resource management and resource preservation. Id. at 3.

opposition to HRI's license. Pursuant to the Presiding Officer's Memorandum and Order dated September 22, 1998, the brief addresses only general licensing issues. As discussed below, HRI's license application must be rejected and its license revoked because the requirements of federal laws protecting cultural resources have not been met.

## **REGULATORY FRAMEWORK**

### **National Historic Preservation Act - Section 106**

Section 106 of the National Historic Preservation Act requires federal agencies with jurisdiction over federally licensed undertakings to take into account the effects of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places, prior to an expenditure or issuance of a license. 16 U.S.C. § 470f; 36 C.F.R. § 800.3(c); Dodge Testimony at 4-5. The regulations implementing the NHPA broadly define "historic property" as any prehistoric or historic site, district, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. 36 CFR § 800.2(e). NHPA Section 106 also requires agencies to afford the Advisory Council the opportunity to comment on such undertakings. *Id.*

Properties that are of traditional religious and cultural importance to a tribe may also be determined eligible for inclusion in the National Register. 16 U.S.C. § 470a(d)(6)(A). These properties are commonly known as traditional cultural properties ("TCPs").<sup>3</sup> A federal agency must consult with any Indian tribe that attaches religious

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<sup>3</sup> "Guidelines for Evaluating and Documenting Traditional Cultural Properties," National Register Bulletin 38, Interagency Resources Division, National Park Service, United

and cultural significance to eligible properties. 16 U.S.C. § 470a(d)(6)(B). Indian tribes are authorized to assume the role of a SHPO with respect to tribal lands. 16 U.S.C. § 470a(d)(2).

The Section 106 compliance process, including its implementing regulations, requires a Federal agency to take four steps before approving a proposed undertaking: (1) identify potential historic properties, (2) evaluate the eligibility of the properties for

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States Department of Interior ("Bulletin 38") (1990) at 2 and 7-8, Kelley Testimony, Exhibit A. A TCP is defined generally as a property:

that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community.

Id. at 1. Bulletin 38 further explains:

A traditional ceremonial location may look like merely a mountaintop, a lake, or a stretch of river . . . . As a result, such places may not necessarily come to light through the conduct of archeological, historical, or architectural surveys.

Id. at 2. Consequently, Bulletin 38 emphasizes:

It is usually important to take knowledgeable consultants into the field to inspect properties that they identify as significant. In some cases such properties may not be discernible as such to anyone but a knowledgeable member of the group that ascribes significance to them; in such cases it may be impossible even to find the relevant properties, or locate them accurately, without the aid of such parties. Even where a property is readily discernible as such to the outside observer, visiting the property may help a consultant to recall information about it that he or she is unlikely to recall during interviews at a remote location, thus making for a richer and more complete record.

Id. at 7-8.

inclusion in the National Register, (3) determine the effects of its undertaking upon listed or eligible historic properties, and (4) if necessary, develop a plan to avoid or minimize any effects. 36 C.F.R. Part 800; Dodge Testimony at 7.

**Native American Graves Protection and Repatriation Act.**

NAGPRA protects the rights of Native Americans by protecting tribal burial sites and the rights to items of cultural significance to Native Americans. 25 U.S.C. § 3001 et seq. See also 43 C.F.R. § 10.1. NAGPRA requires consultation with tribes before removal or excavation of Native American cultural items from federal or tribal lands. 25 U.S.C. § 3002(c). Tribal consent is required for items found on tribal lands. Id. § 3002(c)(2). Cultural items protected under NAGPRA include Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony. 25 U.S.C. § 3001(3).

A federal agency considering issuance of a permit must begin consultation when becoming aware that planned activity may result in intentional excavation or discovery of cultural items and before issuing a permit or approval. 43 C.F.R. §§ 10.5(b)(1), 10.3(c). Indian tribes who may have cultural affiliation with the items, a demonstrated cultural relationship with the items, or who aboriginally occupied the area must be notified. Id. § 10.5(b)(1). The consultation effort must also seek to identify tribes, traditional religious leaders, and lineal descendants who should be consulted. Id. § 10.5(b)(3). Following consultation, the agency must prepare a written action plan. Id. § 10.5(e).

## FACTUAL BACKGROUND

### Cultural Resources Review

HRI has applied for and received a materials license to conduct in situ leach mining on Sections 8 and 17 in Church Rock, New Mexico, and on two sites in Crownpoint, New Mexico, "Unit 1" and "Crownpoint."<sup>4</sup> HRI's application proposes processing the uranium extracted from each site at its Crownpoint processing facility.<sup>5</sup> The NRC has recognized that the licensing of HRI's project is an undertaking subject to the requirements of the National Historic Preservation Act. Dodge Testimony at 10, citing FEIS at 3-73.

The Crownpoint Uranium Project lies within an area of great cultural significance. Marshall, *A Cultural Resources-Environmental Assessment and Management Plan for the Proposed Hydro Resources, Inc., Crownpoint lease in the Eastern Navajo District, New Mexico*, at 27, ("Marshall Crownpoint Report"), Hearing Record ACN 9610070106 (September 15, 1992). Prehistoric human occupation occurred in the area from 12,000 - 7500 B.C. (Paleoindian period) and 7500 B.C. to A.D. 200-400 (Archaic period). Blinman, *Cultural Resources Inventory of Proposed Uranium Solution Extraction and*

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<sup>4</sup> HRI submitted its initial application on April 13, 1988, proposing to mine in Section 8 in Church Rock. Application for Materials License, Hearing Record ACN 8805200339 (April 13, 1988). HRI later amended the application to include processing in Crownpoint, and mining at Section 17, Unit 1 and Crownpoint. Consolidated Operations Plan, Rev. 2.0 at 2 ("COP Rev. 2.0") Hearing Record ACN 9708210179 (August 15, 1997).

<sup>5</sup> COP Rev. 2.0 at 2.

*Monitoring Facilities at the Church Rock Site and of Proposed Surface Irrigation Facilities North of the Crownpoint Site, McKinley County, New Mexico* ("MNM Report") at 7 Hearing Record ACN 9704140140 (April 4, 1997). The Paleoindian period represents the earliest human occupation of North America. Kendrick, *Archaeological Nature and Extent Testing at Seventeen Sites Along Navajo Route 11(A)1, Mariano Lake to Navajo Route 9, Pueblo of Zuni at 369 and 420*, at 35 ("Route 11 Report") (April, 1998), a copy of which is submitted as Exhibit 5 herewith.

Between A.D. 600 and 1500 A.D., the Anasazi civilization dominated the Crownpoint, then Church Rock areas (Basketmaker III period - Pueblo III period). MNM Report at 8. Anasazi community complexes are found in the Crownpoint, Unit 1 and Church Rock project areas. *Id.*; Marshall Crownpoint Report at 27; Route 11 Report at 39-46. The Kin Yaa 'a community complex, part of which is included in Chaco Culture National Historical Park and State Cultural Properties Register Site No. 57, encompasses the Crownpoint mine site. Marshall Crownpoint Report at 27. Unit 1 is within the Chacoan Muddy Water community complex, part of which is included in the Muddy Water Chacoan Protection Site and State Cultural Properties Register District. Marshall, *A Cultural Resources-Environmental Assessment and Management Plan for the Proposed Hydro Resources, Inc. Unit No. 1 Lease in the Crownpoint Area of the Eastern Navajo District, New Mexico* at 28, Hearing Record ACN 9610070079 Attachment F, ("Marshall Unit 1") (December 15, 1991). The Kin Yaa 'a and Muddy Water complexes

may form a single cultural landscape, eligible itself for listing with the National Register. Kelley Testimony at 18.

Following the Anasazi civilization, early Navajos settled the area around Crownpoint and Church Rock. MNM Report at 8. Crownpoint and Unit 1 are the location of extensive historic Navajo settlement. Marshall Crownpoint Report at 27, Marshall Unit 1 Report at 28. Some of the early Navajo sites are present near Church Rock. MNM Report at 8. During the historic period (past 400 years) the project area was the setting for interaction among Navajo, Pueblo, Spanish and Anglo cultures. *Id.*, at 9. The area continues to be inhabited by Navajo people, and traditional Navajo land use continues. MNM Report at 13. The traditional Navajo economy has been subsistence farming and herding augmented by sales of wool and occasional wage work. Route 11 Report at 52.

### **Cultural Resource Reports**

In order to identify all types of cultural resources in a particular area, the area must be surveyed for resources. A typical cultural resources report seeks to identify archaeological sites, historical sites, and traditional cultural properties ("TCPs"). See Navajo Nation Policy to Protect Traditional Cultural Properties, Attachment B to Kelley Testimony (January, 1991). A comprehensive cultural resources report has not been prepared for the Crownpoint Uranium Project. HRI primarily relies on the MNM Report, the Marshall Reports and Ernest C. Becenti Sr.'s report ("Becenti Report") for its cultural

resources documentation. Becenti Report, Letter from Mark Pelizza, HRI, to J. Holonich, NRC, Attachment 6, Hearing Record ACN 9605080097 (May 30, 1996). These different reports, each with varying degrees of detail, cover only some of the project areas. They will each be discussed in detail in the argument section below.

### **Final Environmental Impact Statement**

On November 14, 1994, the NRC published a "Notice of Availability of Draft Environmental Impact Statement: Notice of Opportunity for Hearing" in the Federal Register. Hydro Resources Inc., LBP 98-9, 47 NRC 261, 264 (1998) ("LBP 98-9").

On February 29, 1997, the FEIS was issued. In the FEIS, the NRC Staff recommended that HRI implement a final cultural resources management plan for all mineral operating lease areas and other lands affected by license activities pursuant to National Historic Preservation Act-Section 106 review and consultation processes. FEIS at 4-111, 112. The NRC Staff's recommended cultural resources management plan would include archaeological and traditional cultural property surveys of lease areas, identification of protection areas where human activity would be prohibited, and archaeological testing before subsurface disturbance occurs. The plan would also include archaeological monitoring during ground disturbing construction, drilling and operation activities. If unidentified cultural resources or human remains are found during project activities, the activity would cease, protective action and consultation would occur, and artifacts and human remains would be evaluated for their significance. Id. HRI agreed to

these recommendations. FEIS at 4-111, see also COP Rev. 2.0 at 23.

### **HRI's Materials License**

The NRC staff issued a materials license to HRI on January 5, 1998. License No. SUA-1508, Hearing Record ACN 9801160066. The license contains Condition 9.12 which states that:

Before engaging in any construction activity not previously assessed by the NRC, the licensee shall conduct a cultural resource inventory. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR Part 800), and the Archaeological Resources Protection Act of 1979, as amended, and its implementing regulations (43 CFR Part 7).

In order to ensure that no unapproved disturbance of cultural resources occurs, any work resulting in the discovery of previously unknown cultural artifacts shall cease. The artifacts shall be inventoried and evaluated in accordance with 36 CFR Part 800, and no disturbance shall occur until the licensee has received written authorization to proceed from the State and Navajo Nation Historic Preservation Offices.

### **ENDAUM and SRIC's Concerns**

On August 15, 1997, ENDAUM and SRIC filed their Second Amended Request, in which they raised, inter alia, concerns regarding violations of the National Historic Preservation Act, Bulletin 38, and the Native American Graves Protection and Repatriation Act ("NAGPRA"). ENDAUM and SRIC's Second Amended Request For

Hearing, Petition to Intervene, and Statement of Concerns (August 15, 1997) ("Second Amended Request") at 116-131. Petitioners asserted that the NRC Staff failed to identify historic properties eligible for inclusion in the National Register of Historic Places and failed to take into account the Project's effect on historic properties in consultation with affected Indian tribes, Pueblos, and organizations. These concerns were admitted as germane by the Presiding Officer. LBP-98-9, 47 NRC at 282 and notes 60 and 61.

ENDAUM and SRIC also argued that the NRC Staff clearly intended that identification of historic properties by archeological and traditional cultural property surveys, which are necessary to determine whether the project will have an adverse effect on historic properties, would be conducted after issuance of the materials license, in violation of 36 C.F.R. § 800.3(c). This concern was also admitted as germane by the Presiding Officer in LBP-98-9. Id.

In addition, ENDAUM and SRIC raised the concern that the FEIS and HRI's Environmental Reports do not adequately examine the impacts of the project on cultural resources, traditional cultural properties ("TCPs"), and traditional cultural practices, particularly in light of the American Indian Religious Freedom and Restoration Act. ENDAUM and SRIC's Second Amended Request at 136-137. ENDAUM and SRIC, therefore, raised the concern that the FEIS is based on incomplete and inaccurate information. Id. at 141. The Presiding Officer admitted this concern as germane. LBP-98-9, 47 NRC at 282 and note 62.

## ARGUMENT

### **I. THE NRC STAFF FAILS TO COMPLY WITH THE NATIONAL HISTORIC PRESERVATION ACT BY FAILING TO ADEQUATELY IDENTIFY PROPERTIES ELIGIBLE FOR THE NATIONAL REGISTER AND BY APPLYING THE WRONG CRITERIA TO DETERMINE THE EFFECTS OF THE PROJECT.**

The NRC Staff's issuance of a license to HRI violates the National Historic Preservation Act, 16 U.S.C. §§ 470f and 470a, implementing regulations in 36 C.F.R. Part 800, and the U.S. Department of the Interior, National Park Service Interagency Resources Division, National Register Bulletin 38: "Guidelines for Evaluating and Documenting Traditional Cultural Properties." The NRC Staff has failed to identify historic properties eligible for inclusion in the National Register of Historic Places and to adequately take into account the Project's effect on historic properties in consultation with the affected tribes, pueblos, and organizations.<sup>6</sup>

NHPA Section 106 requires federal agencies:

prior to the issuance of any license . . . to take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register [of Historic Places].

16 U.S.C. § 470f. An "undertaking" is the project or activity requiring the license. *Id.* § 470w(7). To comply with Section 106, the agency must (1) *identify* "historic properties"

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<sup>6</sup> HRI has performed many of the tasks involved in the NRC Staff's 106 review, but the NRC remains responsible for compliance with the 106 review. See 36 C.F.R. § 800.1(c)(1)(I) (agency "may use the services of grantees, applicants, consultants, or designees to prepare the necessary information and analyses, but remains responsible for section 106 compliance").

(properties included in or eligible for inclusion in the National Register), (2) evaluate the eligibility for inclusion in the National Register, (3) determine whether the undertaking will have an effect and adverse effect on historic properties, and (4) if there are adverse effects, determine ways to avoid or reduce those adverse effects. 36 C.F.R. §§ 800.4 and 800.5; See also Dodge Testimony at 7.

The Crownpoint Uranium Project is an undertaking within the scope of the NHPA, because it involves the issuance of a federal license. The NRC Staff has concluded that the Section 106 process is complete with respect to the Church Rock Sections 8 and 17 and Crownpoint Section 12. Exhibit D to Dodge Testimony, at 2. In fact, Mr. Dodge's testimony demonstrates this conclusion is incorrect, because the NRC never properly completed early stages of the 106 process, namely steps 1 and 2 above. Dodge Testimony at 9-10. As Mr. Dodge testifies, the "Cultural Resources Management Plan" prepared by HRI is premature at this stage in the process, and cannot be prepared until historic properties are completely identified. Dodge Testimony at 17. Moreover, the documentation supporting the 106 review is inadequate. Kelley Testimony at 3; Dodge Testimony at 11. Finally, the NRC has not made a good faith effort to identify properties and has failed to consult adequately with Indian tribes. Dodge Testimony at 10-11.

**A. The NRC Staff failed to adequately identify historic properties under NHPA Section 106**

Identifying historic properties requires the agency, inter alia, to review existing

information on historic properties and the likelihood that they exist in the area, to request the view of the State Historic Preservation Officer ("SHPO") on identification, and to seek information from tribes and other parties likely to have knowledge of or concerns about historic properties in the area. 36 C.F.R. § 800.4(a). "Historic property" means "any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register." *Id.* § 800.2(e). Historic property "includes, for the purposes of these regulations, artifacts, records, and remains that are related to and located within such properties." *Id.* The National Register Bulletin 38 also provides that a traditional cultural property is "eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community." *Pueblo of Sandia v. Smith*, 50 F.3d 856, fn. 2 (10th Cir. 1995).

The agency must "make a reasonable and good faith effort to identify historic properties that may be affected by the undertaking and gather sufficient information to evaluate the[ir] eligibility . . . for the National Register." *Id.* § 800.4(b). Effects must be determined by application of specified criteria and in consultation with the SHPO and interested persons, including Indian tribes. *Id.* §§ 800.5(e) and 800.9. Widely followed guidelines of the National Park Service emphasize that consultation and field work with religious leaders of these tribes is particularly important to sufficiently identify traditional

cultural properties. The NRC Staff has not made a reasonable and good faith effort to identify historic properties or traditional cultural properties that may be affected by HRI's project.

**1. Inadequate Cultural Resources Documentation.**

For cultural resources documentation, HRI relies on the two Marshall reports, (the Marshall Crownpoint Report and the Marshall Unit 1 Report), the Becenti Report, and the MNM Report. Each of these reports was "done by different people at different times using different research methods." Kelley Testimony at 4. As Dr. Kelley observes:

No uniform set of information has been collected on each of the parcels that together make up the project area. The various reports fail to use a uniform set of information sources and uniform methods for gathering information. The information on all parcels has not been compiled into one document. Dividing information among multiple documents makes review for compliance with applicable cultural resource management laws and policies more difficult, because, for example, in order for a cultural resources review to be effective, reviewers must assess the significance of each cultural resource in the context of all this information in aggregate.

Kelley Testimony at 4-5.

Therefore, the disipated and mixed nature of the review documentation undermines the reviewer's ability to assess its adequacy. Id.

**a. Crownpoint Mine Site**

The Crownpoint mine site encompasses portions of Sections 19, 24, and 25, T17N, R13W, and Section 29, T17N, R12W. FEIS at 2-28 and Figure 2.9. In September, 1992, the Marshall Crownpoint Report was prepared for Sections 19, 25 and

29 of the Crownpoint site, but not Section 24.<sup>7</sup> Letter from Daniel Gillen to Dr. Phillip Shelley, New Mexico State Historic Preservation Officer, ("October 1996 Gillen Letter") Hearing Record ACN 9610070079 (October 6, 1996), Attachment D; and Marshall Crownpoint Report. This report does not contain site surveys, rather it is a "preliminary planning document for cultural resource and traditional site management". Marshall Crownpoint Report at 1. The report concludes that the lease area is "located within a cultural district of considerable significance", a systematic Class III cultural (archeological) inventory and traditional site inquiry are necessary. Id. at 27. Nevertheless, the report concludes that a management plan that limits subsurface disturbance, preceded by archaeological test excavations, will render the adverse impacts negligible. Id. Dr. Kelley testifies, however, that parts of this parcel have not been inspected by archaeologists on foot at all, despite the fact that the standard practice for compliance with federal and tribal cultural resources laws requires a professionally qualified archaeologist to conduct a complete inspection of the project area on foot with transects spaced no more than 15 meters apart. Kelley Testimony at 5. Therefore, even though the Marshall Crownpoint Report recognizes the area is of great cultural significance, and opines that a more in-depth survey is required, minimal work was done, with the result that important resources may have been overlooked.

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<sup>7</sup> Three quarters of Section 24 is included in the project. FEIS at Figure 2.9. A different report commissioned by HRI covers the only NE quarter of Section 24. See Marshall Unit 1 Report, at 1, Figure 2; FEIS at Figure 2.9. And, just the southeast quarter of Section 24 was the subject of a 1989 "Class III" inventory. October, 1996 Gillen Letter, Attachment H.

**b. Unit 1 mine site.**

Unit 1 mining is proposed for Sections 15, 16, 21, 22 and 23, T17N, R13W. FEIS at 2-26 and Figure 2.9; Marshall Unit 1 Report. Like the Marshall Crownpoint Report, the Marshall Unit 1 Report is a preliminary report meant to describe existing information and propose a cultural resources inventory and management plan. Marshall Unit 1 Report at 1. The report recognizes that the area is located within the Chacoan Muddy Water community complex and is in an area of considerable significance. Id. at 28.

Like the Marshall Crownpoint Report, the Marshall Unit 1 report does not demonstrate that Unit 1 has been correctly inspected by qualified archaeologists on foot at proper transects. Kelley Testimony at 5. Actually, half of the portion of Section 16 that lies within the project, is excluded from this report. Id. at 1 and Figure No. 2; See FEIS at Figure 2.9.

The inadequacy of the Unit 1 report is confirmed by a recent survey of a narrow strip of land for a road improvement project on the haul route that traverses Unit 1. Kendrick, *Archaeological Nature and Extent Testing at Seventeen Sites Along Navajo Route 11(A)1*, Mariano Lake to Navajo Route 9, Pueblo of Zuni at 369 and 420 ("Route 11 Report") (April, 1998), a copy of which is submitted as Exhibit 5 herewith.<sup>8</sup> The

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<sup>8</sup> Appendix D to the Route 11 Report provides site location information which demonstrates that two sites along Route 11 are within Unit 1. At the request of the Navajo Nation Historic Preservation Department, ENDAUM and SRIC will keep this information confidential. A copy of Appendix D is therefore provided only to the Presiding Officer as Exhibit 6. ENDAUM and SRIC request that if the Staff or HRI deems it necessary to view this document, that the Presiding Officer allow that party to view the document *in camera*, without

Route 11 Report identifies 17 cultural resource sites along the road, including, two sites not listed in the Marshall Unit 1 Report. All seventeen sites are eligible for inclusion in the National Register of Historic Places. Id. at iii.

The first site in Unit 1, "NM-Q-23-62," "contains significant cultural materials and features from the early Basketmaker II period in the early A.D. centuries. Id. at 420. The other site, "NM-Q-23-63," is even older, with Late Archaic hearth and Basketmaker III ceramics from 1030 to 810 B.C. Id. at 450. Neither of these sites was identified in the Marshall Unit 1 Report. The Marshall Unit 1 Report only lists two sites older than Navajo and Anasazi settlements and neither of those two are near the Route 11 Report sites. See Marshall Unit 1 Report at 14-17 and Figure No. 4. The MNM Report concedes that older prehistoric sites are difficult to identify. MNM Report at 7.

**c. Church Rock mine sites**

The Church Rock mine site includes Sections 8 and 17. In 1997, HRI submitted a cultural resources inventory of Sections 8 and 17, which was commissioned from the Office of Archaeological Studies, Museum of New Mexico. MNM Report.

On May 20, 1998, relying on the MNM Report, the NRC made a finding of no effect on Sections 8, 17, and Crownpoint Section 12. Dodge Testimony, Attachment B. Mr. Dodge testifies that the MNM report does not consider the presence of non-Navajo TCPs, nor does it describe its field methodology for the identification of Navajo sites (i.e.

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opportunity to photocopy the document.

does not state how people were chosen for the interviews or whether they live in the project area). Dodge Testimony at 19-20. On July 10, 1998, the NRC informed HRI that it can begin activities on those sites. As Mr. Dodge observes, the NRC's no effect determination only applies to archaeological sites, not TCPs. Dodge Testimony at 10 and 17. Therefore, the Staff's finding of no effect was premature. Id.

**d. Waste Water disposal sites.**

In addition to the mine sites, HRI has proposed performing land application of liquid wastes on several alternative locations. These include flat mesa land on Section 12 in Church Rock, pasture land in Section 16 of Church Rock, and Section 12 in Crownpoint. FEIS at 4-11. Of these locations, HRI has only gathered cultural resources data on Crownpoint Section 12. On July 30, 1996, HRI submitted the archaeology reports performed for a road on part of Section 12 for Mobil Oil in 1976. Letter from Mark Pelizza, HRI to M. Layton, NRC, Transmits archaeological reports for Mobil Oil Corp. for T17N, R13W, Section 12, near Crownpoint, Hearing Record ACN 9607310085 (July 24, 1996). As Mr. Dodge testifies, this report does not meet professional standards. Dodge Testimony at 18. The MNM Report does covers Section 12. Additional areas for evaporation ponds or deep well disposal of liquid wastes have not been identified. COP Rev. 2.0 at 59 (up to 100 acres of ponds may be required).

**e. TCP documentation for all sites.**

For the most part, the reports relied on by HRI generally involve archaeological

reports and surveys. Information on traditional cultural properties (TCPs) for Church Rock and Section 12 has been gathered in the Becenti Report, which was submitted in 1996. Letter from Mark Pelizza, HRI, to J. Holonich, NRC, forwarding summary report from L. Heartfield, recapping work completed in response to NRC requests 22, 23, 24, Attachment 6, ("Pelizza Letter I") Hearing Record ACN 9605080097 (May 3, 1996).<sup>9</sup> In his report, Becenti states he made a walking tour of the areas that would be affected and conducted field interview with individuals living on or near the Church Rock project. *Id.* at 1. Becenti states that he is a Navajo medicine man that has been practicing for

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<sup>9</sup> HRI included in its submission report a statement by Mark Pelizza, HRI, that he believes the sacred sites listed in Ernest Becenti's interview will not be located in the proposed wellfield. *Id.* With regard to TCPs, HRI stated that,

The consensus of opinion seems to indicate that the detailed TCP work is expected during the Section 106 Cultural Resources Review. We anticipate starting the 106 review at the Church Rock property in July, 1996.

*Id.*

In response to an additional set of Requests for Additional Information ("RAI") from the NRC, on cultural resources, HRI submitted its response to RAI 2/24 in August, 1996. RAI 2/24 sought additional action from HRI to comply with the requirements of Bulletin 38, including documenting a report researching whether any additional Navajos, other than those in Ernest Becenti's report, have ties to the areas in question; retaining an ethnographer to perform a follow-up report to Ernest Becenti's; and retaining an ethnographer to follow-up on contacts with tribes. Letter from Mark Pelizza, HRI, to D. Gillen, NRC, (Pelizza Letter II) Hearing Record ACN 9608230202 (August 15, 1996), a copy of which is attached hereto as Exhibit 7. HRI's response is assertions from Mark Pelizza, an unqualified expert in either archaeology, anthropology or Navajo tradition. Mr. Pelizza states that no other traditional practitioners were identified. *Id.* He goes on to state that he himself visited Section 12 with two men, apparently local Navajo residents. Mr. Pelizza does not submit any reports or statements from the two men, other than his own statements of their observations. *Id.* Mr. Pelizza also offers his personal opinion that the sites identified in Mr. Becenti's report will not be within sight of the project areas. *Id.*

thirty years, performing the Warrior Way and the Blessing Way ceremonies. Id. at 1-2. He concludes that "No significant sacred and traditional places were found." Id. at 2.

The Becenti Report also purports to have assessed whether other Indian tribes or pueblos have used the area for religious purposes, a task for which Becenti is not qualified. Dodge Testimony at 19 ("only the religious and cultural leaders of the Hopi, Zuni, and other Indian tribes are qualified to determine whether there are TCPs in the projects area of potential effects").

The Becenti report is unreliable in several respects. First, Mr. Becenti exaggerates his years of experience. Mr. Francisco observes that Mr. Becenti has only been practicing as a traditional practitioner for some 16 years, not the thirty years Mr. Becenti asserts in his report. Francisco Testimony at 5 (stating both men apprenticed with the same trainer). Second, Mr. Becenti's statements at the September 15, 1998, limited appearance session, were irrational and call his qualifications as a witness into question. A copy of Mr. Becenti's limited appearance statement is attached hereto as Exhibit 8. He recited that he has a grandmother who is 114 years old, *and* a mother who is 110. Exhibit 8 at 3. He also appears to deny the UNC Church Rock tailing spill ever happened, "And I think in Church Rock area, I don't see anybody die from there just like my grandmother says. I don't see any horse die, mice, roaches, ants, nothing. Nothing happened like these guys talk about." Id. at 4.

Dr. Kelley observes that although Mr. Becenti used the Navajo Nation interview

information checklist, he failed to include all the relevant information in his report, such as the adverse effects two interviewees foresaw on their homesites. Kelley Testimony at 10. Further, Mr. Becenti does not ask interviewees about any concerns for possible adverse effects on the cultural resources inventoried in the project, such as traditional Navajo homes, or "hogans". Kelley at 10-11. Nor, did Mr. Becenti question interviewees about concerns regarding adverse effects from the project outside the project area. Kelley at 11-12.

Moreover, the Becenti Report misrepresents the sacred nature of the project areas by concluding that no significant sites exist in Church Rock. Mr. Francisco, on the contrary, states,

As a medicine man, I feel that these areas are sacred and the people that live in those areas are sacred also. . .The statement that the areas where uranium mining is being proposed are not sacred is also a mis-statement. Why are the herbs not sacred? The herbs outside our doors are sacred. We feel the whole surrounding area is sacred. We use these herbs for the Evil Way, the Wind Way, the Lightning Way and the Blackening Enemy Way ceremonies. The tree roots we use. The junipers, the cedars, the sagebrush, the rabbit brush are used in our ceremonies.

Id. at 2-3.

In Mr. Francisco's professional opinion, the project is sacred,

Yes, there are areas in the mountains but the area where we live everyday is important. We recognize that this is important to use. The water that we speak of, the water is also sacred. We talk about the water in different ways. We talk about the female water and the male water and refer to the waters in ceremonies also. When there is no rain and this is not in balance then we offer minerals to the water and we ask for rain. From water we grow corn in our own corn fields. We talk about being made from the male white corn and the female yellow corn and also the mixed corn.

Corn is our food and also the corn pollen which we use in the blessing way. Everytime we pray we use corn pollen. I ask why this wasn't included in the description of the land and the ways we use from it.

Id. at 3. Mr. Francisco's description of sacred traditional uses centered around the Navajo homesite is consistent with the The Navajo Nation Policy to Protect Traditional Cultural Properties. The Navajo Nation policy incorporates the definition in Bulletin 38, and further adds that besides sacred sites, other Navajo TCPs include homesites, and places where weavers gather plants for dyes. Kelley Testimony, Attachment B at 1.<sup>10</sup> Dr. Kelley also testified that homesites and water sources can be TCPs. Kelley Testimony at 11-13. This evidence of sacred sites common to the Navajo traditional household belie the Becenti's report's conclusion that there are no significant TCPs.

The MNM Report also included a section on TCPs in Church Rock and Crownpoint Section 12. MNM Report at 17. Dr. Kelley testifies to much of the same concerns regarding this report, as she does for the Becenti Report. The MNM Report does not ask interviewees about any concerns for possible adverse effects on the cultural resources inventoried in the project, nor question interviewees about concerns regarding

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<sup>10</sup> The Navajo Nation Policy goes on to include sites that may have been blessed and where ceremonies have occurred, such as hogans, houses, sweathouses, game corrals, eagle traps, trail shrines, rock art and graves, and to include places for gathering plants for use in ceremonies, gathering minerals for ceremonies, gathering contents of sacred bundles, prayer offering sites, places associated with the Navajo origin story, origin stories of particular ceremonies, places associated with the origin of a clan, a Navajo custom, or the home of a Holy Being, talking rocks (echoes), natural discoloration of rocks that has supernatural power, a place where a supernatural event occurred, and places that play a part in life-cycle rituals (such as the spot where a newborn baby's umbilical cord is placed. Kelley Testimony, Attachment B at 2-3.

adverse effects from the project outside the project area. Kelley at 10-12. And, the MNM report does not use the Navajo Nation interview forms at all. Kelley at 10.

**2. Inadequate efforts to seek information from tribes and other parties with knowledge of cultural resources.**

**a. Efforts to obtain information from tribes.**

The NHPA requires federal agencies to "consult with any Indian tribe . . . that attaches religious and cultural significance to properties" of traditional religious and cultural importance, in carrying out its section 106 duties. 16 U.S.C. §§ 470a(d)(6)(B) and 470a(d)(6)(A). The NRC has failed to carry out these responsibilities in a manner that complies with federal guidelines and ensures that potentially affected tribes are adequately consulted.

In January, 1996, the NRC Staff sent three Requests for Additional Information to HRI on the subject of cultural resources. Letter from Mark Pelizza, HRI, to J. Holonich, NRC, forwarding responses to RAI, questions 1-48 (questions 22, 23 and 24) Hearing Record ACN 9602220389 (February 20, 1996), a copy of HRI's responses to questions 22, 23 and 24 is attached hereto as Exhibit 9. RAI No. 24 sought reports from the Navajo, Hopi, Zuni, Acoma, Laguna and other potentially affected tribes describing the TCPs of each tribe at or near each of the three sites, in accordance with the National Park Service's National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties. *Id.* at 7. HRI responded to all three RAIs by stating that its responses "will be the subject of additional work by our cultural resource contractor."

Id. at 1. Then, in May, 1996, HRI supplemented its answer to RAI 24, by submitting a report from Lorraine Heartfield, indicating that the effort HRI made in contacting neighboring tribes “provided only limited response.” Pelizza Letter I.

The NRC then sent a request for additional information on RAI 24 (RAI #2/24). Pelizza Letter II. In response, HRI described a set of letters it had send to Zuni and Hopi Tribes, asking them to “notify” HRI of any traditional cultural practices at Churchrock, Crownpoint and Unit 1. Pelizza Letter II at 6; Letter from L. Heartfield, HRI cultural resources consultant to J. Saulsbury, ORNL, HRI’s application to operate in situ leach uranium facilities near Crownpoint and Churchrock, NM, cultural resources open issue question 24 at 1, 3, Hearing Record ACN 9607290081 (July 23, 1996). HRI described letters sent to Acoma, Hopi, Zuni, Laguna, and the All Indian Pueblo Council, asking to be notified of any traditional cultural practices on Section 12. Pelizza Letter II at 6. This response states that Mark Pelizza, HRI, made follow-up telephone calls in the last week of July, 1996. Id.

On October 2, 1996, Daniel Gillen wrote to officials at Navajo Nation Historic Preservation Department, Pueblo of Zuni Heritage and Historic Preservation Office, Hopi Cultural Preservation Office, the Pueblo of Acoma, the Pueblo of Laguna, the All Indian Pueblo Indian Council, the Crownpoint Chapter, the Church Rock Chapter, the BLM and the BIA, thanking them for their interest in the consultations being conducted for the Section 106 review process, and stating "We will keep you informed as the review

process proceeds." Letter from D.Gillen, NRC to federal agencies and interested parties, at 1, Hearing Record ACN 961010079 (October 2, 1996). Subsequently, the NRC wrote to the tribes and asked them to comment on the MNM Report. Dodge Testimony at 23.

As discussed in Mr. Dodge's testimony, the NRC has not done an adequate job of consulting with the tribes. Id. at 20. Many tribes do not consider consultation to have begun until the appropriate agency official contacts tribal leadership. Id. at 22. So, tribes would not consider contacts by HRI to constitute consultation. Moreover, the tone of the NRC's first contact, which came by letter on October 2, 1996, was an insult to tribal sovereignty. Id., (citing President Clinton, Government to Government Relations with Native American Tribal Governments Memorandum). The NRC's January 31, 1997 letter to the NNHPD, requesting consultation, which was copied to the other tribes, added further insult. Id., at 23.

As a result, Mr. Dodge concludes that the process is in a "introductory stage of consultations and the tribes are reasonably awaiting consultation," and to halt further consultation efforts would not be in good faith under Section 106. Id., at 20, 24. Mr. Dodge testifies that his contacts with officials at the Zuni and Hopi Tribes confirm that these tribes do not believe the consultation process with regard to TCPs is complete. His conversations with Glenna Dean at the NMSHPO and Dr. Downer at the NNHPD indicate that these officials believe that they were only asked to consult on archaeological sites, not TCPs, in the NRC letters of May, 20, 1998. Id. at 26, Exhibit B. Mr.

Dishta of the Zuni Tribe considers the project area aboriginal tribal lands, and expects the NRC to fund a visit by the Zuni Cultural Resources Advisory Team. Dodge Testimony at 25. Mr. Dongoske of the Hopi Tribe expects the Hopi Tribe to visit the area and anticipates further consultation. Id.

**b. Efforts to obtain information from Chapter Officials.**

Dr. Kelley found the Staff's consultation with Chapter officials (local Navajo officials) to be inadequate to ensure the identification of cultural resources. Kelley Testimony at 8. Crownpoint Chapter officials were not consulted regarding Crownpoint and Unit 1. Kelley Testimony at 8; MNM Report at 17-22. The only Church Rock Chapter official who was consulted was Earnest Becenti, an HRI consultant, who consulted himself. Kelley Testimony at 8.

**c. Efforts to obtain information from residents and ceremonial practitioners**

Dr. Kelley also found the Staff's consultation with residents to be inadequate. Kelley Testimony at 9. The NRC Staff has not solicited information from ENDAUM in the HRI licensing proceeding, nor others who are "parties likely to have knowledge of or concerns with historic properties in the area." 36 C.F.R. § 800.4(a). Mitchell Capitan's testimony states that he engages in Navajo traditional practices near the Crownpoint and on Section 22 of the Unit 1 mine sites, but has not been consulted by any researchers. Capitan Testimony, Exhibit 4.

The Staff's consultation with ceremonial practitioners was also lacking. See

Kelley Testimony at 9. HRI submitted only the Becenti Report and claims that it cannot identify any other traditional practitioners. Pelizza Letter II at 4. HRI's assertion is not credible and reflects an inadequate effort. Mr. Francisco testified that he is a medicine man, who apprenticed from the same man as Ernest Becenti, and that he performs ceremonies in the Church Rock and Crownpoint areas. Exhibit 3 at 2, 4 and 5. He should have been known to Mr. Becenti and a practitioner that was consulted.

### **3. Inadequate review of existing information.**

Dr. Kelley is experienced in applying federal and Navajo Nation cultural resource management standards and guidelines, through her work as a consultant to and as an employee with the Navajo Nation Historic Preservation Department ("NNHPD"). Kelley Testimony at 1-2. Dr. Kelley has concluded, as a result of her evaluation of the work of HRI's cultural resource researchers, that they did not consult sufficient sources of relevant literature. The MNM report ignores such important scholarly works as *The Handbook of North American Indians, Southwest*, and historical research compiled for land claims adjudication before the Indian Claims Commission (published by Garland Press). Kelley Testimony at 6-7. These omissions, Dr. Kelley concludes, have led to factual errors in the report. Consulting relevant literature is important in identifying previously recorded cultural resources in an area and in locating similar resources. Kelley Testimony at 6-7.

Moreover, Dr. Kelley finds that the MNM Report lacks background information necessary to assess the significance of cultural resources and recommend mitigation

measures. Kelley Testimony at 6-8. Dr. Kelley further points out that HRI's researchers have not consulted relevant literature about other tribes that may have interests in the area. As she states:

A careful effort to identify potentially interested tribes might have identified others as well, such as Jemez. Yet these researchers report virtually no information about these other tribes, even though, in my experience, libraries in Window Rock, Gallup, Albuquerque, and Santa Fe have ample collections of the relevant literature, and even though all of the tribal governments identified are experienced at providing cultural resources information when consulted by agencies and project proponents.

Kelley Testimony at 5.

HRI's researchers have not reviewed all of the information that could have provided information on all potentially interested tribes and the extent of cultural resources in the area. As Dr. Kelley has stated, such information is well-known and readily available. Failure to utilize these resources demonstrates a lack of reasonable and good faith effort.

**4. Inadequate Efforts to Obtain the View of the Historic Preservation Officer on Identification.**

The NHPA authorizes Indian tribes to assume all functions of SHPOs with respect to tribal lands, including dependent Indian communities. 16 U.S.C. §§ 470a(d)(2) and 470w(14). The NRC Staff failed to recognize the Navajo Nation Historic Preservation Department ("NNHPD") as the appropriate SHPO for this project until very late in the process, and then failed to recognize its authority to consult on all of the project areas.

On October 2, 1996, the NRC requested advice from the New Mexico Historic Preservation Office ("NMSHPO") on advancing the review process and the NMSHPO's comments about the survey work. Letter from Daniel Gillen to Dr. Phillip Shelley, New Mexico State Historic Preservation Officer, ("October 1996 Gillen Letter") Hearing Record ACN 9610070079 (October 6, 1996). That same date, October 2, 1996, Daniel Gillen wrote to officials at Navajo Nation Historic Preservation Department ( and to Hopi, Zuni, Acoma, and Laguna officials, the All Indian Pueblo Indian Council, the BLM and the BIA as well) thanking them for their interest in the consultations being conducted for the Section 106 review process, and stating "We will keep you informed as the review process proceeds." Letter from D.Gillen, NRC to federal agencies and interested parties, Those who expressed interest re: Section 106, see letter to St. of NM and enclosures at 1 Hearing Record ACN 961010079 (October 2, 1996).

The NRC subsequently requested consultation under NHPA Section 106 with the Navajo Nation Historic Preservation Department. Letter from Joseph J. Holonich, NRC, to Alan S. Downer, NNHPD, January 31, 1997, at 1, reproduced in Exhibit C to the FEIS. However, it appears from the Staff's request that although the Staff acknowledges NNHPD's recently acquired status as a SHPO, the Staff intends to continue to deal with the New Mexico SHPO as the SHPO for this project, rather than treat the NNHPD as SHPO. See id. HRI's project lies within the dependent Navajo Indian communities of Church Rock and Crownpoint, hence, the Staff must deal with NNHPD as a SHPO. See

Dodge Testimony, Exhibit C, Letter from Peter T. Noyes, Navajo Nation Historic Preservation Department to Joseph Holonich, NRC, at 1 (June 24, 1998) (stating Sections 8, 12 and 17 are within the exterior boundaries of the Navajo Nation).

On May 20, 1998, the NRC made a finding of "no effect" on the historic properties identified on Sections 8 and 12 in Churchrock and that it did not identify eligible properties on Section 17. Dodge Testimony at 10; Exhibit B to Dodge Testimony.<sup>11</sup> The Staff sought consultation from the NMSHPO on its finding for Sections 8 and 12. Exhibit B to Dodge Testimony at 1-6. The Staff only sought consultation from the NNHPD on Section 17. Id. On June 3, 1998, the NMSPO responded, by stating it concurs with a finding the project will have no effect on the listed archaeological sites, provided they are fenced and avoided. Dodge Testimony, Attachment C at 3. The NNHPD responded on June 24, 1998, asserting its jurisdiction over all three Sections as within Navajo Nation lands, and concurring in the finding that there will be no effect, if the eligible properties are avoided with a protection zone of 50 feet. Exhibit C to Dodge Testimony at 5. On July 10, 1998, the NRC concluded

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<sup>11</sup> This finding was stated in letters sent to Lynne Sebastian, Ph.D., NMSHPO, Alan Downer, Ph.D., Navajo Nation Historic Preservation Department, and forwarded to James Copeland, BLM, Jenni Denetsonie, BIA, Roy Bernal, Chairman, All Pueblo Indian Council, Charles Long, Crownpoint Chapter President, Herbert Benally, Churchrock Chapter President, Reginald T. Pasqual, Acoma Pueblo Governor, Roland Johnson, Laguna Pueblo Governor, Joseph Dishta, Director, Pueblo of Zuni Heritage and Historic Preservation Office, and Leigh Jenkins, Director of Hopi Cultural Preservation Office. Dodge Testimony, Exhibit B; Hearing Record Index Update, October, 1998.

"HRI may proceed with its planned mining-related activities" on Churchrock Sections 8, 17 and Crownpoint Section 12. Dodge Testimony, Exhibit D at 2. It dismissed the NNHPD's statement that sites should be protected by 50 feet. Id. "Until the jurisdictional issues are resolved by the litigation now pending in the United States Court of Appeals for the Tenth Circuit, the effect of the NNHPD comments regarding Sections 8 and 12 will be uncertain." Dodge Testimony, Exhibit D at 2.

The Staff comment references the current litigation over jurisdiction on Section 8 and 17, before the United States Court of Appeals for the Tenth Circuit. HRI and the state of New Mexico have challenged the United States Environmental Protection Agency's decision to assert jurisdiction over Sections 8 and 17 because the land status of Section 8 is in dispute between the state and the Navajo Nation and because Section 17 is Indian trust land. Despite the uncertainty now surrounding jurisdiction in Church Rock, the NRC authorized HRI to commence activities on Sections 8, 12 and 17 on the basis of the NMSHPO's opinion. Dodge Testimony, (Exhibit 2) Exhibit D. The NRC only sought NNHPD's opinion on Section 17, and when NNHPD provided its opinion on Sections 8 and 12 as well, the NRC ignored them. Id., at Exhibit C, and Exhibit D.

The Staff's disregard for the comments of the NNHPD breaches its obligation to consult with the Navajo Nation on a government to government basis. President Clinton's Memorandum of April 29, 1994, *Government to Government Relations with*

*Native American Tribal Governments*, 59 Fed.Reg. 22951 (May 4, 1994).

Moreover, 36 C.F.R. §800.1(c)(2)(iii) states that agencies "should be sensitive to the special concerns of Indian tribes in historic preservation issues, which often extend beyond Indian lands to other historic properties." The NRC Staff has demonstrated extreme insensitivity to the NNHPD's request that a 50 foot protection perimeter be established around sites.

In Pueblo of Sandia v. Smith, the Tenth Circuit court found that the U. S. Forest Service did not make a reasonable and good faith effort to identify historic properties on national forest land located in New Mexico and close to the Pueblo of Sandia. 50 F.3d 856 (10th Cir. 1995). The Court held that "a mere request for information is not necessarily sufficient to constitute the 'reasonable effort' section 106 requires." Id. at 860. The Forest Service had mailed form letters to local Indian tribes and to a few individual tribal members requesting detailed information about the location of traditional cultural property sites, activities conducted there, and the frequency of those activities. The letters also asked tribes to provide maps of the sites and documentation of the historic nature of the property. Id. After none of the tribes replied with information requested in the letters, the Forest Service determined that the federal lands in question contained no traditional cultural properties.

To the extent that information has been submitted by HRI or otherwise collected by the NRC, the reliability of portions of that information is suspect. For example, the

FEIS states that a preliminary traditional cultural survey identified no Navajo TCPs, such as "sacred sites, sites associated with life-cycle rituals, prayer offering places, plant gathering locations, and important landscape formations." FEIS at 4-109. This finding is contradicted by the testimony of Mr. Francisco and Mitchell Capitan.<sup>12</sup>

In conclusion, the NRC Staff has not made a "reasonable and good faith effort" to identify historic properties and gather sufficient information to evaluate their National Register eligibility, in violation of 16 U.S.C. § 470(f) and 36 C.F.R. § 800.4(b).

**B. The NRC Staff Failed to Apply Appropriate Criteria to Determine Whether the Project Will Have an Adverse Effect on Historic Properties.**

The NRC Staff failed to apply the appropriate criteria to determine whether the project will have an adverse effect on historic properties. The Advisory Council on Historic Preservation's regulations provide, in pertinent part:

(b) An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

(1) Physical destruction, damage, or alteration of all or part of the property;

(2) Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register [of Historic Places];

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<sup>12</sup> Exhibits 3 and 4; See FEIS at 2-26 and Figure 2.9 at 2-27 (showing that the Unit 1 lease area encompassing a substantial portion of Section 22, where Mitchell Capitan gathers herbs).

(3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

....

36 C.F.R. § 800.9. Thus, alteration of the property's setting alone, even when there is no physical disturbance of the property itself, may constitute an adverse effect.

However, the FEIS indicates that the NRC Staff has considered only physical disturbance in concluding that the project has minimal potential to result in significant impacts on cultural resources. The NRC Staff ignores, for example, the project's impact on the setting of historic properties on-site and in the immediate area as well as its impact on the association of the sites with one another and the Chaco Culture National Historical Park and a New Mexico State Register Archeological District. See FEIS at 3-76. The industrial facilities and equipment associated with HRI's proposed project would introduce visual and audible elements out of character with its rural location and the traditional Navajo culture of residents, and hence adversely affect the historic properties there.

In addition, HRI's consultants did not ask local residents and traditional practitioners whether they think noise, visual interference, dust, traffic, and other project intrusions might affect TCPs outside the project area. Kelley Testimony at 12. Dr. Kelley also finds that the consultants ignored possible adverse effects on ground water under and outside the project area, which are often sites of cultural significance. Kelley Testimony at 12. Mr. Francisco's statement that corn pollen and mineral offerings are

made at water sources confirms this statement. Francisco Testimony at 3.

HRI's assertion that TCPs will not be impacted because they all lie north or west of the mine field boundaries is untenable. See Response to RAI, letter from Mark Pelizza, HRI, to Daniel Gillen, NRC (April 10, 1996). Mr. Dodge states that the area of potential effects is likely to extend beyond the project boundaries to affect TCPs in the project area. Dodge Testimony at 14. The NRC Staff must still determine how the project will affect TCPs. Dodge Testimony at 14. He notes that this conclusion is supported by statements made by Dr. Downer of the NNHPD. Dodge Testimony at 14-15.

Moreover, the conclusion that HRI's policy of avoidance would eliminate or mitigate significant impacts or adverse effects from physical disturbance of historic properties is unfounded. First, as discussed above, HRI has failed to identify all of the historic properties that should be avoided. Moreover, because the historic properties within the project boundaries are large in number and extent, it is highly unlikely that HRI could avoid impacting them. This is especially true in view of the extensive surface and subsurface disturbance that would be required by, for example, construction of retention ponds, construction of rainfall diversion channels, land application of waste water, drilling of wells for injection, production, and monitoring, processing facilities, and piping between wellfields and processing facilities. See FEIS at 3-74 to 3-77 (discussing presence of numerous and/or large archeological sites at each of the project

sites); id. at 2-26 and 2-28 (stating that approximately 90 percent of the Church Rock site and 70 percent of the Crownpoint and Unit 1 sites would be disturbed during project construction and operation).

Dr. Kelley finds two major problems with the avoidance strategy. First, the wellfield layouts for Crownpoint and Unit 1 show wells coinciding with archaeological sites. Kelley Testimony at 15. Second, the archaeological sites are not carefully mapped by HRI to reflect the true surfacial extent, and subsurface materials maybe disturbed even if surface materials are avoided. Dr. Kelley concludes that the wells are so densely distributed that disturbance is highly likely. Id. at 15.

Dr. Kelley concludes the Staff has not considered all the effects of the project by failing to consider the effects of the project on integrated cultural landscapes. Id. at 16. Cultural landscapes are created when archaeological sites and TCPs are related to each other as successive inhabitants continue or modify activity patterns and land uses, re-using or abandoning spots in favor of others. Id. at 15-16. Dr. Kelley states,

the project area may affect landscapes with qualities that make them significant to Navajo traditionalists, those of other tribes, or both. In addition, these landscapes as integrated wholes may contain as-yet untapped information about the past that can help answer research questions significant to cultural resource researchers, thereby making these landscapes eligible to the National Register of Historic Places under eligibility criterion d.

Id. at 16. Simply avoiding archaeological sites "can nevertheless destroy the integrity of significant cultural landscapes." Id. Avoiding archaeological sites may still destroy

information and qualities that will compromise the significance of the sites as TCPs and compromise their eligibility to the National Register. Id. at 17-18. HRI's ground disturbance will alter large parts of land surface that may alter the distribution and character of ground water sources; ground water sources significantly influence cultural activities. Id. at 18. This action could change the land surface and subsurface beyond the ability of researchers to reconstruct past human activities and decisions. Id. at 18.

The area around the HRI project has been used for daily and ceremonial activities more or less continuously from the early centuries A.D. to the present. Kelley Testimony at 17. Therefore, Dr. Kelley believes significant cultural landscapes exist. Id. Dr. Kelley states that the only HRI consultant that mentions cultural landscapes, Marshall, "underrepresents the spatial and temporal extent and complexity of these landscapes." Id. at 18. As Dr. Kelley concludes, the Kin Yaa 'a and the Muddy Water complexes, as well as the postcolumbian features attributed to Navajos, should be researched as a single cultural landscape, because they consist of near continuous distribution of archaeological features. Id. at 18.

Accordingly, HRI's cultural resource reports do not adequately consider the impacts on cultural resources inside or outside the project and do not properly consider the significance of these resources in light of the importance of the surrounding area.

**II. THE NRC STAFF VIOLATES THE NHPA BY AUTHORIZING ACTIVITY ON SECTIONS 8, 12, AND 17 BEFORE THE 106 REVIEW PROCESS IS COMPLETE.**

**A. The NRC Staff Violated Advisory Council on Historic Preservation Requirements to Complete the NHPA Section 106 Process Before Licensing under 36 C.F.R. § 800.3(c).**

The NRC has violated the requirements under the regulations of the Advisory Council on Historic Preservation to complete the Section 106 process before a license is issued and before initiation of ground-disturbing activities. Section 106 requires that the agency official complete the Section 106 process *before* the issuance of a license. 36 C.F.R. § 800.3(c). The Advisory Council states

The Agency Official should ensure that the section 106 process is initiated early in the planning stages of the undertaking, when the widest feasible range of alternatives is open for consideration. The Agency Official should establish a schedule for completing the section 106 process that is consistent with the planning and approval schedule for the undertaking.

Id.

The NRC Staff and HRI concede that the National Historic Preservation Act (“NHPA”) § 106 process is incomplete. Staff’s Response to Motion for Stay, Request for Prior Hearing, and Request for Temporary Stay (February 20, 1998), Affidavit of Robert D. Carlson (February 20, 1998), ¶ 13 (“NHPA review process is far from concluded”); Affidavit of Lorraine Heartfield (January 23, 1998), ¶ 18 (“compliance . . . is progressing”). Therefore, the Staff’s issuance of a license before the Section 106 process was complete violates the NHPA.

While there is some support for phasing compliance to coincide with a phased approval, it is only permissible if the schedule for completing the § 106 process is “consistent with the planning and approval schedule for the undertaking.” 36 C.F.R. §

800.3(c); WATCH v. Harris, 603 F.2d 310, 316 n.8 (2d Cir. 1979) (where approvals are given in stages, NHPA procedures apply at each stage). This is far from the case here. The Staff concedes it has not finished the § 106 review process for any part of the HRI project, including the activities at the Church Rock site covered by the first review phase. The Staff has yet to complete -- or in some cases even initiate -- significant steps in the § 106 review process. These include the crucial steps of historic property identification, Advisory Council comment, and consultation with the NNHPD as a Tribal SHPO.

In any event, an agency may only expend funds or authorize "nondestructive" planning activities prior to completion of the 106 process. Id. So, even assuming *arguendo* that Church Rock was a separate planning phase, only nondestructive planning activities are permitted by the Advisory Council regulations. HRI's license allows mining to commence at Church Rock in violation of this rule.

Moreover, the Advisory Council encourages agencies to integrate compliance with Section 106 "with the processes of environmental review carried out pursuant to the National Environmental Policy Act, and coordinating any studies needed . . . with studies of related natural and social aspects. 36 C.F.R. § 800.14(a). The FEIS encompasses all three mine sites.

Thus, the NRC Staff intends that the identification of historic properties by archeological and TCP surveys, which are necessary to the determination of whether the project will have an adverse effect on historic properties, would be conducted as part of

the cultural resources management plan after the license is issued, in violation of 36 C.F.R. § 800.39(c). The NRC incorporated License Condition 9.12 into the HRI license, which states that:

Before engaging in any construction activity not previously assessed by the NRC, the licensee shall conduct a cultural resource inventory. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR Part 800), and the Archaeological Resources Protection Act of 1979, as amended, and its implementing regulations (43 CFR Part 7).

In order to ensure that no unapproved disturbance of cultural resources occurs, any work resulting in the discovery of previously unknown cultural artifacts shall cease. The artifacts shall be inventoried and evaluated in accordance with 36 CFR Part 800, and no disturbance shall occur until the licensee has received written authorization to proceed from the State and Navajo Nation Historic Preservation Offices.

On January 5, 1998, the NRC Staff issued a license to HRI for a five-year term, subject to renewal. License SUA-1508. Although the license prohibits HRI from injecting lixiviant at Unit 1 or Crownpoint unless it successfully demonstrates groundwater restoration at Church Rock, the license permits all other activities, such as construction and operation of the main processing facility at Crownpoint and satellite processing plants at Church Rock and Unit 1, as well as ground disturbing activities in preparation for mining at Unit 1 and Crownpoint. See License Conditions, 10.2 and 9.1 (processing plants), 10.17 - 10.20 (monitoring wells), 10.26 (waste retention

ponds), 10.27 (replacement of drinking water wells), and 10.31 (aquifer injection tests). The license authorizes HRI to do everything short of injecting lixiviant. Indeed, the only § 106 review step that it expressly requires to be done before previously unreviewed construction activity takes place is the preparation of a cultural resources inventory by HRI, an unlawful delegation of the NRC statutory obligation.

A federal agency may only conditionally approve a project prior to completion of the § 106 process when the permit or approval contains a specific prohibition of any cultural resource disturbance prior to the agency's completion of the § 106 process. See Walsh v. U.S. Army Corps of Engineers, 757 F.Supp. 781, 787-789 (D.Tex. 1990) (Corps complied with § 106 by placing specific conditions in the permit that prohibited disturbances of cultural resources prior to the incorporation into the permit of a signed "programmatic agreement" between the ACHP and the Corps which was in draft stage); Abenakai Nation of Missisquoi v. Hughes, 805 F.Supp. 234, 239 n.9 and 250-251 (D.Vt. 1992), aff'd, 990 F.2d 729 (2d Cir. 1993)(agency complied where agency incorporated formal agreement with SHPO into permit conditions "establish[ing] an intensely detailed plan for . . . protecting cultural and historic resources," including "joint supervision of the site by the Corps, the Advisory Council on Historic Preservation and the Vermont State Historic Preservation Office, and a prohibition on work at the site until written approval has been received from the Corps") (emphasis added); City of Grapevine, Texas v. Dept. of Transportation, 17 F.3d 1502, 1508 (D.C. Cir. 1994),

cert. denied, 513 U.S. 1041 (1990) (NHPA compliance found where FAA's approval of a runway was "expressly conditioned upon completion of the § 106 process").

The HRI license contains no such prohibition. To the contrary, Condition 9.12 suggests that disturbances may be commenced before or during the § 106 review, as long as they are "completed" in compliance with the § 106 review. Indeed, the only § 106 review step that it expressly requires to be done before previously unreviewed construction activity takes place is the preparation of a cultural resources inventory by HRI. No mention is made of any other essential review step involved in the § 106 process, including consultation by NRC with the State and Navajo Nation SHPO's.<sup>13</sup>

It is uncontroverted that the NRC has not completed its NHPA review for the areas to be impacted during that first five-year phase. Dodge Testimony at 12-13.

HRI stated in its Response to Scheduling Conference Briefs of all Petitioners, that mining is scheduled to commence at Church Rock Section 8 in the year 2000, at Church Rock Section 17 and Unit 1 in the year 2002 and at Crownpoint in the year 2004. HRI's Response to Scheduling Conference Briefs of all Petitioners, (September 9, 1998) Attachment A at 3. The FEIS also indicates that portions of the Crownpoint and Unit 1 mining units will be developed in the initial five year mine plan. FEIS Figure 2.11 at 2-30. In addition, the central processing plant for all three mine sites is located in Crownpoint. Moreover, to the extent it has been completed, the review is

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<sup>13</sup> Mr. Carlson's affidavit and resume evidence no training and experience that qualify him to give expert opinion testimony on Section 106 compliance.

inadequate. Id., at 13-14. Thus, the NRC issued the license to HRI in violation of the statute.

Mr. Dodge states in his professional opinion that the license condition is not equivalent to completion of the Section 106 process prior to issuance of the license. Dodge at 16. Rather, this license condition "makes an a priori determination that all effects can be avoided. The 106 process is not designed for such 'boiler plate' decisions." Dodge Testimony at 16.

**B. The NRC has not Provided the Advisory Council the Opportunity to Comment on the Project.**

"The head of any federal department or independent agency having authority to license any undertaking shall afford the Advisory Council on Historic Preservation . . . a reasonable opportunity to comment with regard to such undertaking." 16 U.S.C. § 470f. The Advisory Council's regulations establish certain procedures by which an agency must request comments from the Advisory Council. See 36 C.F.R. § 800.6. Consultation with the Advisory Council, constitutes the very "heart" of the NHPA review process. Walsh, 757 F.Supp at 789. See also WATCH (Waterbury Action to Conserve Our Heritage) Inc. v. Harris, 603 F.2d 310, 326 (2nd Cir. 1979) (holding that agency violated NHPA by not soliciting ACHP advice before proceeding with demolition).

The Staff has not even contacted the ACHP regarding the HRI license. Dodge Testimony at 10.

### **III. THE NRC STAFF FAILS TO COMPLY WITH THE NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT**

Issuance of the license violates the Native American Graves Protection and Repatriation Act, 25 U.S.C. § 3001 *et seq.*, in that the NRC Staff has failed to comply with the NAGPRA consultation and concurrence requirements.

#### **A. NAGPRA Consultation and Concurrence Requirements**

NAGPRA requires consultation with the appropriate tribe prior to the removal or excavation of Native American cultural items from federal or tribal lands.<sup>14</sup> 25 U.S.C. § 3002(c). In the case of tribal lands, tribal consent is required. 25 U.S.C. § 3002(c)(2). "Cultural items" includes human remains, objects placed with remains as part of a death rite or ceremony, sacred objects needed for the practice of traditional Native American religions by present day adherents, and objects having ongoing historical, traditional or cultural importance central to a Native American group. *Id.* § 3001(3).

A federal agency considering issuance of a permit must commence consultation upon becoming aware that the planned activity may result in intentional excavation or inadvertent discovery of cultural items, 43 C.F.R. § 10.5(b)(1), and in any event prior to issuing any permit or approval for such activity. *Id.* 10.3(c).

Indian tribes who have likely cultural affiliation with the items, have demonstrated cultural relationship with the items, or aboriginally occupied the area must

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<sup>14</sup>But see 43 C.F.R. § 10.2(f)(2)(iv) (actions authorized or required by regulations implementing NAGPRA do not apply to tribal lands to extent that an unconstitutional taking of property would result).

be notified. Id. § 10.5(b)(1). The notice must be written and is required to:

describe the planned activity, its general location, the basis upon which it was determined that human remains [and other cultural items] may be excavated, and, the basis for determining likely custody pursuant to [43 C.F.R.] § 10.6. The notice must also propose a time and place for meetings or consultations to further consider the activity, the Federal agency's proposed treatment of any human remains [and other cultural items], and the proposed disposition of any excavated human remains [and other cultural items].

Id. § 10.3(c)(1). This notice "should be followed up by telephone contact if there is no response in 15 days." Id.

The consultation effort must also seek to identify tribes, traditional religious leaders, and lineal descendants who should be consulted. Id. § 10.5(b)(3). Following consultation, the agency must prepare a written plan of action that documents, inter alia, planned archeological recording, steps to be followed to contact tribes at the time of excavation or discovery, the kind of traditional treatment to be afforded by members of the tribe, and the disposition of remains and other items. Id. § 10.5(e).

**B. The Staff Fails to Meet NAGPRA Consultation and Concurrence Requirements.**

Human remains have already been discovered at the Crownpoint waste water irrigation site (Section 12, Township 17 North, Range 13 West). MNM Report at 160. The Route 11 Report researched human remains. Route 11 Report at 678 and See Exhibit 6. Additional burials and other cultural items are also likely to exist there as well as at the Church Rock, Crownpoint, and Unit 1 mining sites in view of the rich archeological

and cultural resources located at and near these sites. MNM Report at 156; FEIS at 3-70, 3-74 to 3-77. The activities contemplated by HRI's application may result in intentional excavation or inadvertent discovery of cultural items either through archaeological work or construction of wells and surface facilities. See COP Revision 2.0 at 23; FEIS at 4-110 ("[e]ven with these precautions [of HRI's avoidance policy], the possibility exists that subsurface artifacts or unmarked graves could be discovered").

Because this information has been provided to the NRC by HRI and certain tribal officials, the NRC has become aware of the potential for excavation or discovery and hence should commence consultation under 43 C.F.R. § 10.5(b)(1). The consulting parties should include the Navajo Nation, the Hopi Tribe, and the Pueblos of Zuni, Acoma, and Laguna, which have cultural affiliation with the items or aboriginally occupied the area. In addition, because human remains and other cultural items may be excavated or discovered on tribal lands of the Navajo Nation,<sup>81</sup> the NRC must obtain the Navajo Nation's concurrence.

The NRC Staff has not properly notified the Navajo Nation, the Hopi Tribe, and the Pueblos of Zuni, Acoma, and Laguna to Petitioners' knowledge. Although by letter of October 2, 1996, the Staff informed officials of these tribal governments that it had

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<sup>81</sup> See 25 U.S.C. § 3001(15) (defining "tribal land" to include dependent Indian communities). HRI's entire proposed project, including portions on private land, is within the dependent Indian communities of Crownpoint and Church Rock.

initiated the NHPA § 106 process,<sup>82</sup> the Staff's letter does not constitute notification under NAGPRA. In particular, neither that letter nor the letter and enclosures addressed to the New Mexico State Historic Preservation Officer<sup>83</sup> that apparently accompanied it even purport to be a notification or request for NAGPRA consultation. Nor does the Staff "propose a time and place for meetings or consultations to further consider the activity." 43 C.F.R. § 10.3(c)(1). The Staff also fails to state its "proposed treatment of any human remains [and other cultural items], and the proposed disposition of any excavated human remains [and other cultural items]." *Id.* The Staff's bare assertion that human remains encountered during ground-disturbance will be handled on a "case-by-case" basis under NAGPRA or New Mexico State law<sup>84</sup> provides no information about treatment or disposition.

Moreover, the NRC Staff has not sought to identify lineal descendants and traditional religious leaders of the Hopi, Zuni, Acoma, or Laguna who should be consulted, in violation of 43 C.F.R. § 10.5(b)(3). Nor has the staff made any further consultation efforts with the Hopi, Zuni, Acoma, or Laguna or obtained the concurrence

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<sup>82</sup>Letter from Daniel M. Gillen, NRC, to Federal Agencies and Interested Parties, October 2, 1996, reproduced in Appendix C to the FEIS.

<sup>83</sup>October, 1996, Gillen Letter.

<sup>84</sup> *Id.*, at 2. Moreover, the Staff erroneously assumes that NAGPRA is only applicable on Indian lands and ignores Navajo Nation policies applicable to human remains and funerary items. *See* letter from Alan S. Downer, Navajo Nation Historic Preservation Department, to Daniel M. Gillen, NRC, October 31, 1996, at 2, reproduced in Appendix C to the FEIS.

of the Navajo Tribe.

Accordingly, the NRC Staff has not complied with the consultation and concurrence requirements of NAGPRA prior to issuance of the license. The Staff has also failed to develop a written plan of action in connection with the license issuance that complies with 43 C.F.R. § 10.5(e).

### **III. THE FINAL ENVIRONMENTAL IMPACT STATEMENT FAILS TO ADEQUATELY ADDRESS THE IMPACTS OF THE PROJECT ON CULTURAL RESOURCES.**

Section 102 of NEPA sets forth procedures to ensure that environmental analysis is part of agency decision making. National Environmental Policy Act of 1969, 42 U.S.C. § 4321 - 4370(d); 4331(b); 4332(2)(A) (1994). An environmental impact statement ("EIS") must be prepared by the agency which is a detailed statement of: the environmental effects of the proposed action, any adverse environmental effects which cannot be avoided, alternatives to the proposed action, the relationship between short-term use of the human environment and the support of long-term productivity, and any irreversible or irretrievable commitments of resources, should the action be implemented. 42 U.S.C. § 4332(2)(C).

NEPA's fundamental purpose is to "help public officials make decisions that are based on understanding of environmental consequences, and make decisions that protect, restore, and enhance the environment." 40 C.F.R. § 1500.1(1). NEPA requires federal agencies to examine the environmental consequences of their actions, before taking those actions, in order to ensure "that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast." Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989) (holding that although agencies must take a hard look at environmental consequences, NEPA imposes no substantive duty to mitigate adverse environmental

impacts, fully develop a mitigation plan or do a worst case analysis). See also 40 C.F.R. §§ 1502.14, 1502.16; Thomas v. Peterson, 753 F.2d 754, 760 (9th Cir. 1985) (NEPA requires the Forest Service to prepare an EIS that analyzes the combined impact of a road and the timber sales it was meant to facilitate).

In addition, NEPA "ensures that relevant information about a proposed project will be made available to members of the public so that they may play a role in both the decision making process and the implementation of the decision." Roberts, 490 U.S. at 349. As the Court recognized in Calvert Cliffs Coordinating Committee v. AEC, 449 F.2d 1109, 1113 (D.C. Cir. 1971) (rejecting AEC rules implementing NEPA), a NEPA analysis involves a "finely tuned and systematic" balancing of "[e]nvironmental amenities" against "economic and technical considerations." To "ensure that the balancing analysis is carried out and given full effect," an environmental impact statement must be "detailed" and the analysis carried out "fully and in good faith." Id., at 1114-1115; 42 U.S.C. § 433(2)(C). Moreover, the Courts have held that federal agencies must take a "hard look" at all of the significant consequences of their actions. Baltimore Gas & Electric Company v. Natural Resources Defense Council, 462 U.S. 87, 97 (1983) (NRC had taken a hard look, as required by NEPA, in adopting rules to evaluate the environmental effects of the nuclear fuel cycle); Robertson, 490 U.S. at 350; NRDC v. Morton, 458 F.2d 827, 838 (D.C. Cir. 1972) (Denying motion to set aside injunction prohibiting the Department of Interior from proceeding with oil and gas lease sales until

EIS revised). Thus, an FEIS must evaluate environmental impacts in sufficient detail to permit a meaningful analysis. Montgomery v. Ellis, 364 F.Supp. 517, 521 (N.D. Ala. 1973) (rejecting EIS for insufficient project description).

The FEIS was drafted and published while the NRC's Section 106 process was in the initial identification phases. Since not all cultural resources had been identified at the time, nor have they yet, the FEIS is not fully informed of the resources that may be affected by the project. "Few project-specific data exist." FEIS at 3-68. In fact, the FEIS defers consideration of impacts on TCPs that may be identified, asserting "measures to eliminate or minimize potential impacts to such properties would be developed through the measures to eliminate or minimize potential impacts to such properties would be developed through the Section 106 consultation process." FEIS at 4-109. Such deferral violates NEPA because the same deficiencies in the Section 106 process, examined above, apply to the FEIS.

The FEIS focuses only the impacts to cultural resources that result from physical damage and only covers sites that have been discovered within the project. FEIS at 4-109. The FEIS describes damage in terms of physical contact: "removal of artifacts, destruction of walls of structures, plowing, mining, construction excavation, irrigation and livestock herding. Id. The primary threats from HRI's project are earthmoving, pedestrian and vehicle traffic, and looting. Id. at 4-110. The FEIS does note that "Some Native Americans hold spiritual or religious beliefs that any mining upsets the balance

among nature, people, and their creator." Id. at 4-119. But, states, "It is difficult to determine the significance of such an impact, either in terms of cultural resources or environmental justice." Id. The NRC, in fact, could have easily determined the significance of this impact by consulting those who hold similar views. Mr. Francisco's testimony states that the Navajo believe that when uranium and coal are taken out of the earth, it causes sickness in the people and herbs necessary for ceremonies are lost.

Francisco Testimony at 4.

The NRC's off-hand mitigation recommendation -- to consult with traditional practitioners to find if special ceremonies or blessing are in order -- is offensive. Id. at 4.119. Without investigating into the nature of the impacts that will be felt, the NRC suggests a mitigation measure that will not require any changes in the project. Certainly, traditional practitioners should be consulted on mitigation. They should not be asked only to identify a ceremony that would cleanse the agency's hands in this matter.

The FEIS asserts that "[c]ontacts between HRI's cultural resources consultant and Pueblo tribes in the area (Zuni, Acoma, Hopi, and Laguna) have not identified any traditional cultural properties in the project area." FEIS at 4-109. This conclusion is contrary to NRC Staff's previous statement that "[t]he Hopi and Zuni are on record as having cultural ties to the area," and to the observation in a cultural resources report recently submitted by HRI that "the Navajo, Hopi, Zuni, Acoma, and Laguna are accepted as having

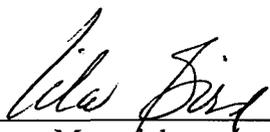
potential cultural interests in the landscape of the project areas."<sup>85</sup>

### CONCLUSION AND REQUEST FOR RELIEF

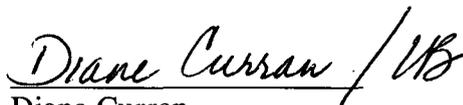
For the foregoing reasons, the Presiding Officer should:

1. Reject the NRC Staff's cultural resource review as inadequate to satisfy the requirements of National Historic Preservation Act Section 106;
2. Reject the NRC Staff's cultural resource review as inadequate to satisfy the requirements of the Native Graves Protection and Repatriation Act;
3. Find that the licensing of the Crownpoint Uranium Project is not supported by an adequate FEIS that complies with NEPA;
4. Revoke HRI's license because it was unlawfully issued prior to the Staff's compliance with NHPA and NGPRA and supported by an inadequate EIS.

Respectfully Submitted this 7th Day of December, 1998.



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<sup>85</sup>MNM Report, at 17. While the MNM Report provides additional archeological surveys and additional interviews with Navajos regarding the possibility of cultural resources at the Church Rock site and the waste water application site north of Crownpoint, it provides no additional information from the Hopi Tribe or the Pueblos of Zuni, Acoma, and Laguna. Dodge Testimony at 19-20.

DOCKETED  
USNRC

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

'98 DEC -9 P3:15

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD OF SECRETARY  
RULEMAKING AND  
ADJUDICATIONS STAFF

In the Matter of )  
HYDRO RESOURCES, INC. ) Docket No. 40-8968-ML  
2929 Coors Road, Suite 101 ) ASLBP No. 95-706-01-ML  
Albuquerque, NM 87120 ) December 7, 1998

**CERTIFICATE OF SERVICE**

I hereby certify that:

On December 7, 1998, I caused to be served copies of the following:

**ENDAUM and SRIC's Brief in Opposition to Hydro Resources, Inc.'s Application for a Materials License with Respect to: COMPLIANCE WITH THE NATIONAL HISTORIC PRESERVATION ACT, NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT AND RELATED CULTURAL RESOURCE ISSUES**

via e-mail and upon the following persons marked by an asterisk (\*) by Federal Express, standard overnight delivery, and upon the following persons marked by a (+) by U.S. mail, first class, in accordance with the requirements of 10 C.F.R. § 2.712:

Office of the Secretary\*  
U.S. Nuclear Regulatory Commission  
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Rockville, MD 20852  
Attn: Rulemakings and Adjudications  
Staff

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Rockville, MD 20852

Administrative Judge  
Thomas D. Murphy\*  
Special Assistant  
Atomic Safety and Licensing Board

Office of Commission Appellate  
Adjudication\*  
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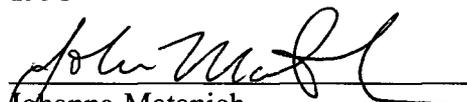
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Signed at Santa Fe, NM, December 7,  
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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Administrative Judge  
Peter B. Bloch, Presiding Officer

_____	)	
In the Matter of	)	
	)	
HYDRO RESOURCES, INC.	)	Docket No. 40-8968-ML
2929 Coors Road, Suite 101	)	
Albuquerque, NM 87120	)	ASLBP No. 95-706-01-ML
_____	)	

**WRITTEN TESTIMONY OF KLARA B. KELLEY, Ph.D.**

On behalf of Eastern Navajo Diné Against Uranium Mining ("ENDAUM") and the Southwest Research and Information Center ("SRIC"), Klara B. Kelley, Ph.D., submits the following testimony regarding the cultural resources issues involved in Hydro Resources Inc.'s (HRI's) amended application for a materials license.

**Q.1. Please state your name and qualifications.**

**A.1.** My name is Klara Kelley. I am a self-employed professional anthropologist and have worked as a consultant in anthropology since 1993. I received a Ph.D. in anthropology from the University of New Mexico in 1977. I also perform archaeological surveys and am familiar with standard archaeological survey methods as used in the Navajo Nation jurisdiction. Most of my professional work has focussed on Navajo life, culture history, and archaeology. Since 1977, I have worked continuously as an anthropologist, including 11 years' employment with the Navajo Nation. Since

1973, I have conducted anthropological research in all parts of the Navajo Nation, including the Crownpoint, Church Rock, Pinedale, Mariano Lake, Becenti, Dalton Pass, Little Water, and Smith Lake chapters of the Eastern Navajo Agency. In 1990-1991, as an employee of the Navajo Nation Historic Preservation Department, I helped draft the *Navajo Nation Policy to Protect Traditional Cultural Properties* (January 21, 1991). Throughout my tenure with the Navajo Nation and since then as a consultant, I have routinely applied federal and Navajo Nation cultural resource management standards and guidelines, including preliminary and current versions of the *Navajo Nation Policy to Protect Traditional Cultural Properties* and National Register Bulletin 38. A copy of Bulletin 38 is attached hereto as Exhibit A. A copy of the current Navajo Nation Policy to Protect Traditional Cultural Properties is attached hereto as Exhibit B. I have also received permits from the Navajo Nation to conduct archaeological surveys in the Navajo Nation jurisdiction. With a Navajo colleague I have written an academically published book on Navajo sacred places and cultural resource management. I have previously qualified as an expert on Navajo culture in a federal court. Details of this experience are given in the attached vita (Exhibit C).

**Q.2. What is the purpose of your testimony?**

**A.2. The purpose of this affidavit is to state my professional opinion of the cultural resources review conducted to date by HRI for the Nuclear Regulatory Commission's licensing of HRI's proposed Crownpoint Uranium Solution Mining**

Project. By cultural resources, I mean archaeological sites; historic buildings and other locations associated with important historical events and persons; and traditional cultural properties (which include certain archaeological sites, features of the natural landscape, and currently used facilities), regardless of whether these resources have been determined eligible for National or State Registers of Historic Places. My evaluation has focussed on HRI's cultural resources review for Navajo cultural resources. In my professional opinion, HRI's cultural resources documentation is first, an inadequate and incomplete basis for determining how the project, and licensing it, may affect significant cultural resources according to applicable federal and Navajo Nation laws, regulations, and policies. These laws and policies include Section 106 of the National Historic Preservation Act (NHPA)(as amended), the Navajo Nation Cultural Resources Protection Act of 1988, National Register Bulletin 38, the Navajo Nation Policy to Protect Traditional Cultural Properties, and Advisory Council on Historic Preservation Regulations at 36 C.F.R. Part 800. Second, the documentation is fragmented and internally inconsistent.

**Q.3. What materials did you review in support of your evaluation?**

**A.3.** I have reviewed the cultural resources portions of the "Final Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico," Docket No. 40-8968, Hydro Resources, Inc., prepared by the U.S. Nuclear Regulatory Commission in cooperation with U.S.

Bureaus of Land Management and Indian Affairs, dated February 1997. I have also reviewed supporting cultural resources documentation (see "Works Consulted," Exhibit D).

**Q.4. Please summarize your evaluation of the adequacy of the cultural resources documentation relied on by HRI and the NRC for the HRI project?**

**A.4.** The cultural resources documentation consists of several reports and correspondence, each covering only a part of the total project area. The research and reporting have been done by different people at different times using different research methods. Michael Marshall's reports (see "Works Consulted"), in addition to some preliminary work in part of the Church Rock parcel, deal with the Crownpoint and Unit I parcels. Earnest Becenti's report (see "Works Consulted") deals with the Crownpoint and Unit 1 parcel and with the Church Rock parcel. The Museum of New Mexico's report (see "Works Consulted") deals with Church Rock and Crownpoint Section 12 parcels as well as the haul route between Church Rock and Crownpoint.

No uniform set of information has been collected on each of the parcels that together make up the project area. The various reports fail to use a uniform set of information sources and uniform methods for gathering information. The information on all parcels has not been compiled into one document. Dividing information among multiple documents makes review for compliance with applicable cultural resource management laws and policies more difficult, because, for example, in order for a cultural resources review to be effective, reviewers must assess the significance of each cultural

resource in the context of all this information in aggregate.

Some parts of the project area, such as parts of Crownpoint and Unit I parcels, have not been inspected by archaeologists on foot at all. Yet I know from my professional experience that Navajo Nation standards for compliance with applicable federal and Navajo Nation cultural resource laws on Navajo jurisdiction require that a professionally qualified archaeologist conduct a complete inspection of the project area on foot.

According to current Navajo Nation Historic Preservation Department "Interim Fieldwork and Report Standards and Guidelines" (see "Works Consulted"), the archaeologists must walk across the project area with transects spaced no more than 15 meters apart (p. 1).

The HRI parcels that archaeologists have inspected have been covered at varying degrees of intensity. Different archaeologists have recorded their findings at different levels of detail.

HRI's documentation of Navajo and other tribal "traditional cultural properties" is particularly fragmented, unstandardized, and incomplete, and does not comply with professional standards. HRI's cultural resource researchers identify several other tribes besides Navajo as having potential traditional interests in the project area. The tribes identified include Zuni, Acoma, Laguna, and Hopi. A careful effort to identify potentially interested tribes might have identified others as well, such as Jemez. Yet these researchers report virtually no information about these other tribes, even though, in my experience, libraries in Window Rock, Gallup, Albuquerque, and Santa Fe have ample collections of the relevant literature, and even though all of the tribal governments

identified are experienced at providing cultural resources information when consulted by agencies and project proponents.

**Q.5. What is your evaluation of the methods used to document cultural resources by HRI's cultural resource researchers?**

**A. 5.** To document Navajo traditional cultural properties, the Navajo Nation Policy to Protect Traditional Cultural Properties requires professionally qualified researchers to consult the relevant literature, Navajo chapter officials, Navajo residents living in and near the project area (including but not limited to those with permits to use the project area), and Navajo ceremonial practitioners referred by chapter officials or local residents. National Register Bulletin 38 also instructs researchers to consult both the literature and community members with sound knowledge of tradition. HRI's cultural resource researchers have consulted these sources incompletely and unsystematically, as described in the following paragraphs.

**a. Literature Review.**

HRI's various researchers have not consulted the same body of the literature on Navajo ceremonialism and traditional land use for each parcel of the project area. For example, the Museum of New Mexico researchers consulted far fewer scholarly works about the parcels they address (Church Rock and Crownpoint Section 12) than Marshall did about the parcels he addresses (Crownpoint and Unit 1).

Consulting relevant literature is necessary to identify previously recorded cultural resources and the qualities that contribute to the significance of these resources or others

of the same type. Information from the literature is also necessary as a context for assessing the significance of other cultural resources identified through field work. HRI's Museum of New Mexico researchers consulted some contract archaeology reports but used few scholarly sources on Navajo history and culture. Both types of sources are important. For example, the Museum of New Mexico researchers ignored the great majority of articles on Navajo, Zuni, Hopi, Acoma, and Laguna in the Handbook of North American Indians, Southwest (volumes 9 and 10, published by the Smithsonian Institution). Also, they do not cite historical research compiled in reference to the land claims of these tribes before the Indian Claims Commission and published by Garland Press. Both of these sources are among the many basic reference works on Southwest Indian culture and history that professional cultural resource researchers use. The background information in the Museum of New Mexico report based on this spotty use of literature contains many factual errors. The report also lacks the kind of background information on Navajo ceremonial and traditional land use that is necessary for assessing the significance of specific cultural resources and recommending measures to mitigate the ways that the project might adversely affect them.

**b. Consultation with Chapter Officials.**

None of HRI's researchers documents consultations with Crownpoint chapter officials about the Crownpoint and Unit I parcels. HRI's Museum of New Mexico researchers consulted chapter officials about the Church Rock and Crownpoint Section 12 parcels, but not about the main Crownpoint or Unit 1 parcels. HRI's consultant Earnest Becenti is

himself a Church Rock chapter officer, but his report does not mention consulting Crownpoint chapter officials about the Crownpoint or Unit 1 parcels. Consultations with chapter officials and local residents evidently were not part of Marshall's scope of work.

**c. Consultation with Residents.**

None of HRI's cultural resource researchers have systematically consulted residents in or near the Crownpoint or Unit 1 parcels. The Museum of New Mexico researchers did not interview local residents living in or near the Church Rock or Crownpoint Section 12 parcels. Earnest Becenti interviewed people living near the Church Rock parcel only, and not those living in or near the Crownpoint or Unit I parcels.

**d. Consultation with Ceremonial Practitioners.**

HRI's researchers did not consult an adequate range of Navajo ceremonial practitioners. Only one ceremonial practitioner was consulted about Crownpoint and Unit I -- Church Rock chapter official Earnest Becenti, who consulted himself. The Museum of New Mexico researchers consulted ceremonial practitioners about the Church Rock and Crownpoint Section 12 tracts. But practitioners consulted seem to be those named by chapter officials only, since Museum of New Mexico researchers did not contact Navajos living in or near the Crownpoint Section 12 or Church Rock tracts and therefore could not have gotten names of practitioners from those residents. Earnest Becenti does not report contacting any practitioners whom the residents he interviewed might have recommended, and he does not specify whether the people whom these residents referred him to are practitioners. By failing to obtain referrals from residents living in and nearest the project area, the reports fail to comply with Navajo Nation policy.

**Q.6. What is your evaluation of the interviews conducted by HRI's cultural resource researchers during their documentation?**

**A.6.** HRI's cultural resource researchers did not follow Navajo Nation interview and reporting standards set forth in the Policy to Protect Sacred Places. Although Earnest Becenti used and recorded interviewees' responses on the information checklist recommended by the Navajo Nation Historic Preservation Department for such interviews, he failed to include all the relevant information from this checklist in his report. For example, in his "Report on Sacred and Traditional Places for Hydro Resources, Inc." (attached to Heartfield's report; see "Works Consulted"), Becenti states (part VII.), "No significant sacred and traditional sites were found. ... They reported of family grave sites near their residents which are clearly marked and sweat lodges that were no longer used. These should not make a major impact" on the proposed project. Yet the checklist that Becenti filled out for his interviews with Wilhelmina Yazzie and Dorothy Livingston show that each foresees adverse effects on her homesite by the project, even if it is as far away as a mile (according to Ms. Yazzie) or 2-3 miles (according to Ms. Livingston).

Similarly, the Museum of New Mexico researchers give no evidence of using this checklist, and also do not report certain types information that Navajo Nation report standards require. The following paragraph gives examples of failures by both the Museum of New Mexico researchers and Earnest Becenti to follow Navajo Nation requirements.

**a. Scope of Questions Regarding Traditional Cultural Properties.**

HRI's cultural resource researchers do not report asking interviewees whether they have concerns about possible adverse effects from the project on the specific cultural

resources (hogans, sweat houses, corrals, and so forth) identified in the archaeological inventories for various parcels of the project area. These researchers also fail to state whether any in-use structures are present in any of the parcels, let alone evaluate their significance as possible historic or traditional cultural properties. Yet the Navajo Nation Policy to Protect Traditional Cultural Properties and the suggested interview checklist make clear that these types of archaeological and in-use structures may also be "traditional cultural properties." A cultural resource is a "traditional cultural property" if it has traditional significance to living people who carry on those traditions. The Navajo Nation Policy and National Register Bulletin 38 make clear that traditional cultural properties include, among other things, archaeological sites, landscape features with no evident human modification, and constructions still in use. According to Bulletin 38,

A traditional cultural property, then, can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community.

**b. Scope of Questions Regarding Anticipated Effects.**

According to National Register Bulletin 38 (p. 19), "a given activity outside the boundaries of a traditional cultural property may constitute an adverse effect" on "those qualities of a property's visual, auditory, and atmospheric setting that contribute to its significance." Among the ways that a project may affect cultural resources outside the area of direct physical disturbance are by producing intrusive or dangerous traffic, unacceptable noise, visual interference, and dust, for example (36 CFR 800.9.b) A project may also

impede access to other places outside the project area. HRI's cultural resource researchers did not ask interviewees whether they think noise, visual interference, dust, traffic, and other intrusions from the proposed project might affect traditional cultural resources outside the project area.

In assessing project effects on cultural resources, HRI's reports systematically ignore how the project may affect traditional cultural properties and other cultural resources outside the project area. Yet interview responses recorded by Earnest Becenti (see paragraph 14 above) indicate that interviewees (Navajos living near the Church Rock parcel) do expect adverse effects from mining within 1-3 miles of their homesites. Homesites and the loci of traditional activities in and around them are likely to be traditional cultural properties, because their users are likely to consider them significant in maintaining traditions. These same interviewees also told Becenti about sacred places within these distances of the Church Rock parcel. Mr. Becenti did not record what specific ways interviewees might foresee the project adversely affecting these places. Also, he did not record the locations of interviewees' homesites, customary use areas, and sacred places they identified as within possible range of adverse effects of the project.

HRI's researchers also ignored the project's possible adverse effects on ground water under and outside the project area. Ground water sources are potentially significant Navajo traditional cultural properties. For example, springs are likely to be Navajo ceremonial offering places, and naturally occurring waters are likely to be collected for use in ceremonies, including for making medicinal drinks and foods that participants swallow.

Several times in the last few years, Gallup and Albuquerque newspapers have reported statements by Crownpoint residents that they believe this project can contaminate ground water. Thus there is ample indication of a locally perceived possibility for the project to contaminate sacred springs outside the project areas. Normal professional procedure is to ask about such concerns in cultural resource interviews. Therefore, in my professional opinion, the cultural resource reports do not comply with professional standards for identifying traditional cultural properties.

**Q.7. What is your evaluation of the potential for traditional cultural properties to exist on or near the project areas?**

**A.7.** As a researcher on Navajo sacred places, I am aware that the literature on Navajo ceremonialism mentions several such places near the project parcels. Only one of these places (Kin Yaa 'a) is mentioned in HRI's cultural resource reports. Some of these places are named zones that may extend into various project parcels and may contain a variety of ceremonially used resources. Interviews are necessary to determine whether these places are still significant to Navajo traditionalists, and whether the project would adversely affect the qualities that make these areas significant to Navajo traditionalists, including impeding their access to and uses of these areas.

HRI's cultural resource researchers did not ask specifically about these places. They probably were not aware of most of these places since their reports do not cite the works that mention these places. In my professional opinion, because important questions remain about the actual significance of these places to people today and the project's

possible adverse effects on them, it is not possible to take accurate account of how the project, or issuing a license for it, will adversely affect significant cultural resources.

HRI's cultural resource reports also are inconsistent on how transporting slurry between Church Rock and Crownpoint might affect significant cultural resources along the route. Museum of New Mexico researchers report that Interviewees were concerned about adverse effects from accidents. Their report denies that these concerns are attached to particular "traditional cultural properties" as defined by the Museum of New Mexico researchers. As noted above, however, these researchers ignore the fact that the commonly accepted definition of traditional cultural properties includes structures and activity areas currently used for traditional purposes (see National Register Bulletin, p. 1). Their excessively narrow definition of traditional cultural properties leaves open the question whether Navajos living along the transport route foresee adverse effects on such structures and activity areas. HRI consultant Earnest Becenti evidently did not ask interviewees about possible effects of slurry transport. Thus HRI's reports do not deal adequately with how slurry transport might adversely affect traditional cultural properties.

**Q.8. What is your evaluation of the avoidance strategy proposed by HRI adequate to protect cultural resources on or near the project areas?**

**A.8.** HRI's cultural resource reports tend to define individual clusters of remains of human activity as archaeological sites and fail to recognize that archaeological sites may also be traditional cultural properties. HRI's reports propose to prevent adverse effects on significant cultural resources inside the project area by avoiding direct physical

disturbance. There are two problems with this avoidance strategy. First, HRI's 1993 proposed wellfield site layouts for Crownpoint and Unit I parcels (see "Works Consulted") show wells coinciding with locations of archaeological sites. Second, archaeological sites are shown on these maps as dots rather than shapes that reflect a careful mapping of their true surfacial extent. Even if the surface wells avoid surface manifestations of sites as defined by HRI, they may disturb subsurface archaeological materials. The wells in these maps are so densely distributed that such disturbance is extremely likely.

HRI's cultural resource reports also do not adequately cover cultural landscapes as a type of cultural resource. Applicable cultural resource guidelines recognize cultural landscapes as significant types of resources. An example of a cultural landscape is the Helkau Historic District, which, according to National Register Bulletin 38 (p. 18), takes in "a substantial portion of California's North Coast Range." For the practical purpose of unambiguously defining the area for listing on the National Register, this historic district's boundaries were, according to Bulletin 38 (p. 18), "defined more narrowly" to include "all the locations at which traditional practitioners carry out medicine making and similar activities, the travel routes between such locations, and the immediate viewshed surrounding this complex of locations and routes."

The Helkau Historic District example shows that, in a cultural landscape, spots on the land surface identified as "archaeological sites" and "traditional cultural properties" are related to each other and to the surrounding land surface and subsurface. At any one time, land users have conducted interlinked activities at different spots in their land-use area.

They have chosen these spots partly with reference to the character of the land and its resources, partly with reference to their other activities. Through time, their successors continue or modify these activity patterns and land uses, re-using or abandoning spots in favor of others, including spots nearby. Archaeological and ethnohistorical research tries, among other things, to reconstruct these past activities and the life systems that they have constituted. This kind of research requires that the landscape maintain a certain degree of integrity.

The methods of data gathering and reporting used by HRI's cultural resource researchers are inadequate to determine the full extent to which the spots defined as cultural resources form integrated landscapes. Yet the project area may affect landscapes with qualities that make them significant to Navajo traditionalists, those of other tribes, or both. In addition, these landscapes as integrated wholes may contain as-yet untapped information about the past that can help answer research questions significant to cultural resource researchers, thereby making these landscapes eligible to the National Register of Historic Places under eligibility criterion d.

Avoiding archaeological sites and confining land disturbance to the interstices among them can nevertheless destroy the integrity of significant cultural landscapes. Such disturbance may thereby compromise the qualities that make them significant to traditionalists. Disturbance is also likely to reduce the research potential of these landscapes, another quality that makes them significant. But avoiding these spots -- while disturbing the area between spots -- is the only measure proposed in any of HRI's cultural

resource reports to mitigate adverse effects on significant cultural resources. Therefore, this proposed mitigating measure is unlikely to preserve information content and qualities that may contribute to their significance as traditional cultural properties, and thereby compromise their eligibility to the National Register of Historic Places.

The information content of sites analyzed together as whole landscapes is also important for another research objective, reconstructing continuities and discontinuities between precolumbian and more recent times. HRI's cultural resource reports, even though spotty and inconsistent, show that people have conducted a range of daily and ceremonial activities in and around the project area more or less continuously from the early centuries A.D. to the present. Therefore, even HRI's research indicates significant cultural landscapes that extend into the project area.

In my opinion, based on consulting work I have done with other professional cultural resource researchers, breaks between precolumbian and more recent land use in the southwestern United States in general may be more apparent than real. The break may be more the result of the scholarly division of labor between archaeologists, who gather information from ground surface observations, and ethnologists-historians, who gather information through in-depth interviews and documents. To correct this possible illusion, many cultural resource researchers are now using more tightly integrated interdisciplinary research programs focussed on cultural landscapes.

Of HRI's cultural resource researchers, only Marshall discusses cultural landscapes, the Muddy Water and Kin Yaa 'a archaeological complexes. In my opinion, Marshall under-

represents the spatial and temporal extent and complexity of these landscapes. Based on my own work as a consultant with Navajo Nation Historic Preservation Department Chaco Protection Sites and Traditional Culture sections, my opinion is that Muddy Water and Kin Yaa 'a should be researched as a single landscape. These two complexes together seem to consist of a more-or-less continuous distribution of archaeological features. It is further my opinion that postcolumbian features attributed to Navajos in this area should be included in the complex. Navajo ceremonial tradition links Navajos to both precolumbian and postcolumbian features in the complex.

In contrast to Marshall, and based on my work with the Navajo Nation Historic Preservation Department, my opinion is that ground disturbance in the interstices of the archaeological sites that make up this landscape is likely to have an adverse effect on the landscape. The ground disturbance will be widespread enough to alter large parts of the land surface and subsurface. Disturbance also may include changing the distribution and character of groundwater sources. Groundwater sources would have significantly influenced the locations of cultural activities and their archaeological manifestations. HRI's project may change large parts of the land surface and subsurface beyond the ability of researchers to reconstruct their influence on placement of past human activities as evidenced by archaeological sites and other cultural manifestations.

In sum, HRI's cultural resource reports do not adequately assess the significance of cultural resources in the project area or in areas outside that the project may affect. The reports also do not adequately assess the possible adverse effects on significant cultural

resources that the project or licensing it may have.

**Q.9. Does this conclude your testimony?**

**A.9. Yes.**

**AFFIRMATION**

STATE OF ARIZONA     )  
                                  )  
COUNTY OF APACHE    ) ss.

I hereby affirm that the opinions expressed in the foregoing testimony constitute my best professional judgment, and that the factual representations are true and correct to the best of my knowledge.

Klara B. Kelley  
Klara B. Kelley

Nov. 30, 1998  
Date

Subscribed and sworn before me, the undersigned, a Notary Public, on this 30<sup>th</sup> day of November, 1998. My Commission expires on 1-07-00

Ruby L. Cody  
Notary Public



OFFICIAL SEAL  
RUBY L. CODY  
NOTARY PUBLIC-STATE OF ARIZONA  
APACHE COUNTY  
My Commission Expires: 01-07-00

# • NATIONAL REGISTER • BULLETIN

Technical information on comprehensive planning, survey of cultural resources, and registration in the National Register of Historic Places.

U.S. Department of the Interior  
National Park Service  
Interagency Resources Division

## Guidelines for Evaluating and Documenting Traditional Cultural Properties



As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our nation parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



**Cover photographs:**

Many traditional cultural properties are used for practical purposes by those who value them. This sedge preserve in northern California, for example, is tended and harvested by Pomo Indian basketmakers as a vital source of material for making their world famous baskets. The preserve was established at Lake Sonoma by the U.S. Army Corps of Engineers. (Richard Lerner)

This bedrock mortar in central California plays an essential role in processing Black Oak acorns. (Theodoratus Cultural Research)

# Guidelines for Evaluating and Documenting Traditional Cultural Properties

By Patricia L. Parker  
and Thomas F. King<sup>1</sup>

## Introduction

### What are traditional cultural properties?

The National Register of Historic Places contains a wide range of historic property types, reflecting the diversity of the nation's history and culture. Buildings, structures, and sites; groups of buildings, structures or sites forming historic districts; landscapes; and individual objects are all included in the Register if they meet the criteria specified in the National Register's *Criteria for Evaluation* (36 CFR §60.4). Such properties reflect many kinds of significance—in architecture, history, archeology, engineering, and culture.

There are many definitions of the word "culture," but in the National Register programs the word is understood to mean the traditions, beliefs, practices, lifeways, arts, crafts, and social institutions of any community, be it an Indian tribe, a local ethnic group, or the people of the nation as a whole.<sup>2</sup>

One kind of cultural significance a property may possess, and that may

make it eligible for inclusion in the Register, is *traditional cultural significance*. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Examples of properties possessing such significance include:

- a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world;
- a rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents;
- an urban neighborhood that is the traditional home of a particular cultural group, and that reflects its beliefs and practices;
- a location where Native American religious practitioners have historically gone, and are known or

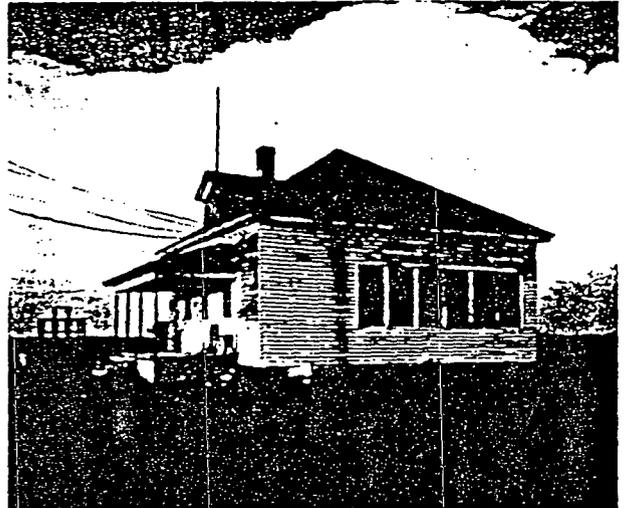
thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice; and

- a location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historical identity.

A traditional cultural property, then, can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. Various kinds of traditional cultural properties will be discussed, illustrated,

<sup>1</sup> Dr. Parker is a cultural anthropologist and archeologist in the National Park Service's Interagency Resources Division. Dr. King was Senior Archeologist and Director of the Office of Program Review and Education in the Advisory Council on Historic Preservation at the time this Bulletin was drafted; he is now in private practice as a consultant in archeology and historic preservation.

<sup>2</sup> For a detailed definition, see Appendix I.



Numerous black people left the South to migrate to the Midwest. The A.M.E. Church (on the left) and District No. 1 School remain in Nicodemus Historic District in Nicodemus, Kansas, which was declared a National Historic Landmark by the Secretary of the Interior in 1976. (Clayton B. Fraser for the Historic American Buildings Survey)

and related specifically to the National Register Criteria later in this bulletin.

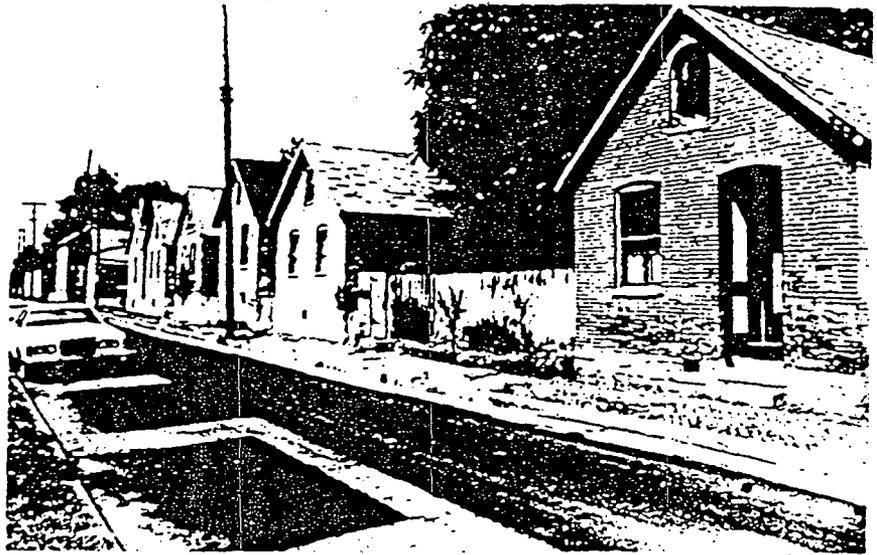
### Purpose of this Bulletin

Traditional cultural values are often central to the way a community or group defines itself, and maintaining such values is often vital to maintaining the group's sense of identity and self respect. Properties to which traditional cultural value is ascribed often take on this kind of vital significance, so that any damage to or infringement upon them is perceived to be deeply offensive to, and even destructive of, the group that values them. As a result, it is extremely important that traditional cultural properties be considered carefully in planning; hence it is important that such properties, when they are eligible for inclusion in the National Register, be nominated to the Register or otherwise identified in inventories for planning purposes.

Traditional cultural properties are often hard to recognize, however. A traditional ceremonial location may look like merely a mountaintop, a lake, or a stretch of river; a culturally important neighborhood may look like any other aggregation of houses, and an area where culturally important economic or artistic activities have been carried out may look like any other building, field of grass, or piece of forest in the area. As a result, such places may not necessarily come to light through the conduct of archeological, historical, or architectural surveys. The existence and significance of such locations often can be ascertained only through interviews with knowledgeable users of the area, or through other forms of ethnographic research. The subtlety with which the significance of such locations may be expressed makes it easy to ignore them; on the other hand it makes it difficult to distinguish between properties having real significance and those whose putative significance is spurious. As a result, clear guidelines for evaluation of such properties are needed.

In the 1980 amendments to the National Historic Preservation Act, the Secretary of the Interior, with the American Folklife Center, was directed to study means of:

preserving and conserving the intangible elements of our cultural



The German Village Historic District in Columbus, Ohio, reflects the ethnic heritage of 19th century German immigrants. The neighborhood includes many simple vernacular brick cottages with gable roofs. (Christopher Cline)

heritage such as arts, skills, folk-life, and folkways. . . .

and to recommend ways to:

preserve, conserve, and encourage the continuation of the diverse traditional prehistoric, historic, ethnic, and folk cultural traditions that underlie and are a living expression of our American heritage. (NHPA §502; 16 U.S.C. 470a note)

The report that was prepared in response to §502, entitled *Cultural Conservation*, was submitted to the President and Congress on June 1, 1983, by the Secretary of the Interior. The report recommended in general that traditional cultural resources, both those that are associated with historic properties and those without specific property referents, be more systematically addressed in implementation of the National Historic Preservation Act and other historic preservation authorities. In transmitting the report, the Secretary directed the National Park Service to take several actions to implement its recommendations. Among other actions, the Service was directed to prepare guidelines to assist in the documentation of intangible cultural resources, to coordinate the incorporation of provisions for the consideration of such resources into Departmental planning documents and administrative manuals, and to encourage the identification and documentation of

such resources by States and Federal agencies.

This bulletin has been developed as one aspect of the Service's response to the *Cultural Conservation* report and the Secretary's direction. It is intended to be an aid in determining whether properties thought or alleged to have traditional cultural significance are eligible for inclusion in the National Register. It is meant to assist Federal agencies, State Historic Preservation Officers (SHPOs), Certified Local Governments, Indian Tribes, and other historic preservation practitioners who need to evaluate such properties when nominating them for inclusion in the National Register or when considering their eligibility for the Register as part of the review process prescribed by the Advisory Council on Historic Preservation under Section 106 of the National Historic Preservation Act. It is designed to supplement other National Register guidance, particularly National Register Bulletin 15—*Guidelines for Applying the National Register Criteria for Evaluation*—and National Register Bulletin 16—*Guidelines for Completing National Register of Historic Places Forms*. It should be used in conjunction with these two Bulletins and other applicable guidance available from the National Register, when applying the National Register Criteria and preparing documentation to support nominations or determinations that

a given property is or is not eligible for inclusion in the Register.

This Bulletin is also responsive to the American Indian Religious Freedom Act (AIRFA) of 1978, which requires the National Park Service, like other Federal agencies, to evaluate its policies and procedures with the aim of protecting the religious freedoms of Native Americans (Pub. L. 95341 §2). Examination of the policies and procedures of the National Register suggests that while they are in no way intended to be so interpreted, they can be interpreted by Federal agencies and others in a manner that excludes historic properties of religious significance to Native Americans from eligibility for inclusion in the National Register. This in turn may exclude such properties from the protections afforded by Section 106, which in turn may result in their destruction, infringing upon the rights of Native Americans to use them in the free exercise of their religions. To minimize the likelihood of such misinterpretation, this Bulletin gives special attention to properties of traditional cultural significance to Native American groups, and to discussing the place of religion in the attribution of such significance.

The fact that this Bulletin gives special emphasis to Native American properties should not be taken to imply that only Native Americans to ascribe traditional cultural value to

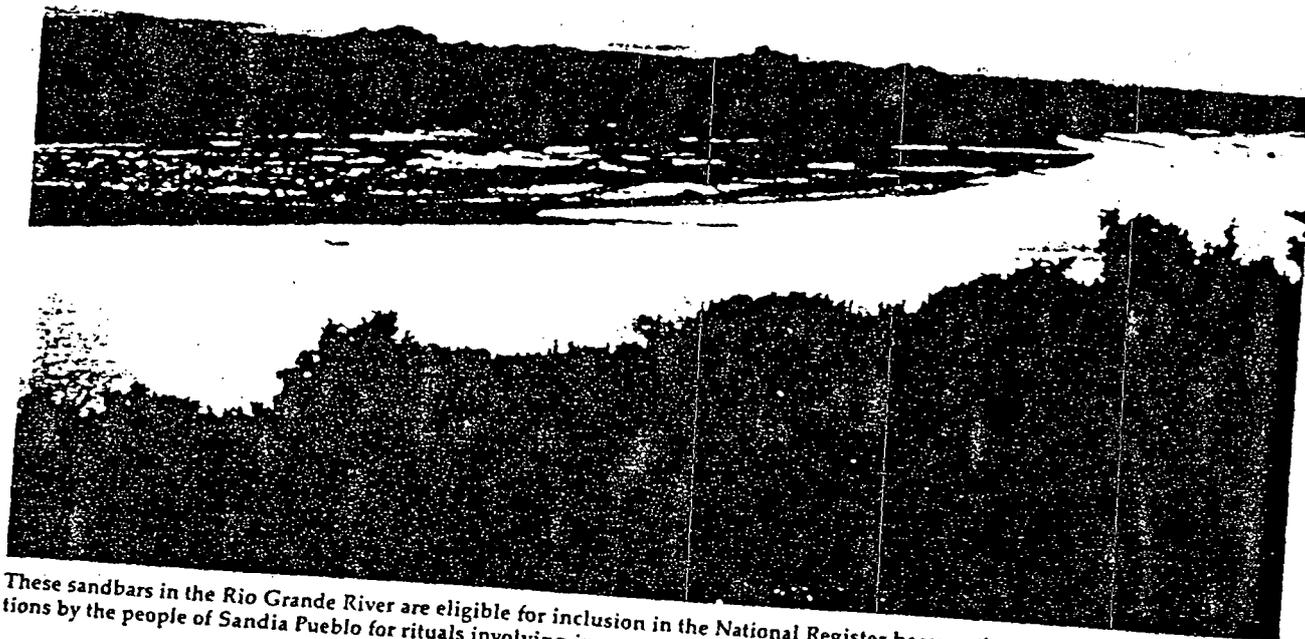
historic properties, or that such ascription is common only to ethnic minority groups in general. Americans of every ethnic origin have properties to which they ascribe traditional cultural value, and if such properties meet the National Register criteria, they can and should be nominated for inclusion in the Register.

This Bulletin does not address cultural resources that are purely "intangible"—i.e. those that have no property referents—except by exclusion. The Service is committed to ensuring that such resources are fully considered in planning and decisionmaking by Federal agencies and others. Historic properties represent only some aspects of culture, and many other aspects, not necessarily reflected in properties as such, may be of vital importance in maintaining the integrity of a social group. However, the National Register is not the appropriate vehicle for recognizing cultural values that are purely intangible, nor is there legal authority to address them under Section 106 unless they are somehow related to a historic property. The National Register lists, and Section 106 requires review of effects on, tangible cultural resources—that is, historic properties. However, the attributes that give such properties significance, such as their association with historical events, often are intangible in nature. Such attributes cannot be ignored in evaluating and

managing historic properties; properties and their intangible attributes of significance must be considered together. This Bulletin is meant to encourage its users to address the intangible cultural values that may make a property historic, and to do so in an evenhanded way that reflects solid research and not ethnocentric bias.

Finally, no one should regard this Bulletin as the only appropriate source of guidance on its subject, or interpret it rigidly. Although traditional cultural properties have been listed and recognized as eligible for inclusion in the National Register since the Register's inception, it is only in recent years that organized attention has been given to them. This Bulletin represents the best guidance the Register can provide as of the late 1980s, and the examples listed in the bibliography include the best known at this time,<sup>3</sup> but it is to be expected that approaches to such properties will continue to evolve. This Bulletin also is meant to supplement, not substitute for, more specific guidelines, such as those used by the National Park Service with respect to units of the National Park System and those used by

<sup>3</sup> It is notable that most of these examples are unpublished manuscripts. The literature pertaining to the identification and evaluation of traditional cultural properties, to say nothing of their treatment, remains a thin one.



These sandbars in the Rio Grande River are eligible for inclusion in the National Register because they have been used for generations by the people of Sandia Pueblo for rituals involving immersion in the river's waters. (Thomas F. King)

some other agencies, States, local governments, or Indian tribes with respect to their own lands and programs.

### Ethnography, ethnohistory, ethnocentrism

Three words beginning with "ethno" will be used repeatedly in this Bulletin, and may not be familiar to all readers. All three are derived from the Greek *ethnos*, meaning "nation," and are widely used in the study of anthropology and related disciplines.

*Ethnography* is the descriptive and analytic study of the culture of particular groups or communities. An ethnographer seeks to understand a community through interviews with its members and often through living in and observing it (a practice referred to as "participant observation").

*Ethnohistory* is the study of historical data, including but not necessarily limited to, documentary data pertaining to a group or community, using an ethnographic perspective.

Ethnographic and ethnohistorical research are usually carried out by specialists in cultural anthropology, and by specialists in folklore and folklife, sociology, history, archeology and related disciplines with appropriate technical training.<sup>4</sup>

*Ethnocentrism* means viewing the world and the people in it only from the point of view of one's own culture, and being unable to sympathize with the feelings, attitudes, and beliefs of someone who is a member of a different culture. It is particularly important to understand, and seek to avoid, ethnocentrism in the evaluation of traditional cultural properties. For example, Euroamerican society tends to emphasize "objective" observation of the physical world as the basis for making statements about that world. However, it may not be possible to use such observations as the major basis for evaluating a traditional cultural property. For example, there may be nothing observable to the outsider about a place regarded as sacred by a Native American group. Similarly, such a group's belief that its ancestors emerged from the earth at a specific location at the begin-

ning of time may contradict Euroamerican science's belief that the group's ancestors migrated to North America from Siberia. These facts in no way diminish the significance of the locations in question in the eyes of those who value them; indeed they are irrelevant to their significance. It would be ethnocentric in the extreme to say that "whatever the Native American group says about this place, I can't see anything here so it is not significant," or "since I know these people's ancestors came from Siberia, the place where they think they emerged from the earth is of no significance." It is vital to evaluate properties thought to have traditional cultural significance from the standpoint of those who may ascribe such significance to them, whatever one's own perception of them, based on one's own cultural values, may be. This is not to say that a group's assertions about the significance of a place should not be questioned or subjected to critical analysis, but they should not be rejected based on the premise that the beliefs they reflect are inferior to one's own.

### Evaluation, consideration, and protection

One more point that should be remembered in evaluating traditional cultural properties—as in evaluating any other kind of properties—is that establishing that a property is eligible for inclusion in the National Register does not necessarily mean that the property must be protected from disturbance or damage. Establishing that a property is eligible means that it must be considered in planning Federal, federally assisted, and federally licensed undertakings, but it does not mean that such an undertaking cannot be allowed to damage or destroy it. Consultation must occur in accordance with the regulations of the Advisory Council (36 CFR Part 800) to identify, and if feasible adopt, measures to protect it, but if in the final analysis the public interest demands that the property be sacrificed to the needs of the project, there is nothing in the National Historic Preservation Act that prohibits this.

This principle is especially important to recognize with respect to traditional cultural properties, because such properties may be valued by a

relatively small segment of a community that, on the whole, favors a project that will damage or destroy it. The fact that the community as a whole may be willing to dispense with the property in order to achieve the goals of the project does not mean that the property is not significant, but the fact that it is significant does not mean that it cannot be disturbed, or that the project must be foregone.

### Traditional Cultural Values in Preservation Planning

Traditional cultural properties, and the beliefs and institutions that give them significance, should be systematically addressed in programs of preservation planning and in the historic preservation components of land use plans. One very practical reason for this is to simplify the identification and evaluation of traditional cultural properties that may be threatened by construction and land use projects. Identifying and evaluating such properties can require detailed and extensive consultation, interview programs, and ethnographic fieldwork, as discussed below. Having to conduct such activities may add considerably to the time and expense of compliance with Section 106, the National Environment Policy Act, and other authorities. Such costs can be reduced significantly, however, by early, proactive planning that identifies significant properties or areas likely to contain significant properties before specific projects are planned that may affect them, identifies parties likely to ascribe cultural value to such properties, and establishes routine systems for consultation with such parties.

The *Secretary of the Interior's Standards for Preservation Planning* provide for the establishment of "historic contexts" as a basic step in any preservation planning process—be it planning for the comprehensive survey of a community or planning a construction project. A historic context is an organization of available information about, among other things, the cultural history of the area to be investigated, to identify "the broad patterns of development in an area that may be represented by historic properties." (48 FR 44717) The traditions and traditional lifeways

<sup>4</sup> For a detailed discussion of the qualifications that a practitioner of ethnography or ethnohistory should possess, see Appendix II.

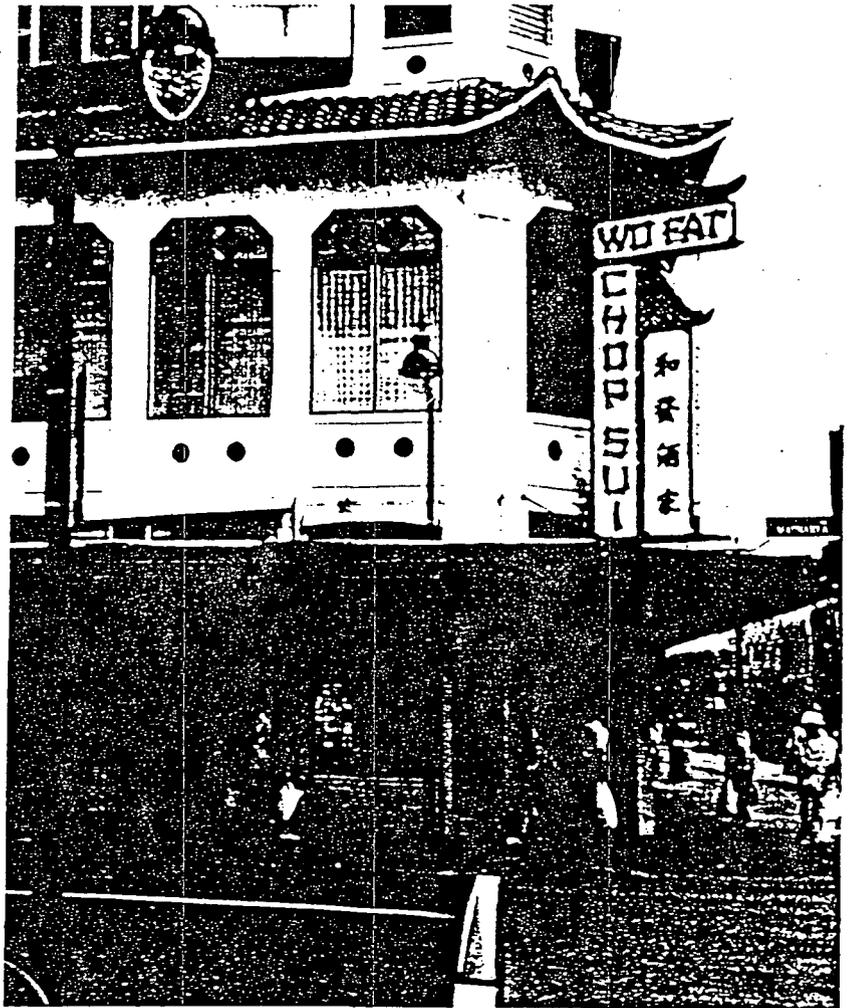
of a planning area may represent such "broad patterns," so information about them should be used as a basis for historic context development.

The *Secretary of the Interior's Guidelines for Preservation Planning* emphasize the need for organized public participation in context development. (48 FR 44717) The Advisory Council on Historic Preservation's *Guidelines for Public Participation in Historic Preservation Review* (ACHP 1988) provide detailed recommendations regarding such participation. Based on these standards and guidelines, groups that may ascribe traditional cultural values to an area's historic properties should be contacted and asked to assist in organizing information on the area. Historic contexts should be considered that reflect the history and culture of such groups as the groups themselves understand them, as well as their history and culture as defined by Euroamerican scholarship, and processes for consultation with such groups should be integrated into routine planning and project review procedures.

### Identifying Traditional Cultural Properties

Some traditional cultural properties are well known to the residents of an area. The San Francisco Peaks in Arizona, for example, are extensively documented and widely recognized as places of extreme cultural importance to the Hopi, Navajo, and other American Indian people of the Southwest, and it requires little study to recognize that Honolulu's Chinatown is a place of cultural importance to the city's oriental community. Most traditional cultural properties, however, must be identified through systematic study, just as most other kinds of historic properties must be identified. This section of this Bulletin will discuss some factors to consider in identifying traditional cultural properties.<sup>5</sup>

<sup>5</sup> For general guidelines for identification see *The Secretary of the Interior's Standards and Guidelines for Identification* (48 FR 44720-23), *Guidelines for Local Surveys: A Basis for Preservation Planning* (National Register Bulletin 24), and *Identification in Historic Preservation Review: a Decisionmaking Guide* (ACHP/DOI 1988).



Honolulu's Chinatown reflects the cultural values and traditions of its inhabitants not only in its architectural details but also in its organization of space and the activities that go on there. (Ramona K. Mullahey)

### Establishing the level of effort

Any comprehensive effort to identify historic properties in an area, be the area a community, a rural area, or the area that may be affected by a construction or land-use project, should include a reasonable effort to identify traditional cultural properties. What constitutes a "reasonable" effort depends in part on the likelihood that such properties may be present. The likelihood that such properties may be present can be reliably assessed only on the basis of background knowledge of the area's history, ethnography, and contemporary society developed through preservation planning. As a general although not invariable rule, however, rural areas are more likely than urban areas to contain properties

of traditional cultural importance to American Indian or other native American communities, while urban areas are more likely to contain properties of significance to ethnic and other traditional neighborhoods.

Where identification is conducted as part of planning for a construction or land-use project, the appropriate level of effort depends in part on whether the project under consideration is the type of project that could affect traditional cultural properties. For example, as a rule the rehabilitation of historic buildings may have relatively little potential for effect on such properties. However, if a rehabilitation project may result in displacement of residents, "gentrification" of a neighborhood, or other sociocultural impacts, the possibility that the buildings to be rehabilitated, or the neighborhood

in which they exist, may be ascribed traditional cultural value by their residents or others should be considered. Similarly, most day-to-day management activities of a land managing agency may have little potential for effect on traditional cultural properties, but if the management activity involves an area or a kind of resource that has high significance to a traditional group—for example, timber harvesting in an area where an Indian tribe's religious practitioners may continue to carry out traditional ceremonies—the potential for effect will be high.

These general rules of thumb aside, the way to determine what constitutes a reasonable effort to identify traditional cultural properties is to consult those who may ascribe cultural significance to locations within the study area. The need for community participation in planning identification, as in other forms of preservation planning, cannot be over-emphasized.

#### Contacting traditional communities and groups

An early step in any effort to identify historic properties is to consult with groups and individuals who have special knowledge about and interests in the history and culture of the area to be studied. In the case of traditional cultural properties, this means those individuals and groups who may ascribe traditional cultural significance to locations within the study area, and those who may have knowledge of such individuals and groups. Ideally, early planning will have identified these individuals and groups, and established how to consult with them. As a rule, however, the following steps are recommended.

#### Background research

An important first step in identifying such individuals and groups is to conduct background research into what is already recorded about the area's history, ethnography, sociology, and folklife. Published and unpublished source material on the historic and contemporary composition of the area's social and cultural groups should be consulted; such source material can often be found in the anthropology, sociology, or folklife libraries of local universities or other academic institutions. Pro-

fessional and nonprofessional students of the area's social and cultural groups should also be consulted—for example, professional and avocational anthropologists and folklorists who have studied the area. The SHPO and any other official agency or organization that concerns itself with matters of traditional culture—for example, a State Folklorist or a State Native American Commission—should be contacted for recommendations about sources of information and about groups and individuals to consult.

#### Making contact

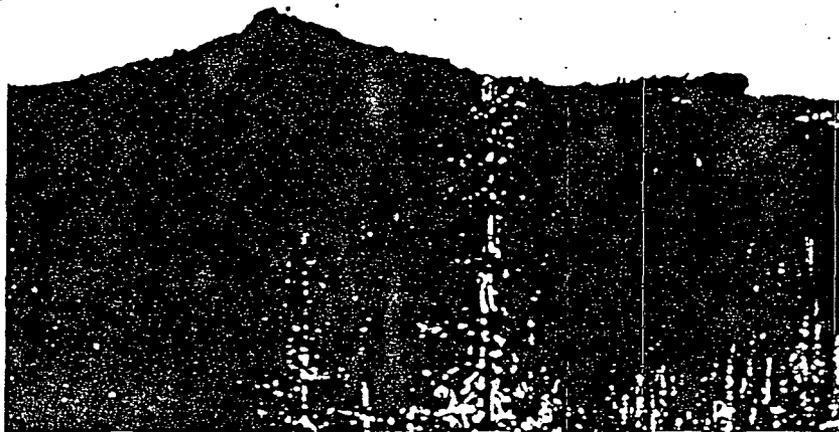
Having reviewed available background data, the next step is to contact knowledgeable groups and individuals directly, particularly those groups that are native to the area or have resided there for a long time. Some such groups have official representatives—the tribal council of an Indian tribe, for example, or an urban neighborhood council. In other cases, leadership may be less officially defined, and establishing

contact may be more complicated. The assistance of ethnographers, sociologists, folklorists, and others who may have conducted research in the area or otherwise worked with its social groups may be necessary in such cases, in order to design ways of contacting and consulting such groups in ways that are both effective and consistent with their systems of leadership and communication.

It should be clearly recognized that expertise in traditional cultural values may not be found, or not found solely, among contemporary community leaders. In some cases, in fact, the current political leadership of a community or neighborhood may be hostile to or embarrassed about traditional matters. As a result, it may be necessary to seek out knowledgeable parties outside the community's official political structure. It is of course best to do this with the full knowledge and cooperation of the community's contemporary leaders; in most cases it is appropriate to ask such leaders to identify members of the community

Federal agencies and others have found a variety of ways to contact knowledgeable parties in order to identify and evaluate traditional cultural properties. Generally speaking, the detail and complexity of the methods employed depend on the nature and complexity of the properties under consideration and the effects the agency's management or other activities may have on them. For example:

- The Black Hills National Forest designated a culturally sensitive engineer to work with local Indian tribes in establishing procedures by which the tribes could review Forest Service projects that might affect traditional cultural properties;
- The Air Force sponsored a conference of local traditional cultural authorities to review plans for deployment of an intercontinental missile system in Wyoming, resulting in guidelines to ensure that effects on traditional cultural properties would be minimized.
- The New Mexico Power Authority employed a professional cultural anthropologist to consult with Native American groups within the area to be affected by the Four Corners Power Project.
- The Ventura County (California) Flood Control Agency consulted with local Native American groups designated by the State Native American Heritage Commission to determine how to handle human remains to be exhumed from a cemetery that had to be relocated to make way for a flood control project.
- The Utah State Historic Preservation Officer entered into an agreement with the American Folklife Center to develop a comprehensive overview of the tangible and intangible historic resources of Grouse Creek, a traditional Mormon cowboy community.
- The Forest Service contracted for a full-scale ethnographic study to determine the significance of the Helkau Historic District on California's Six Rivers National Forest.



The Helkau Historic District, in the Six Rivers National Forest of California, is eligible for inclusion in the National Register because of its association with significant cultural practices of the Tolowa, Yorok, Karuk, and Hoopa Indian tribes of the area, who have used the district for generations to make medicine and communicate with spirits. (Theodoratus Cultural Research)

who are knowledgeable about traditional cultural matters, and use these parties as an initial network of consultants on the group's traditional values. If there is serious hostility between the group's contemporary leadership and its traditional experts, however, such cooperation may not be extended, and efforts to consult with traditional authorities may be actively opposed. Where this occurs, and it is necessary to proceed with the identification and evaluation of properties—for example, where such identification and evaluation are undertaken in connection with review of an undertaking under Section 106—careful negotiation and mediation may be necessary to overcome opposition and establish mutually acceptable ground rules for consultation. Again, the assistance of anthropologists or others with training and experience in work with the community, or with similar communities, may be necessary.

#### Fieldwork

Fieldwork to identify properties of traditional cultural significance involves consultation with knowledgeable parties, coupled with field inspection and recordation of locations identified as significant by such parties. It is often appropriate

and efficient to combine such fieldwork with surveys to identify other kinds of historic properties, for example archeological sites and properties of architectural significance. If combined fieldwork is conducted, however, the professional standards appropriate to each kind of fieldwork should be adhered to, and appropriate expertise in each relevant discipline should be represented on the study team. The kinds of expertise typically needed for a detailed ethnographic study of traditional cultural properties are outlined in Appendix II. Applicable research standards can be found in *Systematic Fieldwork, Volume 2: Ethnographic Analysis and Data Management*. (Werner and Schoepfle 1986)

#### Culturally sensitive consultation

Since knowledge of traditional cultural values may not be shared readily with outsiders, knowledgeable parties should be consulted in cultural contexts that are familiar and reasonable to them. It is important to understand the role that the information being solicited may play in the culture of those from whom it is being solicited, and the kinds of rules that may surround its transmittal. In some societies traditional information is regarded as powerful,

even dangerous. It is often believed that such information should be transmitted only under particular circumstances or to particular kinds of people. In some cases information is regarded as a valued commodity for which payment is in order; in other cases offering payment may be offensive. Sometimes information may be regarded as a gift, whose acceptance obligates the receiver to reciprocate in some way, in some cases by carrying out the activity to which the information pertains.

It may not always—or even often—be possible to arrange for information to be sought in precisely the way those being consulted might prefer, but when it is not, the interviewer should clearly understand that to some extent he or she is asking those interviewed to violate their cultural norms. The interviewer should try to keep such violations to a minimum, and should be patient with the reluctance that those interviewed may feel toward sharing information under conditions that are not fully appropriate from their point of view.

Culturally sensitive consultation may require the use of languages other than English, the conduct of community meetings in ways consistent with local traditional practice, and the conduct of studies by trained ethnographers, ethnohistorians, sociologists, or folklorists with the kinds of expertise outlined in Appendix II. Particularly where large projects or large land areas are involved, or where it is likely that particularly sensitive resources may be at issue, formal ethnographic studies should be carried out, by or under the supervision of a professionally qualified cultural anthropologist.

#### Field inspection and recordation

It is usually important to take knowledgeable consultants into the field to inspect properties that they identify as significant. In some cases such properties may not be discernible as such to anyone but a knowledgeable member of the group that ascribes significance to them; in such cases it may be impossible even to find the relevant properties, or locate them accurately, without the aid of such parties. Even where a property is readily discernible as such to the outside observer, visiting the property may help a consultant

recall information about it that he or she is unlikely to recall during interviews at a remote location, thus making for a richer and more complete record.

Where the property in question has religious significance or supernatural connotations, it is particularly important to ensure that any visit is carried out in accordance with appropriate modes of behavior. In some cases, ritual purification is necessary before a property can be approached, or spirits must be propitiated along the way. Some groups forbid visits to such locations by menstruating women or by people of inappropriate ages. The taking of photographs or the use of electronic recording equipment may not be appropriate. Appropriate ways to approach the property should be discussed with knowledgeable consultants before undertaking a field visit.

To the extent compatible with the cultural norms of the group involved, traditional cultural properties should be recorded on National Register of Historic Places forms or their equivalent.<sup>6</sup> Where items normally included in a National Register nomination or request for a determination of eligibility cannot be included (for example, if it is culturally inappropriate to photograph the property), the reasons for not including the item should be explained. To the extent possible in the property's cultural context, other aspects of the documentation (for example, verbal descriptions of the property) should be enhanced to make up for the items not included.

If making the location of a property known to the public would be culturally inappropriate, or compromise the integrity of the property or associated cultural values (for example, by encouraging tourists to intrude upon the conduct of traditional practices), the "Not for Publication" box on the National Register form should be checked; this indicates that the reproduction of locational information is prohibited, and that other information contained in the nomination will not be reproduced without the permission of the nominating authority. In the case of

a request for a determination of eligibility in which a National Register form is not used, the fact that the information is not for publication should be clearly specified in the documentation, so that the National Register can apply the same controls to this information as it would to restricted information in a nomination.<sup>7</sup>

#### Reconciling sources

Sometimes an apparent conflict exists between documentary data on traditional cultural properties and the testimony of contemporary consultants. The most common kind of conflict occurs when ethnographic and ethnohistorical documents do not identify a given place as playing an important role in the tradition and culture of a group, while contemporary members of the group say the property does have such a role. More rarely, documentary sources may indicate that a property does have cultural significance while

contemporary sources say it does not. In some cases, too, contemporary sources may disagree about the significance of a property.

Where available documents fail to identify a property as culturally significant, but contemporary sources identify it as such, several points should be considered.

- (a) Ethnographic and ethnohistorical research has not been conducted uniformly in all parts of the nation; some areas are better documented than others simply because they have been the focus of more research.
- (b) Ethnographic and ethnohistorical documents reflect the research interests of those who prepared them; the fact that one does not identify a property as culturally important may reflect only the fact that the individual who prepared the report had research interests that did not require the identification of such properties.
- (c) Some kinds of traditional cultural properties are regarded by those who value them as the loci of supernatural or other power, or as having other attributes that make people reluctant to talk about them. Such properties are not likely to be recorded unless someone makes a very deliberate effort to do so, or unless those

<sup>7</sup> Section 304 of the National Historic Preservation Act provides the legal authority to withhold National Register information from the public when release might "create a substantial risk of harm, theft, or destruction." For detailed guidelines concerning restricting access to information see National Register Bulletin 29, *Guidelines for Restricting Information About Historic and Prehistoric Resources*.



Much of the significance of traditional cultural properties can be learned only from the testimony of the traditional people who value them, like this old man being interviewed in Truk. (Micronesia Institute)

<sup>6</sup> For general instructions on the completion of National Register documentation, see National Register Bulletin 16, *Guidelines for Completing National Register of Historic Places Forms*.

who value them have a special reason for revealing the information—for example, a perception that the property is in some kind of danger.

Particularly because properties of traditional cultural significance are often kept secret, it is not uncommon for them to be “discovered” only when something threatens them—for example, when a change in land-use is proposed in their vicinity. The sudden revelation by representatives of a cultural group—which may also have other economic or political interests in the proposed change—can lead quickly to charges that the cultural significance of a property has been invented only to obstruct or otherwise influence those planning the change. This may be true, and the possibility that traditional cultural significance is attributed to a property only to advance other, unrelated interests should be carefully considered. However, it also may be that until the change was proposed, there simply was no reason for those who value the property to reveal its existence or the significance they ascribe to it.

Where ethnographic, ethnohistorical, historical, or other sources identify a property as having cultural significance, but contemporary sources say that it lacks such significance, the interests of the contemporary sources should be carefully considered. Individuals who have economic interests in the potential development of an area may be strongly motivated to deny its cultural significance. More subtly, individuals who regard traditional practices and beliefs as backward and contrary to the best contemporary interests of the group that once ascribed significance to a property may feel justified in saying that such significance has been lost, or was never ascribed to the property. On the other hand, of course, it may be that the documentary sources are wrong, or that the significance ascribed to the property when the documents were prepared has since been lost.

Similar consideration must be taken into account in attempting to reconcile conflicting contemporary sources. Where one individual or group asserts that a property has traditional cultural significance, and another asserts that it does not, or

where there is disagreement about the nature or extent of a property's significance, the motives and values of the parties, and the cultural constraints operating on each, must be carefully analyzed.

In general, the only reasonably reliable way to resolve conflict among sources is to review a wide enough range of documentary data, and to interview a wide enough range of authorities to minimize the likelihood either of inadvertent bias or of being deliberately misled. Authorities consulted in most cases should include both knowledgeable parties within the group that may attribute cultural value to a property and appropriate specialists in ethnography, sociology, history, and other relevant disciplines.<sup>8</sup>

### Determining Eligibility: Step by Step

Whether a property is known in advance or found during an identification effort, it must be evaluated with reference to the National Register Criteria for Evaluation (36 CFR Part 60) in order to determine whether it is eligible for inclusion in the Register. This section discusses the process of evaluation as a series of sequential steps. In real life, of course, these steps are often collapsed into one another or taken together.

#### Step One: Ensure that the entity under consideration is a property

Because the cultural practices or beliefs that give a traditional cultural property its significance are typically still observed in some form at the time the property is evaluated, it is sometimes perceived that the intangible practices or beliefs themselves, not the property, constitute the subject of evaluation. There is naturally a dynamic relationship between tangible and intangible traditional cultural resources, and the beliefs or practices associated with a traditional cultural property are of central importance in defining its significance. However, it should be clearly

<sup>8</sup> For excellent examples of studies designed in whole or in part to identify and evaluate traditional cultural properties based on both documentary sources and the testimony of contemporary consultants, see Bean and Vane 1978; Carroll 1983; Johnston and Budy 1983; Stoffle and Dobyms 1982, 1983; Theodoratus 1979.

recognized at the outset that the National Register does not include intangible resources themselves. The entity evaluated must be a tangible property—that is, a district, site, building, structure, or object.<sup>9</sup> The relationship between the property and the beliefs or practices associated with it should be carefully considered, however, since it is the beliefs and practices that may give the property its significance and make it eligible for inclusion in the National Register.

Construction by human beings is a necessary attribute of buildings and structures, but districts, sites, and objects do not have to be the products of, or contain, the work of human beings in order to be classified as properties. For example, the National Register defines a “site” as “the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.”<sup>10</sup> Thus a property may be defined as a “site” as long as it was the location of a significant event or activity, regardless of whether the event or activity left any evidence of its occurrence. A culturally significant natural landscape may be classified as a site, as may the specific location where significant traditional events, activities, or cultural observances have taken place. A natural object such as a tree or a rock outcrop may be an eligible object if it is associated with a significant tradition or use. A concentration, linkage, or continuity of such sites or objects, or of structures comprising a culturally significant entity, may be classified as a district.

In considering the eligibility of a property that contains no observable evidence of human activity, however, the documentary or oral evidence for the association of the property with traditional events, activities or observances should be carefully weighed and assessed. The National Register discourages the nomination of natural features without sound documentation of their historical or cultural significance.

<sup>9</sup> See National Register Bulletin 15. *Guidelines for Applying the National Register Criteria*, for discussion of property types.

<sup>10</sup> See National Register Bulletin 16.



*Cannonball Island*, off Cape Alava on the coast of Washington State, is a traditional cultural property of importance to the Makah Indian people. It was used in the past, and is still used today, as a navigation marker for Makah fishermen, who established locations at sea by triangulation from this and other landmarks. It also was a lookout point for seal and whale hunters and for war parties, a burial site, and a kennel for dogs raised for their fur. (Makah Cultural and Research Center Archives)

### Step Two: Consider the property's integrity

In order to be eligible for inclusion in the Register, a property must have "integrity of location, design, setting, materials, workmanship, feeling, and association." (36 CFR Part 60) In the case of a traditional cultural property, there are two fundamental questions to ask about integrity. First, does the property have an integral relationship to traditional cultural practices or beliefs; and second, is the condition of the property such that the relevant relationships survive?

#### *Integrity of relationship*

Assessing the integrity of the relationship between a property and the beliefs or practices that may give it significance involves developing some understanding about how the group that holds the beliefs or carries out the practices is likely to view the property. If the property is known or likely to be regarded by a traditional cultural group as important in the retention or transmittal of a belief, or to the performance of a practice, the property can be taken to have an integral relationship with the belief or practice, and vice-versa.

For example, imagine two groups living along the shores of a lake. Each group practices a form of baptism to mark an individual's acceptance into the group. Both carry out

baptism in the lake. One group, however, holds that baptism is appropriate in any body of water that is available; the lake happens to be available, so it is used, but another lake, a river or creek, or a swimming pool would be just as acceptable. The second group regards baptism in this particular lake as essential to its acceptance of an individual as a member. Clearly the lake is integrally related to the second group's practice, but not to that of the first.

#### *Integrity of condition*

Like any other kind of historic property, a property that once had traditional cultural significance can lose such significance through physical alteration of its location, setting, design, or materials. For example, an urban neighborhood whose structures, objects, and spaces reflect the historically rooted values of a traditional social group may lose its significance if these aspects of the neighborhood are substantially altered.

In some cases a traditional cultural property can also lose its significance through alteration of its setting or environment. For example, a location used by an American Indian group for traditional spirit questing is unlikely to retain its significance for this purpose if it has come to be surrounded by housing tracts or shopping malls.

A property may retain its traditional cultural significance even though it has been substantially modified, however. Cultural values are dynamic, and can sometimes accommodate a good deal of change. For example, the Karuk Indians of northwestern California continue to carry on world renewal rites, ancient ceremonies featuring elaborate dances, songs, and other ritual activities, along a stretch of the Klamath River that is now the site of a highway, a Forest Service Ranger Station, a number of residences, and a timber cutting operation. Specific locations important in aspects of the ceremony remain intact, and accommodation has been reached between the Karuk and other users of the land. The State Department of Transportation has even erected "Ritual Crossing" signs at locations where the Karuk religious practitioners cross the highway, and built shallow depressions into the roadway which are filled with sand in advance of the ceremony, so the feet of the practitioners need not be profaned by contact with man-made macadam. As this example shows, the integrity of a possible traditional cultural property must be considered with reference to the views of traditional practitioners; if its integrity has not been lost in their eyes, it probably has sufficient integrity to justify further evaluation.

Some kinds of traditional cultural significance also may be retained regardless of how the surroundings of a property may be changed. For example, the First African Baptist Church Cemetery in Philadelphia, rediscovered during archeological work in advance of highway construction in 1985, has considerable cultural significance for the congregation that traces descent from those interred in the Cemetery, and for Philadelphia's Black community in general, even though its graves had been buried under fill and modern construction for many decades.

It should also be recalled that even if a property has lost integrity as a possible traditional cultural property, it may retain integrity with reference to some other aspect of significance. For example, a property whose cultural significance has been lost through disturbance may still retain archeological deposits of significance for their information

content, and a neighborhood whose traditional residents no longer ascribe significance to it may contain buildings of architectural importance.

### Step Three: Evaluate the property with reference to the National Register Criteria

Assuming the entity to be evaluated is a property, and that it retains integrity, it is next necessary to evaluate it against the four basic National Register Criteria set forth in the National Register regulations (36 CFR Part 60). If the property meets one or more of the criteria, it may be eligible; if it does not, it is not eligible.<sup>11</sup>

*Criterion (a): Association with events that have made a significant contribution to the broad patterns of our history.*

The word "our" in this criterion may be taken to refer to the group to which the property may have traditional cultural significance, and the word "history" may be taken to include traditional oral history as well as recorded history. For example, Mt. Tonaachaw on Moen Island in Truk, Federated States of Micronesia, is in the National Register in part because of association with oral traditions about the establishment of Trukese society.

"Events" can include specific moments in history of a series of events reflecting a broad pattern or theme. For example, the ongoing participation of an ethnic or social group in an area's history, reflected in a neighborhood's buildings, streetscapes, or patterns of social activity, constitutes such a series of events.

The association of a property with significant events, and its existence at the time the events took place, must be documented through accepted means of historical research. The means of research normally employed with respect to traditional cultural properties include ethnographic, ethnohistorical, and folklore studies, as well as historical and archeological research. Sometimes, however, the actual time a traditional event took place may be ambiguous; in such cases it may be impossible, and to some extent

<sup>11</sup> For general guidelines, see National Register Bulletin 15.

irrelevant, to demonstrate with certainty that the property in question existed at the time the traditional event occurred. For example, events recounted in the traditions of Native American groups may have occurred in a time before the creation of the world as we know it, or at least before the creation of people. It would be fruitless to try to demonstrate, using the techniques of history and science, that a given location did or did not objectively exist in a time whose own existence cannot be demonstrated scientifically. Such a demonstration is unnecessary for purposes of eligibility determination; as long as the tradition itself is rooted in the history of the group, and associates the property with traditional events, the association can be accepted.

*Criterion (b): Association with the lives of persons significant in our past.*

Again, the word "our" can be interpreted with reference to the people who are thought to regard the property as traditionally important. The word "persons" can be taken to refer both to persons whose tangible, human existence in the past can be inferred on the basis of historical, ethnographic, or other

research, and to "persons" such as gods and demigods who feature in the traditions of a group. For example, Tahquitz Canyon in southern California is included in the National Register in part because of its association with Tahquitz, a Cahuilla Indian demigod who figures importantly in the tribe's traditions and is said to occupy an obsidian cave high in the canyon.

*Criterion (c)(1):<sup>12</sup> Embodiment of the distinctive characteristics of a type, period, or method of construction.*

This subcriterion applies to properties that have been constructed, or contain constructed entities—that is, buildings, structures, or built objects. For example, a neighborhood that has traditionally been occupied by a particular ethnic group may display particular housing styles, gardens, street furniture or ornamentation distinctive of the group. Honolulu's Chinatown, for example, embodies the distinctive cultural values of the City's oriental community in its architecture, landscaping, signage, and ornamentation.

<sup>12</sup> Note: Criterion (c) is not subdivided into subcriteria (1), (2), etc. in 36 CFR §60.4. The subdivision given here is only for the convenience of the reader.



In Trukese tradition, the Tonaachaw Historic District was the location to which Sowukachaw, founder of Trukese society, came and established his meetinghouse at the beginning of Trukese history. The mountain, in what is now the Federated States of Micronesia, is a powerful landmark in the traditions of the area. (Lawrence E. Aten)

*Criterion (c)(2): Representative of the work of a master.*

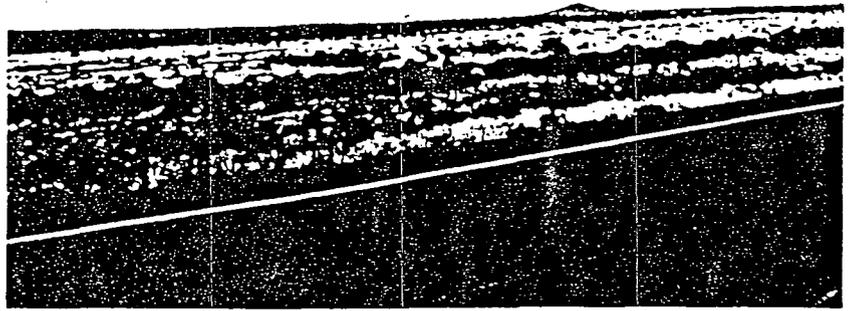
A property identified in tradition or suggested by scholarship to be the work of a traditional master builder or artisan may be regarded as the work of a master, even though the precise identity of the master may not be known.

*Criterion (c)(3): Possession of high artistic values.*

A property made up of or containing art work valued by a group for traditional cultural reasons, for example a petroglyph or pictograph site venerated by an Indian group, or a building whose decorative elements reflect a local ethnic group's distinctive modes of expression, may be viewed as having high artistic value from the standpoint of the group.

*Criterion (c)(4): Representative of a significant and distinguishable entity whose components may lack individual distinction.*

A property may be regarded as representative of a significant and distinguishable entity, even though it lacks individual distinction, if it represents or is an integral part of a larger entity of traditional cultural importance. The larger entity may, and usually does, possess both tangible and intangible components. For example, certain locations along the Russian River in California are highly valued by the Pomo Indians, and have been for centuries, as sources of high quality sedge roots needed in the construction of the Pomo's world famous basketry. Although the sedge fields themselves are virtually indistinguishable from the surrounding landscape, and certainly indistinguishable by the untrained observer from other sedge fields that produce lower quality roots, they are representative of, and vital to, the larger entity of Pomo basketmaking. Similarly, some deeply venerated landmarks in Micronesia are natural features, such as rock outcrops and groves of trees; these are indistinguishable visually (at least to the outside observer) from other rocks and trees, but they figure importantly in chants embodying traditional sailing directions and lessons about traditional history. As individual objects



Many traditional cultural properties look like very little on the ground. The small protuberance in the center of this photo, known to residents of the Hanford Nuclear Reservation in Washington State as *Goose Egg Hill*, is regarded by the Yakima Indians of the area as the heart of a goddess who was torn apart by jealous compatriots. They scattered her pieces across the landscape, creating a whole complex of culturally significant landforms. (Thomas F. King)

they lack distinction, but the larger entity of which they are a part—Micronesian navigational and historical tradition—is of prime importance in the area's history.

*Criterion (d): History of yielding, or potential to yield, information important in prehistory or history.*

Properties that have traditional cultural significance often have already yielded, or have the potential to yield, important information through ethnographic, archeological, sociological, folkloric, or other studies. For example, ethnographic and ethnohistorical studies of Kaho'olawe Island in Hawai'i, conducted in order to clarify its eligibility for inclusion in the National Register, have provided important insights into Hawai'ian traditions and culture and into the history of twentieth century efforts to revitalize traditional Hawai'ian culture. Similarly, many traditional American Indian village sites are also archeological sites, whose study can provide important information about the history and prehistory of the group that lived there. Generally speaking, however, a traditional cultural property's history of yielding, or potential to yield, information, if relevant to its significance at all, is secondary to its association with the traditional history and culture of the group that ascribes significance to it.

**Step 4: Determine whether any of the National Register criteria considerations (36 CFR §60.4) make the property ineligible**

Generally speaking, a property is not eligible for inclusion in the Register if it represents a class of properties to which one or more of the six "criteria considerations" listed in 36 CFR §60.4 applies, and is not part of a district that is eligible.

In applying the criteria considerations, it is important to be sensitive to the cultural values involved, and to avoid ethnocentric bias, as discussed below.

*Consideration A: Ownership by a religious institution or use for religious purposes.*

A "religious property," according to National Register guidelines, "requires additional justification (for nomination) because of the necessity to avoid any appearance of judgement by government about the merit of any religion or belief."<sup>13</sup> Conversely, it is necessary to be careful not to allow a similar judgement to serve as the basis for determining a property to be ineligible for inclusion in the Register. Application of this criteria consideration to traditional cultural properties is

<sup>13</sup> National Register Bulletin 15.

fraught with the potential for ethnocentrism and discrimination. In many traditional societies, including most American Indian societies, the clear distinction made by Euroamerican society between religion and the rest of culture does not exist. As a result, properties that have traditional cultural significance are regularly discussed by those who value them in terms that have religious connotations. Inyan Karan Mountain, for example, a National Register property in the Black Hills of South Dakota, is significant in part because it is the abode of spirits in the traditions of the Lakota and Cheyenne. Some traditional cultural properties are used for purposes that are definable as religious in Euroamerican terms, and this use is intrinsic to their cultural significance. Kootenai Falls on the Kootenai River in Idaho, part of the National Register-eligible Kootenai Falls Cultural Resource District, has been used for centuries as a vision questing site by the Kootenai tribe. The Helkau Historic District in northern California is a place where traditional religious practitioners go to make medicine and commune with spirits, and Mount Tonaachaw in Truk is an object of spiritual veneration. The fact that such properties have religious connotations does not automatically make them ineligible for inclusion in the Register.

Applying the "religious exclusion" without careful and sympathetic consideration to properties of significance to a traditional cultural group can result in discriminating against the group by effectively denying the legitimacy of its history and culture. The history of a Native American group, as conceived by its indigenous cultural authorities, is likely to reflect a kind of belief in supernatural beings and events that Euroamerican culture categorizes as religious, although the group involved, as is often the case with Native American groups, may not even have a word in its language for "religion." To exclude from the National Register a property of cultural and historical importance to such a group, because its significance tends to be expressed in terms that to the Euroamerican observer appear to be "religious" is ethnocentric in the extreme.

In simplest terms, the fact that a property is used for religious purposes by a traditional group, such as

seeking supernatural visions, collecting or preparing native medicines, or carrying out ceremonies, or is described by the group in terms that are classified by the outside observer as "religious" should not by itself be taken to make the property ineligible, since these activities may be expressions of traditional cultural beliefs and may be intrinsic to the continuation of traditional cultural practices. Similarly, the fact that the group that owns a property—for example, an American Indian tribe—describes it in religious terms, or constitutes a group of traditional religious practitioners, should not automatically be taken to exclude the property from inclusion in the Register. Criteria Consideration A was included in the Criteria for Evaluation in order to avoid allowing historical significance to be determined on the basis of religious doctrine, not in order to exclude arbitrarily any property having religious associations. National Register guidelines stress the fact that properties can be listed in or determined eligible for the Register for their association with religious history, or with persons significant in religion, if such significance has "scholarly, secular recognition."<sup>14</sup> The integral relationship among traditional Native American culture, history, and religion is widely recognized in

secular scholarship.<sup>15</sup> Studies leading to the nomination of traditional cultural properties to the Register should have among their purposes the application of secular scholarship to the association of particular properties with broad patterns of traditional history and culture. The fact that traditional history and culture may be discussed in religious terms does not make it less historical or less significant to culture, nor does it make properties associated with traditional history and culture ineligible for inclusion in the National Register.

#### *Consideration B: Relocated properties.*

Properties that have been moved from their historically important locations are not usually eligible for inclusion in the Register, because "the significance of (historic properties) is embodied in their locations and settings as well as in the (properties) themselves" and because "one basic purpose of the National Register is to encourage the preservation of historic properties as living parts of their communities."<sup>16</sup> This

<sup>14</sup> National Register Bulletin 15.

<sup>15</sup> For example see U.S. Commission on Civil Rights 1983; Michaelson 1986.

<sup>16</sup> National Register Bulletin 15.



The fact that a property has religious connotations does not automatically disqualify it for inclusion in the National Register. This Shaker community in Massachusetts, for example, while religious in orientation, is included in the Register because it expresses the cultural values of the Shakers as a society. (Historic American Buildings Survey)



Some traditional cultural properties may be moveable, like this traditional war canoe still in use in the Republic of Palau. (Palau Historic Preservation Office)

consideration is relevant but rarely applied formally to traditional cultural properties; in most cases the property in question is a site or district which cannot be relocated in any event. Even where the property can be relocated, maintaining it on its original site is often crucial to maintaining its importance in traditional culture, and if it has been moved, most traditional authorities would regard its significance as lost.

Where a property is intrinsically portable, however, moving it does not destroy its significance, provided it remains "located in a historically appropriate setting."<sup>17</sup> For example, a traditionally important canoe or other watercraft would continue to be eligible as long as it remained in the water or in an appropriate dry land context (e.g., a bathhouse). A property may also retain its significance if it has been moved historically.<sup>18</sup> For example, totem poles moved from one Northwest Coast village to another in early times by those who made or used them would not have lost their significance by virtue of the move. In some cases, actual or putative relocation even contributes to the significance of a property. The top-most peak of Mt. Tonaachaw in Truk, for example, is traditionally thought to have been brought from another island; the stories surrounding this magical relocation are parts of the mountain's cultural significance.

In some cases it may be possible to relocate a traditionally significant

property and still retain its significance, provided the property's "historic and present orientation, immediate setting, and general environment" are carefully considered in planning and executing the move.<sup>19</sup> At Lake Sonoma in California, for example, the U.S. Army Corps of Engineers relocated a number of boulders containing petroglyphs having artistic, archeological, and traditional cultural significance to protect them from inundation. The work was done in consultation with members of the local Pomo Indian tribe, and apparently did not destroy the significance of the boulders in the eyes of the tribe.<sup>20</sup>

#### *Consideration C: Birthplaces and graves.*

Birthplaces and graves of famous persons are not usually eligible for inclusion in the Register as such. If the birthplace or gravesite of a historical person is significant for reasons other than its association with that person, however, the property can of course be eligible.<sup>21</sup> Thus in the case of a traditional cultural property, if someone's birth or burial within the property's boundaries was incidental to the larger traditional significance of the property, the fact that it occurred does not make the property ineligible. For example, in South Texas, the burial site of Don Pedrito Jaramillo, a well documented folk healer who practiced at the turn of the century, has for more than seventy years been a

culturally significant site for the performance of traditional healing rituals by Mexican American folk healers. Here the cultural significance of the site as a center for healing is related to the intangible belief that Don Pedrito's spirit is stronger there than in other places, rather than to the fact of his burial there.

On the other hand, it is possible for the birth or burial itself to have been ascribed such cultural importance that its association with the property contributes to its significance. Tahquitz Canyon in southern California, for example, is in a sense the traditional "birthplace" of the entire Cahuilla Indian people. Its status as such does not make it ineligible; on the contrary, it is intrinsic to its eligibility. Mt. Tonaachaw in Truk is according to some traditions the birthplace of the culture hero Souwoonüras, whose efforts to organize society among the islands of Truk Lagoon are the stuff of Trukese legend. The association of his birth with the mountain does not make the mountain ineligible; rather, it contributes to its eligibility.

#### *Consideration D: Cemeteries.*

Cemeteries are not ordinarily eligible for inclusion in the Register unless they "derive (their) primary significance from graves of persons of transcendent importance, from age, from distinctive design values, or from association with historic events."<sup>22</sup> Many traditional cultural properties contain cemeteries, however, whose presence contributes to their significance. Tahquitz Canyon, for example, whose major significance lies in its association with Cahuilla traditional history, contains a number of cemeteries that are the subjects of great concern to the Cahuilla people. The fact that they are present does not render the Canyon ineligible; on the contrary, as reflections of the long historical

<sup>17</sup> National Register Bulletin 15.

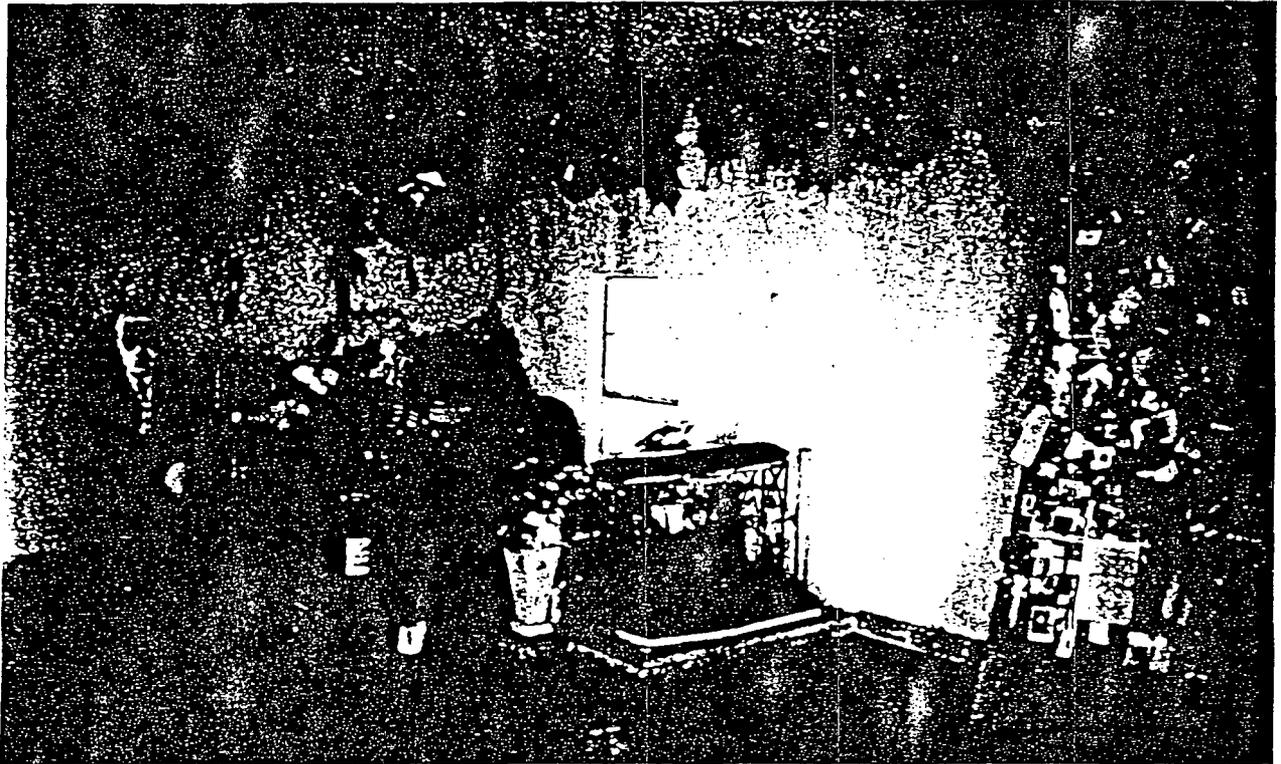
<sup>18</sup> National Register Bulletin 15.

<sup>19</sup> National Register Bulletin 15.

<sup>20</sup> The location to which a property is relocated, and the extent to which it retains its integrity after relocation, must be carefully considered in judging its continued eligibility for inclusion in the National Register. See National Register Bulletin 15 for general guidelines.

<sup>21</sup> National Register Bulletin 15.

<sup>22</sup> National Register Bulletin 15.



Several hundred persons visit this shrine to Don Pedrito Jaramillo, *curandero* (faith healer), yearly to seek his healing spirit. (Curtis Tunnell, Texas Historical Commission)

association between the Cahuilla and the Canyon, the cemeteries reflect and contribute to the Canyon's significance. Thus the fact that a traditional cultural property is or contains a cemetery should not automatically be taken to render it ineligible.

*Consideration E: Reconstruction.*

A reconstructed property—that is, a new construction that ostensibly reproduces the exact form and detail of a property or portion of a property that has vanished, as it appeared at a specific period in time—is not normally eligible for inclusion in the Register unless it meets strict criteria.<sup>23</sup> The fact that some reconstruction has occurred within the boundaries of a traditional cultural property, however, does not justify regarding the property as ineligible for inclusion in the Register. For example, individuals involved in the revitalization of traditional Hawaiian culture and religion have reconstructed certain religious structures on the island of Kaho'olawe; while the structures themselves might not be eligible for inclusion in the Register, their con-

struction in no way diminishes the island's eligibility.

*Consideration F: Commemoration.*

Like other properties, those constructed to commemorate a traditional event or person cannot be found eligible for inclusion in the Register based on association with that event or person alone.<sup>24</sup> The mere fact that commemoration is involved in the use or design of a property should not be taken to make the property ineligible, however. For example, traditional meetinghouses in the Republic of Palau, included in the National Register, are typically ornamented with "storyboards" commemorating traditional events; these derive their design from traditional Palauan aesthetic values, and thus contribute to the cultural significance of the structures. They connect the structures with the traditional history of the islands, and in no way diminish their cultural, ethnographic, and architectural significance. Similarly, the murals painted in many local post offices across the United States by artists employed during the 1930s by the Works Progress Administra-

tion (WPA) often commemorate local historical events, but this does not make the murals, or the buildings in which they were painted, ineligible for the Register.

*Consideration G: Significance achieved within the past 50 years.*

Properties that have achieved significance only within the 50 years preceding their evaluation are not eligible for inclusion in the Register unless "sufficient historical perspective exists to determine that the property is exceptionally important and will continue to retain that distinction in the future."<sup>25</sup> This is an extremely important criteria consideration with respect to traditional cultural values. A significance ascribed to a property only in the last 50 years cannot be considered traditional.

As an example, consider a mountain peak used by an Indian tribe for communication with the supernatural. If the peak has been used by members of the tribe for many

<sup>23</sup> National Register Bulletin 15.

<sup>24</sup> National Register Bulletin 15.

<sup>25</sup> National Register Bulletin 15.



Tahquitz Canyon, in southern California, is included in the National Register because of its association with the traditions of the Cahuilla Indians. The ancestors of the Cahuilla came into this world from a lower one at the beginning of time, and an evil spirit, named Tahquitz, is believed to live in the upper reaches of the canyon. (Thomas F. King)

years, or if it was used by members of the tribe in prehistory or early history, it may be eligible, but if its use has begun only within the last 50 years, it is probably not eligible.

The fact that a property may have gone unused for a lengthy period of time, with use beginning again only recently, does not make the property ineligible for the Register. For example, assume that the Indian tribe referred to above used the mountain peak in prehistory for communication with the supernatural, but was forced to abandon such use when it was confined to a distant reservation, or when its members were converted to Christianity. Assume further that a revitalization of traditional religion has begun in the last decade, and as a result the peak is again being used for vision quests similar to those carried out there in prehistory. The fact that the contemporary use of the peak has little continuous time depth does not make the peak ineligible; the peak's association with the traditional activity reflected in its contemporary use is what must be considered in determining eligibility.

The length of time a property has been used for some kinds of traditional purposes may be difficult to establish objectively. Many cultural uses may have left little or no physical evidence, and may not have been noted by ethnographers or early visitors to the area. Some such uses are explicitly kept from outsiders by members of the group ascribing significance to the property. Indirect evidence and inference must be weighed carefully, by or in consultation with trained ethnographers, ethnohistorians, and other specialists, and professional judgments made that represent one's best, good-faith interpretation of the available data.

#### Documenting Traditional Cultural Properties: General Considerations

Generally speaking, documentation of a traditional cultural property, on a National Register nomination form or in eligibility documentation, should include a presentation of the results of inter-

views and observations that systematically describe the behavior, beliefs, and knowledge that are germane to understanding the property's cultural significance, and an organized analysis of these results. The data base from which the formal nomination or eligibility determination documents are derived should normally include appropriate tape recordings, photographs, field notes, and primary written records.

Obtaining and presenting such documentation can present special challenges, however. First, those who ascribe significance to the property may be reluctant to allow its description to be committed to paper, or to be filed with a public agency that might release information about it to inappropriate people. Second, documentation necessarily involves addressing not only the physical characteristics of the property as perceived by an outside observer, but culturally significant aspects of the property that may be visible or knowable only to those in whose traditions it is significant. Third, boundaries are often difficult to define. Fourth, in part because of

the difficulty involved in defining boundaries, it is important to address the setting of the property.

### The problem of confidentiality

Particularly where a property has supernatural connotations in the minds of those who ascribe significance to it, or where it is used in ongoing cultural activities that are not readily shared with outsiders, it may be strongly desired that both the nature and the precise location of the property be kept secret. Such a desire on the part of those who value a property should of course be respected, but it presents considerable problems for the use of National Register data in planning. In simplest terms, one cannot protect a property if one does not know that it is there.

The need to reveal information about something that one's cultural system demands be kept secret can present agonizing problems for traditional groups and individuals. It is one reason that information on traditional cultural properties is not readily shared with Federal agencies and others during the planning and environmental review of construction and land use projects. However concerned one may be about the impacts of such a project on a traditional cultural property, it may be extremely difficult to express these concerns to an outsider if one's cultural system provides no acceptable mechanism for doing so. These difficulties are sometimes hard for outsiders to understand, but they should not be underrated. In some cultures it is sincerely believed that sharing information inappropriately with outsiders will lead to death or severe injury to one's family or group.

As noted above, information on historic properties, including traditional cultural properties, may be kept confidential under the authority of §304 of the National Historic Preservation Act.<sup>26</sup> This may not always be enough to satisfy the concerns of those who value, but fear the results of releasing information on, traditional cultural properties. In some cases these concerns may make it necessary not to nominate

<sup>26</sup> For details regarding maintaining confidentiality, see National Register Bulletin 29, *Guidelines for Restricting Information About Historic and Prehistoric Resources*.

such properties formally at all, or not to seek formal determinations of eligibility, but simply to maintain some kind of minimal data in planning files. For example, in planning deployment of the MX missile system in Wyoming, the Air Force became aware that the Lakota Indian tribe in the area had concerns about the project's impacts on traditional cultural properties, but was unwilling to identify and document the precise locations and significance of such properties. To resolve this problem, Air Force representatives met with the tribe's traditional cultural authorities and indicated where they wanted to construct the various facilities required by the deployment; the tribe's authorities indicated which of these locations were likely to present problems, without saying what the nature of the problems might be. The Air Force then designed the project to minimize use of such areas. In a narrow sense, obviously, the Air Force did not go through the process of evaluation recommended by this Bulletin; no specific properties were identified or evaluated to determine their eligibility for inclusion in the National Register. In a broader sense, however, the Air Force's approach represents excellent practice in the identification and treatment of traditional cultural properties. The Air Force consulted carefully and respectfully with those who ascribed traditional cultural significance to properties in the area, and sought to accommodate their concerns. The tribe responded favorably to this approach, and did not take undue advantage of it. Presumably, had the tribe expressed concern about such expansive or strategically located areas as to suggest that it was more interested in impeding the deployment than in protecting its valued properties, the Air Force would have had to use a different approach.

In summary: the need that often exists to keep the location and nature of a traditional cultural property secret can present intractable problems. These must be recognized and dealt with flexibly, with an understanding of the fact that the management problems they may present to Federal agencies or State Historic Preservation Officers may pale into insignificance when compared with the wrenching cultural

conflicts they may present to those who value the properties.

### Documenting visible and non-visible characteristics

Documentation of a traditional cultural property should present not only its contemporary physical appearance and, if known, its historical appearance, but also the way it is described in the relevant traditional belief or practice. For example, one of the important cultural locations on Mt. Tonaachaw in Truk is an area called *Neepisaram*, which physically looks like nothing but a grassy slope near the top of the mountain. In tradition, however, it is seen as the ear of *kuus*, a metaphorical octopus identified with the mountain, and as the home of *Saraw*, a warrior spirit/barracuda. Obviously a nomination of *Neepisaram* would be incomplete and largely irrelevant to its significance if it identified it only as a grassy slope near the top of the mountain.

### Period of significance

Describing the period of significance for a traditional cultural property can be an intellectual challenge, particularly where the traditions of a Native American or Micronesian group are involved. In such cases there are often two different kinds of "periods." One of these is the period in which, in tradition, the property gained its significance—the period during which the Cahuilla people emerged from the lower world through Tahquitz Canyon, or the period when civilization came to Truk through the magical arrival of the culture-bearer Sowukachaw on Mt. Tonaachaw. Such periods often have no fixed referent in time as it is ordinarily construed by Euroamerican scholarship.<sup>27</sup> To the Cahuilla, their ancestors simply emerged from the lower world at the beginning of human life on earth, whenever that may have been. A Trukese traditional authority will typically say simply that Sowukachaw came to Truk "*nóomw nóomw nóomw*" (long, long ago). It is usually fruitless, and of little or no relevance to the eligibility of the property involved for inclusion in the National Register, to

<sup>27</sup> Except, perhaps, by some of the more esoteric subfields of cosmology and quantum mechanics.

try to relate this sort of traditional time to time as measured by Euroamerican history. Traditional "periods" should be defined in their own terms. If a traditional group says a property was created at the dawn of time, this should be reported in the nomination or eligibility documentation; for purposes of National Register eligibility there is no need to try to establish whether, according to Euroamerican scholarship or radiocarbon age determination, it really *was* created at the dawn of time.

The second period that is often relevant to a traditional property is its period of use for traditional purposes. Although direct, physical evidence for such use at particular periods in the past may be rare in the case of properties used by Native American groups, it is usually possible to fix a period of use, at least in part, in ordinary chronological time. Establishing the period of use often involves the weighing of indirect evidence and inference.

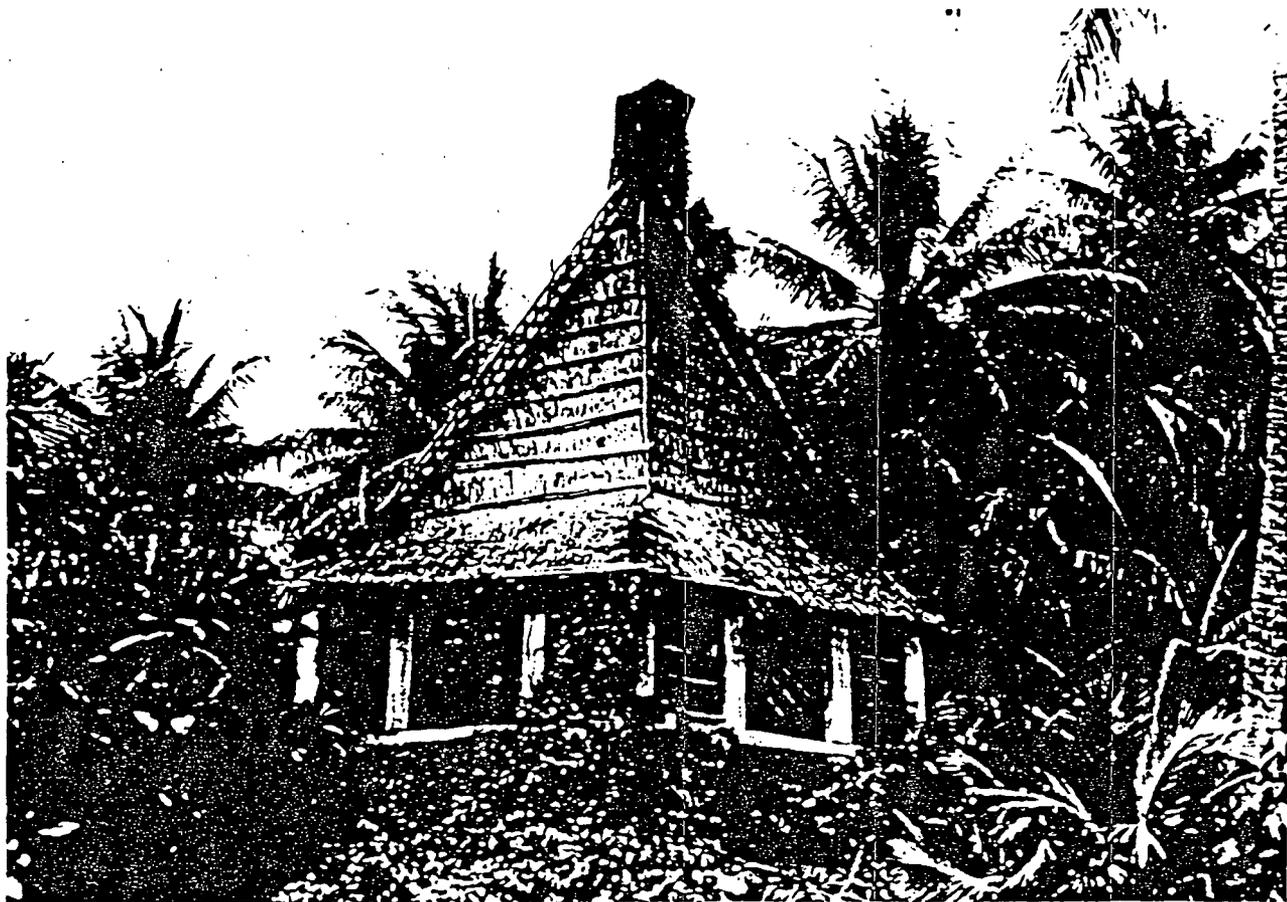
Interviews with traditional cultural authorities are usually the main sources of data, sometimes supplemented by the study of historical accounts or by archeological investigations. Based on such sources of data it should be possible at least to reach supportable inferences about whether generations before the present one have used a property for traditional purposes, suggesting that it was used for such purposes over fifty years ago. It is seldom possible to determine when the traditional use of property *began*, however—this tends to be lost, as it were, in the mists of antiquity.

#### Boundaries

Defining the boundaries of a traditional cultural property can present considerable problems. In the case of the Helkau Historic District in northern California, for example, much of the significance of the property in the eyes of its traditional users is related to the fact that

it is quiet, and that it presents extensive views of natural landscape without modern intrusions. These factors are crucial to the medicine making done by traditional religious practitioners in the district. If the boundaries of the district were defined on the basis of these factors, however, the district would take in a substantial portion of California's North Coast Range. Practically speaking, the boundaries of a property like the Helkau District must be defined more narrowly, even though this may involve making some rather arbitrary decisions. In the case of the Helkau District, the boundary was finally drawn along topographic lines that included all the locations at which traditional practitioners carry out medicine-making and similar activities, the travel routes between such locations, and the immediate viewshed surrounding this complex of locations and routes.

In defining boundaries, the traditional uses to which the property is



Individual structures can have traditional cultural significance, like this Yapese men's house, used by Yapese today in the conduct of deliberations on matters of cultural importance. (Yap State Historic Preservation Office)

put must be carefully considered. For example, where a property is used as the Helkau District is used, for contemplative purposes, viewsheds are important and must be considered in boundary definition. In an urban district significant for its association with a given social group, boundaries might be established where residence or use by the group ends, or where such residence or use is no longer reflected in the architecture or spatial organization of the neighborhood. Changes in boundaries through time should also be taken into consideration. For example, archeological evidence may indicate that a particular cultural practice occurred within particular boundaries in the past, but the practice today may occur within different boundaries—perhaps larger, perhaps smaller, perhaps covering different areas. The fact that such changes have taken place, and the reasons they have taken

place, if these can be ascertained, should be documented and considered in developing a rationale for the boundaries identified in the nomination or eligibility documentation.

#### Describing the setting

The fact that the boundaries of a traditional cultural property may be drawn more narrowly than they would be if they included all significant viewsheds or lands on which noise might be intrusive on the practices that make the property significant does not mean that visual or auditory intrusions occurring outside the boundaries can be ignored. In the context of eligibility determination or nomination, such intrusions if severe enough may compromise the property's integrity. In planning subsequent to nomination or eligibility determination, the Advisory Council's regulations

define "isolation of the property from or alteration of the character of the property's setting" as an adverse effect "when that character contributes to the property's qualification for the National Register." (36 CFR §800.9(b)(2)) Similarly, the Council's regulations define as adverse effects "introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting." (36 CFR §800.9(b)(3)) To assist in determining whether a given activity outside the boundaries of a traditional cultural property may constitute an adverse effect, it is vital that the nomination form or eligibility documentation discuss those qualities of a property's visual, auditory, and atmospheric setting that contribute to its significance, including those qualities whose expression extends beyond the boundaries of the property as such into the surrounding environment.

## Documenting Traditional Cultural Properties: Completing Registration Forms

The following discussion is organized with reference to the National Register of Historic Places Registration Form (NPS 10-900), which must be used in nominating properties to the National Register. To the extent feasible, documentation supporting a request for a determination of eligibility should be organized with reference to, and if possible using, the Registration Form as well.

Where the instructions given in National Register Bulletin 16, *Guidelines for Completing National Register of Historic Places Forms*, are sufficient without further discussion, this is indicated.

### 1. Name of Property

The name given a traditional cultural property by its traditional users should be entered as its historic name. Names, inventory reference numbers, and other designations ascribed to the property by others should be entered under other names/site number.

### 2. Location

Follow Bulletin 16, but note discussion of the problem of confidentiality above.

### 3. Classification

Follow Bulletin 16.

### 4. State/Federal Agency Certification

Follow Bulletin 16.

### 5. National Park Service Certification

To be completed by National Register.

### 6. Function or Use

Follow Bulletin 16.

### 7. Description

Follow Bulletin 16 as applicable. It may be appropriate to address both visible and non-visible aspects of the property here, as discussed under General Considerations above; alternatively, non-visible aspects of the property may be discussed in the statement of significance.

### 8. Statement of Significance

Follow Bulletin 16, being careful to address significance with sensitivity for the viewpoints of those who ascribe traditional cultural significance to the property.

### 9. Major Bibliographical References

Follow Bulletin 16. Where oral sources have been employed, append a list of those consulted and identify the locations where field notes, audio or video tapes, or other records of interviews are housed, unless consultants have required that this information be kept confidential; if this is the case, it should be so indicated in the documentation.

### 10. Geographical Data

Follow Bulletin 16 as applicable, but note the discussion of boundaries and setting under General Considerations above. If it is necessary to discuss the setting of the property in detail, this discussion should be appended as accompanying documentation and referenced in this section.

### 11. Form Prepared By

Follow Bulletin 16.

### Accompanying Documentation

Follow Bulletin 16, except that if the group that ascribes cultural significance to the property objects to the inclusion of photographs, photographs need not be included. If photographs are not included, provide a statement explaining the reason for their exclusion.

## Conclusion

The National Historic Preservation Act, in its introductory section, establishes that "the historical and cultural foundations of the Nation should be preserved as a living part of our community life in order to give a sense of orientation to the American people."<sup>28</sup> The cultural foundations of America's ethnic and social groups, be they Native American or historical immigrant, merit recognition and preservation, particularly where the properties that represent them can continue to function as living parts of the communities that ascribe cultural value to them. Many such properties have been included in the National Register, and many others have been formally determined eligible for inclusion, or regarded as such for purposes of review under Section 106 of the Act. Federal agencies, State Historic Preservation Officers, and others who are involved in the inclusion of such properties in the Register, or in their recognition as eligible for inclusion, have raised a number of important questions about how to distinguish between traditional cultural properties that are eligible for inclusion in the Register and those that are not. It is our hope that this Bulletin will help answer such questions.

<sup>28</sup> 16 U.S.C. 470(b)(2).

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1983 Lost Creek Canyon Native American Sites. National Register of Historic Places Eligibility Evaluation. Manuscript. USDA Forest Service, Lassen National Forest, CA.
- McCarthy, H. C. Blount, E. McKee and D.J. Theodoratus  
1985 Ethnographic and Historic Survey for the Big Creek Expansion Project. Report prepared by Theodoratus Cultural Research, Fair Oaks, CA, for Southern California Edison Company, Rosemead, CA.
- National Park Service  
1985 Promised Land on the Solomon: Black Settlement at Nicodemus, Kansas. National Park Service, Rocky Mountain Region. U.S. Government Printing Office, Washington, DC.
- Stoffle, Richard W. and Henry F. Dobyns (eds)  
1982 Nuvagantu. Nevada Indians Comment on the Intermountain Power Project, Utah Section. Intermountain-Adelanto Bipole I Transmission Line. Ethnographic (Native American) Resources. Report submitted by the Applied Urban Field School, University of Wisconsin, Parkside, Kenosha, WI, to Applied Conservation Technology, Inc.
- Stoffle, Richard W. and Henry F. Dobyns (eds)  
1983 Pauxant Tuvip. Utah Indians Comment on the Intermountain Power Project, Utah Section. Intermountain-Adelanto Bipole I Transmission Line. Ethnographic (Native American) Resources. Report submitted by the Applied Urban Field School, University of Wisconsin, Parkside, Kenosha, WI, to Applied Conservation Technology, Inc.
- Stoffle, Richard W., et al.  
1984 Toyavita Piavuhuru Koroin: Ethnohistory and Native American Religious Concerns in the Fort Carson—Piñon Canyon Maneuver Area. Report submitted by the Applied Urban Field School, University of Wisconsin, Parkside, Kenosha, WI, to the National Park Service.
- Theodoratus Cultural Research, Inc./ Archaeological Consulting and Research Services, Inc.  
1984 Cultural Resources Overview of the Southern Sierra Nevada: An Ethnographic, Linguistic, Archaeological and Historical Study of the Sierra National Forest, Sequoia National Forest, and Bakersfield District of the Bureau of Land Management. Report to the U.S. Department of Agriculture, Forest Service, South Central Contracting Office, Bishop CA.
- Theodoratus, D.J., C.M. Blount, A.L. Hurtado, P.N. Hawkes and M. Ashman  
1978 Balsam Meadow Cultural Resource Study: Ethnology and History. Report prepared by Theodoratus Cultural Research, Fair Oaks, CA, for Southern California Edison Company, Rosemead, CA.
- Theodoratus, D.J. et al.  
1979 Cultural Resources of the Chimney Rock Section, Gasquet-Orleans Road, Six Rivers National Forest. Report prepared by Theodoratus Cultural Research, Fair Oaks, CA, for USDA Forest Service.
- Theodoratus, D.J.  
1982 Ethnographic Cultural Resources Investigation of the Big Creek-Springville-Magunden and Big Creek-Rector-Vestal-Magunden Transmission Corridors. Report prepared by Theodoratus Cultural Research, Fair Oaks, CA, for Southern California Edison Company, Rosemead, CA.
- Woods, C.M.  
1982 APS/SDG&E Interconnection Project Native American Cultural Resources: Miguel to the Colorado River and Miguel to Mission Tap. Report prepared by Wirth Associates, Inc., San Diego, CA, for San Diego Gas and Electric Company, San Diego, CA.
- York, Frederick F.  
1981 An Ethnographic Survey of the Public Service Company of New Mexico's Proposed New Town Site and Its Environs. Human Environmental Resource Services Corporation, Anthropological Series Number 1, Albuquerque.
- Other
- Association on American Indian Affairs  
1988 American Indian Religious Freedom. Special Supplement to Indian Affairs, Number 116, New York, NY.
- Loomis, O.H.  
1983 Cultural Conservation: the Protection of Cultural Heritage in the United States. American Folklife Center, Library of Congress, Washington, DC.
- Michaelson, Robert S.  
1986 American Indian Religious Freedom Litigation: Promise and Peril. Journal of Law and Religion 3:47-76.
- U.S. Commission on Civil Rights  
1983 Religion in the Constitution: A Delicate Balance. Clearinghouse Publication No. 80, U.S. Commission on Civil Rights, Washington, DC.
- U.S. Department of the Interior  
1979 American Indian Religious Freedom Act: Federal Agencies Task Force Report. Washington, DC.
- Walker, Deward E., Jr.  
1987 Protection of American Indian Sacred Geography: Toward a Functional Understanding of Indian Religion Focusing on a Protective Standard of Integrity. Paper presented at the Workshop on Sacred Geography, Harvard Center for the Study of World Religions, May 5-6, Cambridge, MA.
- White, D.R.M. (ed.)  
1982 Proceedings of the First National Conference of the Task Force on Cultural Resource Management. Edison Electric Institute, Washington, DC.

## Appendix I A Definition of "Culture"

Early in this Bulletin a shorthand definition of the word "culture" is used. A longer and somewhat more complex definition is used in the National Park Service's internal cultural resource management guidelines (NPS-28). This definition is consistent with that used in this Bulletin, and may be helpful to those who require further elucidation of the term. The definition reads as follows:

"Culture (is) a system of behaviors, values, ideologies, and social arrangements. These features, in addition to tools and expressive elements such as graphic arts, help humans interpret their universe as well as deal with features of their environments, natural and social. Culture is learned, transmitted in a social context, and modifiable. Synonyms for culture include 'lifeways,' 'customs,' 'traditions,' 'social practices,' and 'folkways.' The terms 'folk culture' and 'folklife' might be used to describe aspects of the system that are unwritten, learned without formal instruction, and deal with expressive elements such as dance, song, music and graphic arts as well as storytelling."

## Appendix II Professional Qualifications: Ethnography

When seeking assistance in the identification, evaluation, and management of traditional cultural properties, agencies should normally seek out specialists with ethnographic research training, typically including, but not necessarily limited to:

- I. Language skills: it is usually extremely important to talk in their own language with those who may ascribe value to traditional cultural properties. While ethnographic fieldwork can be done through interpreters, ability in the local language is always preferable.
- II. Interview skills, for example:
  - The ability to approach a potential informant in his or her own cultural environment, explain and if necessary defend one's research, conduct an interview and minimize disruption, elicit required information, and disengage from the interview in an appropriate manner so that further interviews are welcome; and
  - The ability to create and conduct those types of interviews that are appropriate to the study being carried out, ensuring that the questions asked are meaningful to those being interviewed, and that answers are correctly understood through the use of such techniques as

translating and back-translating. Types of interviews normally carried out by ethnographers, one or more of which may be appropriate during evaluation and documentation of a traditional cultural property, include:

- \* semi-structured interview on a broad topic;
  - \* semi-structured interview on a narrow topic;
  - \* structured interview on a well defined specific topic;
  - \* open ended life history/life cycle interview; and
  - \* genealogical interview.
- III. Skill in making and accurately recording direct observations of human behavior, typically including:
    - The ability to observe and record individual and group behavior in such a way as to discern meaningful patterns; and
    - The ability to observe and record the physical environment in which behavior takes place, via photography, mapmaking, and written description.
  - IV. Skill in recording, coding, and retrieving pertinent data derived from analysis of textural materials, archives, direct observation, and interviews.
- Proficiency in such skills is usually obtained through graduate and post-graduate training and supervised experience in cultural anthropology and related disciplines, such as folklore/folklife.

# NAVAJO NATION POLICY TO PROTECT TRADITIONAL CULTURAL PROPERTIES

Navajo Nation Historic Preservation Department  
Window Rock, AZ

1/24/91

## A. INTRODUCTION

As economic development proceeds in the Navajo Nation, a growing number of places of traditional significance to the Navajo people may be damaged by the land disturbance that accompanies development. In June of 1990, the National Park Service issued National Register Bulletin 38, entitled "Guidelines for Evaluating and Documenting Traditional Cultural Properties." The bulletin defines a "traditional cultural property" as a property

that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community.

Most traditional cultural properties significant to Navajos are of the type commonly called "sacred places." Others are locations of other traditional activities, such as homesites and places where weavers gather plants for dyes.

We use the term "traditional cultural property" in this document to make explicit that we are talking about the same kinds of places as does Bulletin 38, and because we have written this document mainly for cultural resource managers and related professionals. The term, however, offends many Navajo traditionalists. One reason is that, by containing the word "property," it suggests that such places can be treated as mere commodities, like real estate. Another reason is that the term seems like a long and lackluster euphemism for "sacred places," which corresponds more closely to the Navajo term for such places (hodiyyin). "Traditional cultural property" is, indeed, partly a euphemism intended to obscure the "religious" qualities that these places have for people who do not separate the sacred from the secular. Within the present federal legal framework for historic and cultural preservation, such obscurantism seems necessary to keep such places from being found ineligible for protection under federal preservation law because of the doctrine of separation of church and state. We would prefer that, instead of avoiding the term "sacred places," all concerned recognize that the root of what makes a place sacred is its association with aspects of the past that people connect with their present concerns of living. We apologize to

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traditionalists for perpetuating the use of the term "traditional cultural properties," which we find a practical necessity in certain contexts.

### **B. TRADITIONAL CULTURAL PROPERTIES COVERED BY THIS POLICY**

This policy covers traditional cultural properties that lack the evidence of human use that would qualify them as archaeological sites, historic properties, or graves. The main emphasis here is on traditional cultural properties significant to the Navajo people. The last section of this policy statement, in addition, addresses such properties significant to other Native American groups that may be located on lands of the Navajo Nation. This policy supersedes the "Draft Proposed Navajo Nation Policy to Protect Navajo Sacred Places" (1986).

Existing federal, state, and tribal laws and rules protect archaeological sites, historic properties, and graves. These laws and rules include the federal Antiquities Act of 1906 (P.L. 59-209); the National Historic Preservation Act (P.L. 89-665); the National Environmental Protection Act of 1969 (P.L. 91-190); Executive Order 11953, "Protection and Enhancement of the Cultural Environment," May 13, 1971 (36 C.F.R. 8921); the Archaeological Resources Protection Act of 1978 (P.L. 95-96); the American Indian Religious Freedom Act of 1978 (P.L. 95-341); the Native American Graves Protection and Repatriation Act; New Mexico and Arizona laws protecting human remains on private lands; the Navajo Nation Policies and Procedures Concerning Protection of Cemeteries, Gravesites, and Human Remains of 1986 (ACMA-39-86); and the Navajo Nation Cultural Resources Protection Act (CMY-19-88), which supersedes all previously existing Navajo Nation cultural resource preservation legislation.

Cultural resource surveys required by these laws and policies are very likely to detect sites with material evidence of human use (mainly archaeological sites) so that they can be protected. Certain types of Navajo traditional cultural properties are likely to have such evidence. These types include, but are not limited to, sites that may have been blessed and where ceremonies may have occurred such as those with hogans, houses, sweathouses, game corrals (needzii'), eagle traps and so forth; other sites where ceremonies and rituals occurred (if evidence of such use, such as the remains of ceremonial structures, is visible); trail shrines; rock art; and both marked and unmarked graves.

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Because traditional cultural properties are considered eligible for inclusion in the National Register, such properties are protected by Section 106 of the National Historic Preservation Act, even when they lack clear evidence of human use. Such places are not likely to be detected by conventional surveys, however, and no other way of detecting such places has been used systematically up to now. Navajo traditional cultural properties without clear evidence of human use include, but are not limited to, the following types: places for gathering plants for use in ceremonies and other traditional purposes; places for gathering minerals for ceremonial and other traditional purposes; places for gathering contents of sacred bundles; places for gathering other materials for ceremonial and other traditional purposes; unmarked graves (contain material remains but these are not necessarily visible on the surface); prayer-offering places; places associated with the general Navajo origin story; places associated with origin stories of particular ceremonials; places associated with the origin of a clan; places associated with the origin of a Navajo custom; places identified as the home of a Holy Being such as Wind, Lightning, Big Snake; location of echoes (Talking Rocks, which convey human words to the Holy People); natural discoloration of rock that has some kind of supernatural power; places where an apparition or other supernatural event occurred; and places that have played a part in the life-cycle rituals of individuals (such as the spot where a newborn baby's umbilical cord is placed). Many of these sorts of places are features of the natural landscape, such as mountains, hills, rock outcrops, springs, and individual trees.

This policy outlines procedures for identifying such places, for determining how concerned Navajo people think particular development projects will affect those places, and for learning about the protection measures that concerned Navajo people think should be used. This procedural outline is intended to be used along with National Register Bulletin 38, which offers general guidelines to document and evaluate such properties.

Traditional cultural properties covered by this policy statement may be on land under Tribal, BIA, other Federal (public land) and State jurisdiction. With land owner consent and cooperation, this policy statement will apply to private lands as well.

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C. IDENTIFICATION OF TRADITIONAL CULTURAL PROPERTIES ON LANDS  
ADMINISTERED BY THE NAVAJO NATION OR THE BIA IN TRUST FOR  
NAVAJOS

To identify Navajo traditional cultural properties, the developer of a proposed project on Tribally or BIA administered land must observe the following procedures:

1. The developer shall employ an archaeological contractor or consulting anthropologist who meets the professional standards of the Navajo Nation (or the land manager). That contractor or consultant shall conduct a cultural resources literature search that will include at least the following references for information on places of traditional cultural significance:

Parker, Patricia L., and Thomas F. King

n.d. (1990) Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Register Bulletin 38. U.S. Department of the Interior, National Park Service, Interagency Resources Division, Washington, D.C.

Van Valkenburgh, Richard F.

1974 Navajo Sacred Places, ed. by Clyde Kluckhohn. In Navajo Indians III, pp. 9-199. Garland Publishing, New York.

1941 Dine Bikeyah. U.S. Department of the Interior, U.S. Indian Service, Navajo Agency, Window Rock, AZ.

(WHEN AVAILABLE) Francis, Harris and Klara Kelley

n.d. Places in Navajo Traditional History. Navajo Nation Historic Preservation Department, Window Rock, AZ. In preparation.

Also the following, if the proposed project is in the Eastern Navajo Nation:

Carroll, Charles H.

1982 An Ethnographic Investigation of Sites and Locations of Cultural Significance to the Navajo People to be

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Affected by PNM's Four Corners to Ambrosia to Pajarito 500 kV Transmission Project. Public Service Company of New Mexico, Albuquerque.

1983 The Ute Mountain Ethnographic Study. Public Service Company of New Mexico, Albuquerque.

Fransted, Dennis

1979 An Introduction to the Navajo Oral History of Anasazi Sites in the San Juan Basin Area. Navajo Aging Services, Fort Defiance, AZ.

Roessel, Robert, Jr.

1983 Dinetah: Navajo History. Rough Rock Demonstration School, Rough Rock, AZ.

York, Frederick F.

1981 An Ethnographic Survey of the Public Service Company of New Mexico's Proposed New Town Site and Its Environs. Human Environmental Resource Services Corporation, Anthropological Series 1, Albuquerque.

York, Frederick F., and Joseph C. Winter.

1988 Report of an Ethnographic Study and Archeological Review of Proposed Coal Lease Tracts in Northwestern New Mexico. Office of Contract Archeology, University of New Mexico, Albuquerque.

In addition, the following background readings are strongly recommended for those consultants not thoroughly familiar with them:

Downer, Alan S.

1989 Anthropology, Historic Preservation and the Navajo: A Case Study in Cultural Resource Management on Indian Lands. Ph.D. dissertation, Department of Anthropology, University of Missouri, Columbia.

Frisbie, Charlotte J.

1987 Navajo Medicine Bundles or Jish: Acquisition, Transmission and Disposition in the Past and Present. University of New Mexico Press, Albuquerque.

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Gill, Sam D.

1981 Sacred Words: A Study of Navajo Religion and Prayer. Greenwood Press, Westport, Conn.

Kelley, Klara B.

1988 San Augustine Coal Area, Archaeological Investigations in West-Central New Mexico, Volume 2, Historic Cultural Resources. Cultural Resources Series No. 4, U.S. Bureau of Land Management, New Mexico State Office, Santa Fe.

Kelly, Roger E., R.W. Lang, and Harry Walters

1972 Navajo Figurines Called Dolls. Museum of Navajo Ceremonial Art, Inc., Santa Fe, N.M.

Kluckhohn, Clyde and Leland C. Wyman

1940 An Introduction to Navaho Chant Practice. Memoirs of the American Anthropological Association 53.

Spencer, Katherine

1957 Mythology and Values, An Analysis of Navajo Chantway Myths. Memoirs of the American Folklore Society 48.

Wyman, Leland C.

1970 Blessingway: With Three Versions of the Myth Recorded and Translated from the Navajo by Father Berard Haile, O.F.M. University of Arizona Press, Tucson.

2. For all projects that require more than 1 acre, consultations with Navajo people are also required. (Projects of one acre or less are likely to include, but are not limited to, single homesites, single-business-site leases, and isolated utilities installations for single homesites or single business sites.) In addition, consultations with Navajo people are also required for projects of 1 acre or less in certain localities and natural settings with a high probability of having traditional cultural properties. If the developer or anthropological consultant is in

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doubt about the need for such consultations, they should contact NNHPD. The project developer must demonstrate that a qualified professional anthropologist made a good-faith effort to consult:

- a. Present surface user(s): grazing-permit holder(s) (individuals whose consents for right-of-way have been sought by developer); any other residents in or within view of the proposed project area.
  - b. Chapter(s) within which the proposed project is located: chapter officers and/or delegate(s) to Navajo Nation Council; at the request of any of these individuals, the developer's consulting anthropologist will also make a presentation at a meeting of general chapter membership.
  - c. Other knowledgeable people recommended by the present surface user(s), chapter officials, and chapter members.
3. Documentation of the concerns of people consulted will normally take the form of a questionnaire or interview schedule administered by the developer's consulting anthropologist and his or her interpreter/field assistant, if any. Documentation of each consultation will normally include the following information (documentation shall include a detailed explanation as to why any of this information was not provided):
- a. source of information on traditional cultural properties: name(s) of interviewee(s) or group consulted; names of interviewer and interpreter, date and location of interview, language of interview
  - b. identification of each place by Navajo and English names (English translation of Navajo name if there is no English name) and USGS 1:24,000 or 1:62,500 scale map location;
  - c. what type of place is it: description of its physical attributes or appearance and its traditional associations or functions (attributes that make it a traditional cultural property).
  - d. what impacts, if any, does the interviewee expect the proposed project to have on each place?

VITA: Klara B. Kelley

P.O. Box 2635, Gallup, NM 87305  
505-371-5306

Degrees

B.A., George Washington University, Washington, D.C., 1970  
M.A., Anthropology, University of New Mexico, Albuquerque, 1974  
Ph.D., Anthropology, University of New Mexico, 1977

Fellowships

National Science Foundation Graduate Fellowship, 1971-1974  
National Science Foundation Dissertation Improvement Grant 1975  
American Association of University Women Dissertation Fellowship,  
1975-76

Professional work excluding consulting

1971-72 Linguistic Analyst, Navajo Reading Study, University  
of New Mexico

1974-75 Statistical abstractor, Bureau of Business and  
Economic Research, University of New Mexico

1976-77 Instructor, Native American Studies Center,  
University of New Mexico. Course taught: Reservation Economic  
Development.

1977-78 Instructor, Navajo Community College, Tsaile, AZ.  
Courses taught: Introductory Anthropology--cultural; Introductory  
Anthropology--human prehistory; Introductory Economics--  
microtheory; Introductory Economics--macrotheory; and a course to  
prepare students for Arizona GED exam in social studies.

1980-83 Ethnohistorian (1980-81), technical editor (1982),  
and Assistant coordinator (1982-83), Navajo Nation Cultural  
Resource Management Program, Window Rock, AZ. Ethnohistorical  
research (see field work below), then editing archaeological  
reports, then (as assistant coordinator) conducting archaeological  
inventory surveys, maintaining site and report files, writing  
proposals, representing program at professional meetings, general  
administrative duties.

1984 Anthropologist, Bureau of Land Management, Socorro, NM,  
Resource Area. See field work below.

1985-88. Archaeologist and technical editor, Navajo Nation  
Archaeology Department, Window Rock, AZ. Conducting archaeological  
inventory surveys, editing all archaeological reports that  
professional staff of department produced, conducting  
ethnohistorical research for archaeological projects and  
environmental documents, on-job instruction of Navajo staff  
archaeologists, helping to develop uniform policies for  
identifying and protecting Navajo graves and sacred places,  
conducting background research for Navajo Nation land acquisitions,  
miscellaneous administrative duties.

1988-93. Ethnohistorian, Navajo Nation Historic Preservation Department, Window Rock, AZ. Conducting ethnohistorical research for cultural resource management planning (major effort was designing -- and conducting most of the field work for -- a survey of Navajo communities to learn about local historic preservation concerns); representing department on committees, work groups, and task forces involving other Navajo Nation, state, and federal agencies about preservation matters; representing Navajo Nation as an expert witness in federal court and in state administrative proceedings; advising department and division heads on cultural resource preservation policies and developing sacred places protection policy; preparing grant applications; reviewing cultural resource preservation documents within framework of Navajo Nation, federal, and state laws.

Consulting (short-term consultations and projects in progress excluded)

1975 Kirschner Associates, Albuquerque. Writing a proposal to do a socioeconomic technical document for an environmental impact statement.

1976 Native American Studies Center, University of New Mexico. Writing grant proposals for a Native American history curriculum development project.

1977 Isleta Pueblo Headstart Program. Miscellaneous research.

1977 Larry Adcock and Associates, Albuquerque. Data analysis for socioeconomic background reports for environmental impact statements.

1977 Harbridge House, Boston. See field work below.

1978 Larry Adcock and Associates. Data analysis for socioeconomic background reports for environmental impact statements.

1978-80 Office of Contract Archeology, University of New Mexico. See field work below.

1980 Navajo Nation Division of Economic Development. Writing portions of an implementation plan for a Navajo Nation minerals policy.

1982 School of American Research, Santa Fe. See field work.

1983 Soil Systems, Inc., Phoenix. Writing ethnohistories for Fort Wingate and White Sands Missile Range.

1984-85 Pittsburg and Midway Coal Mining Company, Gallup, NM. See field work below.

1993 Office of Contract Archeology, University of New Mexico. Providing background material for Transwestern Pipeline expansion technical report.

1993-94 Navajo-Hopi Land Commission, Window Rock, AZ. Compiling previously recorded information on Navajo sacred places in the 1882 Executive Order Reservation.

1993-94 Navajo Nation Historic Preservation Department, Glen Canyon Environmental Studies Section. Compiling previously recorded information on Navajo sacred places in and around Marble Canyon, the Grand Canyon, and related landscapes.

1993-94 Navajo Nation Justice Department. Interviewing and compiling socioeconomic data about communities in Former Bennett and Statutory Freeze Area.

1993-94, 1995-96 Dames & Moore, Phoenix. Providing information about potential impacts of Navajo Transmission Project on Navajo sacred places, to be used in the Environmental Impact Statement for this project. See also field work below.

1995 Navajo Nation Historic Preservation Department. Collaborative work with NNHPD staff archaeologist on precolumbian archaeology.

1995-1996. Navajo Nation Historic Preservation Department. Compiling and analyzing historical documentation on Navajo and non-Indian use of Nahat'a Dziil (Chambers-Sanders Trust Lands), Navajo Nation, to be part of a cultural resource inventory and management plan.

1995-1996. Nahat'a Dziil Woodland and Wildlife Management Plan, by Ecosystem Management Inc. for Office of Navajo and Hopi Indian Relocation. See field work below.

1995-1997. Ecosystems Management Inc., Gallup. Research for Glen Canyon National Recreation Area. See field work below.

1993-present. Archaeological surveys and/or interviewing for miscellaneous small projects for compliance with federal and state cultural resource protection laws. Clients include:

- Southwest Archaeological Consultants, Inc., Santa Fe
- Dames and Moore, Phoenix
- Navajo Tribal Utility Authority
- Marron and Associates, Albuquerque
- Ecosystems Management Inc., Gallup
- Navajo Nation
- Zuni Cultural Resources Enterprise

Field work (small projects excluded)

1968-69 Two summer session of University of New Mexico archaeological field school excavating at Sapawe, a large protohistoric-period pueblo near El Rito, NM.

1973 Independent field work observing trading posts in the hinterland of Gallup, NM.

1974-75 Dissertation field work. Interviews with more than 400 commercial and manufacturing firms in northwestern New Mexico, northeastern Arizona, southwestern Colorado, and southeastern Utah. The research concerned the present commercial structure of the Navajo-Hopi-Zuni region and its historical development, with a focus on trading posts.

1977 Public opinion survey in northwestern New Mexico for U.S. Bureau of Land Management coal leasing regional environmental impact statement for San Juan Basin of New Mexico (contract with Harbridge House).

1978-79 Ethnohistorical and ethnoarchaeological research for Pittsburg and Midway Coal Mining Company (contract with Office of Contract Archeology, University of New Mexico). Intensive data recovery on McKinley Mine South Lease for compliance with National Historic Preservation Act. My work concerned historical and current Navajo land-use patterns in and around the leasehold and interviews with more than 80 people.

1980 Ethnohistorical and ethnoarchaeological research for Alamito Coal Company (employed by Navajo Nation Cultural Resource Management Program). Intensive data recovery for compliance with National Historic Preservation Act. My work concerned the activities of oil drillers, Navajos, and Hispanic shepherds working for a large-scale absentee owner and interviews with 50-60 people.

1981-83 Document research and interviewing Navajo people for ethnohistorical portions of several contract archaeology projects of the Navajo Nation Cultural Resource Management Program and School of American Research; conducting archaeological surveys.

1984 Document research and interviewing residents of the Quemado, NM, vicinity and representatives of Navajo, Zuni, Acoma, and Laguna tribes about their use of the San Augustine Coal Area (about 25-30 people), conducted for Bureau of Land Management coal-leasing planning documents.

1984-85 Ethnohistorical and ethnoarchaeological research for Pittsburg and Midway Coal Mining Company McKinley Mine North Lease. Field research similar to the 1978-79 South Lease research above, but with interviews with about 20 people and an emphasis on site-formation processes rather than on land use.

1985-88 Archaeological inventory surveys and accompanying ethnohistorical research for Navajo Nation Archaeology Department (estimated 50+ reports).

1986-87 Preparation of a socioeconomic technical document for a Supplementary Environmental Impact Statement on the proposed Dine Power Project (formerly New Mexico Generating Station) at Bisti, NM. The field work involved interviewing about 20 people representing families that use land proposed for the Dine Power Plant and related coal mines. (Navajo Nation Archaeology Department contract with Public Service Company of New Mexico.)

1987-88. Interviews with chapter officials and 40-50 other people in 8 chapters of the Navajo Nation to learn about historic preservation concerns of the Navajo people themselves, then documenting the places identified. Navajo Nation Historic Preservation and Archaeology Department grants from New Mexico and Arizona State Historic Preservation Offices.

1988-89 Inspection and recording of approximately 80 archaeological sites in the Tuba City and Navajo Mountain areas reportedly occupied by Navajos, Hopis, Paiutes, and people of mixed Navajo-Paiute ancestry. Work was in preparation for expert witness testimony on behalf of the Nation Nation in litigation in federal court concerning the 1934 Reservation.

1990. Interviews with approximately 25 Navajo residents of Hopi Partitioned Lands in 1882 Reservation to identify sacred places for Navajo-Hopi Land Office (a Navajo Nation program).

1990, 1992 Interviews with 16 Navajo residents of Canyon de Chelly National Monument to identify landscapes culturally important to Navajos; field documentation of places identified. Two-phase project with funding from National Park Service to Navajo Nation Historic Preservation Department.

1993-1995. Recording comments at two rounds of public scoping meetings in more than a dozen communities all around Navajoland about possible impacts of the proposed Navajo Transmission Project (my focus was on the cultural concerns that local people expressed); interviews with four ceremonial practitioners about certain alternative route segments in 1993; interviews with Navajo chapter officials about mitigating measures in 1995.

1993-94. Interviews of about half of a sample of 50 families in the former Bennett and Statutory Freeze Area to determine various socioeconomic conditions during the Bennett and Statutory Freezes (collaboration with Dr. Scott Russell).

1995-1996. Nahat'a Dziil Woodland and Wildlife Management Plan, by Ecosystem Management Inc. for Office of Navajo and Hopi Indian Relocation. Recording comments of Navajo residents of Nahat'a Dziil in public meetings and private interviews for interdisciplinary community-based planning team.

1995-1997. Glen Canyon National Recreation Area Ethnobotanical Study by Ecosystem Management Inc. for National Park Service. Principal Investigator for interdisciplinary research team to interview about 20 Navajo and San Juan Southern Paiute ceremonial practitioners about traditional uses of plants and botanical protection policies in Glen Canyon National Recreation Area.

1993-present. Archaeological surveys and/or interviewing for miscellaneous small projects compliance with federal and state cultural resource protection laws. See Consulting above.

Writings: Books and Articles

1976 Dendritic Central Place Systems and the Regional Organization of Navajo Trading Posts. In Regional Analysis, Volume 1, Economic Systems, ed. by Carol A. Smith. Academic Press, NY.

1979 Federal Indian Land Policy and Economic Development in the U.S. In Economic Development in American Indian Reservations, ed. by Roxanne Dunbar Ortiz. Native American Studies Program, University of New Mexico, Albuquerque.

1980 Navajo Political Economy before Fort Sumner. In The Versatility of Kinship, ed. by Linda S. Cordell and Stephen Beckerman. Academic Press, NY.

1982 Ethnoarchaeology of the Black Hat Navajos: Ahistorical and Historical Determinants of Site Features. Journal of Anthropological Research 38:45-74.

1982 Yet Another Reanalysis of the Navajo Outfit: New Evidence from Historical Documents. Journal of Anthropological Research 38:363-381.

1983 Ethnoarchaeology and the Study of Family Land Use Patterns. American Archeology 3:231-236.

1984 Navajo Influence on the Anasazi Landscape. American Archeology 4(2):146-150.

1985 The Ethnoarchaeology of Navajo Trading Posts. The Kiva 51:19-37.

1986 Navajo Land Use: An Ethnoarchaeological Study. Academic Press, Orlando FL.

1989 (with Peter Whiteley) Navajoland: Family Settlement and Land Use. Navajo Community College Press, Tsaile, AZ.

1993 (with Harris Francis) Places Important to Navajo People. American Indian Quarterly 17(2):151-169.

1994 Pastoralism, Material Culture, and the Market in the Southwestern United States. In Pastoralists at the Periphery: Herders in a Capitalist World, ed. by Claudia Chang and Harold Koster, pp. 62-78. University of Arizona Press, Tucson.

1994 (junior author with Alan Downer, Alexandra Roberts, and Harris Francis) Identification of Historic Resources: Traditional History and Alternative Conceptions of the Past. In Conserving Culture: A New Discourse on Heritage, ed. by Mary Hufford, pp. 39-55. University of Illinois Press, Urbana and Chicago.

1994 (with Harris Francis) Navajo Sacred Places. Indiana University Press, Bloomington.

1997 Comment on Anthropology and the Making of Chumash Tradition, by Brian D. Haley and Larry R. Wilcoxon. Current Anthropology 38:782-783.

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Chief Administrative Judge Peter B. Bloch, Presiding Officer<sup>7</sup>

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In the Matter of )

HYDRO RESOURCES, INC. )  
2929 Coors Road, Suite 101 )  
Albuquerque, NM 87120 )

) Docket No. 40-8968-ML

) ASLBP No. 95-706-01-ML  
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**TESTIMONY OF WILLIAM A. DODGE**

On behalf of Eastern Navajo Diné Against Uranium Mining ("ENDAUM") and Southwest Research and Information Center ("SRIC"), William A. Dodge submits the following testimony regarding cultural resources issues regarding Hydro Resources Inc.'s ("HRI's") amended application for a source materials license.

**Q. 1. Please state your name and qualifications.**

A.1. My name is William A. Dodge. I am a Cultural Resources Consultant providing services in the areas of compliance with the National Historic Preservation Act (NHPA), the Native American Graves Protection and Repatriation Act (NAPGRA), the National Environmental Policy Act (NEPA), and related historic preservation and heritage conservation issues. I have over 20 years professional experience in archaeological and anthropological research, with an emphasis on cultural resource management and historic preservation law and policy. The principal focus of my work has been in the Southwest United States, where I have been employed by the Arizona State Museum, National Park Service, Pueblo of Zuni, the Bureau of Indian Affairs, and the Indian Health Service. A

copy of my resume is attached to this testimony as Exhibit A.

**Q. 2. What is the purpose of your testimony?**

**A.2.** I have been asked to describe the incomplete status of the National Historic Preservation Act (NHPA) Section 106 historic properties review process for the proposed Hydro Resources Inc. Crownpoint Uranium Solution Mine at Crownpoint and Church Rock, New Mexico, and to provide my professional opinion that the review conducted to date is inadequate to ensure that properties eligible for listing in the National Register of Historic Places are not destroyed or disturbed before they have been properly identified and subjected to the procedural protections of the NHPA.

**Q. 3. What materials did you review in support of your evaluation?**

**A.3.** I have reviewed the following cultural resources inventory reports and cultural resource management plans concerning the proposed Crownpoint Project:

“Archaeological Clearance Survey Report of a Road Improvement Right-of-Way Northwest of Crownpoint, New Mexico,” by J. Lee Correll, Navajo Tribal Museum (9/29/76); “An Intensive Archaeological Clearance Survey of Four Sections of Indian Allotment Land Conducted for United Nuclear Corporation,” by Dabney Ford and Suzanne DeHoff, Report 77-SJC-078, New Mexico State University (6/77); “The URI Archaeological Protection Program for the Church Rock Mine-Survey and Preservation of the Archaeological Antiquities,” by Dan Hurley and Michael P. Marshall (7/88); “The URI Crownpoint Cultural Resources Survey, A Class III Inventory,” by Michael P. Marshall, Cibola Research Report No. 38 (6/28/89); “A Cultural Resources-

Environmental Assessment and Management Plan for the Proposed Hydro Resources, Inc., Unit No. 1 Lease in the Crownpoint Area of the Eastern Navajo District, New Mexico," by Michael P. Marshall, Cibola Research Report No. 52 (12/15/91); "A Cultural Resources-Environmental Assessment and Management Plan for the Proposed Hydro Resources, Inc., Crownpoint Lease in the Eastern Navajo District, New Mexico," by Michael P. Marshall, Cibola Research Report No. 57 (9/15/92); "Report on Sacred and Traditional Places for Hydro Resources, Inc." by Earnest C. Becenti, Sr. (1996); and "Cultural Resources Inventory of Proposed Uranium Solution Extraction and Monitoring Facilities at the Church Rock Site and of Proposed Surface Irrigation Facilities North of the Crownpoint Site, McKinley County, New Mexico," by Eric Blinman, Archaeology Notes 214, Museum of New Mexico, Office of Archaeological Studies (1997). I use the term "cultural resources inventory" to include the full range of cultural resources: archaeological sites, historic buildings and structures, cultural landscapes, and traditional cultural properties, which is consistent with most historic properties compliance specialists.

I also reviewed excerpts of "Final Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico," U.S. Nuclear Regulatory Commission (2/97); "Crownpoint Uranium Project Consolidated Operations Plan, Revision 2.0" HRI, Inc. (8/15/97); and "Safety Evaluation Report" (New Mexico Uranium Mining Project), NRC (12/97).

I have also reviewed letters, supplemental information requests and responses, and

technical reports written between 1993 and 1997 relating to cultural resources that are within the proposed project area. I have review the set of letters sent on May 20, 1998 by the NRC Staff to Roy Bernal, Chairman, All Pueblo Indian Council, Charles Long, Crownpoint Chapter President, Herbert Benally, Churchrock Chapter President, Reginald T. Pasqual, Acoma Pueblo Governor, Roland Johnson, Laguna Pueblo Governor, the BIA, the BLM, Joseph Dishta, Director, Pueblo of Zuni Heritage and Historic Preservation Office, and Leigh Jenkins, Director of Hopi Cultural Preservation Office (Exhibit B), the response letters received by the NRC (Exhibit C), and the letter referencing the responses from the NRC to Richard F. Clement Jr., HRI President (July 10, 1998) (Exhibit D).

On the dates indicated in parenthesis, I spoke either in person or on the telephone to the following people and questioned each of them on the status of the Section 106 process for the Crownpoint Uranium Solution Mining Project: Dr. Alan Downer, Navajo Nation Tribal Historic Preservation Officer (12/22/97); Mr. Joe Dishta, Director, Pueblo of Zuni, Heritage and Historic Preservation Office (12/22/97); Mr. Kurt Dongoske, Tribal Archaeologist, Hopi Cultural Preservation Office (12/29/97); Dr. Glenna Dean, State Archaeologist, New Mexico Office of Cultural Affairs, Historic Preservation Division (12/30/97); and Mr. Alan Stanfill, historic preservation specialist, Denver Office, Advisory Council on Historic Preservation (12/22/97).

**Q. 4. What are the general requirements of Section 106 of the NHPA?**

**A.4.** Section 106 of the NHPA requires Federal agencies with jurisdiction over federal,

federally assisted, or federally licensed undertakings to take into account the effects of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places, prior to the expenditure or license issuance. 16 U.S.C. § 470f; 36 C.F.R. § 800.3(c). Section 106 also requires agencies to afford the Advisory Council the opportunity to comment on such undertakings. Id. The Advisory Council has established regulations for federal agencies to follow in complying with Section 106. 36 CFR Part 800 (Protection of Historic Properties). Participation by local governments, Indian tribes, and interested members of the public is also an important part of the Section 106 process. See, e.g., 36 C.F.R. §§ 800.1(c)(2). The Advisory Council has recognized the importance of Indian tribes in the regulatory process by virtue of their inherent knowledge of cultural resources located within their reservation, or on land used by them historically, and their interest in protecting these resources. It is further accepted that these resources may hold cultural significance for a tribe that is not obvious to the non-tribal researcher or the federal agency. Similarly, some of these resources, particularly traditional cultural properties, may not even be identical except by selected members of a tribe.

**a. General background of Section 106 of the NHPA**

The regulations define "historic property" as any prehistoric or historic site, district, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. 36 CFR § 800.2(e). This includes those properties formally determined as such by the Secretary of the Interior and all other properties that meet

National Register criteria. The National Register contains a wide variety of property types including historic buildings and structures, archaeological sites, historic landscapes, and traditional cultural properties (TCPs). The National Register criteria are stated in 36 CFR Part 60. An "undertaking" consists of any project, activity, or program that can result in changes in the character or use of historic properties, if any such historic properties are located within the area of potential effects. 36 CFR § 800.2(o). The "area of potential effects" is the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist. 36 CFR § 800.2(c).

**b. 1992 amendments to the NHPA**

In 1992, the NHPA was amended in part to give Indian tribes a larger role in the Section 106 consultation process. The amended Act authorizes tribes to assume the functions of a State Historic Preservation Officer (SHPO) discussed below with respect to tribal lands. 16 U.S.C. § 470a(d)(2). Tribal lands include all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities. 16 U.S.C. 470w(14). In addition, the amended statute reemphasizes the fact that properties of traditional religious and cultural importance to a tribe (i.e., "traditional cultural properties"), may be determined to be eligible for inclusion in the National Register. 16 U.S.C. § 470a(d)(6)(A). Furthermore, the amended Act requires that a Federal agency shall consult with any Indian tribe that attaches religious and cultural significance to such properties. 16 U.S.C. § 470a(d)(6)(B). The amended Act's concern for TCPs was

supplemented by the publication of National Park Service "National Register Bulletin 38" which presented guidelines for evaluating and documenting TCPs. Bulletin 38 defines a TCP as a property that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. Bulletin 38 has become the accepted standard for Section 106 compliance with respect to TCPs among most historic preservation specialists. In addition, the Tenth Circuit Court of Appeals cited Bulletin 38 in its decision on how federal agencies should consult with Indian tribes on matters pertaining to TCPs. Pueblo of Sandia v. United States, 50 F.3d 856, 861-862 (10<sup>th</sup> Cir. 1995).

**c. Section 106 four step compliance process**

As guided by 36 CFR Part 800, the Section 106 compliance process requires a Federal agency to take four steps before approving a proposed undertaking: (1) identify potential historic properties, (2) evaluate the eligibility of the properties for inclusion in the National Register, (3) determine the effects of its undertaking upon listed or eligible historic properties, and (4) if necessary, develop a plan to avoid or minimize any effects.

Identifying the historic properties (step 1) requires that the agency begin by assessing the information needed to locate historic properties. 36 CFR § 800.4(a). This information needs assessment must be done in consultation with the SHPO, Indian tribes, and other persons or organizations likely to have knowledge of historic properties in the project area to determine whether further actions, such as field surveys, will be required to

identify properties. Based on this information needs assessment, the agency must then make a "reasonable and good faith effort" in consultation with the SHPO to identify historic properties and gather enough information for the next step, the evaluation of the eligibility of these properties for National Register listing. 36 CFR § 800.4(b).

If historic properties are located, then the agency, in consultation with the SHPO, must apply the National Register Criteria to determine if the properties are eligible (step 2). The 1992 amendments to NHPA also require consultation with the appropriate Indian tribe(s) regarding the evaluation of properties as TCPs. Although the Advisory Council has not yet issued revisions to its regulations to account for the 1992 statutory amendments, compliance with Section 106 requires consultation with tribes that have cultural affiliation with TCPs to determine the eligibility of those TCPs.

If eligible properties are found, the agency, again in consultation with the SHPO and the appropriate tribes, must assess the effects of the undertaking on the properties (step 3). Advisory Council regulations at 36 CFR § 800.9 provide the agency with a set of criteria with which to determine whether the undertaking will have either (1) No Effect, (2) No Adverse Effect, or (3) Adverse Effect. These findings must be documented. 36 C.F.R. § 800.8.

If an undertaking is found to have no effect, the agency must notify the SHPO and interested persons, and provide the SHPO with an opportunity to respond. 36 C.F.R. § 800.5(b). If the undertaking is found to have an effect on historic properties, the agency must consult with the SHPO, the Advisory Council, and the appropriate tribes to

determine whether the effect is adverse. 36 C.F.R. §§ 800.5© and (d)(2). If the undertaking is found to have an adverse effect on historic properties, the agency must consult with the SHPO, the Advisory Council, and the appropriate tribes to develop a plan to avoid or minimize any effects (step 4). 36 CFR §§ 800.5(d)(2) and 800.5(e)(4). If these parties come to agreement on a plan, they enter into a memorandum of agreement that spells out how the agency will avoid or reduce the effects of the undertaking on the historic properties. 36 CFR § 800.5(e)(4). Completion and acceptance of a memorandum of agreement by the Advisory Council usually signals the completion of the Section 106 consultation process. When there is no agreement on a plan, the Advisory Council regulations require the Agency to take specified steps to obtain the Advisory Council's comments. 36 CFR § 800.6.

**Q.5. Please describe the status of the NHPA review for the Crownpoint Project.**

**A.5.** The proposed licensing of the HRI project constitutes an undertaking that is subject to Section 106 and the Advisory Council's regulations, as acknowledged in the FEIS at page 3-73 and in correspondence by NRC Staff that I reviewed. Although the NRC has issued a license for the entire Crownpoint Project, HRI and the Staff have taken a piecemeal approach to the NHPA review, and the NHPA process remains incomplete for a large portion of the project area. For the Crownpoint and Unit 1 areas, which make up most of the geographical area of the project, the NRC has just started the Section 106 process, namely steps 1 and 2 (identification and evaluation of eligibility). For these areas, the NRC has made no determination regarding whether or not there are adverse effects on

any historic or cultural properties.

In addition, Mr. Stanfill of the Advisory Council checked the Advisory Council's Denver Office files at my request and found no information regarding this project. The Denver Office is the point of contact with the Advisory Council for federal agencies concerning undertakings in New Mexico.

Only with respect to Sections 8 and 17 has the NRC Staff made a determination regarding the effects of the Crownpoint Project on historic properties. The determination is reflected in the form letter, all dated May 20, 1998, sent by the NRC to Mr. Leigh Jenkins, Director, Hopi Cultural Preservation Office; Mr. Charles Long, President, Crownpoint Chapter, Navajo Nation; Mr. Herbert Benally, President, Churchrock Chapter, Navajo Nation; Mr. Reginald T. Pasqual, Governor, Pueblo of Acoma; Mr. Ronald Johnson, Governor, Pueblo of Laguna; Mr. Joseph Dishta, Director, Pueblo of Zuni Heritage and Historic Preservation Office. Exhibit B. As I will discuss later in my testimony, I do not believe that the finding of no effect is adequate to satisfy the NHPA.

**Q. 6. Has the Section 106 review process for the proposed HRI project been adequate?**

**A.6.** I do not believe the Section 106 review process for the Crownpoint Project is adequate, in several respects. First, the NHPA review has not been completed for all areas of potential effect, i.e., areas for which operations have been licensed by the NRC and that may be disturbed by HRI. Second, to the extent that the review has been completed, for Sections 8 and 17, it is inadequate to comply with the requirements of the NHPA. Third,

for all of the project, including Sections 8 and 17, Unit 1, and Crownpoint, the NRC has failed to consult adequately with Indian tribes. Finally, the documentation supporting the Section 106 review is inadequate.

**Q.7. Please explain the basis for your conclusion that the NHPA review has not been completed for all areas of potential effect.**

**A.7.** In order to be adequate, the Section 106 review must properly define the area of potential effects, and all four steps must be completed for the entire area of potential effects before the undertaking may be permitted. See 36 C.F.R. § 800.3(c).

In this case, the NRC has not complied with the NHPA because it has not completed the four steps required for the Section 106 process prior to issuance of the license, as required by the NHPA. 16 U.S.C. § 470f. Thus, the NRC has not taken the steps necessary to ensure procedural protection of listed or eligible historic properties affected by the Crownpoint Project before licensing the HRI project, as required by the NHPA. It is my professional opinion that in the absence of a completed Section 106 review process, there is a significant risk that HRI's construction and operation activities will destroy, damage or disturb cultural resources before they can be identified or properly protected. Well before mining begins, building of access roads, construction of well pads, and development of facilities to support the actual mining activity are substantially likely to damage, destroy, and intrude upon archeological sites and TCPs and thereby have grave adverse effects on the cultural life ways of both Navajo and Pueblo peoples.

The NRC has made inconsistent representations regarding the areas to be

developed during the first five years of operation, and therefore to be covered by the Section 106 review. Mr. Gillen of the NRC indicated in Attachments C and D to his October 2, 1996 letter to the NMSHPO that the first five-year project area to be covered by the initial Section 106 review would include portions of the Church Rock, Crownpoint, and Unit 1 sites comprising the proposed project. This intention is repeated in Mr. Holonich's January 31, 1997 letter to Dr. Downer. Similarly, according to HRI's Consolidated Operations Plan Revision 2.0 dated August 15, 1997, mining is scheduled to commence at the Church Rock site in the first quarter of 1998, at the Unit 1 site in the first quarter of 1999, and at the Crownpoint site in the first quarter of 2000. COP Revision 2.0, Figure 1.4-1. HRI stated in its Response to Scheduling Conference Briefs of all Petitioners, that mining is scheduled to commence at Church Rock Section 8 in the year 2000, at Church Rock Section 17 and Unit 1 in the year 2002 and at Crownpoint in the year 2004. HRI's Response to Scheduling Conference Briefs of all Petitioners, (September 9, 1998) Attachment A at 3. The FEIS also indicates that portions of the Crownpoint and Unit 1 mining units will be developed in the initial five year mine plan. FEIS Figure 2.11 at 2-30. In addition, the central processing plant for all three mine sites is located in Crownpoint.

In contrast to these representations, in June of 1997, Joseph Holonich of the NRC represented to the NMSHPO that "a cultural resources survey of Section 12 (T17N R13W) and portions of Sections 7 and 18 [sic, 8 and 17] (T16N R16W) has been conducted" and that "these are the areas that HRI proposes to initially develop." Letter

from Joseph J. Holonich, NRC, to Lynne Sebastian, NMSHPO (June 19, 1997). Sections 8 and 17 correspond to the Church Rock mining site, and Section 12 is a proposed wastewater land application area in Crownpoint. According to Mr Holonich, "although additional areas were initially proposed for development during the first five year period of the project, these areas are either no longer planned for development during this time frame (e.g., Crownpoint), or were difficult to gain access to because property leases have not been executed (eg., Unit 1). Consultation regarding these areas will be conducted at a later date." Mr. Holonich further stated that the Museum of New Mexico Report documenting the cultural resources survey of Sections 12 and portions of 8 and 17 "will serve as the basis of a determination of potential effect under Section 106 of the NHPA." Thus, contrary to the NRC's other representations that all three sites would be developed in the first five years, and therefore reviewed pursuant to Section 106, the NRC actually set out to study only parts of two of the sites.

Mr. Holonich's June 19, 1997, statements to the SHPO about the areas that will initially be developed are inconsistent with the FEIS for the project and HRI's later released Consolidated Operations Plan Revision 2.0. However, land within the Unit 1 site (portions of Sections 15, 16, 21, 22, and 23, Township 17 North, Range 13 West) and Crownpoint site (portions of Sections 19, 24, and 25, Township 17 North, Range 13 West, and Section 29, Township 17 North, Range 12 West) as described in the FEIS at pages 2-26 and 2-28 is omitted from the area that the NRC intends to cover in the Section 106 process for this first five year license issuance. Thus, it appears that the NRC has

omitted from its cultural resources survey significant areas slated for development during the first five years of HRI's operation.

Similarly, it appears that the Church Rock waste application areas (see COP Revision 2.0 at 42-43) were not included in the cultural resources inventory reports. It is my understanding that the NRC is not concerned about this because HRI would need to make a license application to land-apply liquid waste. In my opinion, this piecemeal approach is extremely short-sighted and inconsistent with the NHPA's goal of including historic and cultural values into the decision making process. By allowing the front end of the Crownpoint Project to go ahead without evaluating the impacts of the inevitable back end, the NRC weights the decisionmaking process in favor of development rather than protection of historic and cultural properties. By not considering the effects of land application of uranium-tainted wastewater on historic and cultural resources in the proposed land application area, the NRC appears to be foreclosing its options with regard to the adequate treatment of historic properties. What if certain historic properties are found at a later date on the land application site? Impacts on these properties will be unavoidable if the project is beyond a point at which significant changes or abandonment of the project can be taken? Such questions cannot, in my opinion, wait for an answer. They must be answered "up front" by identifying all potentially affected historic properties in all potentially affected areas.

In addition, in my professional opinion, the area of potential effects is likely to extend beyond the project boundaries to include TCPs in the vicinity of the project, which

may be adversely affected by visual or noise intrusion or alteration of their setting. 36 CFR § 800.4. In HRI's Response to Supplemental Information Request attached to the letter dated April 10, 1996, from Mark Pelizza, HRI, to Daniel Gillen, NRC, HRI contends that TCPs will not be impacted by the undertaking because "all traditional locations . . . lie north or west of the mine field boundaries." Similarly, HRI states that, "(1) none of the potential resources [TCPs] are on property owned or leased by HRI, Inc., and thus, (2) none of the properties are within the area to be impacted by the proposed well field." In accordance with the definition of "area of potential effects" cited in paragraph 9 above, the fact that there are no TCPs within the proposed project boundaries is not relevant to the question of whether there will be effects to TCPs. The agency must determine how their project will affect the integrity, setting, feeling, or association of such properties regardless of whether or not they are within a project's boundaries. The area of potential effects must be defined broadly enough to consider the visual, auditory, or atmospheric effects on historic properties which may lie outside the project boundaries but still be affected by project impacts. My opinion in this regard is supported by statements made by Dr. Downer in a letter dated October 31, 1996, to the NRC. Therefore, the area of review designated by the NRC does not comply with Section 106.

**Q.8. Do you believe that the NRC has provided adequate measures for the protection of historic properties under the license?**

**A.8.** As I have stated above, I believe the Section 106 process should have been completed for the entire Crownpoint Project before the license was issued. Even if the

NRC's piecemeal approach were acceptable, however, I do not believe that the NRC has taken adequate measures to protect cultural and historic properties pending completion of the Section 106 process. I have reviewed the following proposed license condition stated in the FEIS at 4-112 and repeated in the Consolidated Operations Plan at 23:

the NRC Staff recommend that if a license is issued it be conditioned on the development and implementation of a final cultural resources management plan for all mineral operating lease areas and other land affected by licensed activities. The plan would be developed pursuant to the National Historic Preservation Act Section 106 review and consultation process and would provide specific procedures to implement HRI's policy of avoiding cultural resources. The plan would include archaeological and traditional cultural property surveys of all lease areas; identification of protection areas where human activity would be prohibited; archeological testing (by an archaeologist contracted to HRI and holding appropriate permits from the Navajo Nation and the State of New Mexico); and archaeological monitoring during all ground disturbing construction, drilling, operation, and reclamation activities.

In my professional opinion, the proposed license condition is not equivalent to completion of the Section 106 process prior to issuance of the license. The Section 106 process calls for a logical step by step progression to identify and evaluate historic properties and then determine what effects the undertaking may have on them. Only after the effects are determined can a treatment plan and memorandum of agreement be developed to specifically address ways to avoid or minimize any effects. The license condition makes an *a priori* determination that all effects can be avoided. The 106 process is not designed for such "boiler plate" decisions, but instead relies on a consultative process among all interested parties to try and reach agreement.

HRI, Inc. has prepared a "Cultural Resources Management Plan" for the proposed

project. A letter from HRI to Leigh Jenkins, Hopi Cultural Preservation Office, dated May 16, 1996, indicates that this report has been distributed to the Hopi Tribe. In my professional opinion, the preparation of this plan, which calls for the avoidance of adverse effects on historic properties, is premature at this stage in the 106 process. Such a plan, which is usually called a "treatment plan" cannot be properly prepared before historic properties have been completely identified. In this case, as discussed below, Navajo TCPs have not been fully identified and there has not been a good faith effort to identify TCPs significant to the Hopi, Zuni, and other tribes. Moreover, a cultural resource management plan is not the equivalent of the memorandum of agreement required by the regulations. The memorandum of agreement requires that all consulting parties have been satisfied that historic properties have been identified and evaluated, and that a treatment plan to take into account the effects of the undertaking on identified properties has been agreed upon. It is my professional opinion that this project is still a long way from the memorandum of agreement phase.

**Q.9. Please describe the basis for your opinion that to the extent that the Section 106 review has been completed, for Church Rock Sections 8 and 17, it is inadequate to comply with the requirements of the NHPA.**

**A.9.** There are several reasons that I believe the review conducted by the NRC Staff on Sections 8 and 17 is inadequate. First, the NRC's "no effects" finding of May 20, 1998, is applied only to archaeological sites. Second, the NRC did not do an adequate job of consulting with Indian tribes regarding these archaeological sites and any existing

traditional cultural properties. My opinion regarding the inadequate consultation with Indian tribes also relates to the entire project, for which the NRC has sent letters to the Navajo, Hopi, and Zuni tribes.

**Q.10. Please explain the basis for your opinion that the review conducted by the NRC Staff on Sections 8 and 17 is not supported by adequate documentation.**

**A.10.** In my professional opinion, the reports relied on by the NRC for the identification of eligible historic properties are incomplete. The NRC is only using the Museum of New Mexico report; however, cultural resources reports for the entire project area should be considered in a proper effort to identify and evaluate historic properties that the project may affect. Only the Museum of New Mexico report and the Marshall report no. 38, in my professional opinion, adequately document the archaeological resources located within their respective scopes of work. The adequacy of the Ford and DeHoff report has already been called into question by the NRC (Mr. Holonich's letter to Dr. Downer dated January 31, 1997). And the Correll report, in my opinion, does not meet contemporary professional standards. From my understanding of the area of effects for this project, it appears that the reports prepared to date do not adequately cover the project area.

The Marshall reports 52 and 57, are planning documents intended to be used by HRI not for inventory survey, but as guides to describing known cultural resources (particularly archaeological sites) and to outline a plan for future data collection and analysis. They, in fact, form the basis for the HRI Cultural Resources Management Plan referred to in paragraph 28 above. These reports contain some statements regarding

Pueblo-affiliated traditional cultural properties that cannot be supported by fact. For instance, both reports call for additional research into Navajo TCPs; but have identical statements that, "Pueblo Anasazi sacred sites may once have existed in the area, but it is very unlikely that any of these sites are maintained by a living community." This is a highly speculative conclusion and is not supported by my knowledge of the Hopi Tribe's and Pueblo of Zuni's active claims to ancestral lands in the project area. Marshall further states that, "In the unlikely event that such places are still maintained by Pueblo populations, it is probable that Navajo residents of the area will have knowledge of this use." The same generalization is found in the Becenti report in which he claims there is no evidence of religious use of the area by "other Indian tribes or pueblos." In my professional opinion, only the religious and cultural leaders of the Hopi, Zuni, and other Indian tribes are qualified to determine whether there are TCPs in the project's area of potential effects. Based on the documentation provided me there is no indication that either Mr. Marshall or Mr. Becenti contacted the relevant tribes prior to making these statements.

The 1997 Museum of New Mexico report, which the NRC indicates is the basis for their Section 106 review, reexamines sites found during previous surveys, describes new archeological sites found, and addresses identification of Navajo traditional cultural properties. It does not, however, consider the presence of non-Navajo TCPs, nor does it explicitly describe its field methodology as it pertains to the identification of Navajo sites. For instance, while the report identifies the traditional cultural practitioners interviewed

about TCPs, it does not state how these people were chosen for the interview, nor does it tell us if the interviewees live in the project area. Both are important facts relating to the relevancy of their information and the adequacy of the identification process.

**Q.11. Please explain the basis for your opinion that the NRC has failed to consult adequately with Indian tribes.**

**A.11.** In my professional opinion, the NRC has not done an adequate job of consulting with Indian tribes. This has been true throughout the process, for all of the areas of the Crownpoint Project. In addition, the NRC has to date failed to adequately consult with tribes, other than Navajo, regarding traditional cultural properties affiliated with their respective cultures that may exist within the project area. Although the NRC has made initial contact by letter with the Hopi and Zuni tribes, my conversations with tribal representatives indicate they are still waiting for the NRC to continue consultation on traditional cultural properties. In my opinion, the letters exchanged to date are, at best, merely an introductory stage of such consultations and the tribes are reasonably still awaiting consultation. Identification and evaluation of TCPs (steps 1 and 2) cannot be considered complete before knowledgeable traditional cultural practitioners of the Hopi, Zuni, Acoma, and Laguna tribes are provided the opportunity to conduct fieldwork in the project area.

I have reviewed the letter report from Dr. Lorraine Heartfield, cultural resources consultant, to Mr. Mark Pelizza, HRI, Inc., dated April 30, 1996, in which Dr. Heartfield states that she sent letters to the pueblos of Hopi, Zuni, Acoma, and Laguna, and to the

All Indian Pueblo Council asking them to identify TCPs in or near the project location. Based on my professional experience with the Section 106 process and knowledge of Bulletin 38, this does not constitute “consultation” with the tribes regarding TCPs. Pueblo governors or chairmen are often not the primary source of information regarding TCPs. Knowledgeable individuals, who are usually religious and cultural leaders and are usually referred to as traditional cultural practitioners, are the persons who should be questioned. Bulletin 38 at 6-7 notes that often these people are not involved in the tribe’s political structure. Therefore, it is recommended that the political leaders direct the agency to those knowledgeable people. It is also customary and important, as emphasized in Bulletin 38 at 7-8, for the appropriate traditional cultural practitioners to visit the project area to identify and evaluate TCPs. It is usually important that the practitioners confer with one another during a site visit in order to fully recognize the importance of a place. Even then they are sometimes reluctant to disclose the exact location or importance of the place due to the spiritual power it might have. Thus, to rely on a writing a letter to tribes as the means of identifying TCPs is not adequate to comply with Section 106.

My opinion that consultation with the appropriate tribes has not been properly conducted is supported by correspondence to HRI from Zuni and Hopi officials. A letter from Roger Anyon, then Director of the Zuni Heritage and Historic Preservation Office, to HRI, Inc. dated March 28, 1996, states that fieldwork by the Zuni Cultural Resources Advisory Team would be required in order to assess and evaluate TCPs. The Hopi

Cultural Preservation Office also sent a letter to HRI, Inc., dated April 25, 1996, stating that a number of Hopi clans have ties to the region of the proposed project, and the Hopi looked forward to working cooperatively with HRI in the future. In my professional opinion, both of these letters demonstrate a concern by each tribe that significant TCPs may exist within the area of potential effects of the project and indicate that they expect further discussion and fieldwork to take place.

In my professional experience, federal agency consultation with tribes is guided by President Clinton's memorandum of April 26, 1996, "Government-to-Government Relations with Native American Tribal Governments," which directs the Federal agency, not the project proponent, to initiate consultation with tribes. It has been my experience that many tribes do not consider consultation to have begun until the appropriate agency official has contacted their governmental leadership. Then the two sides can decide who within the federal agency should talk to whom within the tribal socio-political structure.

In this case, the documents I have reviewed reflect that, although HRI called tribal officials on February 22, 1996 as a result of a NRC inquiry, the NRC's first communication with officials of the Hopi, Zuni, Acoma, and Laguna Tribes regarding Section 106 consultation was by a letter dated October 2, 1996, which appears in Appendix C of the FEIS. This is a form letter that states that the addressees "have either expressed interest, or the NRC has determined that you may have an interest in the consultations being conducted for the Section 106 review process" and states that "we will

keep you informed as the review process proceeds." In my professional opinion, this letter is an insult to tribal sovereignty that flies in the face of the presidential memorandum. That letter further states that NRC initiated the Section 106 review process by a letter to the New Mexico SHPO of the same date. Subsequently, by letter dated January 31, 1997, to Dr. Alan S. Downer of the Navajo Nation Historic Preservation Department from Joseph J. Holonich, and copied to Navajo, Hopi, Zuni, Acoma, and Laguna tribal officials, the NRC describes survey work to be done or underway to remedy shortcomings in the first step of the Section 106 process (identification of historic properties) and requests a response "that would include, as necessary, any direction or advice about advancing the review process and comments about the intended or ongoing survey work." Again, to write one tribe and copy the other tribes is an insulting gesture on the NRC's part. Furthermore, from my review of the correspondence identified above, no further discussions have taken place regarding the identification of TCPs despite the Zuni and Hopi tribes' request for further consultation. Subsequent correspondence from the NRC merely asked the tribes to review and comment on the 1997 Museum of New Mexico report.

In my professional opinion, the tribes could reasonably assume from this correspondence that the NRC would continue to update them and would consult with them at each step in the Section 106 process. In particular, the Navajo Nation, Hopi, and Zuni tribal officials had previously conveyed to NRC in writing that they expected to be active participants in the 106 process at its earliest stages. In my professional opinion, the

apparent lack of a written response to the NRC's January 31, 1997, letter by the Navajo Nation and to the NRC letters by other tribal officials would not be sufficient grounds for the NRC to halt further efforts to consult those tribes in good faith as required by Section 106 and the Advisory Council's regulations. In my professional opinion, the correspondence by the NRC and HRI to the Zuni, Hopi, Laguna, and Acoma tribes that I have reviewed, and the limited efforts to contact those tribes described by Lorraine Heartfield in her report of April 30, 1996, only represent the initial stage of a proper consultation effort.

In the January 31, 1997 letter from Joseph J. Holonich, NRC, to Alan Downer, Navajo Nation, the NRC admits to not having completed archaeological surveys of the project area and having an absence of information about traditional cultural properties. The Museum of New Mexico Report remedied only partially the need for more archaeological survey work because, as discussed above, some locations where ground disturbance is proposed have not been surveyed. As for the lack of TCP information, it is clear that the NRC has not rectified this situation. In fact, Mr. Holonich's statement that, "Cultural resource specialists of some of the aforementioned tribes and pueblos [Navajo, Hopi, Zuni, Acoma, Laguna] have indicated that the additional archaeological surveys may provide information about traditional cultural properties in the area," clearly demonstrates that the NRC does not understand the issues or needs associated with identifying traditional cultural properties. Rarely do archaeologists have the training or experience to identify these properties. It is generally accepted throughout the profession that

ethnographers and tribal religious and cultural practitioners are the ones best suited to identify TCPs.

The NRC letters of May 20, 1998 only request comments regarding the NRC's no effect determination on archaeological sites based on the OAS report. These letters do not, in my opinion, adequately address the question of TCP identification and evaluation by non-Navajo tribes. The letters I examined do not in any new or meaningful manner address the question of whether or not these tribes have identified, or wish to pursue identification efforts, TCPs within the proposed area of potential effects. Furthermore, these letters do not clarify the issues pertaining to whether or not the NRC is adequately complying with the spirit of the Section 106 review process by not considering the entire area of potential effects that will eventually be a part of this project.

My conversations with tribal officials confirmed that they had not been consulted in accordance with Bulletin 38. Mr. Dishta of the Zuni Tribe was not up to date on the status of the project, but reiterated Zuni's concerns with the area since it is considered aboriginal land by the tribe. In my professional experience, Zuni aboriginal lands have a high potential to contain Zuni TCPs. Consistent with Mr. Anyon's letter of March 28, 1996, Mr. Dishta stated that he expects the NRC to provide funds for the Zuni Cultural Resources Advisory Team to visit the area.

Mr. Dongoske of the Hopi Tribe stated that he knew of the project from his attendance at a meeting in Crownpoint in 1995. He stated that the Hopi Tribe is awaiting further consultation efforts from the NRC or HRI and that it expects to visit the project

area to complete identification and evaluation efforts.

More recently, I had telephone conversations with Mr. Loren Panteah, the new Director of the Zuni Heritage and Historic Preservation Office on November 4, 1998; Dr. Glenna Dean, State Archaeologist, New Mexico Office of Cultural Affairs, Historic Preservation Division (SHPO office), on November 4, 1998; and Dr. Alan Downer, Director of the Navajo Nation Historic Preservation Department, on November 13, 1998. Based on these contacts it is still my opinion that the Hopi and Zuni tribes have not been properly consulted regarding potential TCPs within the proposed project area. In addition, it is my opinion that the Navajo Nation Historic Preservation Department and the New Mexico State Historic Preservation Office are aware that it may be necessary to consult with the NCR on TCP sites in the future. From my conversations with these officials, it was clear that they understood the NRC letters of May 20, 1998, to pertain only to the archaeological sites identified in the OAS report. Accordingly, they did not understand the letter to constitute a determination that there are no TCPs in the area.

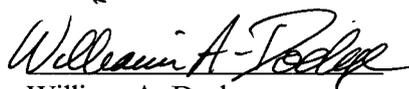
**Q.12. Does this conclude your testimony?**

**A.12. Yes.**

**AFFIRMATION**

STATE OF NEW MEXICO ) ss.  
COUNTY OF BERNALILLO )

I hereby affirm that the opinions expressed in the foregoing testimony constitute my best professional judgment, and that the factual representations are true and correct to the best of my knowledge.

  
William A. Dodge

Date: 12/3/98

Subscribed and sworn before me, the undersigned, a notary public, on this 3rd day of December, 1998.

My commission expires on 09-14-02



OFFICIAL SEAL  
DUANE L. CHAVEZ  
NOTARY PUBLIC-STATE OF NEW MEXICO

My commission expires: 09-14-02

  
Notary Public

# WILLIAM A. DODGE

CULTURAL RESOURCES CONSULTANT

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## RESUME

### EDUCATION

- B.A., Anthropology, University of Arizona, 1973
- M.A., Anthropology, University of Chicago, 1975
- Doctoral Program, American Studies, University of New Mexico, in progress

### AREAS OF EXPERTISE

- More than 20 years experience in anthropology, archaeology, historic preservation, cultural resource management, and environmental impact analysis
- Broad-based knowledge of the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, and National Environmental Policy Act
- Accomplished researcher and technical writer
- Educator on historic preservation, cultural resource management, and NEPA
- Consulting with federal, state, and tribal governments
- Facilitating issues of cross-cultural concerns to achieve project goals

### PROFESSIONAL EXPERIENCE

#### 1995-Present **Cultural Resources Consultant**

Specializing on anthropological, archaeological, and historic preservation issues, and compliance issues pertaining to the National Environmental Policy Act (NEPA). Capable of undertaking a variety of anthropological research and environmental impact analysis projects. Extensive experience consulting with American Indian tribes and government agencies on archaeological and historic properties, and traditional cultural places to facilitate project completion by utilizing a keen understanding of Native American heritage concerns and effective communication skills. Educator on a variety of environmental subjects, particularly the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, and the National Environmental Policy Act.

#### 1979-1995 **Environmental Compliance Officer/Cultural Resources Specialist**

U.S. Public Health Service, Indian Health Service, Albuquerque Area Office, Office of Environmental Health & Engineering.  
developed and implemented the agency's historic preservation and environmental review programs to ensure Developed and implemented the agency's

environmental review and historic preservation programs to ensure compliance with NHPA, NAGPRA, NEPA and other federal statutes and regulation. Served the nineteen New Mexico Pueblos, Mescalero and Jicarilla Apaches tribes, Ute Mountain Ute and Southern Ute tribes. Conducted environmental reviews and prepared environmental assessments, devised mitigation strategies to facilitate project design and consider environmental effects. Conducted archeological surveys and site evaluations for determination of eligibility for the National Register of Historic Places which required extensive consultations and agreement negotiations with the state historic preservation offices, the Advisory Council on Historic Preservation, and tribal officials. Maintained close contacts with tribal leaders and elders to ensure that their concerns regarding tribal heritage issues, e.g., traditional cultural places, and inadvertent discoveries of human remains, were adequately addressed during the planning of proposed IHS construction projects. Prepared HABS/HAER historic building evaluations and documentation for National Park Service archives. Consulted with other IHS offices, particularly the Phoenix, Anchorage, and Nashville area offices, providing advice and direction on historic and heritage preservation issues for IHS project managers and environmental coordinators. Presented multi-media training courses to new IHS engineers and environmental coordinators on environmental and historic preservation laws and regulations.

1978-1979

**Supervisory Archaeologist**

Bureau of Indian Affairs, Albuquerque Area Office

Conducted field investigations, data analysis, archival research, and report writing for BIA projects on Indian lands. Position required supervisory as well as technical skills, and necessitated effective communication with tribal officials and local residents.

1978

**Consulting Archaeologist**

Cultural resource management consultant to the Southern California Edison Company. Conducted archeological surveys, site evaluations, and assessments for SCE projects in southern California. Worked on federal, state, private, and tribal lands in the desert and coastal areas of California.

1975-1977

**Director**

Zuni Archaeology Program. Pueblo of Zuni, New Mexico

Directed the tribal archaeology program involving cultural resource management studies and the training of Zuni students in anthropology, archaeology, and related natural science disciplines. Responsible for developing program activities, managing staff and budget, and required regular contact with the Zuni governor and tribal council.

RESUME - WILLIAM A. DODGE - PAGE 4

*Using Federal Law to Protect Ancestral Sites.* Historic preservation training course, participants's workbook, and instructor's guide prepared for the Keepers of the Treasures by CEHP Inc., Washington, DC (with Dr. Thomas F. King). 1997.

*National Environmental Policy Act & Related Environmental Regulations.* Training course presented at the Indian Health Service P.L. 86-121 Workshop, Albuquerque, New Mexico, August 15, 1996.

*Native American Consultation: A Training Course.* Presented by CEHP Inc., in conjunction with the Federal Preservation Forum. Denver, Colorado, October 30, 1996. (with Thomas F. King, Loretta Neumann, and William Fields).

*20th Century Warriors. Native American Participation in the United States Military.* Prepared by CEHP Inc., Washington, DC, for the Department of the Navy. 1996.

*A Report on the Discovery of Archeological Materials and Subsequent Monitoring of Trenches During Construction of Sewer System Improvements at the Pueblo of Sandia, New Mexico.* Albuquerque Area Indian Health Service, Office of Environmental Health & Engineering. 1995.

*Evaluation of the Phoenix Area Indian Health Service's Policies for Historic Preservation Compliance.* Phoenix Area Indian Health Service, Office of Environmental Health and Engineering. 1994

*A Report of Archeological Monitoring for a Sanitation Facilities Construction Project on the Tesuque Indian Reservation (the Tsogue Site).* Albuquerque Area Indian Health Service, Office of Environmental Health & Engineering. 1994.

*A Report on the Archeological Investigations at the Jemez Water Tank Site, LA 51807.* Albuquerque Area Indian Health Service, Office of Environmental Health & Engineering. 1987.

*Archeological Investigations at Jemez Pueblo, New Mexico. The Monitoring of Indian Health Service Waterline Trenches.* Office of Contract Archeology. University of New Mexico. 1982.

*Archeological Monitoring of Water and Sewer Line Trenches at Zia Pueblo, New Mexico.* Albuquerque Area Indian Health Service, Office of Environmental Health & Engineering. 1982.

*Archeological Investigations at Cochiti Pueblo, New Mexico. A Study of Cultural Materials Recovered from Waterline Trenches.* Albuquerque Area Indian Health Service, Office of Environmental Health & Engineering. 1981.

RESUME - WILLIAM A. DODGE - PAGE 5

*The Miller Unit Survey.* Zuni Archaeology Program. Pueblo of Zuni. 1977. (with T.J. Ferguson and Barbara Mills)

*Archeological Investigations at Kyaki:ma.* Zuni Archaeology Program. Pueblo of Zuni. 1977. (with T.J. Ferguson and Barbara Mills)

*The Pescado Springs Pipeline Archeological Survey and Mapping Project.* Zuni Archaeology Program. Pueblo of Zuni. 1976. (with T.J. Ferguson and Barbara Mills)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998

Lynne Sebastian, Ph.D., State Historic  
Preservation Officer  
Historic Preservation Division  
Office of Cultural Affairs  
228 East Palace Avenue  
Santa Fe, NM 87501

SUBJECT: DETERMINATION OF EFFECT FOR THE CHURCH ROCK SECTION 8 AND  
CROWNPOINT SECTION 12 PORTIONS OF THE CROWNPOINT, NEW  
MEXICO PROJECT

Dear Dr. Sebastian:

In response to a letter from Glenna Dean of your staff, dated November 20, 1997, and pursuant to National Historic Preservation Act (NHPA) requirements, the staff of the U.S. Nuclear Regulatory Commission (NRC) is consulting with your office for purposes of making a determination of effect regarding Section 8, a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located about seven miles north of Church Rock, New Mexico (Sections 8 and 17, T16N, R16W), and Section 12 (T17N, R13W), an area located about two miles north of Crownpoint, New Mexico. These areas were surveyed, as reflected in the report prepared by the Museum of New Mexico's Office of Archaeological Studies *Cultural Resources Inventory* (1997) (OAS Report), which your office has reviewed. Separate NHPA consultations will be conducted prior to any additional undertakings which HRI may pursue under its NRC license.

The NRC staff concurs with the OAS Report regarding the archaeological sites on Section 8 and Section 12 found eligible for inclusion in the *National Register of Historic Places*. More specifically, the NRC staff agrees that these sites qualify as historic properties, and are thus eligible for inclusion, based on their potential to contribute important information to the understanding of regional prehistory or history (Criterion D for listing in the *National Register of Historic Places*, 36 CFR § 60.4). No traditional cultural properties were identified at or near any of the project areas identified above (Sections 8, 17, and 12).

The NRC staff has applied 36 CFR § 800.5 ("Assessing effects") and 36 CFR § 800.9 ("Criteria of effect and adverse effect"), and proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located therein. The NRC staff seeks your concurrence on this proposed finding of no effect, which is based on the following:

- Sections 8 and 17 (T16N, R16W), and Section 12 (T17N, R13W) have been surveyed for archaeological resources and traditional cultural properties. Historic properties eligible for inclusion in the *National Register* were identified on Section 8 and Section 12. No such properties were identified on Section 17.
- All eligible and potentially eligible historic properties on Sections 8 and 12 would be fenced, as necessary, to preclude intrusion during any construction, mining, or other ground-disturbing activity. The recommended fencing (as identified in the OAS Report) would serve both as a mechanical equipment barrier and to discourage casual foot traffic trespass. Fencing would remain in place throughout construction and mining phases, and it would not be removed until after site reclamation processes have been concluded following completion of mining. This protective measure will assure that the characteristics of the historic properties will not be changed by the undertaking. If unanticipated circumstances arise such that an effect on any eligible or potentially eligible historic property cannot be avoided, consultation with your office and other appropriate parties will be reopened.
- All ground-disturbing activities within the vicinity of the historic properties (the areas as identified in the OAS Report) will be monitored by an archaeologist. Within the HRI project areas surveyed in the OAS Report, the site archaeologist will have authority to stop ground-disturbing activity in the event that previously undetected subsurface cultural resources are identified. The development of treatment protocols for the unexpected discovery of human remains will be initiated as necessary within the framework of 36 CFR § 800.11, the Native American Graves Protection and Repatriation Act, and existing New Mexico State regulations or Navajo Nation regulations (as applicable) regarding treatment of unmarked burials and protection of human remains.
- As discussed in the OAS Report, adequate consultation with local traditional practitioners has occurred and no traditional cultural properties have been identified in or near Sections 8, 17, and 12.

As reflected in the enclosed letter to Dr. Alan Downer, the Navajo Nation's Historic Preservation Officer, dated May 20, 1998, the NRC staff is consulting with his office regarding Section 17, the portion of HRI's Church Rock site located on land held in trust for the Navajo Nation. The NRC staff will consider any written comments your office submits within 15 days of your receipt of this letter with respect to the Section 17 findings discussed in the enclosed letter.

If your office has any questions, please contact Mr. Robert Carlson, NRC's Project Manager of the HRI mining project, at (301) 415-8165. If no response from your office is received within 30 days of your receipt of this letter with respect to Sections 8 and 12, the NRC staff will assume that your office concurs in the proposed determination that any HRI undertakings on Sections 8 and 12 would have no effect on the historic properties located there. If your office so concurs,

Dr. L. Sebastian

-3-

or does not otherwise submit any objections to the NRC staff's proposed determination, then pursuant to 36 CFR § 800.5 (b), the staff would consider the NHPA process to be concluded with respect to Sections 8 and 12.

Sincerely,

A handwritten signature in black ink, appearing to read "Joe M. Holonich" with a stylized flourish at the end.

Joseph J. Holonich, Chief  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: As stated

cc: Service list attached

Dr. L. Sebastian

-4-

cc: for letter dated 5/20/98

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U.S. Nuclear Regulatory Commission  
Washington, DC 20555

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Jep Hill and Associates  
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Austin, Texas 78768-2254

Chief Administrative Judge  
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Presiding Officer  
Atomic Safety and Licensing Board  
Mail Stop T-3F23  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Richard F. Clement, Jr.  
President  
Hydro Resources, Inc.  
2929 Coors Road  
Suite 101  
Albuquerque, New Mexico 87120

Administrative Judge  
Thomas D. Murphy  
Special Assistant  
Atomic Safety and Licensing Board  
Mail Stop T-3F23  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Lila Bird, Executive Director  
Water Information Network  
PO Box 4524  
Albuquerque, New Mexico 887106

Secretary (2)  
Attn: Rulemakings and Adjudication Staff  
Mail Stop O-16C1  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Mitchell W. Capitan, President  
Eastern Navajo-Dine' Against  
Uranium Mining  
PO Box 471  
Crownpoint, New Mexico 87313

Adjudicatory File(2)  
Atomic Safety and Licensing Board  
Mail Stop T-3F23  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

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Zuni Mountain Coalition  
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Susan G. Jordan, Esq.  
New Mexico Environmental Law Center  
1405 Luisa Street, Suite 5  
Santa Fe, New Mexico 87505



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998

Alan S. Downer, Ph.D., Director  
Navajo Nation Historic Preservation Department  
ATTN: Mr. Peter Noyes  
P.O. Box 4950  
Window Rock, AZ 86515

SUBJECT: HYDRO RESOURCES, INC.'S URANIUM MINING PROJECT,  
CHURCH ROCK SECTION 17 - NO HISTORIC PROPERTIES FOUND

Dear Dr. Downer:

In my letter to you dated January 31, 1997, the staff of the U.S. Nuclear Regulatory Commission (NRC) requested National Historic Preservation Act (NHPA) consultation with your office regarding HRI's activities to occur on Navajo Tribal lands. Pursuant to the subsequent agreement entered into in April 1997, between the Navajo Nation and the National Park Service, for NHPA purposes you became the historic preservation officer with respect to undertakings occurring on Navajo Tribal lands, in addition to retaining responsibility for administering the Navajo Nation historic preservation laws on various tribal lands, and those lands held in trust for the Navajo Nation.

As stated in the enclosed letter to New Mexico's State Historic Preservation Officer (SHPO), dated May 20, 1998, the NRC staff is consulting with New Mexico's SHPO for purposes of making a determination of effect regarding Section 8, a portion of the proposed HRI uranium mining project located about seven miles north of Church Rock, New Mexico (Sections 8 and 17, T16N, R16W), and Section 12 (T17N, R13W), an area located about two miles north of Crownpoint, New Mexico. Sections 8, 12, and 17 were surveyed, pursuant to NHPA requirements, as reflected in the report prepared by the Museum of New Mexico's Office of Archaeological Studies *Cultural Resources Inventory* (1997) (OAS Report). The NRC staff sent your office a copy of the OAS Report in June 1997.

The NRC staff is consulting with your office regarding the above-described Section 17, land which is held in trust for the Navajo Nation. The NRC staff concurs with the OAS Report's finding that no historic properties (i.e., cultural properties as defined in the Navajo Nation Cultural Resources Protection Act) eligible for listing in the *National Register of Historic Places* or in the *Navajo Nation Register of Cultural Properties and Cultural Landmarks* are located within Section 17. The OAS Report found that the only cultural resources identified in Section 17 are isolated occurrences unlikely to yield information beyond that already documented in the survey performed. Pursuant to 36 CFR § 800.4 (d), the NRC staff considers the NHPA Section 106 process to be concluded with respect to the Section 17 area surveyed in the OAS Report, based on the finding that no historic properties are located within Section 17. Pursuant to § 101(d) of the Navajo Nation Cultural Resources Protection Act (NNCRPA), the NRC staff requests approval to implement the undertaking (as described above and in previous communications) on Section 17, again based on the above-described findings.

As stated in the enclosed letter, with respect to Section 17 and the other HRI project areas surveyed in the OAS Report, the site archaeologist will have authority to stop ground-disturbing activity in the event that previously undetected subsurface cultural resources are identified. The development of treatment protocols for the unexpected discovery of human remains will be initiated as necessary within the framework of 36 CFR § 800.11, the Native American Graves Protection and Repatriation Act, and existing New Mexico State regulations or Navajo Nation regulations (as applicable) regarding treatment of unmarked burials and protection of human remains.

Separate NHPA Section 106 and NNCRPA consultations will be conducted with your office prior to any additional undertakings which HRI may pursue under its NRC license on lands falling within your NHPA and/or NNCRPA jurisdiction.

If your office has any questions, please contact Mr. Robert Carlson, NRC's Project Manager of the HRI mining project, at (301) 415-8165. If no response from your office is received within 30 days of your receipt of this letter with respect to Section 17, the NRC staff will assume that your office, for NNCRPA purposes, approves HRI's undertaking on Section 17. The NRC staff will consider any written comments your office submits within 15 days of your receipt of this letter with respect to the findings regarding Sections 8 and 12 discussed in the enclosed letter to New Mexico's SHPO.

Sincerely,



Joseph J. Holonich, Chief  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: As stated

cc: Service list attached

Dr. A. Downer

-3-

cc: for letter dated 5/20/98

Office of Commission Appellate  
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Mail Stop O-16G15  
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Presiding Officer  
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Special Assistant  
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Secretary (2)  
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Washington, DC 20555

Mitchell W. Capitan, President  
Eastern Navajo-Dine' Against  
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PO Box 471  
Crownpoint, New Mexico 87313

Adjudicatory File(2)  
Atomic Safety and Licensing Board  
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Dr. A. Downer

-4-

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141 East Palace Avenue  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998

Mr. James Copeland  
Bureau of Land Management  
Farmington District Office  
1235 La Plata Highway  
Farmington NM 87401

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Mr. Copeland:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for, or listed in, the *National Register of Historic Places*.

As documented in the Museum of New Mexico's Office of Archaeological Studies report (OAS Report) (see letter addressed to your office dated June 19, 1997, enclosing a copy of the OAS Report), historic properties eligible for inclusion in the *National Register* were found in Section 8 (T16N, R16W) and Section 12 (T17N, R13W). No such properties were found on Section 17 (T16N, R16W). No traditional cultural properties were identified at or near any of these project areas. As discussed more fully in the enclosed letter to Dr. Sebastian, the NRC staff proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located there.

The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.

J. Copeland

-2-

If you have any questions, please contact Mr. Robert Carlson, NRC's Project Manager of the HRI mining project, at (301) 415-8165.

Sincerely,



Joseph J. Holonich, Chief *fu*  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Enclosures: As stated \*

cc: Service list attached \*Copies of the enclosures are included in your package

cc: for letter dated 5/20/98

Office of Commission Appellate  
Adjudication  
Mail Stop O-16G15  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Chief Administrative Judge  
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Secretary (2)  
Attn: Rulemakings and Adjudication Staff  
Mail Stop O-16C1  
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Adjudicatory File(2)  
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J. Copeland

-4-

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141 East Palace Avenue  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

May 20, 1998

Ms. Jenni Denetsone, Area Realty Officer  
Bureau of Indian Affairs  
Navajo Area Office  
Real Estate Services  
PO Box 1060  
Gallup, NM 87305-1060

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Ms. Denetsone:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for, or listed in, the *National Register of Historic Places*.

As documented in the Museum of New Mexico's Office of Archaeological Studies report (OAS Report) (see letter addressed to your office dated June 19, 1997, enclosing a copy of the OAS Report), historic properties eligible for inclusion in the *National Register* were found in Section 8 (T16N, R16W) and Section 12 (T17N, R13W). No such properties were found on Section 17 (T16N, R16W). No traditional cultural properties were identified at or near any of these project areas. As discussed more fully in the enclosed letter to Dr. Sebastian, the NRC staff proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located there.

The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

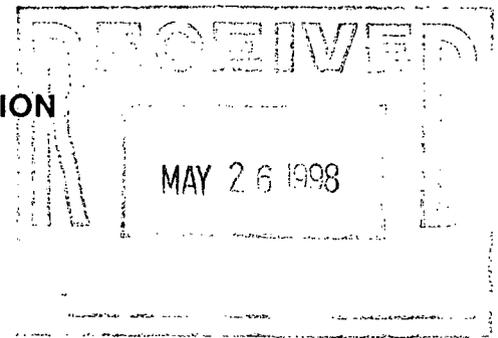
The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998



Mr. Roland Johnson, Governor  
Pueblo of Laguna  
PO Box 194  
Laguna Pueblo, NM 87026

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Mr. Johnson:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for, or listed in, the *National Register of Historic Places*.

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The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

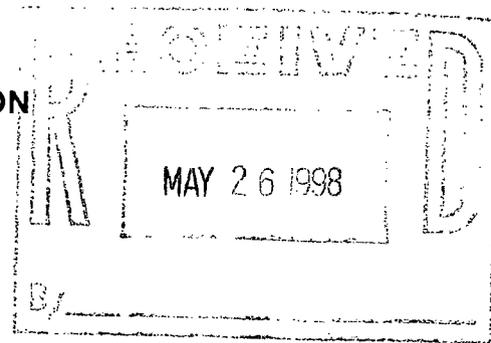
The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998



Mr. Reginald T. Pasqual, Governor  
Pueblo of Acoma  
PO Box 309  
Acoma, NM 87304

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Mr. Pasqual:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for, or listed in, the *National Register of Historic Places*.

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The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

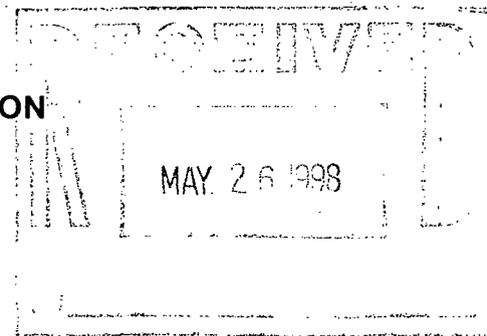
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998



Mr. Charles Long, President  
Crownpoint Chapter, Navajo Nation  
PO Box 336  
Crownpoint, NM 87313

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Mr. Long:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998 the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for, or listed in, the *National Register of Historic Places*.

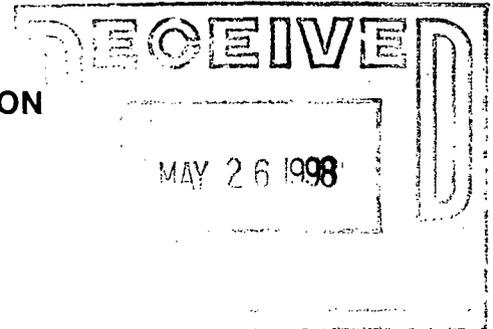
As documented in the Museum of New Mexico's Office of Archaeological Studies report (OAS Report) (see letter addressed to your office dated June 19, 1997, enclosing a copy of the OAS Report), historic properties eligible for inclusion in the *National Register* were found in Section 8 (T16N, R16W) and Section 12 (T17N, R13W). No such properties were found on Section 17 (T16N, R16W). No traditional cultural properties were identified at or near any of these project areas. As discussed more fully in the enclosed letter to Dr. Sebastian, the NRC staff proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located there.

The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001



May 20, 1998

Mr. Herbert Benally, President  
Churchrock Chapter, Navajo Nation  
PO Box 549  
Churchrock, NM 87311

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Mr. Benally:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for, or listed in, the *National Register of Historic Places*.

As documented in the Museum of New Mexico's Office of Archaeological Studies report (OAS Report) (see letter addressed to your office dated June 19, 1997, enclosing a copy of the OAS Report), historic properties eligible for inclusion in the *National Register* were found in Section 8 (T16N, R16W) and Section 12 (T17N, R13W). No such properties were found on Section 17 (T16N, R16W). No traditional cultural properties were identified at or near any of these project areas. As discussed more fully in the enclosed letter to Dr. Sebastian, the NRC staff proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located there.

The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998

MAY 26 1998

Mr. Roy Bernal, Chairman  
All Pueblo Indian Council  
ATTN: Terrell Muller  
3939 San Pedro NE  
Albuquerque, NM 87190

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Mr. Bernal:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for, or listed in, the *National Register of Historic Places*.

As documented in the Museum of New Mexico's Office of Archaeological Studies report (OAS Report) (see letter addressed to your office dated June 19, 1997, enclosing a copy of the OAS Report), historic properties eligible for inclusion in the *National Register* were found in Section 8 (T16N, R16W) and Section 12 (T17N, R13W). No such properties were found on Section 17 (T16N, R16W). No traditional cultural properties were identified at or near any of these project areas. As discussed more fully in the enclosed letter to Dr. Sebastian, the NRC staff proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located there.

The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 20, 1998

MAY 26 1998

Mr. Leigh Jenkins, Director  
Hopi Cultural Preservation Office  
PO Box 123  
Kykotsmovi, AZ 86039

Dear Mr. Jenkins:

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Ms. Jenkins:

As indicated in the enclosed letter to Dr. Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for or listed in the *National Register of Historic Places*.

As documented in the Museum of New Mexico's Office of Archaeological Studies report (OAS Report), a copy of which was previously sent to you for review, historic properties eligible for inclusion in the *National Register* were found in Section 8 (T16N, R16W) and Section 12 (T17N, R13W). No such properties were found on Section 17 (T16N, R16W). No traditional cultural properties were identified at or near any of these project areas. As discussed more fully in the enclosed letter to Dr. Sebastian, the NRC staff proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located there.

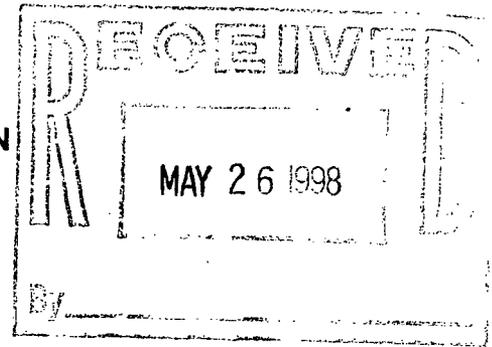
The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to its proposed determination of no effect.

The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

May 20, 1998



Mr. Joseph Dishta, Director  
Pueblo of Zuni Heritage and Historic  
Preservation Office  
PO Box 339  
Zuni, NM 87327

SUBJECT: HISTORIC PROPERTIES ON PORTIONS OF THE HYDRO RESOURCES, INC.  
URANIUM MINING PROJECT AREAS

Dear Mr. Dishta:

As indicated in the enclosed letter to Dr. Lynne Sebastian, dated May 20, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff is consulting with the New Mexico State Historic Preservation Officer (SHPO) pursuant to the National Historic Preservation Act (NHPA). The consultation regards a portion of the proposed Hydro Resources, Incorporated (HRI) uranium mining project located in Sections 8 and 17 (T16N, R16W) about seven miles north of Church Rock, New Mexico; and Section 12 (T17N, R13W), located about two miles north of Crownpoint, New Mexico. NHPA Section 106 and the regulations through which it is implemented (36 CFR 800) require federal agencies to take into account the effects of undertakings on any historic properties eligible for or listed in the *National Register of Historic Places*

As documented in the Museum of New Mexico's Office of Archaeological Studies report (OAS Report), a copy of which was previously sent to your office for review, historic properties eligible for inclusion in the *National Register* were found in Section 8 (T16N, R16W) and Section 12 (T17N, R13W). No such properties were found on Section 17 (T16N, R16W). No traditional cultural properties were identified at or near any of these project areas. As discussed more fully in the enclosed letter to Dr. Sebastian, the NRC staff proposes to determine that any HRI undertakings on Sections 8 and 12, as described above, would have no effect on the historic properties located there.

The NRC staff will consider any written comments you submit within 15 days of your receipt of this letter with respect to this proposed determination of no effect.

The NRC staff is also consulting with Dr. Alan Downer, the Director of the Navajo Nation Historic Preservation Department, as reflected in the enclosed letter to him dated May 20, 1998. This consultation regards the above-described Section 17, on which no historic properties eligible for inclusion in the *National Register* were found. Regarding this finding, the NRC staff will consider any written comments you submit within 15 days of your receipt of this letter.



# United States Department of the Interior

## BUREAU OF LAND MANAGEMENT

Farmington District Office  
1235 La Plata Highway, Suite A  
Farmington, New Mexico 87401

IN REPLY REFER TO:  
8100 (07600)

JUN 1 1998

Mr. Robert Carlson  
Nuclear Regulatory Commission  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety and Safeguards  
Washington, DC 20555-0001

Dear Mr. Carlson:

On May 26, 1998, we received a letter from Mr. Joseph J. Holonich dated May 20, 1998. The letter concerns historic properties on portions of the Hydro Resources Inc. uranium mining project areas near Church Rock and Crownpoint, New Mexico. Public Lands administered by the Farmington District of the Bureau of Land Management are administered in the NE1/4 and the W1/2 of Section 8, T. 16 N., R. 16 W. As we currently understand the project, no mining activities are proposed for Public Lands at this time, and no sites on Public Lands appear threatened. In the event that mining activities extend onto Public Lands, we agree that as long as significant or potentially significant cultural properties are avoided the undertaking will have no effect on the properties located there.

We have no comments regarding cultural resources on non-Public Lands involved in this undertaking.

Our records are unclear if our review of the survey report was ever sent to your office. A letter was drafted but we can not tell if it was ever finalized and mailed. For your information, we are providing those comments at this time. If this is the first you have seen of these, please accept our apologies. We do not think that any of the comments affect the undertaking at this time, nor are they in conflict with your proposed determination of no effect for this undertaking.

The report appears thorough and we appreciate the way it is structured to allow easier review by the pertinent agencies. The various site illustrations are clear and well done.

\* Page 87: The first paragraph seems to be out of place, and apparently belongs after the third paragraph.

\* Figure 24: The site "key" is incomplete.

\* Isolates #6, 7, 36, 88, and 89 should most likely have been recorded as sites. Although they are not currently threatened, future actions in those areas should treat those locations as sites until appropriate documentation is completed. If IO #6 and 7 retain no integrity as suggested in Table 31 of the report, then a simple recording of the features and a determination that they are not eligible for the National Register of Historic Places will be relatively straight forward. Testing at IO #36, 88, and 89 would help clear up the suspicions that they may or may not be cultural sites.

\* Table 32

LA 26162: Anasazi component not described in text of report; Navajo component is labeled Gobernador Phase in Table 53

LA 116115: Navajo component is best left as unknown, rather than Gobernador Phase

LA 116118: Navajo component is best left as unknown, rather than Gobernador Phase

LA 117316: Out of sequence in the table. A good line drawing of the images in the text of the report would be helpful.

LA 117317: A good line drawing of the image in the text of the report would be helpful.

\* Site Records: The site records for Navajo sites LA 26158, 26162, 88877, 116113, 116115, 116118, and 117314, are miscoded with regard to the *Periods of Occupation*. The New Mexico Cultural Resource Information System (NMCRIS) manual should be followed for the correct terminology. Correct options for the *Periods Of Occupation* include Pre or Post Pueblo Revolt, Pre-Reservation, Early, Middle, or Late Reservation, Recent and unspecified Navajo. Gobernador is a phase designation and goes in the category of *Associated Phase/Complex Name*.

The identification of Gobernador Phase sites on BLM lands seems very tenuous. None of the architecture reported is diagnostic to the phase. The ceramics found at LA 88877 would indicate either a Gobernador or possibly a Cabezon Phase occupation.

What is the basis for the site boundary at LA 116115? No artifacts were located so why is the site boundary so much larger than the feature?

\* National Register Eligibility: The eligibility summary presented in Table 53, unlike Table 32, does not distinguish between the various components of the sites recorded. Separate components of the same site, when evaluated, may or may not be contributing elements of the eligibility of the sites for the National Register. Our impressions from the report and site record regarding eligibility are as follows:

\* Eligible: LA 26158 (Anasazi component), LA 88874, LA 116115, LA 116118 (Anasazi component),  
LA 117314 (Anasazi component).

\* Not Eligible: LA 26158 (historic component), LA 116113, LA 116116 (historic component), LA 116119, LA 116120 (historic component), LA 116121, LA 117314 (historic component), LA 117315, LA 117316, LA 117317, LA 117318, LA 117319.

\* Need Data: LA 26162, LA 88873, LA 88874, LA 88878, LA 116116 (Anasazi component), LA 116117, LA 116118 (historic component), 116120 (Anasazi component).

\* Treatment: We agree with the general treatment options for BLM sites outlined on pages 118 and 119.

If you have any questions contact Jim Copeland at 505-599-6335, or [jcopelan@nm.blm.gov](mailto:jcopelan@nm.blm.gov).

Sincerely,



Jerrold E. Crockford  
Acting Land Resources Team Leader

cc:  
Museum of New Mexico, OAS  
NMHPD, SHPO  
Navajo Nation HPD



GARY E. JOHNSON  
GOVERNOR

STATE OF NEW MEXICO  
**OFFICE OF CULTURAL AFFAIRS**  
**HISTORIC PRESERVATION DIVISION**

VILLA RIVERA BUILDING  
228 EAST PALACE AVENUE  
SANTA FE, NEW MEXICO 87501  
(505) 827-6320

3 June 1998

Joseph J. Holonich, Chief  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety and Safeguards  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Dear Mr. Holonich:

This is in response to your letter of 20 May 1998, received by this office 27 May 1998, which made recommendations about site eligibility based on opinions offered by the Museum of New Mexico, Office of Archaeological Studies (OAS), in their survey report for the Hydro Resources, Inc. (HRI) leach uranium mining facility proposed near Crownpoint, New Mexico (Archaeology Notes 214). Your letter also recommends a finding of "no effect" for the proposed mining activities.

Forty-one archaeological sites were found in Sections 8 (T16N, R16W) and 12 (T17N, R13W). No archaeological sites were found in Section 17 (T16N, R16W). My previous letter of 20 November 1997 supported the recommendations put forward by OAS, but included five sites on BLM land (LA 116116, 116117, 116119, 116121, and 117317) and one site on private land (LA 116129) whose eligibility cannot be determined with current information. Under National Historic Preservation Act definitions, these six sites are not technically "historic properties" as they are not definitively eligible for listing in the National Register of Historic Places.

Point 2 on page two of your letter states that "All eligible and potentially eligible historic properties on Sections 8 and 12 would be fenced, as necessary, to preclude intrusion during any construction, mining, or other ground-disturbing activity." This wording would appear to include sites LA 116116, 116117, 116119, 116121, 116129, and 117317 whose eligibility remains undetermined without additional information. If HRI intends to avoid these six sites and protect them with fencing, their eligibility can remain undetermined. If HRI cannot avoid these six sites, or if mining plans change, determining eligibility becomes a point still in need of resolution.

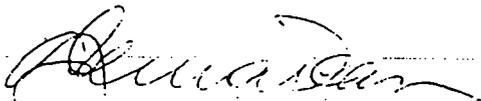
This office recommends that the eligibility of sites LA 116116, 116117, 116119, 116121, 116129, and 117317 be determined. Failing that, this office concurs that the project will have no effect on these six sites provided they are also fenced and avoided by construction, mining, or other ground-disturbing activities.

This office concurs that the proposed mining project will have no effect on the following eligible archeological sites, provided they are fenced and avoided by construction, mining, or other ground-disturbing activities:

LA 26158	LA 88875	LA 116123
LA 26159	LA 88876	LA 116124
LA 26160	LA 88877	LA 116125
LA 26162	LA 88878	LA 116126
LA 26163	LA 116111	LA 116127
LA 26164	LA 116112	LA 116128
LA 70610	LA 116114	LA 116130
LA 88871	LA 116115	LA 117314
LA 88872	LA 116118	LA 117316
LA 88873	LA 116120	LA 117319
LA 88874	LA 116122	

Please contact me with any questions you might have on these comments.

Sincerely,



Glenna Dean  
State Archaeologist

Log 55442



**THE  
NAVAJO  
NATION**

**THOMAS E. ATCITY  
PRESIDENT**

June 24, 1998

Joseph J. Holonich, Chief  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington D.C. 20555-0001

Dear Mr. Holonich:

The Cultural Resources Compliance Section of the Historic Preservation Department received your letter dated May 20, 1998 on June 4, 1998. Your letter referred to consultation on Navajo Tribal lands, and then specified Section 17 -- a section of trust land -- and requested consultation with the Navajo Nation Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act under the authority of the April 1997 agreement. We have deemed your request as applicable to and appropriate to any and all lands within the exterior boundaries of the Navajo Nation (including sections 8, 12, and 17) and are responding accordingly. Further, your letter requested approval pursuant to the Navajo Nation Cultural Resources Protection Act for Navajo Nation lands. With this letter we provide approval pursuant to the NNCRPA and offer the following comments regarding the entirety of the project.

- 1) We concur, based on the information previously provided, with your proposed determinations of eligibility for each of the properties described in the OAS report.
- 2) We further concur that the undertaking described in your May 20 letters to Alan Downer and Lynne Sebastian at the New Mexico State Historic Preservation Office will have no effect on properties listed on or eligible to the National Register of Historic Places, provided that:
  - A) All of the eligible properties are avoided by any and all ground disturbing activity by a minimum of 50 feet; and
  - B) In the event of a discovery ["discovery" means any previously unidentified or incorrectly identified cultural resources including but not limited to archaeological deposits, human remains, or locations reportedly associated with Native American religious/traditional beliefs or practices] all operations in the immediate vicinity of the discovery must cease and the Navajo Nation Historic Preservation Department shall be notified at 520-871-7132.

We thank you for your interest in the history and heritage of the Navajo Nation. Should questions arise, please contact the Historic Preservation Office as indicated below.

Sincerely,

Peter T. Noyes, Supervisor  
Cultural Resource Compliance Section  
Historic Preservation Department  
P.O. Box 4950  
Window Rock, Navajo Nation, AZ 86515  
(520) 871-7132



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 10, 1998

Mr. Richard F. Clement, Jr., President  
Hydro Resources, Inc.  
2929 Coors Blvd., NW  
Suite 101  
Albuquerque, NM 87120

SUBJECT: RESPONSES TO STAFF'S NATIONAL HISTORIC PRESERVATION ACT  
LETTERS DATED MAY 20, 1998

Dear Mr. Clement:

By letters dated June 1, 3, and 24, 1998, the U.S. Nuclear Regulatory Commission (NRC) staff received responses to the subject letters from the Bureau of Land Management (BLM), the Office of the New Mexico State Historic Preservation Officer (NMSHPO), and the Navajo Nation Historic Preservation Department (NNHPD), respectively. These responses are discussed below. As of the date of this letter, no other responses have been received.

The NMSHPO concurred with the NRC staff's proposed finding that Hydro Resources, Inc. (HRI) undertakings on Section 8 at the Church Rock site, and Section 12 north of Crownpoint, would have no effect on the historic properties located therein which are eligible for inclusion in the National Register of Historic Places -- provided such properties "are fenced and avoided by construction, mining, or other ground-disturbing activities."

The NMSHPO had comments concerning six other potentially eligible sites (LA 116116, 116117, 116119, 116121, 116129, and 117317) located on Sections 8 and 12. Five of the six sites are on the public lands portion of Section 8 (i.e., the northeast quarter and western half of Section 8). These public lands are administered by the BLM and are not part of HRI's proposed mining area (although HRI owns patented Federal mining claims on these lands). LA 116129 is located on Section 12 land owned jointly by HRI and a private individual. The only potential mining-related use of the lands on which the six sites are located would be for application of treated waste water. Such use of these land parcels is one of several waste water disposal options available to HRI, as discussed in Sections 2.1.2 and 4.2.1 of the Final Environmental Impact Statement for the proposed Crownpoint, New Mexico, *in situ* leach uranium mining project. Should irrigation operations come within 100 feet of any of the sites identified above, placement of protective fencing around the site would be necessary.

The BLM's response states that if HRI's mining activities expand beyond the southeast quarter of Section 8 onto Section 8 public lands, "we agree that as long as significant or potentially significant cultural properties are avoided the undertaking will have no effect on the properties located there." Any such expansion of the mining area would first require HRI to submit a license amendment application to the NRC.

The NNHPD response asserts that the Navajo Nation has jurisdiction over the above-described Sections 8 and 12, in addition to control of the trust lands on Section 17 at HRI's Church Rock

site. Other than this assertion of jurisdiction, the NNHPD response largely agrees with the NMSHPO's concurrence on the NRC staff's no effect finding, except the NNHPD specifies that the proposed protective fencing on Sections 8 and 12 be placed so as to create buffer areas extending 50 feet around each eligible historic property. Regarding Section 17, the NNHPD response expressed no disagreement with the NRC staff's finding that no historic properties are located there, and approved HRI's undertaking pursuant to the Navajo Nation Cultural Resources Protection Act (NNCRPA).

Until the jurisdictional issues are resolved by the litigation now pending in the United States Court of Appeals for the Tenth Circuit, the effect of the NNHPD comments regarding Sections 8 and 12 will be uncertain.

Based on the NMSHPO concurrence discussed above, and pursuant to 36 CFR § 800.5 (b), the National Historic Preservation Act (NHPA) process is concluded with respect to Sections 8 and 12. Additionally, based on the NNHPD approval discussed above, the NNCRPA process is concluded with respect to Section 17. Accordingly, HRI may proceed with its planned mining-related activities in these areas to the extent authorized by its NRC Materials License SUA-1508. However, if HRI cannot meet any of the following conditions, it must notify the NRC immediately and cease ground-disturbing activities in the affected area.

1. Activities must be restricted to Sections 8 and 17 (T16N, R16W) and Section 12 (T17N, 13W), which constitute the areas covered under this NHPA/NNCRPA consultation. Additional NHPA and/or NNCRPA consultations will be required prior to any additional undertakings which HRI may pursue under its NRC license on other lands.
2. All eligible and potentially eligible historic properties on Sections 8 and 12 will be fenced, as necessary, to preclude intrusion during any construction, mining, or other ground-disturbing activity. The recommended fencing (as identified in the Museum of New Mexico, Office of Archaeological Studies, "Cultural Resources Inventory of Proposed Uranium Solution Extraction and Monitoring Facilities at the Church Rock Site and of Proposed Surface Irrigation Facilities North of the Crownpoint Site, McKinley County, New Mexico" (OAS Report), dated 1997) would serve both as a mechanical equipment barrier, and to discourage casual foot traffic trespass. Fencing would remain in place throughout construction and mining phases, and it would not be removed until after site reclamation processes have been concluded following completion of mining. This protective measure will assure that the characteristics of the historic properties will not be changed by the undertaking.
3. All ground-disturbing activities within the vicinity of the historic properties (the areas as identified in the OAS Report) will be monitored by an archaeologist who will have authority to stop ground-disturbing activity in the event that previously undetected subsurface cultural resources are identified. If such a find occurs, the NRC (Mr. Robert Carlson, 301-415-8165), the NNHPD (520-871-7132), and the NMSHPO (505-827-6320) must be notified within 24 hours of the find. The

R. Clement, Jr.

3

development of treatment protocols for the unexpected discovery of human remains will be initiated as necessary within the framework of 36 CFR § 800.11, the Native American Graves Protection and Repatriation Act, and applicable New Mexico and Navajo Nation regulations regarding treatment of unmarked burials and protection of human remains.

Should unanticipated circumstances arise such that an effect on any eligible or potentially eligible historic property cannot be avoided, NHPA and/or NNCRPA consultations must be reopened.

If you have any questions concerning this subject, please contact Mr. Robert Carlson of my staff at (301) 415-8165.

Sincerely,



Joseph J. Holonich, Chief  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

cc: HRI Service List  
B. Saulsbury, ORNL

HRI Mailing List - Letter dated July 10, 1998

Office of Commission Appellate  
Adjudication  
Mail Stop O-16C1  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Administrative Judge  
Peter B. Bloch  
Presiding Officer  
Atomic Safety and Licensing Board  
Mail Stop T-3F23  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Administrative Judge  
Thomas D. Murphy  
Special Assistant  
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Secretary (2)  
Attn: Rulemakings and Adjudications Staff  
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U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Adjudicatory File(2)  
Atomic Safety and Licensing Board  
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Richard F. Clement, Jr.  
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Water Information Network  
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Eastern Navajo-Dine' Against  
Uranium Mining  
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New Mexico Environmental Law Center  
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Johanna Matanich  
DNA - People's Legal Services, Inc.  
PO Box 116  
Crownpoint NM 87313

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Chief Administrative Judge Peter B. Bloch, Presiding Officer

\_\_\_\_\_  
In the Matter of )  
)  
)

HYDRO RESOURCES, INC. )  
2929 Coors Road, Suite 101 )  
Albuquerque, NM 87120 )  
)  
\_\_\_\_\_)

Docket No. 40-8968-ML

ASLBP No. 95-706-01-ML

**TESTIMONY OF ABIE FRANCISCO**

On behalf of Eastern Navajo Diné Against Uranium Mining ("ENDAUM") and Southwest Research and Information Center ("SRIC"), Abie Francisco submits the following testimony regarding cultural resources issues regarding Hydro Resources Inc.'s ("HRI's") amended application for a source materials license. This testimony was spoken in Navajo and translated to English by the undersigned interpreter, Raymond Morgan.

**Q. 1. Please state your name.**

**A.1.** My name is Abie Francisco.

**Q.2. Where do you live?**

**A.2.** I live in Chichiltah community.

**Q.3. What is your occupation?**

**A.3.** My occupation is medicine man. There are three different blessing ways I am certified in.

One is the warrior blessing way and the regular blessing way, also the leadership blessing way.

Then also I do the evil way blackening ceremonial. There are two different ones in that - big star

blessing way and the major evil way. So there are two big ones, two major categories. Then, I

also do other smaller ceremonials things also. I am apprenticing in the seven-day enemy way

ceremonial, also known as a squaw dance.

**Q.4. How long have you been practicing these?**

A.4. Since 1985.

**Q.5. When did you begin your apprenticeship?**

A.5. In 1979 I started my apprenticeship with Hoskie Tom Becenti.

Also, I am a landboard member representing Chichiltah Chapter and Manuelito Chapter to District 16 Eastern Navajo Agency. I am also a farmer and rancher raising sheep and cattle.

**Q. 6. What materials did you review in support of your evaluation?**

A.6. I have reviewed the statements that were presented to HRI from Ernest Becenti and the maps in the FEIS, and based my conclusions on that.

**Q.7. What is your evaluation of the information you have review?**

A.7. Ernest Becenti and I were apprentices of Hoskie Tom Becenti. Ernest Becenti talks about these places as not begin sacred and I do not agree with that. Personally, I disagree with his report that some of the places he visited are not sacred. That is not true. As a medicine man, I feel that these areas are sacred and the people that live in those areas are sacred also.

Going back to my earlier statement about why I am going to be disputing Earnest Becenti's statement, in conversation with Hoskie Tom Becenti, who is their trainer, both Ernest Becenti and myself, Hoskie Tom Becenti, our trainer, said uranium is very dangerous, and Mr. Becenti's statement that uranium is not dangerous is a misstatement. We are all learning, even Mr. Becenti is still learning. The statement that the areas where uranium mining is being proposed are not sacred is also a mis-statement. Why are the herbs not sacred? The herbs outside our doors are sacred. We feel the whole surrounding area is sacred. We use these herbs

for the Evil Way, the Wind Way, the Lighting Way and the Blackening Enemy Way ceremonies.

The trees roots we use. The junipers, the cedars, the sagebrush, the rabbit brush are used in our ceremonies.

Even before we use these plants, we offer a prayer to use them so that we can use them to heal the person the ceremony is being used for. So I oppose the statement that the area inside the mining cannot be used. Yes, there areas in the mountains but the area where we live everyday is important. We recognize that this is important to use. The water that we speak of, the water is also sacred. We talk about the water in different ways. We talk about the female water and the male water and refer to the waters in ceremonies also. When there is no rain and this is not in balance then we offer minerals to the water and we ask for rain. From water we grow corn in our own corn fields. We talk about being made from the male white corn and the female yellow corn and also the mixed corn. Corn is our food and also the corn pollen which we use in the blessing way. Every time that we pray we use corn pollen. I ask why this wasn't included in the description of the land and the ways we use from it.

I have seen uranium and it blows from the wind and can be spread all over. We talk about the Wind Way and in our prayers the wind is also included. We ask for protection from the wind and even in the smallest areas where water has made a path, we make a prayer and in the wind path we offer corn pollen so that corn pollen is left inside these trails. We ask why wasn't this considered because these areas are sacred.

We raise sheep. This is associated with the Blessing Way. The sheep eat the grass and all the herbs are grown from near the and we eat the sheep and the goats and these should be considered because this is our livelihood.

In our prayers we talk about all these things but also as in the earlier statements that I

made. During the creation, people were being created, man and woman and also the earth. With each one of them there were evil parts of it. Man has evil parts and the Earth has evil parts. Those were the things we were taught not to touch the evil things in the earth. We were taught that when you take the evil things out of the earth, it will cause sickness in the people. I believe there is sickness in people now, it is cancer and diabetes. Many medicine people like me feel this is caused by the uranium mining. People are getting payments but what are payments compared to life. The herbs for the Evil Way and the Life Way cannot be found anymore in places. We believe the cause for the loss of these herbs in areas now are the result of coal and uranium mining. Some cannot be found in the area where they used to be found at anymore. The coal is related to our traditional stories and ways, the black warrior that had the black fire is where that story comes from. The stories associated with these things, the people really do not take seriously anymore. Even the birds are not found anymore. It used to be you would go out in the morning and there would be birds chirping and chattering out there. Some birds are not found anymore in these areas. We feel these, but even the wildlife we do not see a lot anymore. The sheep - some things are airborne and other things that get attached to plants and maybe the sickness is passed through to us. The sickness is airborne and can be transmitted to us.

I wonder why some of us medicine men do not take this seriously. This is causing harm.

**Q.8. Have you performed ceremonies near the project areas?**

**A.8.** In Church Rock I have performed ceremonies north of the project area at the Tom Lewis residence and areas north and east of that residence and also around Mary Gray's

residence, which is around 3/4s of a mile east of the Church Rock site and also south of the project site in Church Rock. In Crownpoint, I have performed ceremonies in several of the Navajo Housing areas developments, west of the project sites, at Grace Tsosie's residence, near Standing Rock and near Becenti Chapter.

**Q.9. Do you have anything else to add?**

**A.9.** Ernest Becenti says he has practiced for over thirty years on the first page of his report.

In conferring with Hoskie Tom Becenti, I understand that Ernest Becenti has only been practicing for about sixteen years.

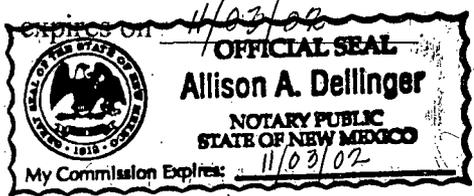
We as medicine people work in conjunction with the holy people. And, if an individual says that he knows so much as if he were speaking for himself, he forgets the holy people. That is not right, one has forgotten the holy people, who are the main people we are working with.

**AFFIRMATION**

I declare under penalty of perjury on this 4<sup>th</sup> day of December, 1998, at Gallup, New Mexico, that the foregoing is true and correct.

Abie Francisco  
Abie Francisco

Sworn and subscribed before me, the undersigned, a Notary Public in and for the State of New Mexico, on this 4 day of December, 1998. My Commission



Allison A. Dellinger  
Notary Public

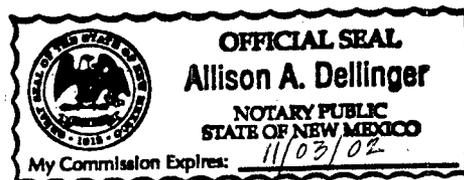
**INTERPRETER'S CERTIFICATION**

I declare under penalty of perjury on this 4<sup>th</sup> day of December, 1998, at Gallup, New Mexico, that I can read, speak, and understand the English language fluently and that I can speak and understand the Navajo language fluently, and that the foregoing is a true and correct interpretation of Mr. Francisco's testimony.

Raymond Morgan  
Raymond Morgan

Sworn and subscribed before me, the undersigned, a Notary Public in and for the State of New Mexico, on this 4 day of December, 1998. My Commission expires on 11/03/02.

Allison A. Dellinger  
Notary Public



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Administrative Judge  
Peter B. Bloch, Presiding Officer

_____ )	
In the Matter of )	
HYDRO RESOURCES, INC. )	Docket No. 40-8968-ML
2929 Coors Road, Suite 101 )	
Albuquerque, NM 87120 )	ASLBP No. 95-706-01-ML
_____ )	

**WRITTEN TESTIMONY OF MITCHELL W. CAPITAN**

**Q.1. Please state your name.**

**A.1.** My name is Mitchell W. Capitan.

**Q.2. Where do you live?**

**A.2.** I am a resident of the Navajo Housing Authority Crownpoint West Mesa housing unit #27, T17N, R13W, Section 19 NW 1/4, where I have lived for the past twenty-eight years.

**Q.3. What is your occupation?**

**A.3.** I am a meter reader employed by the Navajo Tribal Utility Authority. I am also the president of Eastern Navajo Diné Against Uranium Mining ("ENDAUM").

**Q.4. Are you familiar with the Crownpoint Uranium Mining Project proposed by HRI?**

**A.4.** Yes. As the President of ENDAUM, which is a party to this proceeding, I have

reviewed many of the documents in the Hearing Record, including the Final Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico ("FEIS") (February, 1997) and the Crownpoint Uranium Project Consolidated Operations Plan, ("COP Rev. 2") Revision 2.0 (8/15/97).

**Q.5. Are you familiar with the areas in Crownpoint where HRI proposes to mine uranium?**

**A.5.** I have lived in Crownpoint for twenty-eight years, and I graze livestock west of the town of Crownpoint on Range Unit 48. As a result, I am quite familiar with the lands referred to in the FEIS and the COP as the "Crownpoint" mining site and the "Unit 1" mining site.

**Q.6. Do you practice the traditional Navajo way of life?**

**A.6.** I am a member of the Navajo tribe of Indians. I speak the Navajo language and try to follow the Navajo way of life. I graze livestock on Range Unit 48. I use plants and herbs from Section 22 and 27 in Crownpoint for traditional medicine and grow food crops of corn and squash on Section 23 NE 1/4. The corn pollen from this corn crop is used in our traditional ceremonies.

**Q.7 Are the areas where you practice Navajo tradition near the Crownpoint or Unit 1 sections of the mining project?**

**A.7.** Yes, the areas are near both the Crownpoint and Unit 1 mining sections, and are within sight of them.

**Q.8. Do you believe your plant gathering and food crop cultivation will be affected by HRI's proposed project?**

**A.8.** Yes. In the Navajo culture, uranium is said to be a source of evil that is best left in the ground. My tradition tells me that once uranium is brought to the surface, the surrounding area is contaminated and the people will be destroyed. If mining begins at Crownpoint or Unit 1, I will no longer be able to use Sections 22 or 27 for plant gathering and food crop cultivation. And, we will not be able to perform ceremonies in those areas.

**Q.9. Have you ever been consulted regarding cultural resources near the HRI project by any researchers?**

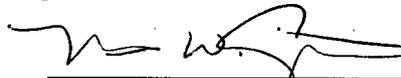
**A.9.** No.

**Q.10. Does this conclude your testimony?**

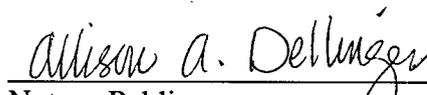
**A.10.** Yes.

**AFFIRMATION**

I declare under penalty of perjury on this 4 day of December, 1998, at Gallop, New Mexico, that the foregoing is true and correct.

  
\_\_\_\_\_  
Mitchell W. Capitan

Sworn and subscribed before me, the undersigned, a Notary Public in and for the State of New Mexico, on this 04 day of December, 1998. My Commission expires on 11/03/02.

  
\_\_\_\_\_  
Notary Public

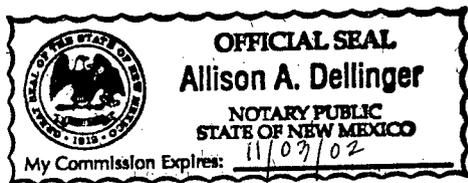


EXHIBIT 5

Archaeological Nature and Extent  
Testing At Seventeen Sites  
Along Navajo Route 11(A)1,  
Mariano Lake To Navajo Route 9

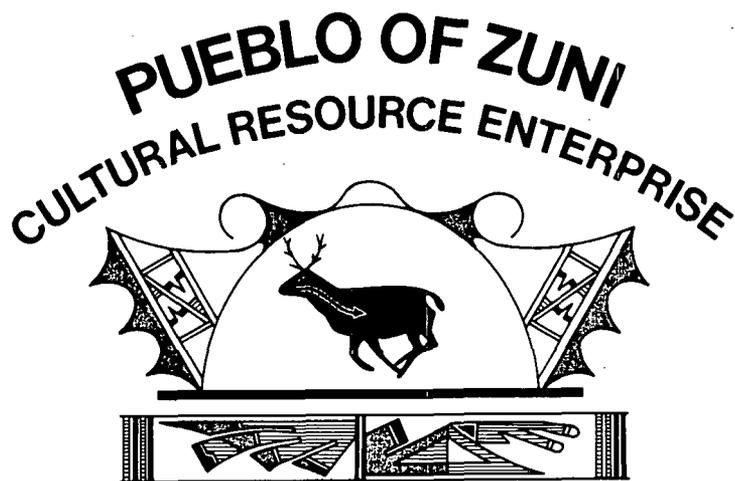
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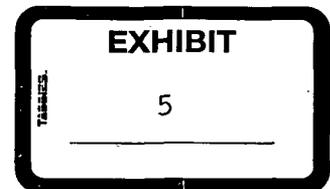
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ARCHAEOLOGICAL NATURE AND EXTENT  
TESTING AT SEVENTEEN SITES  
ALONG NAVAJO ROUTE 11(A)1,  
MARIANO LAKE TO NAVAJO ROUTE 9

Prepared by  
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Pueblo of Zuni  
Cultural Resource Enterprise

ARCHAEOLOGICAL NATURE AND EXTENT  
TESTING AT SEVENTEEN SITES  
ALONG NAVAJO ROUTE 11(A)1,  
MARIANO LAKE TO NAVAJO ROUTE 9

Prepared by  
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Fieldwork Conducted Under  
Navajo Nation Cultural Resources Investigations Permit C9706  
and  
United States Department of Interior Permit ARPA-NAO-97-002

Prepared by Zuni Cultural Resource Enterprise  
Under the Administration of the

Navajo Nation Historic Preservation Department  
for the Bureau of Indian Affairs, Navajo Area Office,  
Branch of Roads, Gallup, New Mexico

Contract No. C30657-NR11 (A) Modification Number 2

Submitted to  
Peter Kakos  
Navajo Nation Historic Preservation Department  
Roads Planning Section, Shiprock Office

Zuni Cultural Resource Enterprise Project Number ZCRE-012-96  
Zuni Cultural Resource Enterprise Report Number 569

April 1998

## ABSTRACT

The Navajo Nation Historic Preservation Department (NNHPD), Roads Planning Section, under an Indian Self-determination and Education Act contract with the Bureau of Indian Affairs (BIA) solicited the Zuni Cultural Resource Enterprise (ZCRE) to provide cultural resource services. The agreement for services is set forth in Contract No. C30657-NR11(A), Modification No. Two (2), Archaeological Inventory and Testing. This document is provided in partial fulfillment of that contract, reporting the nature and extent testing activities and findings. The proposed undertaking is one of 19.38 km (12.04 mi) of improvements of Route 11 around its intersection with Route 49 from Mariano Lake, New Mexico, to Route 9 west of Crownpoint, McKinley County, New Mexico. These proposed improvements involve alterations in the existing alignment, road surfacing, and modification of the existing grade and drain conditions. The project area can be found on the Mariano Lake, Dalton Pass, and Crownpoint, New Mexico, 7.5-min USGS quadrangle maps. The fieldwork was conducted under Navajo Nation Cultural Resources Investigation Permit C9706, and the United States Department of Interior Permit NAO-ARPA-97-002.

During nature and extent testing investigations, those portions of 17 archaeological sites falling within the area of effect for the undertaking were examined via surface collection, hand excavation, and machine trenching. All 17 sites had been considered eligible for inclusion in the National Register of Historic Places. Their Navajo Nation Archaeology Department and corresponding Laboratory of Anthropology (LA) site numbers are: NM-Q-23-60 (LA 38698), NM-Q-27-13 (LA 110304), NM-Q-27-15 (LA 110307), NM-Q-22-45 (LA 110308), NM-Q-22-48 (LA 110311), NM-Q-22-51 (LA 110314), NM-Q-22-52 (LA 110315), NM-Q-22-53 (LA 110316), NM-Q-22-54 (LA 110317), NM-Q-23-55 (LA 110318), NM-Q-23-56 (LA 110319), NM-Q-23-57 (LA 110320), NM-Q-23-58 (LA 110322), NM-Q-23-59 (LA 110323), NM-Q-23-62 (LA 110325), NM-Q-23-63 (LA 110326), NM-Q-23-64 (LA 110327). These sites comprise Paleoindian, Archaic, Basketmaker, ancestral Pueblo, Protohistoric, and Historic Navajo components.

No deposits further contributing to the eligibility of sites NM-Q-27-15, NM-Q-22-45, NM-Q-22-48, NM-Q-22-51, NM-Q-22-53, NM-Q-23-55, and NM-Q-23-59 were found within the proposed right-of-way. As a result of test excavations, ZCRE believes that construction of the proposed improvements will cause the destruction of eligible resources within the right-of-way at sites NM-Q-27-13, NM-Q-22-52, NM-Q-22-54, NM-Q-23-56, NM-Q-23-57, NM-Q-23-58, NM-Q-23-60, NM-Q-23-62, NM-Q-23-63, and NM-Q-23-64. In order to arrive at a determination of no adverse effect, ZCRE recommends that these 10 sites be included in the Phase II Data Recovery program for mitigation of effect.

Testing efforts included the excavation by hand of 114 units totalling approximately 162 sq m in area and nearly 77 cu m in volume. A total of 123 backhoe trenches were excavated, totalling over 1800 m in length and 1764 cu m in volume. One hundred one features were defined in 11 sites; 10 of these features, however, are outside the potential area of effect. A total of 7564 prehistoric and protohistoric ceramics, 1085 flaked, ground, and miscellaneous stone artifacts, 321 historic artifacts, and 545 faunal specimens were recovered. The significance of these data regarding current research issues is discussed.

A focused research design is presented for future work during the final phase of the project. Following this research design, the research potential of each site is discussed. Finally, a site-specific work plan is provided for Phase II Data Recovery at 10 sites.

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The field crew did an outstanding job. The ZCRE archaeologists are extremely experienced and knowledgeable regarding Southwestern archaeology. The archaeologists included Jason Weekooty, Steve Lonjose, Roland Quam, Leevis Weekooty, Ardale Delena, and Kenny Bowekaty. All did an excellent job, laying the foundation for this report and any interpretations that can be made from the data recovered. Thanks to all.

The laboratory at ZCRE deserves our thanks also. Janet Hagopian, the Laboratory Director, made sure artifacts and samples returned from the field were processed in a timely manner. Special thanks goes to Janet for providing comments on many of the chapters, providing advice for the report, and insight into the intricacies of ceramics. Thanks, Janet, for going above and beyond what was expected, and being so enthusiastic about the assemblage. Laboratory Specialist Vonda Bert, and Laboratory Technicians Leevis Weekooty and Pablo Padilla processed dozens of samples, photographs, and slides, and washed thousands of artifacts, which is all too often a thankless job. Thanks to everyone in the lab.

The Front Office here at ZCRE has done an excellent job organizing and keeping track of numerous contractual and business matters of the project. Darlynn Panteah, Sharon Dewesee, Joy Edaakie, Keith Shebola, and Elaine Kallestewa all deserve our thanks.

The ZCRE Production Office has, as always, done a masterful job with the report. Verina Seoutewa and Faye Quam have provided valuable technical advice, and have been very patient and understanding along the way. Avery Wyaco drafted hundreds of illustrations for this report, all of which are excellent. Artifacts were illustrated by Avery, Steve Lonjose, Ardale Delena, and Davis Nieto, Jr. Thanks also to our Editor, Francie Sisson. To everyone involved with this difficult aspect of the report, thank you.

The material specialists deserve recognition for their very important contributions to the report. Lori Stephens Reed and Joell Goff examined over 7000 sherds and produced a very interesting and informative discussion of the ceramic assemblage. Kate Thompson provided valuable insight into the complex geomorphology of the project area. Although the samples were small, Pamela McBride, Linda Scott Cummings, and Thomas Moutoux gleaned important

information out of the botanical samples. Here at ZCRE, Jonathan Damp and Kenny Bowekaty examined, and then made sense of, over 1000 lithic artifacts. Thanks to all of the analysts for all of your hard work and thought.

Beyond ZCRE there are numerous people who have contributed to this project. The field assistants did a great job. Hoburt Warner, Jymn Mariano, Art Charley, Otis Begay, Barney Mariano, Jr., Kenny Walthal, Harold Warner, and Stanley Brown all worked very hard, often under difficult conditions. Thanks.

To the people of Mariano Lake, Crownpoint, and the surrounding area, thanks for your patience and courtesy.

Appreciation goes to Peter Kakos of the Shiprock Office of the Navajo Nation Historic Preservation Department - Roads Planning Program for guiding us all through this phase of the project. Thanks also goes to Calvin Murphy, Right-of-Way Agent (BIA-NAO-BOR) for all of his help.

Finally, and most importantly, my deepest and most sincere thanks are extended to my wife, Mary Ellen, and my wonderful daughter, Anna Catherine. You were always understanding through the entire project. From the many days away during fieldwork, to the demanding schedule of writing, you were always there with a smile when I came home.

**SECTION I**

**INTRODUCTION AND BACKGROUND**

## Chapter 1

### INTRODUCTION

James W. Kendrick

This draft technical report is submitted in partial fulfillment of the requirements of the task order for Phased Data Recovery on Navajo Route 11(A) 1, Mariano Lake to N9, McKinley County, New Mexico. It provides a report of archaeological investigations associated with Contract No. C30657-NR11(A), Modification No. Two (2), Archaeological Inventory and Testing. This document reports on the testing of 17 sites along Navajo Route 11(A)1: NM-Q-23-60 (LA 38698), NM-Q-27-13 (LA 110304), NM-Q-27-15 (LA 110307), NM-Q-22-45 (LA 110308), NM-Q-22-48 (LA 110311), NM-Q-22-51 (LA 110314), NM-Q-22-52 (LA 110315), NM-Q-22-53 (LA 110316), NM-Q-22-54 (LA 110317), NM-Q-23-55 (LA 110318), NM-Q-23-56 (LA 110319), NM-Q-23-57 (LA 110320), NM-Q-23-58 (LA 110322), NM-Q-23-59 (LA 110323), NM-Q-23-62 (LA 110325), NM-Q-23-63 (LA 110326), NM-Q-23-64 (LA 110327). All material associated with this project was prepared by the Zuni Cultural Resource Enterprise (ZCRE) under the administration of the Navajo Nation Historic Preservation Department (NNHPD) for the Bureau of Indian Affairs, Navajo Area Office, Branch of Roads (BIA-NAO-BOR), Gallup, New Mexico. This report follows the guidelines set forth in Attachment 7 of Task Order No. One: "Reporting Requirements: Types, Format, and Review, Historic Preservation Department, Roads Planning Section" as well as verbal guidelines by the contract administrator.

This report is organized into seven sections. Sections I, IV, and V were written by the principal author.

Section I comprises the first six chapters, which provide an introduction and background for interpretation. Chapter 1 presents a general description and history of the project. Chapter 2 provides a discussion on the physical environment of the project area, and a brief discussion of paleoenvironmental conditions. Chapter 3 presents a brief discussion of the culture history of the area. Chapter 4 discusses previous research within and near the project area. The research design which guided investigations is presented in Chapter 5, and the methods employed during fieldwork and laboratory processing are provided in Chapter 6.

Section II comprises chapters 7 through 23, which provide descriptive treatment of the archaeological investigations at each of the 17 sites within the project. Each chapter provides a brief introduction to the site, and the information collected during the inventory (Zimmerman and Abbott 1996). In-depth descriptions of hand-excavated units and backhoe trenches, and the cultural and natural stratigraphy observed are provided in these chapters. Interpretations regarding number of components, the age of those components, and their function are presented in each chapter summary. Finally, recommendations regarding Phase II data recovery are given at the end of each chapter.

Section III consists of Chapters 24 through 30, and provide descriptions of the analyses conducted on artifacts and ecofacts recovered during the project, as well as the geomorphology of the area (Kate Thompson, Chapter 24). Results of analyses conducted on ceramics recovered during the project are presented in Chapter 25 by Lori Stephens Reed and Joell Goff. Lithic artifacts and material are described in Chapter 26 by Jonathan Damp and Kenny Bowekaty. Results of analyses on the faunal assemblage are presented by Jerome Zunie in Chapter 27. Macrobotanical and pollen analyses are described in Chapters 28 and 29 by Pamela McBride, and Linda Scott Cummings and Thomas E. Moutoux, respectively. Historic artifacts are described by Harding Polk, II, in the final chapter of this section (Chapter 30).

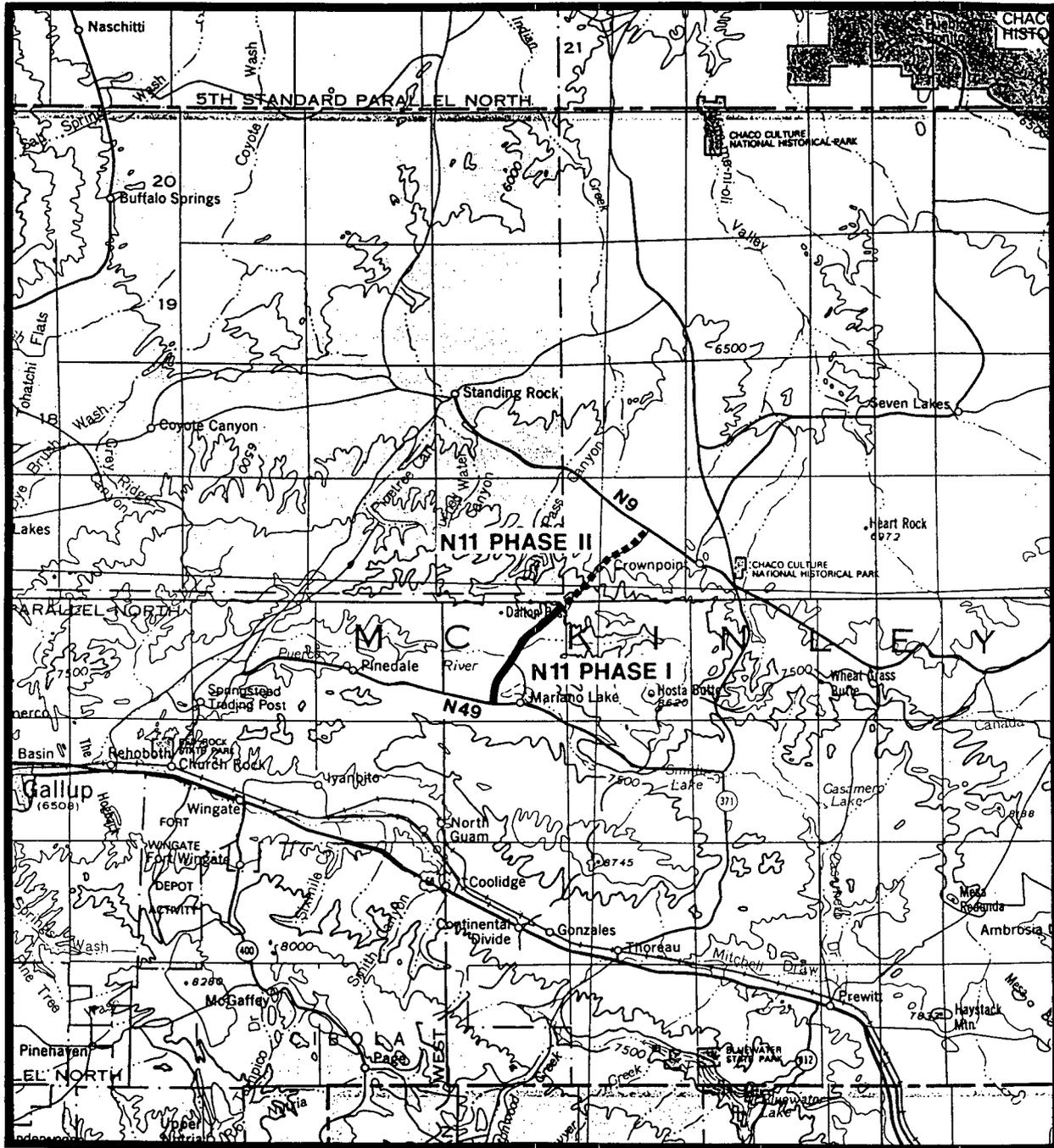
Section IV consists of Chapters 31 (Summary) and 32 (Conclusions), which summarize the findings and significance of the fieldwork and analyses. Chapter 31 summarizes the descriptive and analytical information. A detailed summary of the extent of fieldwork on each site is provided in this chapter, including the number and volume of excavated units. Chapter 32 provides interpretation of the summarized data, and addresses questions put forth in the general research design.

Section V consists of Chapters 33 through 34, which comprise the Phase II data recovery plan. Chapter 33 presents the focused research design specifically stating research issues that can be addressed by the deposits and features within the right-of-way at sites in the N11(A)1 project area. This chapter also discusses the research potential of the sites investigated in light of the information gained from testing efforts. Chapter 34 presents a site-specific work plan for Phase II data recovery.

Section VI contains supplementary information. Appendix A illustrates examples of field and laboratory recording forms. Appendix B contains information on all radiocarbon samples analyzed during the testing phase. Appendix C contains the ceramic data base. Appendix D has information on site locations and human remains (for limited distribution CONFIDENTIAL—bound separately). Finally, Section VII is the references cited.

## DESCRIPTION OF THE UNDERTAKING

The BIA-NAO-BOR has proposed to improve 19.38 km (12.04 mi) of Route 11 around its intersection with Route 49 from Mariano Lake (BOP Station 0+75.20) to Route 9 (EOP Station 644+91.86) west of Crownpoint in McKinley County, New Mexico (Figure 1.1). The proposed improvements involve alterations in the existing alignment, road surfacing, and modification of the existing grade and drain conditions. To accommodate these improvements, a 45.72-m-wide (150-ft-wide) right-of way, or 22.86 m (75 ft) on either side of the centerline as surveyed and staked, is proposed. Additional easements for turnouts, material pits, haul roads, channel improvements, ponds, and detours are not yet specified and are excluded from consideration herein. For management purposes the proposed N11 route has been divided into two segments (Figures 1.2 to 1.6 and Table 1.1), N11 Phase I (1) and N11 Phase II (2) and when considered together hereafter referenced as N11(1&2). Phase I of N11(1&2) roughly comprises the south half of the project, while Phase II comprises the northern half. The project area is found on the Mariano Lake, Dalton Pass, and Crownpoint, New Mexico, 7.5-min USGS quadrangle maps.



Taken from USGS 1:500,000 scale quadrangle, STATE OF NEW MEXICO (1985)

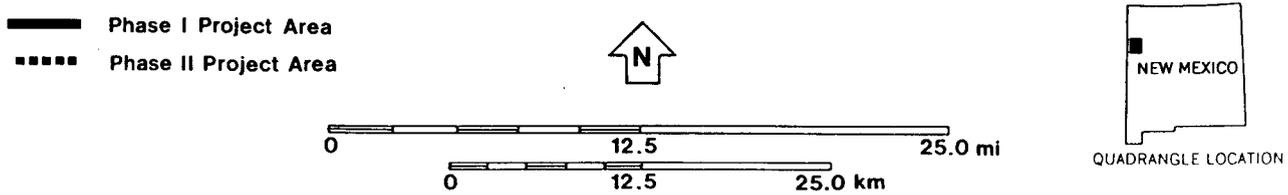
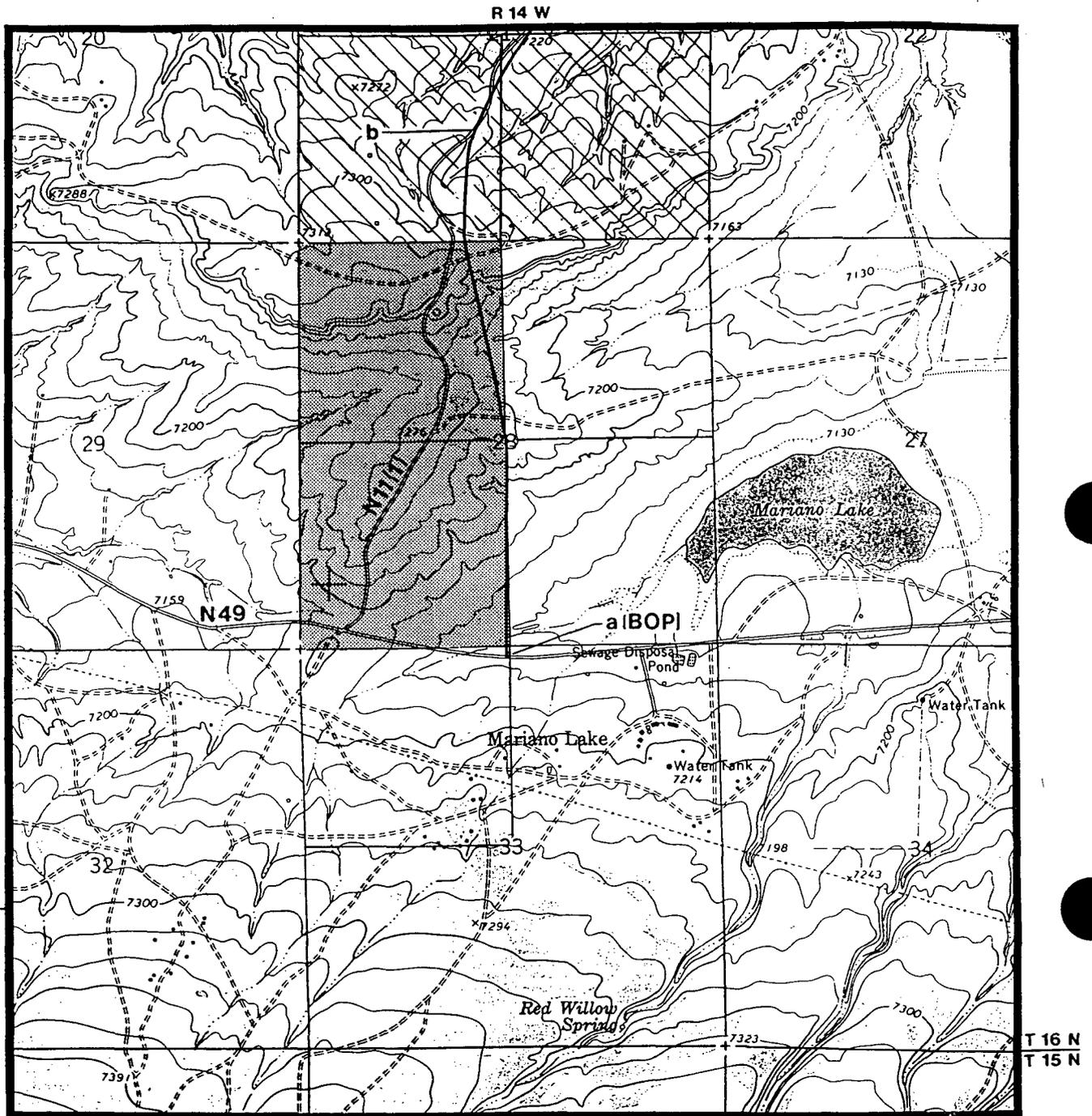


Figure 1.1. General Location of the N11 (1&2) Project Area.



Taken from USGS 7.5-min. quadrangle, MARIANO LAKE, N. MEX. [1963, photorevised 1980]

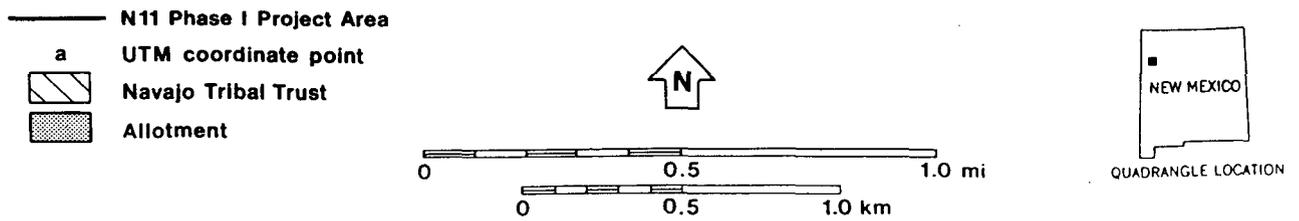
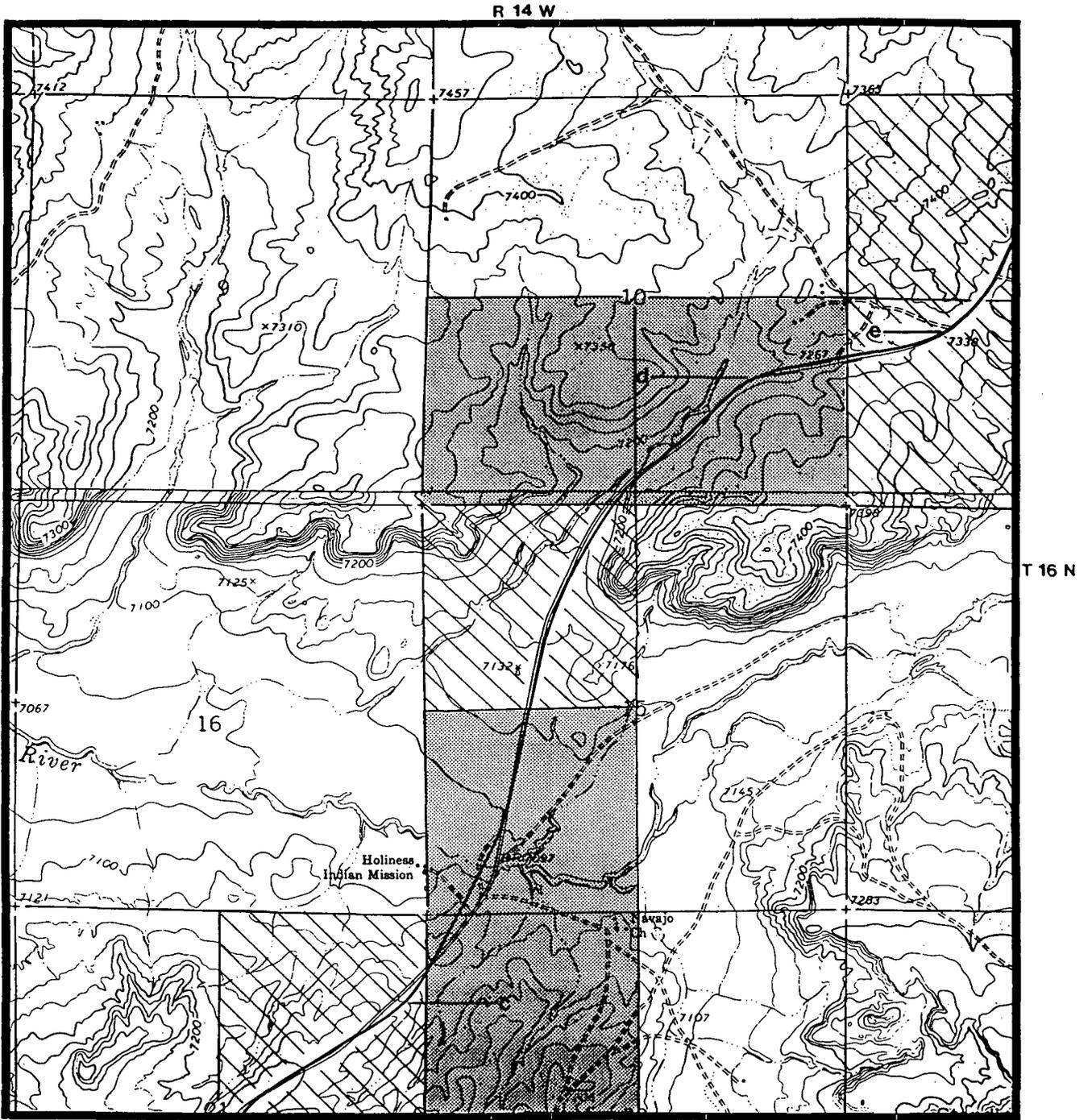


Figure 1.2. N11 (1&2) Project Area, With Selected UTM Points and Land Statuses.



Taken from USGS 7.5 min. quadrangles, DALTON PASS [1963] AND MARIANO LAKE [1963, photorevised 1980], N. MEX.

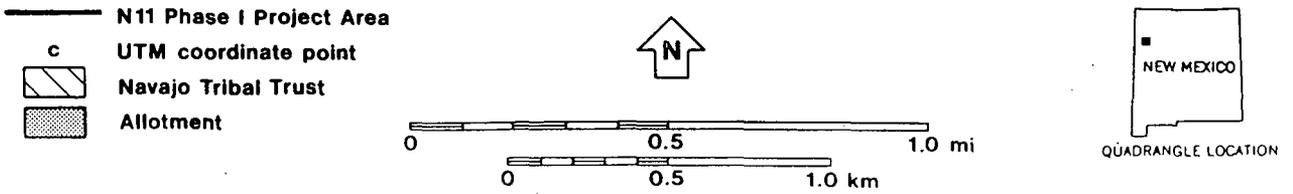
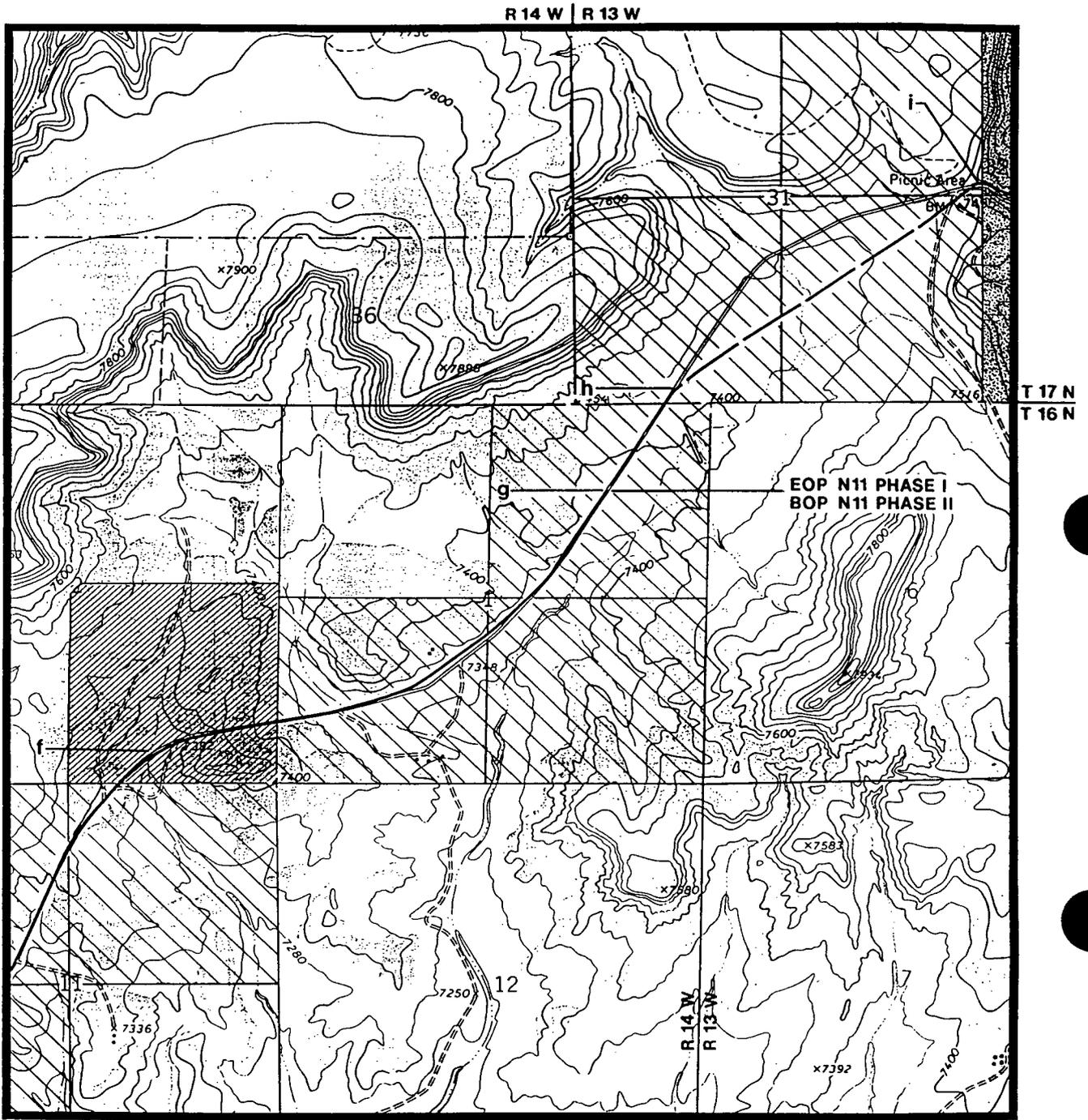


Figure 1.3. N11 (1&2) Project Area, With Selected UTM Points and Land Statuses.



Taken from USGS 7.5-min. quadrangle, DALTON PASS, N. MEX. [1963]

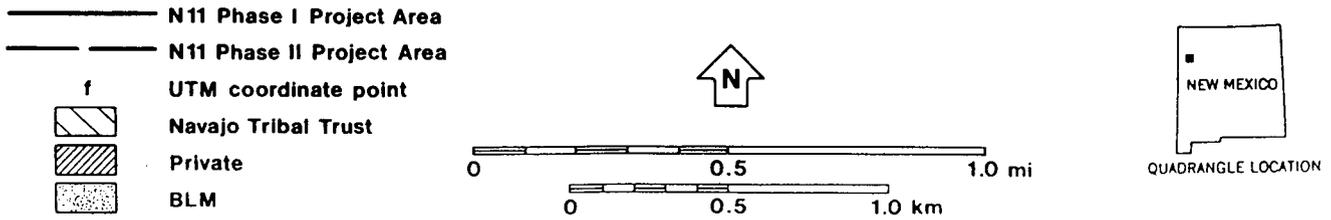
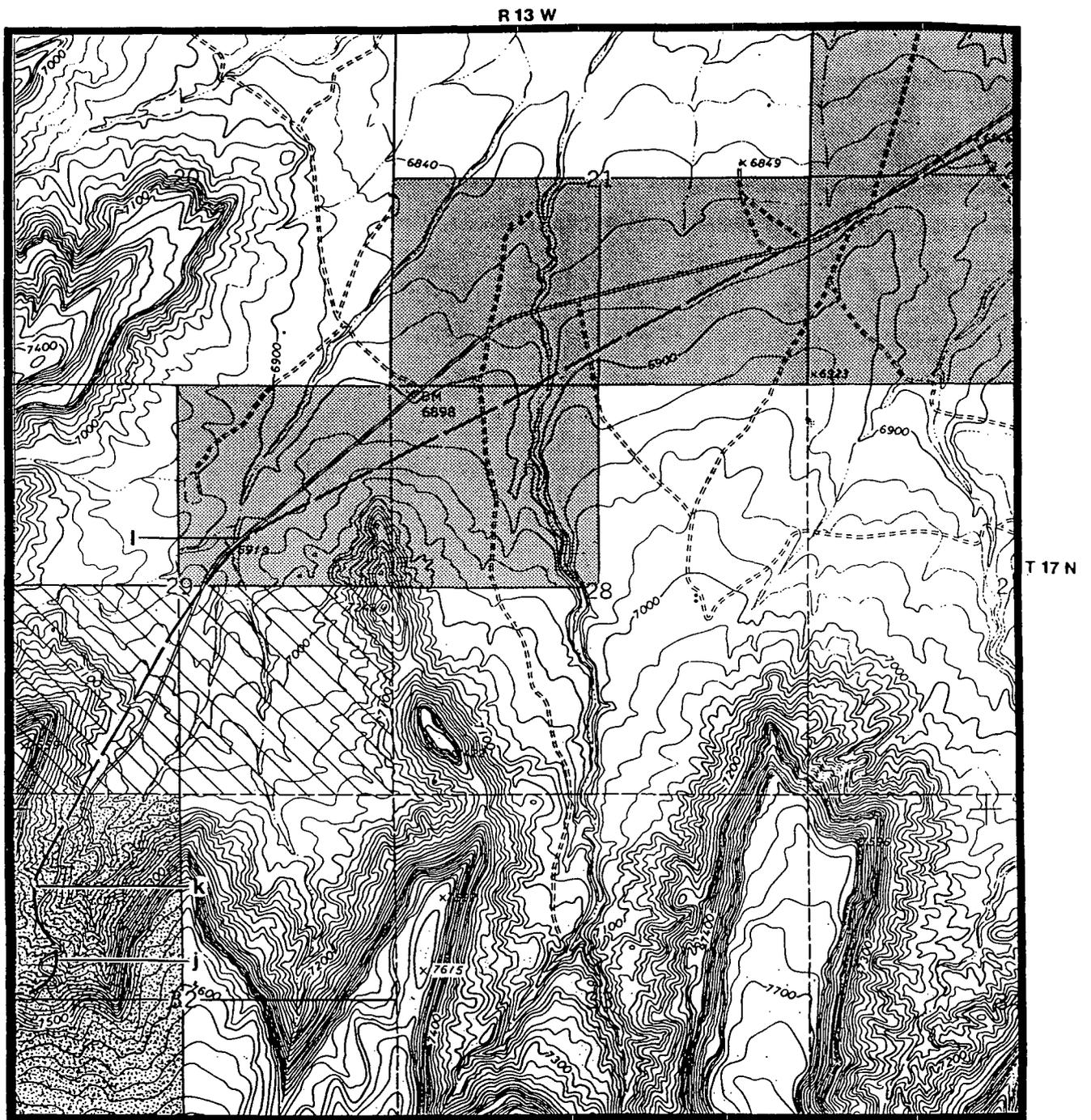


Figure 1.4. N11 (1&2) Project Area, With Selected UTM Points and Land Statuses.



Taken from USGS 7.5-min. quadrangle, CROWNPOINT, N. MEX. [1963]

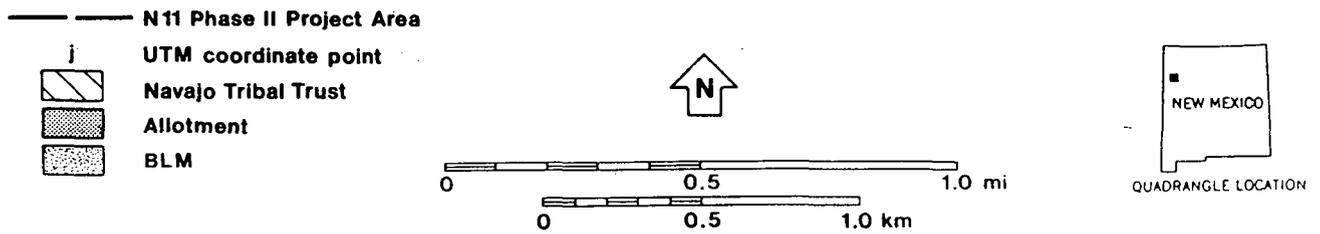
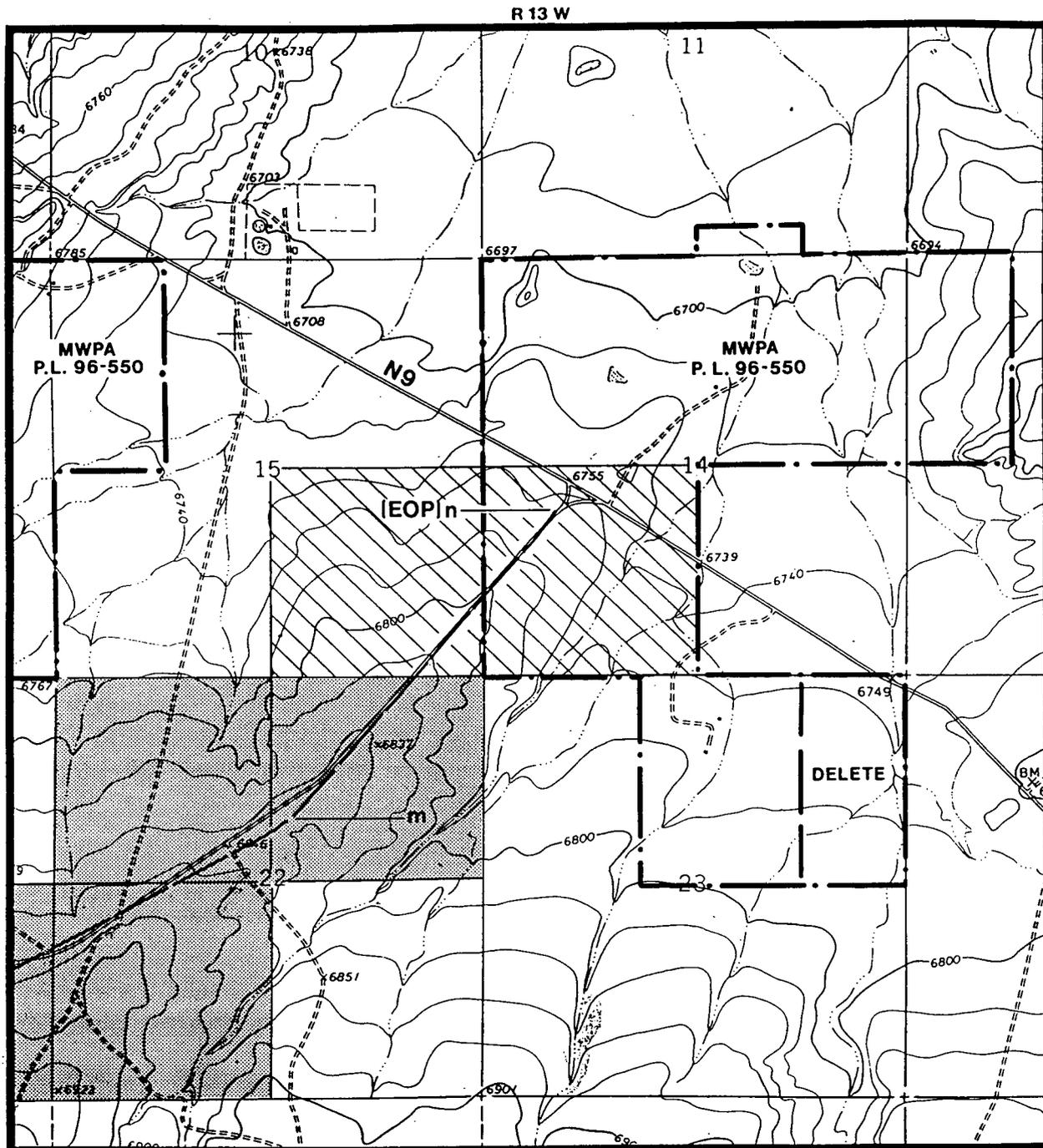


Figure 1.5. N11 (1&2) Project Area, With Selected UTM Points and Land Statuses.



Taken from USGS 7.5-min. quadrangle, CROWNPOINT, N. MEX. (1963)

- N11 Phase II Project Area
- m UTM coordinate point
- Muddy Water Protection Area
-  Navajo Tribal Trust
-  Allotment

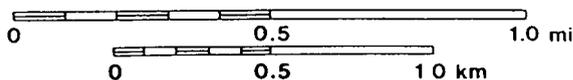


Figure 1.6. N11 (1&2) Project Area, With Selected UTM Points and Land Statuses.

Table 1.1. UTM Coordinates For Surveyed Centerline of the N11(1&2) Undertaking.

Point	Zone	Easting	Northing
a	12	742330	3940540
b	12	742150	3942630
c	12	742970	3943460
d	12	744200	3945960
e	12	744950	3946160
f	12	745670	3947250
g	12	747380	3948340
h	12	747640	3948730
i	12	748810	3949590
j	12	749130	3949670
k	12	749030	3949970
l	12	749760	3951360
m	12	752830	3953150
n	12	753780	3954330

#### AUTHORITY

As specified in the task order (scope of work), the Navajo Nation Historic Preservation Department, Roads Planning Program (NNHPD-RPP), under an Indian Self-determination and Education Act (P.L. 93-638, as amended) is contracted with the Bureau of Indian Affairs, to solicit a contractor to provide cultural resource services.

Pursuant to Sections 110 and 106 of the National Historic Preservation Act (NHPA, P.L. 89-665, as amended) and 36 CFR 800, the BIA is required to identify, evaluate, and protect cultural resources and to ensure that actions initiated by the BIA do not inadvertently harm or destroy cultural resources. The NNHPD acts as contract administrator for the BIA on Navajo Indian Reservation lands. In addition to NHPA, these requirements are mandated by the Archeological and Historic Preservation Act (P.L. 93-291), the Archeological Resource Protection Act (ARPA, P.L. 96-95), the American Indian Religious Freedom Act (AIRFA, P.L. 95-341), the Native American Graves Protection and Repatriation Act (NAGPRA, P.L. 101-601), the National Environmental Policy Act (P.L. 91-190), the Navajo Nation Cultural Resources Protection Act (N.T.C. Resolution CMY-19-88), and the requirements of other tribal and federal laws and regulations pertaining to cultural resources.

#### PROJECT HISTORY

This section provides a discussion of the history of the current project, from the beginning of archaeological inventory and reassessment and ethnographic assessment (Zimmerman and Abbott 1996) through the testing phase addressed in this document. The original task order for the project entitled: "Phased Cultural Resource Investigations on Navajo Route 11A(1) - Mariano Lake to Route 9, McKinley County, New Mexico; Task Order No. One: Archaeological Inventory and Reassessment/Ethnographic Assessment" was signed by Pueblo of Zuni Governor Robert E. Lewis

on 09 May 1994 and by Navajo Nation President Peterson Zah on 06 September 1994. A copy of the final signed agreement was received by ZCRE on 21 September 1994, and notice to proceed for the inventory and reassessment was received by ZCRE on 22 October 1994. Permit authorization to begin fieldwork for this phase of the project was received by ZCRE on 18 May 1995 under Navajo Nation Cultural Resources Investigation Permit No. B9544-B5. ZCRE staff members David Zimmerman and Alysia Abbott functioned as the project directors.

On 22 May 1995 ZCRE began fieldwork for the archaeological inventory and reassessment with a meeting at the Mariano Lake Chapter House. Present at this meeting were Rena Martin, Contract Administrator (NNHPD); Calvin Murphy, Right-of-Way Agent (BIA-NAO-BOR); Raquel Warner, Mariano Lake Chapter Coordinator; and Alysia Abbott, Jason Weekooty, Davis Nieto, and David Zimmerman, all of ZCRE. During this meeting, all parties reviewed the proposed right-of-way and engineering specifications and procedures that would be followed during the archaeological inventory. One issue of particular concern was the spatial relationship of the survey area to the proposed N11(1&2) right-of-way. As a matter of policy, Ms. Rena Martin (NNHPD) stipulated that the area investigated for archaeological resources was not to exceed the defined right-of-way (45.72 m or 150 ft), except on those lands administered by the BLM where a 76.20-m (250-ft) right-of-way is required. After this meeting, NNHPD and ZCRE representatives were given an orientation of the project area by BIA-NAO-BOR staff.

The pedestrian survey for the archaeological reassessment and inventory began on the afternoon of 22 May 1995 and was completed on 8 June 1995. A total of 11 days (44 person-days) were spent locating, mapping, and recording the archaeologically identifiable resources along the proposed N11(1&2) alignment. Field personnel included Project Directors Alysia Abbott and David Zimmerman, Supervisory Archaeologist Jason Weekooty, and Archaeologist Davis Nieto.

The ethnographic assessment began concurrent with the archaeological reassessment and inventory through meetings at local chapters. The specific chapters, meetings attended, and dates are documented in Zimmerman and Abbott (1996). Project Director David Zimmerman and Navajo Cultural Specialist Carmelita Topaha spent 11 days (22 person-days) reviewing records and conducting interviews in the N11(1&2) project area between 19 June 1995 and 04 July 1995.

Records checks of NNHPD files at Window Rock, Arizona, and State of New Mexico Historic Preservation Division Laboratory of Anthropology (LOA) files, Santa Fe, New Mexico, were conducted by ZCRE staff at several points during the research. The original search of the NNHPD site files was conducted by ZCRE staff in the early spring of 1994. On 12 September 1995, Zimmerman expanded this search to identify sites within 1.6 km (1 mi) of the N11(1&2) undertaking. Abbott conducted a remote search of the New Mexico Archaeological Resource Management System (NMARMS) site data base on 27 June 1995. Additional remote searches of the NMARMS data base were conducted by Zimmerman at various times between 17 September and 12 October to identify additional sites.

Some fieldwork was conducted during September and October 1995, in order to refine field maps and to collect informant signatures and consents. Production of the draft inventory and reassessment report took place from July to late November 1995. Comments on the draft report were received from NNHPD on or around 19 January 1996. On 24 January 1996 an in-field meeting was

held between NNHPD, BIA-NAO-BOR, and ZCRE staff. At this meeting, the treatment plan proposed by ZCRE was reviewed and it was decided that sites NM-Q-22-49 (LA 110312) and NM-Q-22-50 (LA 110313) would be avoided by a reroute of the proposed N11(1) right-of-way. A synopsis of all changes to the treatment plan was received from NNHPD on 6 February 1996.

For the current phase of the project, ZCRE accepted the Task Order for Archaeological Inventory and Testing on 21 June 1996, and applied for testing permits on 20 February 1997. All permits were received on 20 March 1997. The contract modification was signed by Pueblo of Zuni Governor Donald F. Eriacho on 18 June 1996 and by Navajo Nation President Albert Hale on 6 January 1997. Official notification of the full ratification of the contract and the Notice to Proceed was received via letter from acting Roads Planning Program Manager Reid Nelson on 9 April 1997.

Fieldwork was conducted between 21 April 1997 and 20 August 1997, under Navajo Nation Cultural Resources Investigation Permit C9706 and United States Department of the Interior Permit NAO-ARPA-97-002. ZCRE initiated fieldwork within eight working days of receipt of the notice to proceed, and completed field work within 95 working days of the notice to proceed. The contract modification called for delivery of a preliminary (letter) report summarizing the results of fieldwork within 20 days of the completion of fieldwork. The preliminary report documenting completion of Phase I data recovery archaeological extent testing was submitted to the contract administrator on 16 September 1997. Pursuant to standard stipulation F of the Navajo Nation Cultural Resources Investigation Permit, this report is provided to document the completion of fieldwork and the general results of investigations.

The following chapters in this section provide an introduction and background for interpretation of the sites investigated along N11(1&2). The following sections of the report provided detailed descriptions of the work performed, analyses conducted, and conclusions drawn regarding the prehistory and history of the project area. The final section of the report provides a focused research design, research potential of the sites, and a detailed data recovery plan for those sites.

## Chapter 2

### PHYSICAL ENVIRONMENT

James W. Kendrick

Recent research has demonstrated that the physical environment has been an integral factor influencing past settlement patterns and community structure in and around the project area (Kantner 1996). Kantner has shown that differences in potential agricultural lands and distribution of water on the northern and southern peripheries of Lobo Mesa may have resulted in great-house community variability during the Pueblo II (AD 900 to 1100 or 1150). A discussion is in order, then, of the physical environment of the project area and surrounding region to provide a foundation for examining the prehistory and history of the area. In addition, resources that may be eligible for inclusion in the National Register of Historic Places (NRHP) as Traditional Cultural Properties are likely to derive varying degrees of significance from elements of the biotic or physiographic landscape (Zimmerman and Abbott 1996). Some of this information may be found in the cultural resource inventory and testing plan for the N11(1&2) project (Zimmerman and Abbott 1996); however, significant additional information such as the geologic formations, location of soil types, and paleoenvironmental conditions has been included here.

### PHYSIOGRAPHY AND GEOLOGY

#### Physiography

The N11(1&2) project area falls within the boundaries of the Colorado Plateau Province of the North American continent (Thornbury 1965). The Colorado Plateau is characterized by high altitude, deep canyons, flat plateaus made up of gently dipping sedimentary rocks, steep escarpments, and an arid climate (Cordell 1984; Thornbury 1965). A large number of monoclines is a particularly distinctive feature of the province (Kelley 1955).

The portion of the Colorado Plateau of concern to the N11(1&2) project has been called the Navajo section, a poorly defined area of scarped plateaus that lacks the degree of dissection seen elsewhere in the province (Thornbury 1965). The rocks in this section have also been less deformed than in other areas of the Colorado Plateau, and the surface is characterized by mesas, buttes, and cuestas rather than clinal ridges and hogbacks. The section is bounded on the south and west by the Little Colorado River and the Echo Cliffs monocline near the Colorado River. The northern boundary follows the lower San Juan River as far as the Four Corners region and then angles northeast to the San Juan Mountains, skirting the headwaters of the San Juan. The Rocky Mountain Province lies to the east, marked by the Sierra Nacimiento. The southeastern boundary runs from the Nacimientos to Mount Taylor, and thence to the Puerco River near Gallup (Thornbury 1965).

The Navajo-Hopi Volcanic Field, the Black Mesa Basin, the Defiance and Zuni Upwarps, and the San Juan Basin are major structural features of the Navajo section in northeastern Arizona and northwestern New Mexico (Thornbury 1965). Of these features, the N11(1&2) project area

crosses the San Juan Basin to the north and Zuni Uplift to the south. Various authors have subdivided these features based on local physiographic characteristics (Binford and Amsden 1992; Fassett and Hinds 1971; Marshall et al. 1979; Vivian 1990). Based on definitions and terminology in Marshall et al. (1979) the N11(1&2) project area begins in the high country of the Upper Rio Puerco of the West and concludes on the south Chaco Slope. North of Mariano Lake, the project area ascends a moderate incline for a distance of about 1.6 km (1.0 mi) before gently descending approximately 61 m (200 ft) into the alluvial valley of the Puerco River. From here, elevations again increase to uplands slightly higher than those to the south. The sharp escarpment of Lobo Mesa and the Dutton Plateau descends approximately 152 m (500 ft) marking the end of this monoclinical feature and the beginning of the south Chaco Slope, a broad area of alluvial outwash between the uplands of the central and southeastern San Juan Basin (Marshall et al. 1979). Binford and Amsden note that although the Chaco Slope is characterized by broad, slightly rolling plains, erosion has formed mesas, cuerdas, terraces and incised drainages in many places (1992:17; cited in Loose 1978).

Elevations in the project area range from about 2059 m (6755 ft) above mean sea level near the EOP to approximately 2286 m (7500 ft) above mean sea level at the top of the escarpment on the N11(2) segment. The BOP is at 2179 m (7150 ft) above mean sea level.

### Geology

The geology of the N11 project area comprises formations of the Mesa Verde Group intertongued with the Mancos Shale, both of the Upper Cretaceous. Lower formations of the Mancos Shale are found from the beginning of the project to the valley of the Upper Puerco. Proceeding northward, the project area crosses Gallup Sandstone and then the Mulatto Tongue of the Mancos Shale. Continuing northward, the project crosses the Dalton Sandstone and Gibson Coal Members of the of the Crevasse Canyon Formation. Before descending Mariana Pass, Point Lookout Sandstone forms high, steep cliffs on the eastern and western sides of the project area. Hosta Butte, a distinctive, isolated feature visible to the east from many portions of the project area and sacred to many social groups throughout this region, is composed of Point Lookout Sandstone and the Gibson Coal Member.

At the crest of the Dutton Plateau the project crosses the Satan Tongue of the Mancos Shale and the Hosta Tongue of the Point Lookout Sandstone. Descending the plateau through Mariana Pass, the project crosses again the Dalton Sandstone and Gibson Coal members of the Crevasse Canyon Formation, which comprise the rest of the project area.

More recent aeolian, colluvial, and alluvial deposition during the Quaternary is present throughout the project area. Detailed descriptions of these deposits and their distribution throughout the project area can be found in Thompson's geomorphology analysis (Chapter 24).

### HYDROLOGY

Two major systems of surface water drainage are present within the project area. The north rim of the Dutton Plateau forms the watershed between these two drainage systems. The N11(1) area is drained by the Upper Puerco River. The northern area, N11(2), is almost entirely drained by

the headwaters of Indian Creek. The portion of N11(2) south of the escarpment is drained by the Upper Puerco. The following is a description of these two drainage systems. The southern, or Upper Puerco, system will be described first, followed by the northern, or Indian Creek, system.

The headwaters of the Upper Puerco River begin on the Continental Divide northeast and southeast of Hosta Butte and the river flows west crossing the project area approximately 16 km (10 mi) downstream. Along the way, numerous unnamed drainages feed the river from the slopes to the north and south. The Upper Puerco River drainage basin is between approximately 3.6 km (2.3 mi) wide in the vicinity of the project area and varies from about 3 to 5 km (1.9 to 3.1 mi) wide to the east and west of the project area. From its headwaters to the east, the Upper Puerco River flows west across the project area and then heads southwest where it meets its south fork and continues west through Gallup, eventually meeting the Little Colorado River in the vicinity of Holbrook, Arizona.

The drainages originating just below the high escarpment of the Dutton Plateau on the N11(2) segment are ephemeral southern drainages of the San Juan Basin (Goodman 1982:45-46) and more specifically of the south Chaco Slope. These north-flowing drainages are part of the Indian Creek headwaters, itself a part of the greater Chaco River drainage (Maker et al. 1974:6) that reaches its terminus at the San Juan River just east of Shiprock, New Mexico. In addition to abundant surface runoff near the project area, the Chaco Slope is identified as an area of high groundwater content and quality. There is also good availability and quality of groundwater in the higher elevation areas south of the Chaco Slope (Goodman 1982:46-47).

At least one unnamed spring was noted in the project area on the north side of the escarpment overlooking the lower N11(2) segment. Although USGS quadrangle maps do not indicate any springs in the vicinity of the project area, additional springs or seeps are likely to be present in areas adjacent to the project area.

During fieldwork, all of the drainages were normally dry or very low. Occasionally, however, floods occurred quickly after sudden storms. On 4 August 1997, for example, a very strong storm passed over the project area causing flash flood conditions. This storm produced significant cutting of many of the drainages and arroyos in the northern portion of the project and rapid flow within the Upper Puerco.

## CLIMATE

### Precipitation

As noted above, precipitation can arrive in the form of brief but violent thunderstorms. Typically, the northern extent of the N11(2) segment has an average annual precipitation of approximately 203 to 254 mm (8 to 10 in). On the higher elevations of the project area, annual precipitation varies from about 254 to 406 mm (10 to 16 in). Between 1951 and 1980, the weather station in Gallup recorded average precipitation of 246 mm (9.68 in), while the station in Chaco Canyon recorded an average 215 mm (8.46 in) during the same period. The region in which the project area is located follows a biseasonal precipitation pattern. In the summer and early fall, moist air flows into the region from the Gulf of California. This warm air collides with cooler air in the

region and produces afternoon thundershowers mostly between July and September (Binford and Amsden 1992; Maker et al. 1974). Approximately 40% of the annual precipitation in the region occurs as a result of this pattern. In winter, precipitation is produced as moist polar air masses enter the region from the west and northwest and collide with local air masses (Sullivan 1994:13). In McKinley County, approximately 60% of the annual precipitation falls during the warmest six months, May through October (Maker et al. 1974:6).

Although the biseasonal pattern of precipitation accounts for most of the region's precipitation, precipitation rates in the project area can be expected to vary significantly year to year and over longer periods of time. This variability is accounted for by the location of the greater San Juan Basin area between two major continental weather patterns. According to Sullivan (1994:13), the San Juan Basin is near the southern edge of winter storm tracts and near the northern edge of summer storm tracts. As a result, slight north-to-south shifts in these major patterns create measurable deviations in the biseasonal precipitation patterns for the region.

Average annual evaporation rates for the area in which the project is located for the period of record from 1956 to 1970 are approximately 1270 mm (50 in; Bennett 1986:48). Sullivan (1994:13) states that for the San Juan Basin in general, low humidity, thin ground cover, few clouds, and high summer temperatures generate a high degree of evapotranspiration that results in an average moisture deficit of 355 to 457 mm (14 to 18 in). In an average year, there would be sufficient precipitation for the cultivation of crops; however, it appears that the variability of climatic conditions in the area of the undertaking would have made yearly crop harvests unpredictable.

### Temperature

Average temperatures vary across the project area primarily as a result of elevational and latitudinal differences. Across the San Juan Basin, temperatures generally decrease 0.8 to 1.4° C (1.4° to 2.5° F) for every one-degree increment in latitude northward (Binford and Amsden 1992:18). Temperatures drop about 2.7° C (4.9° F) for every 305-m (1000-ft) increase in elevation (Binford and Amsden 1992:18). In the period of record between 1951 and 1980, extremely cold temperatures have been recorded at Chaco Canyon (-38.9° C, -38° F) and at Gallup (-32.2° C, -26° F) (Bennett 1986:38). High summer temperatures recorded at these stations are 40° C (104° F) at Chaco Canyon and 37.2° C (99° F) at Gallup (Bennett 1986:38). As in the case of precipitation, there may be great variation in seasonal temperatures from year to year. Data from Binford and Amsden (1992:18) and Bennett (1986:38) indicate year to year variations in high temperatures of 8° C (9° F) and year to year variations in low temperatures of up to 21.6° C (39° F) for the two stations mentioned above. In the vicinity of the project area at Crownpoint, New Mexico, the mean annual temperature for the period ending 1960 was 10.6° C (51.1° F) (Maker et al. 1974:7). The highest elevations in the project area are about 305 m (1000 ft) higher than at Crownpoint meaning a possible average decrease in temperature of about 2.7° C (4.9° F).

The interplay of temperature and moisture, or precipitation, is important in understanding the limiting factors for subsistence pursuits in the project area. The duration of the frost-free period is an important factor for agriculturalists. Modern hybrid corn varieties require at least 120 days of frost-free growing season to reach maturity. Older varieties of corn grown under conditions of

inadequate moisture frequently require longer seasons (Cordell 1984). Wills (1988) points out, however, that "frosts can be buffered by...field placement with southern exposure, soil burning to decrease albedo, rock borders to increase solar radiation, and furrowing to direct cold air drainage away from plants." Data from Bennett (1986:46) and Sullivan (1994:15) indicate an average frost-free period of between 110 and 120 days across the area where the project is located. Maker et al. (1974:7), reporting the average number of days between the last 0° C (32° F) day in spring and the first 0° C (32° F) day in fall, report an average of 166 days in Crownpoint and 124 days in Gallup for the period of record ending 1960.

Frost-free days are not the only limiting factor in maize agriculture. Areas of the upland Southwest may also have higher levels of soil moisture (Wills 1988:448). In areas with significant shifts between diurnal and nocturnal temperatures, moist soils may stay cooler longer than dryer soils. Moist soils may be beneficial at planting, but may also contribute to delayed maturation or even seed decay through the growing season (Wills 1988:448).

## PEDOLOGY

As discussed in Zimmerman and Abbott (1996), four major soil associations are present in the N11(1&2) project area. These are the Las Lucas-Little-Persayo, Hagerman-Travessilla, Rock Land-Travessilla, and Lohmiller-San Mateo associations. Provided here is a description of these soils, their distribution in the project area, and their implications to settlement and subsistence strategies.

Soil types and the qualities of salinity, water permeability, water-holding capacity, resistance to erosion, and toxicity are important in the success of agricultural pursuits. In the case of prehistoric horticulture, Hack (1942) describes the agricultural soils in the Hopi Country of Arizona and states that soils transported by water are most important, as they occur in the fields irrigated by floodwaters. For soils transported by wind, and wherever there is deep accumulation of sand, there is great waterholding capacity. Deep dunes are thus the next most important horticultural soils. Soils formed both in alluvium and through aeolian deposition can be found variously in the immediate N11(1&2) project area.

Following Maker et al. (1974), each of the soil associations found in the N11(1&2) project area are described below. Brief summaries of Maker et al.'s evaluations for the irrigation potential that accompanies each soil association are included. It should be noted, however, that the limitations in the soils that restrict irrigated agriculture may not apply equally to prehistoric and historic flood and dry farming.

### Hagerman-Travessilla

The Hagerman-Travessilla association is found in the northernmost portions of the project area (Figure 2.1). It is widely distributed throughout the northern part of McKinley County. The association is found in areas with gently to steeply sloping and rolling uplands, as well as nearly level to gently sloping valley bottoms. The soils range from shallow to moderately deep, and are residually formed in weathered sandstone. On valley bottoms and floodplains these soils are formed

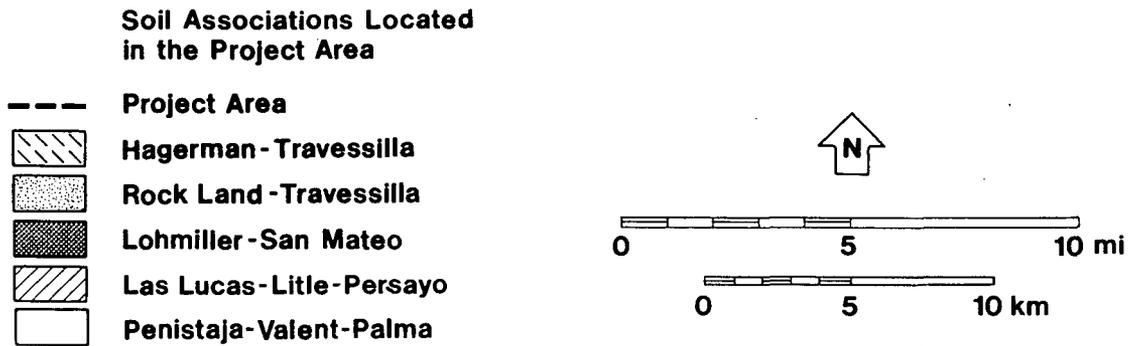
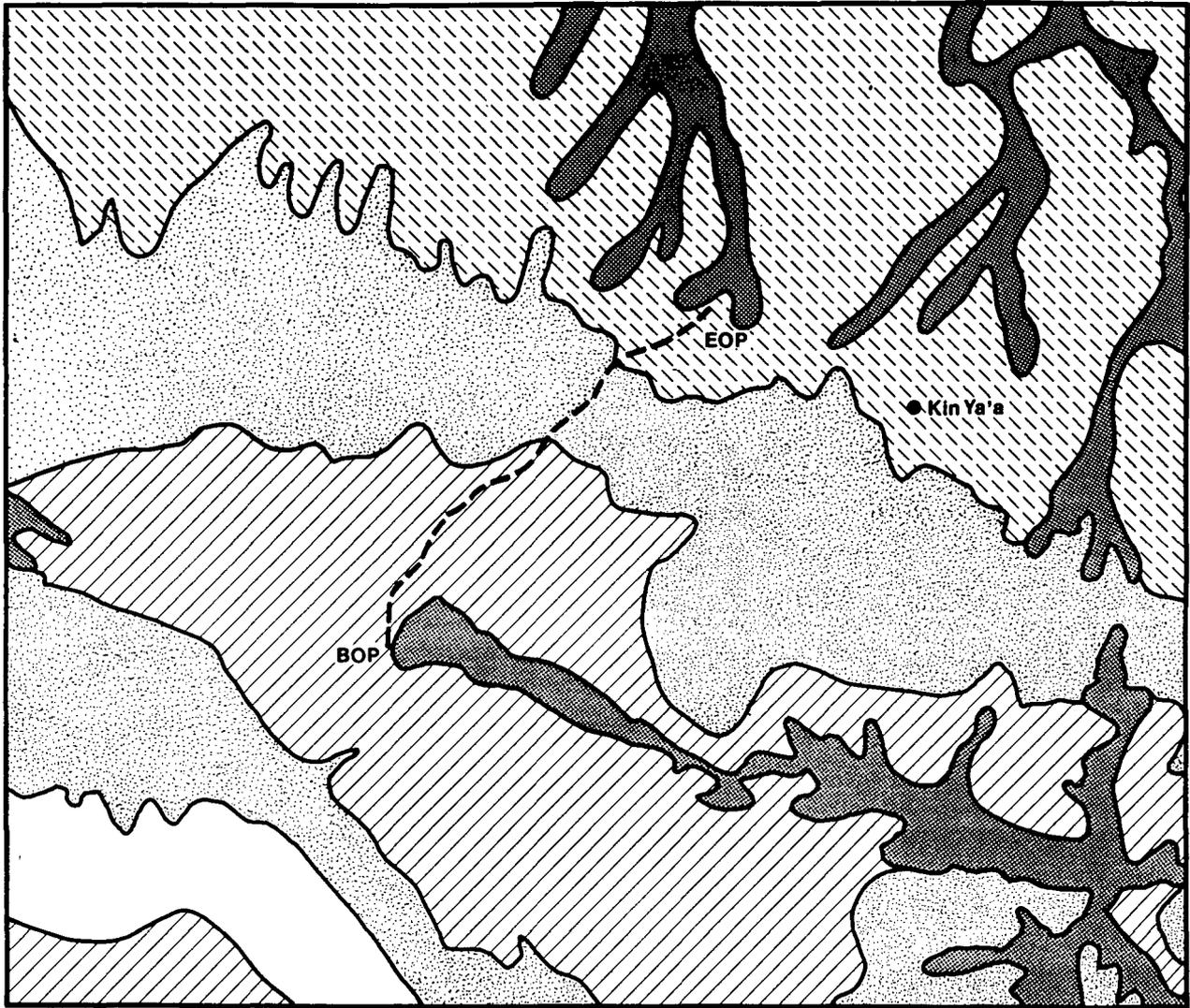


Figure 2.1. Distribution of Soil Associations Within the N11 (1&2) Project Area.

of alluvial and eolian deposits of mixed origin. The Rock Land soils (Rock Land is defined by Maker et al. [1974] as a miscellaneous land type) in this association are mixed and found on steep escarpments and break areas. Approximately 52% of the soils in this association have been characterized as suitable for irrigated agriculture; however, the irrigable tracts are small and intermingled between soils that have the limitations found in the Las Lucas-Little-Persayo association.

#### Rock Land-Travessilla

This is the largest soil association in McKinley County and is widely distributed. The Rock Land-Travessilla association soils are found north of the Dutton Plateau escarpment and south of the Hagerman-Travessilla soils (Figure 2.1). These soils are found in rough broken topography with a large degree of local relief, as typified by topography north of the escarpment. The association occurs where relatively narrow valley floors and upland summits are separated by steep canyon walls and escarpments. Valley bottoms below both escarpments and upland summits are characterized by gently to strongly rolling terrain. Outcrops of sandstone bedrock with some shales are common on canyon walls and escarpments. Thin deposits of gravelly alluvium sometimes are found on the breaks adjacent to larger drainages. Deep alluvial soils in this association occupy nearly level to gently sloping landscapes in narrow valley bottoms with highly variable and stratified soils in the immediate vicinity of arroyos and drainages. Lands in this association are mainly used for grazing livestock, and vegetation associated with these soils provide excellent wildlife habitat. Cultivable soils in this association occur as small, irregular tracts. In most areas, these soils have limitations as cropland similar to those found in the Las Lucas-Little-Persayo association.

#### Las Lucas-Little-Persayo

This association occurs mainly on gently to strongly sloping and rolling uplands, and is the dominant soil association in the southern portion of the project area (Figure 2.1). Slopes are generally less than 10%, although these soils may be found on shale and sandstone outcrops, escarpments, and breaks with slopes of up to 25%. Soils in this association are light to moderately light colored, calcareous, and highly erodible, and formed mainly in materials weathered from gray and olive shale. The major soils in this association have moderate to severe limitations for use as irrigated cropland. The Little and Las Lucas soils have underlying shale leading to the development of salinity and drainage problems. The Persayo soils are shallow, and they have high salinity and low water-holding capacities.

#### Lohmiller-San Mateo

This is the least represented association in the N11(1&2) project area. The association occurs adjacent to the southernmost portion of the project area, and is intermixed with the Hagerman-Travessilla association across the northern half of the project area (Figure 2.1). These soils are widely distributed throughout McKinley County and occur dominantly in valley bottoms, on floodplains, and on terraces adjacent to intermittent drainages. These soils are found on gently sloping landscapes with local relief consisting only of slightly elevated ridges and low hummocks in areas of active wind erosion. These soils develop in alluvium from sedimentary formations,

mainly sandstone and shale, and are susceptible to gully erosion. Deep, vertical-walled arroyos and gullies are common in valley bottoms. The potential for irrigated agriculture in this association varies widely. While some areas with this association are currently considered as excellent for agriculture, some are poor, having low permeability, high salinity, or high alkali content. Other problems include susceptibility to flooding, gullying, and aeolian erosion.

## BOTANY AND ZOOLOGY

### Botany

Two major botanical communities occur along the N11(1&2) corridor. They are the Great Basin Conifer Woodland and Great Basin Grassland (Brown and Lowe 1980). An alternate nomenclature for the same communities is the Western Xeric Evergreen Forest and the Desert-Grassland Transition (Kearney and Peebles 1960). The following sections are drawn from a special issue of *Desert Plants* (Brown 1982) that is devoted entirely to the biotic communities of the American Southwest. Following Brown's style, common names are capitalized when identified to species.

#### Great Basin Conifer Woodland

The cold-adapted evergreen woodland covering the mesa tops and upper slopes in and around the N11(1&2) project area is dominated by species of two conifers — juniper and pinyon. The community is dominated by Utah Juniper (*Juniperus osteosperma*), One-seed Juniper (*J. monosperma*), and Rocky Mountain Pinyon (*Pinus edulis*). Rocky Mountain Juniper (*J. scopulorum*) is present in the community but is less represented than other species listed. This forest is made up of trees of varying heights and diameters and dispersed in varying densities and proportions.

Understory tree and shrub species include Gambel Oak (*Quercus gambelii*), mountain-mahogany (*Cercocarpus* spp.), Skunkbush Sumac (*Rhus trilobata*), Saskatoon Serviceberry (*Amelanchier alnifolia*), snowberries (*Symphoricarpos* spp.), and currants (*Ribes* spp.). Other shrubs occurring in the community are Cliffrose (*Cowania mexicana*), Apache Plume (*Fallugia paradoxa*), Mormon tea (*Ephedra* spp.), mahonia (*Berberis* spp.), Fourwing Saltbush (*Atriplex canescens*), Small Soapweed (*Yucca glauca*), and Datil (*Y. baccata*). Buffaloberry (*Shepherdia* spp.), Antelope Bitterbrush (*Purshia tridentata*), and Fernbush (*Chamaebatiaria millifolium*) may also be present.

Forbs and grasses commonly occurring include gilia (*Gilia* spp.), buckwheat (*Eriogonum* spp.), Sego-lily (*Calochortus nuttallii*), penstemons (*Penstemon* spp.), globemallows (*Sphaeralcea* spp.), Louisiana Sagebrush (*Artemisia ludoviciana*), lupines (*Lupinus* spp.), and brome (*Bromus* spp.). In more open glades, the grasses tend to dominate. Species present include grama (*Bouteloua* spp.), Galleta grass (*Hilaria jamesii*), Indian Ricegrass (*Oryzopsis hymenoides*), Western Wheatgrass (*Agropyron smithii*), muhly (*Muhlenbergia* spp.), dropseeds (*Sporobolus* spp.), and Prairie Junegrass (*Koeleria cristata*). Threadleaf Groundsel (*Senecio longilobus*) and Broom Snakeweed (*Gutierrezia sarothrae*) are common shrubs.

A number of cacti are also found in this plant community. The hedgehog cacti (*Echinocereus* spp.), prickly pear and cholla (*Opuntia* spp.), and pincushion cacti (*Mammillaria* spp.) are most common. Grama Grass Cactus (*Pediocactus papyracanthus*), sclerocactus (*Sclerocactus* spp.), and coryphantha (*Coryphantha* spp.) also occur. Table 2.1 lists these and other common flora associated with the Great Basin Conifer Woodland.

Table 2.1. Great Basin Conifer Woodland Plants.

SCIENTIFIC NAME	COMMON NAME
<i>Agropyron smithii</i>	Western Wheatgrass
<i>Amelanchier alnifolia</i>	Saskatoon Serviceberry
<i>Artemisia arbuscula</i> subsp. <i>nova</i>	Black Sagebrush
<i>A. ludoviciana</i>	Louisiana Sagebrush
<i>Atriplex canescens</i>	Fourwing Saltbush
<i>A. confertifolia</i>	Shadscale
<i>Berberis fremontii</i>	Fremont Mahonia, Barberry
<i>B. haematocarpa</i>	Red Mahonia
<i>Bouteloua gracilis</i>	Blue Grama
<i>Bromus</i> spp.	Brome grasses
<i>Calochortus nuttallii</i>	Sego-lily
<i>Canotia holocantha</i>	Crucifixion Thorn, Canotia
<i>Ceratoides lanata</i>	Winterfat
<i>Cercocarpus intricatus</i>	Littleleaf Mountain-mahogany
<i>C. ledifolius</i>	Curlleaf Mountain-mahogany
<i>C. montanus</i>	Alderleaf Mountain-mahogany
<i>Chamaebatiaria millifolium</i>	Fernbush, Desert Sweet
<i>Chrysothamnus</i> spp.	Rabbitbrushes
<i>Coleogyne ramosissima</i>	Blackbrush
<i>Coryphantha vivipara</i> var. <i>arizonica</i>	-
<i>C. missouriensis</i>	-
<i>Cowania mexicana</i>	Cliffrose
<i>Echinocereus engelmannii</i> var. <i>variegatus</i>	Hedgehog Cactus
<i>E. fendleri</i>	-
<i>E. triglochidiatus</i> var. <i>melanacanthus</i>	Red Hedgehog Cactus
<i>Ephedra viridis</i>	Mountain Joint-fir
<i>Eriogonum</i> spp.	Buckwheats
<i>Fallugia paradoxa</i>	Apache Plume
<i>Garrya wrightii</i>	Wright Silktassel
<i>Gilia</i> spp.	Gilias
<i>Gutierrezia sarothrae</i>	Broom Snakeweed
<i>Hilaria jamesii</i>	Galleta
<i>Juniperus californica</i>	California Juniper
<i>J. monosperma</i>	One-seed Juniper
<i>J. osteosperma</i>	Utah Juniper
<i>J. scopulorum</i>	Rocky Mountain Juniper
<i>Koeleria cristata</i>	Prairie Junegrass
<i>Lupinus</i> spp.	Lupines
<i>Mammillaria wrightii</i>	Wright Pincushion

(continued)

Table 2.1. Continued.

SCIENTIFIC NAME	COMMON NAME
<i>Muhlenbergia</i> spp.	Muhlies
<i>Opuntia basilaris</i> var. <i>aurea</i>	Yellow Beavertail
<i>O. erinacea</i>	Mohave Prickly Pear
<i>O. fragilis</i>	Little Prickly Pear
<i>O. imbricata</i>	Tree Cholla
<i>O. macrorhiza</i>	Plains Prickly Pear
<i>O. phaeacantha</i>	Engelmann Prickly Pear
<i>O. polyacantha</i>	Plains Prickly Pear
<i>O. whipplei</i>	Whipple Cholla
<i>Oryzopsis hymenoides</i>	Indian Ricegrass
<i>Pediocactus papyracanthus</i>	Gramma Grass Cactus
<i>P. simpsonii</i>	-
<i>Penstemon</i> spp.	Penstemons, beardtongues
<i>Pinus cembroides</i>	Mexican Pinyon
<i>P. edulis</i>	Rocky Mountain Pinyon
<i>P. monophylla</i>	Singleleaf Pinyon, One-needle Pinyon
<i>P. quadrifolia</i>	Parry Pinyon
<i>Purshia tridentata</i>	Antelope Bitterbrush
<i>Quercus arizonica</i>	Arizona White Oak
<i>Q. emoryi</i>	Emory Oak
<i>Q. gambelii</i>	Gambel Oak
<i>Q. grisea</i>	Gray Oak
<i>Q. turbinella</i>	Shrub Live Oak
<i>Rhamnus crocea</i>	Hollyleaf Buckthorn
<i>Rhus trilobata</i>	Squawbush, Skunkbush Sumac
<i>Ribes</i> spp.	Currants
<i>Sclerocactus whipplei</i> var. <i>intermedius</i>	-
<i>Senecio longilobus</i>	Threadleaf Groundsel
<i>Shepherdia</i> spp.	Buffaloberries
<i>Sphaeralcea coccinea</i>	Scarlet Globemallow
<i>S. digitata</i>	Juniper Globemallow
<i>S. marginata</i>	-
<i>Sporobolus</i> spp.	Dropseeds
<i>Symphoricarpos</i> spp.	Snowberries
<i>Yucca baccata</i>	Banana Yucca, Datil
<i>Y. glauca</i>	Small Soapweed

Source: Brown (1982)

### Great Basin Grassland

This plant community is found in lower elevations over large portions of the N11(1&2) project area. The grasslands are situated on open, exposed upland plains and broad valleys, and are extensively used for grazing livestock.

Principal grasses in this community are Blue Grama (*Bouteloua gracilis*), other grama (*Bouteloua* spp.), Buffalo Grass (*Buchloë dactyloides*), Indian Ricegrass (*Oryzopsis hymenoides*), Galleta Grass (*Hilaria jamesii*), Prairie Junegrass (*Koeleria cristata*), Plains Lovegrass (*Eragrostis intermedia*), Vine Mesquite Grass (*Panicum obtusum*), Wolftail (*Lycurus phleoides*), and Alkali Sacaton (*Sporobolus airoides*). Dominant shrubs include Fourwing Saltbush (*Atriplex canescens*), sagebrush (*Artemisia* spp.), Winterfat (*Ceratoides lanata*), wild rose (*Rosa* spp.), cholla (*Opuntia* spp.), Small Soapweed (*Yucca glauca*), rabbitbrush (*Chrysothamnus* spp.), and snakeweed (*Gutierrezia* spp.). Cacti include prickly pear and cholla (*Opuntia* spp.), hedgehog (*Echinocereus* spp.), pincushion (*Mammillaria* spp.), and Grama Grass Cactus (*Pediocactus papyracanthus*).

Many areas of Great Basin Grassland have been invaded by juniper (*Juniperus* spp.), partially as a result of the effects of grazing. Forbs have also increased at the expense of the grasses, and primrose (*Oenothera* spp.), bahia (*Bahia* spp.), spiderflower (*Cleome* spp.), four o'clock (*Mirabilis* spp.), and mallow (*Sphaeralcea* spp.) may now be as numerous as the grasses. Other forbs that may occur include aster (*Aster* spp.), scurf-pea (*Psoralea* spp.), coneflower (*Ratibida* spp.), and bricklebrush (*Brickellia* spp.). The less palatable species such as goldeneye (*Viguiera* spp.), groundsel (*Senecio* spp.), thistle (*Cirsium* spp.), prickly poppy (*Argemone* spp.), and sunflowers (*Helianthus* spp.) sometimes achieve dominance. Table 2.2 lists these and other species common to the Great Basin Grassland.

Table 2.2. Great Basin Grassland Plants.

SCIENTIFIC NAME	COMMON NAME
<i>Agropyron smithii</i>	Western Wheatgrass
<i>Andropogon gerardi</i>	Big Bluestem
<i>A. gerardi</i> var. <i>paucipilus</i>	Sand Bluestem
<i>Argemone</i> spp.	Prickly poppies
<i>Aristida longiseta</i>	Red Three-awn
<i>Artemisia</i> spp.	Sagebrushes
<i>A. filifolia</i>	Sand Sagebrush
<i>A. tridentata</i>	Big Sagebrush
<i>Aster</i> spp.	Asters
<i>Atriplex canescens</i>	Fourwing Saltbush
<i>Bahia</i> spp.	Bahias
<i>Bouteloua chondrosioides</i>	Sprucetop Grama
<i>B. curtipendula</i>	Sideoats Grama
<i>B. eriopoda</i>	Black Grama
<i>B. gracilis</i>	Blue Grama
<i>B. hirsuta</i>	Hairy Grama
<i>Brickellia</i> spp.	Bricklebushes
<i>Buchloë dactyloides</i>	Buffalo Grass
<i>Ceratoides lanata</i>	Winterfat
<i>Chrysothamnus</i> spp.	Rabbitbrushes
<i>Cirsium</i> spp.	Thistles
<i>Cleome</i> spp.	Spiderflowers

(continued)

Table 2.2. Continued.

SCIENTIFIC NAME	COMMON NAME
<i>Echinocereus engelmannii</i> var. <i>variegatus</i>	Hedgehog Cactus
<i>E. fendleri</i>	Fendler Hedgehog
<i>Eragrostis intermedia</i>	Plains Lovegrass
<i>Festuca arizonica</i>	Arizona Fescue
<i>Gaura</i> spp.	Gauras
<i>Gutierrezia</i> spp.	Snakeweeds
<i>G. sarothrae</i>	Broom Snakeweed
<i>Helianthus</i> spp.	Sunflowers
<i>Hilaria jamesii</i>	Galleta
<i>Juniperus monosperma</i>	One-seed Juniper
<i>J. osteosperma</i>	Utah Juniper
<i>J. scopulorum</i>	Rocky Mountain Juniper
<i>Koeleria cristata</i>	Prairie Junegrass
<i>Lycurus phleoides</i>	Wolftail, Texas Timothy
<i>Mammillaria wrightii</i>	Wright Pincushion
<i>Mirabilis</i> spp.	Four o'clocks
<i>Oenothera</i> spp.	Primroses
<i>Opuntia</i> spp.	Prickly pears, chollas
<i>O. arbuscula</i>	Pencil Cholla
<i>O. clavata</i>	Club Cholla
<i>O. imbricata</i>	Tree Cholla
<i>O. polyacantha</i>	Plains Prickly Pear
<i>O. macrorhiza</i>	Plains Prickly Pear
<i>O. phaeacantha</i>	Engelmann Prickly Pear
<i>O. polyacantha</i>	Plains Prickly Pear
<i>O. whipplei</i>	Whipple Cholla
<i>Oryzopsis hymenoides</i>	Indian Ricegrass
<i>Panicum obtusum</i>	Vine Mesquite Grass
<i>P. virgatum</i>	Switchgrass
<i>Pediocactus papyracanthus</i>	Grama Grass Cactus
<i>Prosopis glandulosa</i>	Honey Mesquite
<i>Psoralea</i> spp.	Scurf-peas
<i>Quercus havardii</i>	Shinnery Oak, Midget Oak
<i>Ratibida</i> spp.	Coneflowers, Mexican hats
<i>Rhus copallina</i> var. <i>lanceolata</i>	Prairie Sumac
<i>Rosa</i> spp.	Wild roses
<i>Schizachyrium scoparium</i>	Little Bluestem
<i>Senecio</i> spp.	Groundsels
<i>Setaria macrostachya</i>	Plains Bristlegrass
<i>Sorghastrum nutans</i>	Indian Grass
<i>Sphaeralcea</i> spp.	Mallows
<i>Sporobolus airoides</i>	Alkali Sacaton
<i>S. cryptandrus</i>	Sand Dropseed
<i>Stipa comata</i>	Needle and Thread Grass
<i>Viguiera</i> spp.	Goldeneye
<i>Yucca glauca</i>	Soapweed

Source: Brown (1982)

## Zoology

### Great Basin Conifer Woodland

The animal species found in this plant community (listed in Table 2.3) are generally the same as those in adjacent communities. Very few are considered to be closely associated with this specific community. Mammal species include the Pinyon Mouse (*Peromyscus truei*) and the Bushy-tailed Woodrat (*Neotoma cinerea arizonae*). Mule Deer (*Odocoileus hemionus*) and Elk (*Cervus elaphus*) utilize the community as winter range. The Pinyon Jay (*Gymnorhinus cyanocephalus*) is the most readily recognized avian species among the several passerines known to occur. The Plateau Striped Whiptail (*Cnemidophorus velox*) is the sole reptile species specifically associated with the community.

Table 2.3. Great Basin Conifer Woodland Animals.

SCIENTIFIC NAME	COMMON NAME
<u>MAMMALS</u>	
<i>Cervus elaphus</i>	Elk, Wapiti
<i>Neotoma cinerea arizonae</i>	Arizona Bushy-tailed Woodrat
<i>Odocoileus hemionus</i>	Mule Deer
<i>Peromyscus truei</i>	Pinyon Deer Mouse
<u>BIRDS</u>	
<i>Dendroica nigrescens</i>	Black-throated Gray Warbler
<i>Empidonax wrightii</i>	Gray Flycatcher
<i>Gymnorhinus cyanocephalus</i>	Pinyon Jay
<i>Icterus parisorum</i>	Scott's Oriole
<i>Vireo vicinior</i>	Gray Vireo
<u>AMPHIBIANS AND REPTILES</u>	
<i>Cnemidophorus velox</i>	Plateau Striped Whiptail
<i>Sceloporus graciosus</i>	Sagebrush Lizard

Source: Brown (1982)

The species found at the higher elevations of Black Mesa (the Montane Conifer Forest) may also occur in this community (see Table 2.4). A number of shrews (*Sorex* spp.), bats (*Myotis* spp. and others), squirrels (*Sciurus* spp.), and chipmunks (*Eutamias* spp.) make their homes in this plant community. Other small mammals include voles (*Microtus* spp.), mice (*Peromyscus* spp. and *Perognathus* spp.), woodrats (*Neotoma* spp.), and ground squirrels (*Spermophilus* spp.). Cottontails (*Sylvilagus* spp.), Porcupine (*Erethizon dorsatum*), Long-tailed Weasel (*Mustela frenata*), and Blacktailed Jackrabbit (*Lepus californicus*) also occur. Larger species include Raccoon (*Procyon lotor*), foxes (*Vulpes* spp.), Bobcat (*Lynx rufus*), and Beaver (*Castor canadensis*). Black Bear (*Ursus americanus*), Coyote (*Canis latrans*), Gray Wolf (*C. lupus*), Mountain Lion (*Felis concolor*), Mule Deer (*Odocoileus hemionus*), and Elk (*Cervus elaphus*) complete the list.

Table 2.4. Montane Conifer Forest Animals.

SCIENTIFIC NAME	COMMON NAME
<u>MAMMALS</u>	
<i>Canis latrans</i>	Coyote
<i>Canis lupus</i>	Gray Wolf
<i>Castor canadensis</i>	Beaver
<i>Cervus elaphus</i>	Elk, Wapiti
<i>Citellus lateralis</i>	Golden-mantled Ground Squirrel
<i>Eptesicus fuscus</i>	Big Brown Bat
<i>Erethizon dorsatum</i>	Porcupine
<i>Eutamias canipes</i>	Gray-footed Chipmunk
<i>E. cinereicollis</i>	Gray-collared Chipmunk
<i>E. quadrivittatus</i>	Colorado Chipmunk
<i>E. umbrinus</i>	Uinta Chipmunk
<i>Felis concolor</i>	Mountain Lion
<i>Lepus californicus</i>	Blacktailed Jackrabbit
<i>Lynx rufus</i>	Bobcat
<i>Microtus longicaudus</i>	Long-tailed Vole
<i>M. mexicanus</i>	Mexican Vole
<i>M. montanus</i>	Montane Vole
<i>Mustela frenata</i>	Long-tailed Weasel
<i>Myotis auriculus</i>	Southwestern Myotis
<i>M. evotis</i>	Long-eared Myotis
<i>M. volans</i>	Long-legged Myotis
<i>Neotoma mexicana</i>	Mexican Woodrat
<i>Odocoileus hemionus</i>	Mule Deer
<i>O. virginianus</i>	White-tailed Deer
<i>Perognathus spp.</i>	Mice
<i>Peromyscus maniculatus</i>	Deer Mouse
<i>Procyon lotor</i>	Raccoon
<i>Sciurus aberti</i>	Abert's Squirrel
<i>Sorex merriami</i>	Merriam's Shrew
<i>S. nanus</i>	Dwarf Shrew
<i>S. vagrans</i>	Vagrant Shrew
<i>Spermophilus spp.</i>	Ground squirrels
<i>Sylvilagus floridanus</i>	Eastern Cottontail
<i>S. nuttallii</i>	Nuttall's Cottontail
<i>Tamiasciurus hudsonicus</i>	Red Squirrel
<i>Ursus americanus</i>	Black Bear
<i>Vulpes spp.</i>	Foxes
<u>BIRDS</u>	
<i>Accipiter gentilis</i>	Goshawk
<i>Aegolius acadicus</i>	Saw-whet Owl
<i>Campephilus imperialis</i>	Imperial Woodpecker
<i>Cardellina rubrifrons</i>	Red-faced Warbler
<i>Carduelis pinus</i>	Pine Siskin
<i>Catharus occidentalis</i>	Russet Nightingale Thrush
<i>Certhia familiaris</i>	Brown Creeper
<i>Columba fasciata</i>	Band-tailed Pigeon
<i>Contopus pertinax</i>	Coues' Flycatcher
<i>Cyanocitta stelleri</i>	Steller's Jay

(continued)

Table 2.4. Continued.

SCIENTIFIC NAME	COMMON NAME
<i>Dendroica coronata</i>	Yellow-rumped Warbler
<i>D. graciae</i>	Grace's Warbler
<i>Empidonax affinis</i>	Pine Flycatcher
<i>E. difficilis</i>	Western Flycatcher
<i>Ergaticus ruber</i>	Red Warbler
<i>Eugenes fulgens</i>	Rivoli's Hummingbird
<i>Euptilotis neoxenus</i>	Eared Trogon
<i>Glaucidium gnoma</i>	Pygmy Owl
<i>Hesperiphona vespertina</i>	Evening Grosbeak
<i>Junco</i> spp.	juncos
<i>Junco phaeonotus</i>	Yellow-eyed Junco
<i>Loxia curvirostra</i>	Red Crossbill
<i>Meleagris gallopavo merriami</i>	Merriam's Turkey
<i>M. gallopavo mexicana</i>	Gould's Turkey
<i>Myadestes obscurus</i>	Brown-backed Solitaire
<i>M. townsendi</i>	Townsend's Solitaire
<i>Otus flammeolus</i>	Flammulated Owl
<i>Parus sclateri</i>	Mexican Chickadee
<i>Peucedramus taeniatus</i>	Olive Warbler
<i>Piranga flava</i>	Hepatic Tanager
<i>P. ludoviciana</i>	Western Tanager
<i>Rhynchopsitta pachyrhyncha</i>	Thick-billed Parrot
<i>Ridgwayia pinicola</i>	Aztec Thrush
<i>Selasphorus platycercus</i>	Broad-tailed Hummingbird
<i>Sialia mexicana</i>	Western Bluebird
<i>Sitta pygmaea</i>	Pygmy Nuthatch
<i>Spizella passerina</i>	Chipping Sparrow
<i>Strix occidentalis</i>	Spotted Owl
<i>Vireo gilvus</i>	Warbling Vireo
<i>V. solitarius</i>	Solitary Vireo

AMPHIBIANS AND REPTILES

<i>Ambystoma tigrinum</i>	Tiger Salamander
<i>Aneides hardyi</i>	Sacramento Mountain Salamander
<i>Crotalus pricei</i>	Twin-spotted Rattlesnake
<i>C. viridis</i>	Western Rattlesnake
<i>Diadophis punctatus</i>	Ringneck Snake
<i>Eumeces callicephalus</i>	Mountain Skink
<i>E. multivirgatus epipleurotus</i>	Many-lined Skink
<i>E. skiltonianus</i>	Western Skink
<i>Gerrhonotus kingi</i>	Arizona Alligator Lizard
<i>Lampropeltus pyromelana</i>	Sonora Mountain Kingsnake
<i>Phrynosoma douglassi</i>	Short-horned Lizard
<i>Pituophis melanoleucus</i>	Gopher Snake
<i>Plethodon neomexicanus</i>	Jemez Mountain Salamander
<i>Salvadora grahamiae</i>	Mountain Patch-nosed Snake
<i>Sceloporus jarrovi</i>	Yarrow's Spiny Lizard
<i>S. scalaris</i>	Bunchgrass Lizard
<i>S. virgatus</i>	Striped Plateau Lizard
<i>Thamnophis elegans</i>	Western Terrestrial Garter Snake

Source: Brown (1982)

Avifauna in this plant community is diverse. The Goshawk (*Accipiter gentilis*), Steller's Jay (*Cyanocitta stelleri*), and the Pine Siskin (*Carduelis pinus*) are some of the more readily recognizable species. A great number of other passerine species are also present. The Flammulated Owl (*Otus flammeolus*), Spotted Owl (*Strix occidentalis*), Saw-whet Owl (*Aegolius acadicus*), and Pygmy Owl (*Glaucidium gnoma*) are also well known. Wild turkey (*Meleagris gallopavo*) is an important game species.

Amphibians are represented by the Tiger Salamander (*Ambystoma tigrinum*), while the skinks (*Eumeces* spp.) represent the lizards. The Short-horned Lizard (*Phrynosoma douglassi*) and Arizona Alligator Lizard (*Gerrhonotus kingi*) are also widely known. Reptiles include the Ringneck Snake (*Diadophis punctatus*), the Gopher Snake (*Pituophis melanoleucus*), and several varieties of the Western Rattlesnake (*Crotalus viridis*).

The species found at lower elevations in and around the N11(1&2) project area may also occur in this community. They are listed in the discussion of that community presented in the following section.

### Great Basin Grassland

Mammals associated with the grassland community include the Pronghorn (*Antilocapra americana*), prairie dogs (*Cynomys* spp.), Plains Harvest Mouse (*Reithrodontomys montanus*), Plains Pocket Gopher (*Geomys bursarius*), Thirteen-lined Ground Squirrel (*Spermophilus tridecemlineatus*), and the Swift Fox (*Vulpes velox*). Avifauna include the Prairie Falcon (*Falco mexicanus*), the Burrowing Owl (*Athene cunicularia*), and several species of passerine birds. Reptiles and amphibians are well represented by a number of snakes including the Bullsake (*Pituophis melanoleucus sayi*) and the Prairie Rattlesnake (*Crotalus viridis viridis*), as well several skinks, lizards, and toads. Table 2.5 lists these and other species.

Table 2.5. Great Basin Grassland Animals.

SCIENTIFIC NAME	COMMON NAME
<u>MAMMALS</u>	
<i>Antilocapra americana</i>	Pronghorn
<i>Bison bison</i>	Bison, Buffalo
<i>Canis latrans</i>	Coyote
<i>Cynomys gunnisoni</i>	Gunnison's Prairie Dog
<i>C. ludoviciana</i>	Plains Prairie Dog
<i>Geomys bursarius</i>	Plains Pocket Gopher
<i>Lepus californicus</i>	Black-tailed Jackrabbit
<i>Reithrodontomys montanus</i>	Plains Harvest Mouse
<i>Spermophilus tridecemlineatus</i>	Thirteen-lined Ground Squirrel
<i>Vulpes velox</i>	Swift Fox
<u>BIRDS</u>	
<i>Ammodramus savannarum</i>	Grasshopper Sparrow
<i>Athene cunicularia</i>	Burrowing Owl
<i>Bartramia longicauda</i>	Upland Sandpiper

(continued)

Table 2.5. Continued.

SCIENTIFIC NAME	COMMON NAME
<i>Calamospiza melanocorys</i>	Lark Bunting
<i>Charadrius montana</i>	Mountain Plover
<i>Colinus virginianus</i>	Bobwhite, Bobwhite Quail
<i>Falco mexicanus</i>	Prairie Falcon
<i>Numenius americanus</i>	Long-billed Curlew
<i>Pediocetes phasianellus</i>	Sharp-tailed Grouse
<i>Tympanuchus pallidicinctus</i>	Lesser Prairie Chicken
<u>AMPHIBIANS AND REPTILES</u>	
<i>Bufo cognatus</i>	Great Plains Toad
<i>Cnemidophorus sexlineatus viridis</i>	Prairie Lined Racerunner
<i>Crotalus viridis viridis</i>	Prairie Rattlesnake
<i>Diadophis punctatus arnyi</i>	Prairie Ringneck Snake
<i>Elaphe guttata</i>	Corn Snake
<i>Eumeces obsoletus</i>	Great Plains Skink
<i>Heterodon nasicus nasicus</i>	Plain Hognose Snake
<i>Holbrookia maculata</i>	Lesser Earless Lizard
<i>Lampropeltis triangulum celaenops</i>	Mexico Milk Snake
<i>Masticophis flagellum testaceus</i>	Western Coachwhip
<i>Pituophis melanoleucus</i>	Gopher Snake
<i>Scaphiopus bombifrons</i>	Plains Spadefoot
<i>Sceloporus undulatus consobrinus</i>	Southern Prairie Lizard
<i>Sonora episcopa episcopa</i>	Great Plains Ground Snake
<i>Tantilla nigriceps</i>	Plains Blackhead Snake
<i>Terrapene ornata</i>	Western Box Turtle

Source: Brown (1982)

## PALEOENVIRONMENT

Now that the modern environmental setting has been reviewed, a discussion of past environments is in order. Paleoenvironmental reconstructions typically are drawn from data collected through several different methods. Palynological, geomorphic, and dendroclimatological data are commonly used for reconstructing past environments. The 17 sites investigated during the project comprise Paleoindian, Archaic, Basketmaker, Puebloan, and Historic components. General environmental conditions for the project area, based upon reconstructions for the San Juan Basin, during each of these periods are provided below.

### Late Pleistocene

The Late Pleistocene, following Betancourt's (1990; cited in Amsden 1992:29-33) terms, includes the Late Wisconsin glaciation (22,000 to 11,000 BP [20,050 BC to 9050 BC]), which comprises the Full Glaciation Period (22,000 BP to 15,000 BP [20,050 BC to 13,050 BC]), and the Late Glaciation Period (15,000 BP to 11,000 BP [13,050 BC to 9050 BC]). Of concern to the present project is the final, or Late Glaciation, period. The Late Glaciation period was cooler and wetter than present conditions, primarily due to the southward depression of the Aleutian Low and winter storm patterns (Hogan 1983:49).

## Holocene

The Holocene comprises three major periods: the Early Holocene dating from 11,000 BP to 8000 BP (13,050 BC to 6050 BC), the Middle Holocene dating from 8000 BP to 4000 BP (6050 BC to 2050 BC), and the Late Holocene which dates from 4000 BP (2050 BC) to the present.

### Early Holocene

From the presence in Chaco Canyon of a forest dominated by Douglas fir, Rocky Mountain juniper, and limber pine during the Early Holocene, Hogan (1983:57) suggests cooler and wetter conditions than at present. These conditions were a continuation of the Late Glaciation period. Between 8300 BP and 8000 BP a warm, wet period prevailed.

### Middle Holocene

Conditions similar to the present began around 8000 BP (6050 BC), during the beginning of the Middle Holocene. A reduction of winter precipitation allowed vegetational communities similar to the present to establish (Hogan 1983:57). A cool and dry climate prevailed from the beginning of the Middle Holocene to around 6800 BP (4850 BC). Northward expansion of the monsoonal patterns known today created a warmer and wetter climate than the present from 6800 BP to around 2800 BP (4850 to 850 BC). Thompson (Chapter 24) reports a Middle Holocene arid period beginning around 5800 BP (3850 BC). Cooler and drier conditions, however, occurred from 5600 BP to 4500 BP (3650 BC to 2550 BC; Hogan 1983:57). A pinyon and juniper woodland was present at Chaco Canyon by 5500 BP (3550 BC).

### Late Holocene

The Late Holocene began at 4000 BP (2050 BC) and continued to the present. As mentioned above, warmer and wetter conditions prevailed from the Middle Holocene to around 2800 BP (850 BC). Summer and annual precipitation decreased after 2800 BP. For the next 300 years, a cool and dry climate prevailed, followed by a warm and moist period between 2500 BP and 1600 BP (550 BC to AD 350; Hogan 1983:57).

Plateau-wide cyclical changes in precipitation have been observed beginning about AD 250 (Vivian 1990:23). In general, dry periods of approximately 50 years occurred about every 550 years, with less severe periods of drought about 20 years long occurring every 275 years (Vivian 1990:24; Dean et al. 1985). During the Basketmaker III period (ca. AD 400 to 700) climatic conditions were generally cool and dry. At around 500, however, the Colorado Plateau was characterized by somewhat higher moisture than at present (Vivian 1990:24). A gradual decrease in moisture occurred during the 600s and continued to about 725.

Various paleoclimatic studies and regional syntheses seem to conflict for various times during the Pueblo periods. During the Pueblo I period (AD 700 to 900) Hogan suggests an apparent northward movement of the monsoonal pattern which created warm and wet climate (1983:57). Vivian (1990:24) discusses a decline in total moisture between 725 and 750, and a major drought between 850 and 900.

For the period in which the Chacoan System (Judge 1989) developed, flourished, and eventually declined (ca. AD 900 to 1150, or the Pueblo II period) various attempts have been made at reconstructing paleoenvironmental conditions (Betancourt and VanDevender 1981; Euler et al. 1979; Hall 1977; Petersen 1981; Rose et al. 1982). Sebastian (1992) notes that Euler et al.'s (1979) and Petersen's (1981) reconstruction of more mesic and warmer conditions with increased summer precipitation contradicts Hall's (1977) arguments that this period for Chaco Canyon was more arid than today (based on lower pine pollen prior to 1100). Geomorphology studies within the central San Juan Basin have also produced various interpretations. Bryan (1954) believes arroyo downcutting in the Chaco Wash began at around 1100 as a result of drought. Hall (1977) believes the downcutting was a result of increased moisture, instead of drought, but agrees with the timing. Love (1980) agrees there was increased moisture, but disagrees with the timing of downcutting in Chaco Canyon. Love suggests downcutting in the Chaco Wash occurred throughout the cultural sequence.

Hogan's (1983) synthesis describes this period as generally warm and wet; however, droughts likely occurred between AD 900 to 910, 1030 to 1050, and 1080 to 1100. Increased rainfall is evident between 1100 and 1130. Vivian (1990:24) notes that a gradual increase in moisture occurred after 900, and peaked by 1100.

Significant droughts occurred during the Pueblo III period (AD 1150 to 1300). A severe drought occurred between 1130 and 1180. Increased precipitation is evident between 1180 and 1210, and again between 1230 and 1250. The Great Drought occurred throughout the San Juan Basin between the 1270s and 1300 (Hogan 1983:57). It was during this final part of the Pueblo III period that the entire Puebloan population abandoned the Northern San Juan Region.

Cool and moist conditions seem to have prevailed from around AD 1300 to about 1625, followed by cool and drier conditions up to around 1850. Hogan (1983:57) notes that since the 1850s, conditions have been generally warm and wet, with the chance of a return to drier conditions in the past few decades.

## ENVIRONMENTAL SUMMARY

The project area treated in this report is located within the Navajo Section of the Colorado Plateau. The project area begins in the vicinity of the headwaters of the Upper Puerco River on the Dutton Plateau, and continues northward ending in the southernmost portion of the San Juan Basin. The southern portion of the project is drained by the Upper Puerco River, while the northern portion is drained by tributaries of Indian Creek, which feeds the Chaco Wash system. Elevation ranges from about 2059 m (6755 ft) above mean sea level near the EOP to approximately 2286 m (7500 ft) above mean sea level at the top Mariana Pass on the N11(2) segment. The BOP is at approximately 2179 m (7150 ft) above mean sea level.

Geologic formations that outcrop in the project area include lower formations of the Mancos Shale around the beginning of the project, Gallup Sandstone, Dalton Sandstone, Gibson Coal Members of the Crevasse Canyon Formation, and Point Lookout Sandstone, all of the Upper Cretaceous. Quaternary deposits vary according to location within the project area. Below the

Dutton Plateau in the San Juan Basin, late Pleistocene to Middle Holocene aeolian deposits are the predominant sediments. In the southern portion of the project, on the Dutton Plateau, alluvial and colluvial sediments are predominant (Chapter 24).

Two main drainage systems comprise the study area. The steep escarpment of the Dutton Plateau marks the divide within the project area. Multiple unnamed intermittent drainages south of the escarpment feed the Upper Puerco River. Small tributaries of Indian Creek flow north of the escarpment. Precipitation in the northern portion of the project (N11[2]) has an average annual range between 203 mm and 254 mm (8 and 10 in), while the higher elevations of the N11(1) segment varies from 254 mm to 406 mm (10 to 16 in). Within the larger region of McKinley County, New Mexico, approximately 60% of this precipitation falls during the warmest six months, or between May and October.

Temperatures in the project area can range from bitterly cold in the winter to very warm in the summer. Temperatures as low as  $-38.9^{\circ}\text{C}$  ( $-38^{\circ}\text{F}$ ) and as high as  $40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ ) have been recorded at Chaco Canyon, the center of which is approximately 43 km (27 mi) to the north-northeast. The average number of frost-free days, and therefore the growing season, in the project area averages between 110 and 120 days.

Plant resources available to the inhabitants of the area are those typical of the Great Basin Conifer Woodland and the Great Basin Grassland. Again, we see a division within the project area. The Great Basin Conifer Woodland comprises the southern portion of the project, while the Great Basin Grassland is found in the northern portion (within the San Juan Basin). Juniper and pinyon dominate the overstory in the area. Common understory trees and shrubs include Gambel oak, mountain-mahogany, fourwing saltbush, and Mormon Tea. Dominant grasses include blue grama, buffalo grass, and Indian ricegrass.

Faunal resources which the inhabitants of the project area may have exploited in the Great Basin Conifer Woodland and Great Basin Grassland include mule deer, elk, cottontail rabbit, blacktail jackrabbit, various squirrels, raccoons, foxes, bobcats, and beaver. Black bear, mountain lions, coyotes, and gray wolf would have also been present. Wild turkey and a number of other avifauna would have also been important resources.

Environmental conditions that prehistoric and early historic inhabitants of the area experienced can be described as cyclical. From the Late Pleistocene to the beginning of the Middle Holocene conditions were cooler and wetter than normal. Conditions began to approximate modern climate around 8000 BP (6050 BC). The Middle Holocene is characterized by alternating cool and dry conditions with warmer and wetter periods. The Late Holocene experienced cyclical changes also, with periodic droughts of 20 and 50 years in duration occurring every 275 and 550 years, respectively.

## Chapter 3

### CULTURE HISTORY

James W. Kendrick

The 17 sites tested along N11(1&2) comprise Paleoindian, Archaic, Basketmaker, Ancestral Puebloan, Protohistoric Navajo, Historic Navajo, and Anglo components. This chapter presents a discussion of these periods in terms of temporal and material manifestations to provide a general understanding of the prehistory and history of this region of the American Southwest. A brief review of the culture history of the project area is provided in Zimmerman and Abbott (1996). This chapter expands their discussion, particularly with respect to the Pueblo II period (AD 900 to 1150).

#### THE PALEOINDIAN PERIOD

This period represents the earliest human occupation of North America, occurring in the late Pleistocene. At some point in time prior to 10,550 BC human populations from Asia crossed the region of the Bering Strait and populated North and South America. The oldest accepted site in the New World is located in Chile, at the site of Monte Verde (Dillehay 1989, 1997; Meltzer et al. 1997). The MVII component to this site dates to approximately 10,550 BC. There is no consensus, however, when the migrations across the Bering Strait began. There are no known sites in North America which date prior to 9550 BC. These early inhabitants were a highly mobile hunting and gathering population pursuing large, now-extinct fauna (e.g., mammoth, camel, sloth, and bison) as well as modern forms of game and plant resources. Until recently, a heavy emphasis has been placed on the hunting aspect of Paleoindian adaptation (Irwin-Williams and Haynes 1973; Judge 1973) because many of the Paleoindian sites excavated have been either kill or butchering sites. Plant gathering may have played a greater role in Paleoindian subsistence strategies than had been previously thought (Cordell 1979; Wilmsen 1970). One of the reasons for the overemphasis on hunting is that Paleoindian sites or artifacts associated with gathering may go unrecognized (Tainter and Gillio 1980). Of further interest regarding Paleoindian adaptations is the apparent shift in subsistence strategy through time, aspects of local differentiation and adaptation to increasingly specific environments, and resultant processes leading to the variability in material culture (primarily point types) found in different regions in subsequent periods.

In general, Paleoindian sites in the American Southwest are found in areas with substantial erosion and at high altitudes (Stuart and Gauthier 1981:29). A lack of deep erosion in large parts of the San Juan Basin may be obscuring many sites and giving a skewed representation of Paleoindian occupations in parts of the region. Several Paleoindian artifacts (at least 30) were discovered in the Navajo Indian Irrigation Project (NIIP) area, which is located north of the N11(1&2) project area but still within the San Juan Basin (Gilpin et al. 1984, cited in Dello-Russo 1997).

The Paleoindian Period in North America is divided into three distinct artifact complexes: Clovis, Folsom, and Late Paleoindian Complexes. These are briefly discussed below.

## Clovis

The earliest accepted dates for archaeological evidence of human presence in the Southwest are from 10,000 to 9000 BC, from sites with assemblages referred to as the Clovis complex (such as Blackwater Draw, El Llano, Ventana Cave, and Sandia Cave [Cordell 1984]). These assemblages are characterized by large lanceolate to triangular fluted projectile (dart/spear) points with heavily ground concave bases. The flutes cover the central portion of one or both faces in the basal one-quarter to one-third of the points' length. Other artifacts include distinctive spurred end scrapers, large side scrapers, flake knives, backed blades, graters, perforators, and bone tools. These latter tools include foreshafts, awls, punches, fleshers, and batons.

Most of the Clovis sites that have been excavated can be described as kill sites (Cordell 1984) and therefore are not representative of the full range of activity settings. Most unexcavated Clovis locations are surface finds only and so do not materially contribute to our understanding of the complex. The excavated sites show that Clovis materials were deposited during times when the climate was more moist than at present. As mentioned in the previous chapter, recovered species of fauna from this period indicate climatic conditions that were cooler and more equable than today. Warmer winters and cooler summers were the norm. By the end of the Clovis period, the mammoth, sloth, camelids, and similar megafauna were extinct.

## Folsom

The Folsom complex is the next to appear, with dates ranging from about 9500 to 8500 BC. This complex is characterized by both Folsom and Midland points, similar in outline but differing in that Folsom points are fluted on both faces for nearly their entire length. The outlines of these dart points range from lanceolate to parallel-sided with concave bases. Other associated artifact types include end scrapers, bifacial cores and knives, backed flakes, denticulates, burins, graters, and composite tools. Bone and antler items include awls, needles, beads, discs, and tools that were apparently used to flake lithic materials.

Like Clovis, Folsom sites that have been excavated are primarily kill sites. The majority of known Folsom locations are isolated occurrences and surface scatters. A few campsites have been recorded, but fewer still have been excavated. Well recorded Folsom sites are located on the Plains of San Augustin, in the San Juan Basin, and near Saint Johns, Arizona (Cordell 1984). Recently, Zunie and Zimmerman (1996) recorded the base of a Folsom projectile point in the Salt Water Wash valley southwest of Gallup. The picture of the complex we now have is still slanted in favor of kill site assemblages. Folsom period climatic conditions were wetter and more stable than at present. The primary prey of these hunters were apparently the large, now-extinct species of bison, although elk, pronghorn, and rabbits are also known to have been taken (Cordell 1984).

## Later Complexes

Firstview, Plainview, Agate Basin, and Cody points are each associated with complexes of the same names. Other dart/spear point types include Milnesand, Meserve, and Belen points in the Plainview complex and Eden and Scottsbluff points in the Cody complex. Cody "points" are

generally referred to as knives due to their transverse blade and asymmetrical outline. The commonality in these artifacts is a predominance of transverse parallel flaking that sometimes exhibits a rather exquisite quality of control and symmetry. The precise sequence of these complexes is problematic, but all date somewhere in the period from about 9000 to 6000 BC. Other artifacts include a number of scraper types, flake tools, perforators, denticulates, and knives.

Excavated sites from these complexes are still primarily kill sites, but more is known about the campsites and related artifact assemblages than in the Clovis and Folsom periods. Kill site assemblages indicate that prey were large, now-extinct forms of bison as well as modern fauna. Cody site fauna are primarily modern bison. The primary method of hunting appears to have been the communal drive, utilizing traps and jumps to procure the bison (Frison 1978).

### THE ARCHAIC PERIOD

The next period is known as the Archaic, and is representative of a more diversified way of life than the preceding Paleoindian period. While still predominately a mobile hunting and gathering existence, social groups during the Archaic used a greater variety of site and tool types. Ground stone implements appear early in the period, and domesticated plants towards the end. The most visible manifestation of the Archaic is the pattern of greater sedentism.

The transition from Paleoindian to Archaic can be thought of as an alteration of the targeted resource base in response to climatic change at the end of the Pleistocene that had significant effects on plant and animal communities. A handful of plant species (chenopods, amaranth, and grasses) were collected as they were seasonally available near the larger base camps while various game animals (deer, pronghorn, and rabbits) were hunted. Temporary camps and workshops associated with hunting and material resource procurement are also found.

The Archaic populations pursued a seasonally variable settlement pattern, apparently utilizing the lowlands from spring to fall and overwintering in the pinyon and juniper uplands. Stuart and Gauthier (1981:34) note that the transition from Paleoindian to Archaic is temporally differentiated and that it occurs later in the northern part of the Southwest where greater rainfall probably created more favorable conditions for the continuance of the Paleoindian adaptation.

Recently, several Archaic sites were investigated in conjunction with the Transwestern Pipeline Expansion (Burchett et al. 1994). Excavation revealed a generalized subsistence base emphasizing wild plant sources and game, but documented the incorporation of corn and squash by the later Archaic (Hammett and McBride 1993b; Vierra 1994a:379-380). A seasonal migration pattern that included spring through early fall encampments around grassland ecozones, and late fall and winter camps concentrated in the higher woodland or transitional environments was suggested (Vierra 1994a).

Described below are the primary Archaic complexes that have been identified in the American Southwest. The complexes include the Cochise culture, the Pinto Basin complex, and the Oshara tradition, each of which comprises various phases.

## Cochise Culture

Within the Western Desert Archaic (Jennings 1968), the earliest dates for Cochise materials are around 7000 BC. The assemblage from the Sulphur Spring phase includes small milling stones, axes, hammerstones, and percussion-flaked knives. The latter two phases of this culture are Chiricahua and San Pedro. The assemblages are characterized by smaller, broader projectile points than the Paleoindian points, and substantial numbers of ground stone implements.

Chiricahua points are highly variable, but many of them are large side-notched dart points with concave bases. Manos and shallow basin metates are common, as are scrapers and choppers. The original dating, based on geological arguments, for this phase from Ventana Cave are highly problematic. One scheme dates the phase from 7000 to 3000 BC (Antevs 1955), while another places it between 2000 and 1000 BC (Bryan 1965). Radiocarbon dates from other sources range from 3500 to 1500 BC (Whalen 1971, 1975) which support the latter interpretation.

San Pedro points are large corner or side-notched dart points with straight or concave bases. Manos, basin metates (deeper than in the Chiricahua), and mortars and pestles occur in the assemblages, as well as scrapers, bifacial knives, and choppers. From the dates obtained from investigations at Ventana Cave, it is suggested that this material ranges from 1000 BC to about AD 1, and Whalen's (1971, 1975) range of 1500 to 200 BC is in general agreement.

## Pinto Basin Complex

The Pinto Basin complex dates from approximately 3000 to 2000 BC (Gratz 1991). It is characterized by straight-stemmed dart points with concave bases, as well as the ground stone items and other chipped stone artifacts described above for other Desert Archaic complexes. Gratz (1991) refers to finds of diagnostic projectile points near the Grand Canyon, Flagstaff, and Window Rock, Arizona. Parry and Smiley (1990) summarize finds of Pinto materials near Grand Canyon and Kayenta, Arizona.

## Oshara Tradition

Irwin-Williams (1973) developed a classification scheme for northern New Mexico that is complementary to that of the Desert Archaic. Six phases were defined in the Arroyo Cuervo area. The subsistence economy of these prehistoric peoples is generally characterized as wide-ranging hunting and gathering with a variety of site types and an increasing reliance on wild plant foods that led to the adoption of domesticated plants.

The earliest phase in this tradition is Jay, dating from 5500 to 4800 BC (Irwin Williams 1973). Large stemmed or slightly shouldered dart points, leaf-shaped knives, and scrapers are considered diagnostic for this phase (Cordell 1984). Jay is followed by the Bajada phase, when earth ovens and cobble-filled hearths appear along with an increase in chopping tools. This period dates from 4800 to 3000 BC, and is based on the recognition of basally notched and thinned dart points that are otherwise much like those of the Jay phase. Sites in both these periods tend to be located at the heads of canyons where they were perhaps closer to water (Vogler et al. 1982).

The San Jose phase (Irwin-Williams 1973) is characterized by the appearance of shallow basin metates, cobble manos, chopping tools, and side scrapers. Ovens and cobble-filled hearths become more common, and the sites are larger and more numerous. San Jose dart points are similar to the Bajada dart points, but are smaller and are frequently serrated. The quality of workmanship in the rest of the chipped stone assemblage shows a marked decline. Shallow, ephemeral structures are found and an increase in mano size and the number of chopping tools has been noted. In addition to the canyon-head site locations reported for the preceding phases, specialized hunting camps are also known (Hogan 1986). The San Jose phase is believed to date from 3000 to 1800 BC (Irwin-Williams 1973).

The succeeding Armijo phase (1800 to 800 BC) encompasses the introduction of limited agriculture to the subsistence economy and an accompanying increase in site size and indicators of semipermanent settlement. The diagnostic dart points of this phase are concave to straight based with short, widely expanding stems. Other stone tools include bifacial knives, flake scrapers, drills, and choppers.

En Medio phase sites date from 800 BC to AD 400, with diagnostic projectile points being stemmed corner-notched forms with a trend toward increasingly long barbs through time. More ground stone tools are found, but the assemblages are otherwise much the same as in Armijo phase sites. Well-made storage features appear in this period and evidence for repeated seasonal occupation of canyon-head sites is well established. Seasonal camps on large dune ridges appear, apparently associated with plant resources available there. The Trujillo phase (AD 400 to 600) differs from the En Medio essentially with the introduction of small quantities of plain gray ceramics.

These latter two phases of the Oshara tradition overlap with the Basketmaker periods (see below). This is primarily the result of Irwin-Williams' belief in a gradual transition from the Archaic to the Puebloan periods. Two sites in the N11(1&2) project area may yield information regarding this transition. Site NM-Q-23-60 (LA 38698) comprises Late Archaic components, and Site NM-Q-23-62 (LA 110325) dates primarily to Early Basketmaker III.

## THE PUEBLO PERIOD

The Southwest culture area includes portions of the states of Arizona, California, Colorado, New Mexico, Texas, and Utah in the United States, as well as Baja California, Chihuahua, Coahuila, Durango, Sinaloa, and Sonora in Mexico. Traditionally, the Southwest may be said to extend from Durango, Colorado to Durango, Sinaloa, and from Las Vegas, New Mexico to Las Vegas, Nevada. This broad region shares a dry climate and exhibits marked diversity in topography within its boundaries with concomitant variability in temperature and precipitation.

An agricultural adaptation to this arid geography makes the Southwest a recognizable culture area. The common denominators in this adaptation are corn, beans, and squash. It is thought that these plants were domesticated in Mesoamerica and introduced into the Southwest. Other aspects of the Southwest culture pattern (i.e., pottery, irrigation, and perhaps some religious beliefs) may have come from societies to the south (Cordell 1984).

There are a number of recognized archaeological patterns within the Southwest culture area but only two major divisions will be considered here. These are the Mogollon and Anasazi traditions, which are described below.

The Mogollon can be found in southern New Mexico, southeastern Arizona, and south into Mexico. Coil-and-scrape ceramic production is typical, and firing produced a brown or red-brown color. Some of the later pottery is decorated with black paint on a white slip. Much of this region was abandoned prior to European contact, but archaeologists feel that the descendants of the Mogollon people are now included in the Western Pueblos of New Mexico (Zuni) and Arizona (Hopi; Cordell 1984).

The Anasazi tradition is found in southwest Colorado, southern Utah, and northern Arizona and New Mexico. The pottery here is produced with a coil-and-scrape technique and is well fired to produce a gray or white core. Decoration throughout the area is a black painted design on a white slip. Archaeologists have described the Anasazi as sharing a number of common characteristics, most notably pottery, architecture, village pattern, subsistence, and complex systems of communication and trade. While much of this area was also abandoned prior to contact, it is generally believed that the modern Pueblo people are descended from the Anasazi. The N11(1&2) project area is within the eastern edge of the Western Anasazi province (Plog 1979:108-109); thus, it occupies an area on the boundary of the Eastern and Western Anasazi provinces.

The remainder of this discussion provides a brief overview of the periods of Puebloan prehistory within the region defined above as the Southwest culture area. Attention is devoted to developments within the Anasazi region, with emphasis on those aspects that are directly relevant to the current project. This broader treatment is useful to place the archaeology along the N11(1&2) project area within contexts that allow for useful study and interpretation.

### Basketmaker II

According to the Pecos chronology (Kidder 1927) and the modifications by Hayes et al. (1981), this period begins around 100 BC and continues to AD 400. Others (e.g., Gratz 1991) would end the period at about AD 500, and Marshall et al. (1979) places the end of the period as early as AD 50. In some regions, such as Black Mesa, this period may even last a few hundred years longer (Gumerman and Dean 1989). Sites of this period occur primarily in caves or rockshelters or on promontories with a view of the surrounding area (Plog 1979). Although named for the perishable items recovered from protected sites, the most common artifacts are chipped stone tools and debitage. The structures of this phase are generally shallow, oval pitstructures with outwardly sloping walls.

The earliest maize in the Western Anasazi area dates from 3000 to 2000 BC, but it is not a demonstrably important part of the diet until after about AD 1, when beans and squash also appear. Basketmaker II peoples were primarily dependent upon hunting and gathering of wild species with agricultural pursuits as an additional source of food. Stuart and Gauthier (1981:36) argue that the placement of Basketmaker II sites at higher elevations allowed for the simultaneous exploitation of horticultural and foraging lands.

### Basketmaker III

The period begins around AD 400 to 500 and ends at AD 700 in the classic Pecos chronology (Kidder 1927). Hayes et. al (1981) extend the period to AD 750 and Vivian (1990) places the end of the period at about AD 710. Basketmaker III is the first period in which there is good evidence of settlements in much of the Western Anasazi area (Plog 1979). Sites of this period typically exhibit circular pitstructures with interior and exterior storage pits and hearth features, although structures exhibit variation in size and shape. Pitstructures are round to rectangular, 5 to 8 m (16.4 to 26.2 ft) in diameter, and usually less than 1 m (3.3 ft) deep (Bradley 1994:23). Some sites also include significantly larger structures typically interpreted as ceremonial areas, called kivas, that are located at some distance from the other structures. Many of the storage features are elaborate stone-lined cists. Sites occur on alluvial terraces or ridges and bluffs near drainages.

The artifact assemblages from this period include grayware ceramics (Lino Gray, Lino Black-on-gray, and Lino Fugitive Red), small projectile points (inferred to indicate use of the bow and arrow), and the first trough metates, with rectangular manos. In the latter part of the period, a few plain redware ceramic artifacts appear.

Subsistence appears to have shifted toward an increased dependence upon agriculture, judging by the occurrence of plant remains, aggregated villages, and numerous storage pits (Gratz 1991). Plog (1979) maintains that agriculture was somewhat more important than previously, but the major food sources were still hunted and gathered wild species. Gumerman and Dean (1989) argue that the change in settlement pattern reflects a high degree of sedentism related to significant increases in farming. Environmental conditions were generally favorable in all respects, but Gumerman (1988) maintains that populations of this period preferred to reside in the better-watered areas such as the Puerco River Valley, where numerous sites of this period are reported (Gumerman and Olson 1968).

Subregional variations in and around the San Juan Basin include Sambrito, Trujillo-Sky Village, Lupton, and La Plata (Vivian 1990, cited in Bradley 1994:23). Of these, the La Plata variant is the largest, extending from the Mesa Verde region to the lower Chuska Valley and encompassing Chaco Canyon. Supporting Gumerman's (1988) contention, the large Basketmaker III sites of the La Plata variant are located near the most favorably watered areas (Bradley 1994:23).

A Basketmaker III to Pueblo I site was excavated north of the N11(2) alignment by the San Juan Museum Association — Division of Conservation Archaeology in 1980 (Whitten 1980). Sites within the current project that comprise a Basketmaker III component include NM-Q-23-62 (LA 110325), NM-Q-23-63 (LA 110326), and NM-Q-23-64 (LA 110327).

### Pueblo I

The Pueblo I period marks the beginning of the transition to aboveground architecture. The period runs from AD 700 to 900 in the classic Pecos chronology (Kidder 1927) and in Hayes et al. (1981). Vivian (1990) extends the period slightly to AD 920. Some authors (notably Goetz and Mills 1993) subdivide the period, making a distinction between Early and Late Pueblo I periods.

Sites consist of groups of pitstructures occurring in conjunction with rectangular or curvilinear blocks of masonry rooms. The amount of building stone indicates by its paucity that the superstructure of these rooms was usually of jacal (wattle and daub). These surface rooms are believed to have functioned as storage facilities. In some cases these roomblocks are replaced with lines of semisubterranean slab-lined storage pits. Pitstructures are deeper than those built during Basketmaker III and contain ventilators as opposed to antechambers (Bradley 1994:225). Also, distinctive architectural features (kivas) occur within the villages; *sipapus* (small, cylindrical in-floor features that may have served a ritual function) begin to occur on the floors of pitstructures.

The artifact assemblage is dominated by plainware pottery, but some utility vessels exhibit embellishment (Kana'a Neckbanded) and black-on-white and black-on-red types appear in addition to the black-on-gray wares. For the Cibola White Wares, White Mound, Kiatuthlanna, La Plata, and Red Mesa black-on-white all appear at various times in Pueblo I assemblages. For lithic artifacts, small, side-notched projectile points are the rule and ground stone artifacts are common.

The shift toward reliance on agriculture continues during Pueblo I (Plog 1979) and in some areas there is evidence of terracing and irrigation. Sites continue to be rather small villages, although lowland floodplain villages display some degree of aggregation (Gumerman and Dean 1989). Environmental conditions appear to have deteriorated during this period (Gumerman 1988), shifting toward a lower water table, higher erosion, and a decrease in growing-season precipitation. Dean et al. (1985) and Dean and Robinson (1977) characterize precipitation levels as having high temporal and low spatial variability. It is generally held that there were population increases during this period (Gumerman 1984) in the Kayenta and Cibola areas. Both Gumerman (1984) and Gratz (1991) describe increases in site size as well as increases in structure size near the end of the Pueblo I period.

Four subregional variations in the San Juan Basin are noted for the Pueblo I period: Rosa, Loma Alta, Piedra, and White Mound-Kiatuthlanna. Of these, the White Mound-Kiatuthlanna variant is most closely associated with the N11(1&2) project area. Vivian (1990) states that White Mound-Kiatuthlanna sites generally do not contain great kivas and that Pueblo I great houses are restricted to three sites (Pueblo Bonito, Peñasco Blanco, and Una Vida) in Chaco Canyon proper. There are, however, large room suites at the Skunk Springs great house that date to the AD 800s (Windes and Ford 1992:80).

## Pueblo II

The classic Pecos chronology dates this period from AD 900 to 1100 (Kidder 1927). Hayes et al. (1981) subdivide the period into Early and Late Pueblo II with the Early Period ending in AD 980 and the Late Period ending in AD 1050. The Pecos chronology Pueblo II period approximately corresponds to Vivian's (1990) Early and Classic Bonito phases. As in Pueblo I, pitstructures continue to be used for habitation, but surface rooms become the dominant habitation form. The roomblocks are now more frequently built of stone masonry rather than jacal (Gratz 1991). During the early part of Pueblo II, the number of known sites in the San Juan Basin increased 38% (Bradley 1994:26). Typical sites consist of a rectangular or U-shaped roomblock with a kiva in the area between the structure and the trash area to the south. Pitstructures might be located in a cluster

beside and in front of the roomblock, flanking the kiva. Vivian (1990) defines the Pueblo II period between AD 920 and AD 1020 as the Early Bonito phase, a time in which the identifiable form of Chacoan community structure begins. Vivian cautions, however, that there is insufficient evidence of a regional network between the sites at Chaco and other communities in the San Juan Basin during this period and that the cultural contemporaneity of the Chaco core and outlying settlements is uncertain.

Between AD 1020 and 1120 (Vivian's Classic Bonito phase) populations continued to expand into marginal parts of the San Juan Basin. This resulted in a pattern of small habitation sites with water and soil control features common. There is evidence for increased specialization, exchange, and status differentiation and perhaps the development of regionally adapted corn varieties during this time (Bradley 1994:29). The period also marks the development of the Chacoan regional system (Judge 1989). The Muddy Water outlier is adjacent to the north end of the N11(1&2) project and a segment of Chacoan road parallels the N11(2) alignment.

The Chacoan regional system includes communities from present-day southwestern Colorado, southeastern Utah, northeastern Arizona, and northwestern New Mexico. An extensive road system, as mentioned with Muddy Water above, was developed which connected many of these communities. Roney (1992) cautions, however, that many of the roads that have been identified are only short segments that may connect intracommunity locations rather than extend to other communities and to Chaco. The Chacoan system has been defined primarily upon the presence of Chaco-style great houses. These are often compact, multiple-story structures that comprise enclosed and/or elevated kivas, Chaco-style masonry, and core-veneer wall construction (Marshall et al. 1979; Powers et al. 1983). Often associated near or as part of the great house complex are great kivas (circular ceremonial structures whose interior diameters are greater than 10 m [33.3 ft]), roads (linear bermed features that are often below grade), and *nazha*, or earthen features (Fowler and Stein 1992). These great houses located outside of Chaco Canyon are commonly referred to as "outliers." Lekson (1991) demonstrates that the system defined on the basis of Chacoan ceramics yields different system boundaries.

Numerous models have been proposed in attempts to explain the widespread distribution of Chaco-style great houses during the latter portion of the Pueblo II period. These models can be broken down into two main categories: local development and colonization (Kendrick and Judge 1996). Local development models emphasize local processes for the appearance of great houses, but within a regional context. These models may emphasize local elites (Powers et al. 1983), political competition (Kantner 1996; Sebastian 1992), and communal integrative and public aspects of great house complexes (Adler and Varien 1993; Fowler and Stein 1992; Lekson 1991; Marshall et al. 1979; Mobely-Tanaka 1993; Toll 1985).

Colonization models focus on the nonlocal and intrusive character of Chaco-style great houses (Kendrick and Judge 1996). These models propose that the construction and use of great houses was the result of persons or groups from the Chaco core. These models vary, however, regarding these groups as emigrants (Irwin-Williams 1972; Vivian 1990), missionaries (Bradley 1993), priests (Eddy 1977; Warburton and Graves 1992), and even armies (Wilcox 1993). Investigations of sites along N11(1&2) may yield important information regarding both colonization and local development models.

Artifact assemblages during the Pueblo II period include increasing varieties of black-on-white ceramics and a predominance of corrugated utility vessels over plainwares. By the latter half of the period, black-on-red wares from southern regions begin to appear, and in increasing quantities. In the Cibola White Ware series Red Mesa, Puerco, Escavada, Gallup, and Chaco black-on-white are common. White Mountain Red Wares such as Puerco Black-on-red may be found. Chipped stone artifacts tend toward the crude and casual, being most often simply utilized flakes rather than formal tools. Manos of the two-hand variety and flat slab metates are most common, although other types might predominate within local areas.

Reliance upon agriculture continued to increase, although hunting and gathering remained indispensable. Faunal assemblages from the Chimney Rock and Guadalupe outliers and from the Chaco core contain approximately 80% artiodactyls until the late eleventh century when they decrease corresponding to an increase in the percentage of prairie dog and turkey (Bradley 1994:28). In some areas there is good evidence for no permanent occupation of sites in this or the preceding periods (Powell 1983). The number of known sites in this period increases markedly, especially in its latter half, and this is considered as evidence for an increasing population. The environment of this period was initially poor, after the degradation of the preceding period, but began to improve in the last hundred years. Water tables began to rise after AD 900, partially offsetting the drier precipitation regime that began in AD 700 (Dean et al. 1985). Precipitation became more consistent by AD 1000, and by 1050, high spatial variability in climatic conditions were obtained (Dean and Robinson 1977).

### Pueblo III

This period dates from AD 1100 to 1300 according to the Pecos chronology (Kidder 1927). Again, Hayes et al. (1981) recognize an early and late phase in this period and place the Early Pueblo III phase between AD 1050 and AD 1180 and continue the Late Pueblo III phase to AD 1400. Focusing on Chaco Canyon and the San Juan Basin, Vivian (1990) uses the Late Bonito phase and Mesa Verde phase as approximate correlates for Pueblo III. Many now begin the Pueblo III at AD 1150 (Adler 1996). Some later Pueblo III sites exhibit enclosed plazas and special-purpose surface structures (mealing rooms) attached to the northeast side of roomblocks (Gumerman 1984). Sites are increasingly large and exhibit evidence of planning in some respects (Plog 1979), culminating in formal multistory pueblos built around large plazas. Tower kiva complexes appear during this period (Vivian 1990:335).

Artifact assemblages of this period resemble those of the preceding one, with increased variety in design of ceramic items indicating regional style development (Plog 1979). Orangewares and polychrome pottery make their appearance in the Western Anasazi area. Reserve, Tularosa, Pinedale, and Snowflake black-on-white are common Cibola White Wares and White Mountain Red Wares include Wingate, St. Johns, Pinedale, and Kwakina Polychrome. Chipped and ground stone artifacts are essentially identical to those found in the Pueblo II period.

A widespread drought in the first half of the Pueblo III period is thought to be the cause of major population shifts throughout much of the Southwest. By AD 1150, the improved climate of the preceding period had deteriorated to major drought conditions coupled with low spatial and

temporal variability in precipitation (Dean et al. 1985; Dean and Robinson 1977). The drought was followed by a reversal in which water tables rose and floodplains aggraded until AD 1275 (Dean et al. 1985). By the end of the Pueblo III period, most populations were aggregated in the Mesa Verde, Zuni, Acoma, and portions of the Rio Grande regions.

Abandonment of the Mesa Verde region is widely regarded as the most significant event of the Pueblo III period. By AD 1300 the entire Puebloan population had abandoned the Mesa Verde region, including the large pueblos of Sand Canyon, Goodman Point, Cow Canyon, Cliff Palace, Yucca House, and many others. The Great Drought mentioned in the previous chapter, which occurred between 1276 and 1299, likely was a major cause of the abandonment. Van West (1990), however, studied agricultural productivity and predictability of soils within the Mesa Verde region of southwestern Colorado, along with dendroclimatological data from the region, and found that the drought was probably not the only cause for abandonment. Van West believes that there was enough productive land to support at least some of the population during this period. Interestingly, her study shows that cooperation mechanisms broke down during the Late Pueblo III, and when the drought intensified the problems, abandonment was the chosen solution.

#### Pueblo IV

This period dates from AD 1300 to 1600 according to the Pecos chronology (Kidder 1927). The trend toward fewer and larger sites begun in the previous period continued between AD 1300 and 1600, and these nucleated sites are found in only a few limited areas of the Southwest. Very large villages of hundreds of rooms were built, although small sites continued to exist (Plog 1979). In the Western Anasazi area, population was concentrated in the area of Zuni, New Mexico, and Hopi, Arizona. Only a few other well-watered areas continue to be occupied into the early part of this period, such as the Puerco and Little Colorado river valleys, some of the larger washes, and areas along the Rio Grande Valley. The Homol'ovi area near Winslow, for example, was occupied until about AD 1400 and then abandoned (Hays et al. 1991).

Conditions beginning with the environmental degradation at the end of the Pueblo III period persisted until at least AD 1500 (Gumerman and Dean 1989). Minor improvements due to temporal and spatial variability moderation were insufficient to offset the losses during the drought period (Dean et al. 1985). Heavy reliance upon agriculture continued within these areas of nucleated settlement. There is evidence of increased investment in water control systems (e.g., construction of reservoirs). Highly distinctive ceramic styles developed in each of the densely settled areas (Plog 1979), with yellowwares in the Hopi region and glaze wares and polychromes in the Zuni region.

#### Protohistoric Occupations in Northwest-central New Mexico

When the Spanish arrived in New Mexico, many pueblos that are today abandoned were occupied (Pecos, the Piro Pueblos, and the six villages at Zuni, for example). The occupants of these pueblos are the ancestors of people today living in the known Northern Rio Grande, Southern Rio Grande, and Western Pueblos. Hence, an understanding of ethnic diversity in protohistoric New Mexico offers some basis for understanding traditional use areas of contemporary Indian peoples. The following discussion is not intended to be an exhaustive treatment of the historical influences

that have shaped contemporary land-use areas in New Mexico. Rather, the information is intended to assist in the identification of nations that may need to be consulted regarding the disposition of cultural materials or identification of traditional cultural properties potentially impacted by the N11(1&2) undertaking.

The region in which the N11(1&2) undertaking is situated has been a traditional use area for many Southwest Indian tribes. Those with the most direct contemporary placement are the Navajo, Jicarilla Apache, Southern Ute, Zuni, Acoma, and Laguna. According to Opler (1983) the traditional territory of the Jicarilla Apache as noted in 1850 was east of the present reservation. The traditional territory of the White Mountain (Western) Apache as recorded in the 1870s (Basso 1983) was southwest of the N11(1&2) project area, with the Zuni territory between.

The nature of sociopolitical and trade relations between the eastern and western pueblos of the Little Colorado province and the Rio Grande province in the protohistoric period is not fully known. Riley (1987) states that the Rio Grande province could be accurately said to encompass 10 or more subprovinces distinguishable along both linguistic and ethnic lines. This is attributable to the fact that the Rio Grande province was settled by various groups linguistically divided between Keresan speakers (Acoma, Laguna, Zia, Santa Ana, San Felipe, Santo Domingo, Cochiti) and the three branches of Tanoan: Tiwa (Taos, Picuris, Sandia, Isleta), Tewa (Santa Clara, San Juan, San Ildefonso, Nambe, Tesuque, and possibly Pojoaque), and Towa (Jemez) (Hale and Harris 1979). The Keresan speakers are believed to have formed a linguistic bridge between the peoples living in the eastern (Rio Grande) and western (Hopi and Zuni) pueblos (Riley 1987). The exact qualities of interaction between the individual pueblos is uncertain for the prehistoric, protohistoric, and much of the historic periods. Swagerty (1988) suggests that Zuni and Pecos served as major protohistoric trade centers with Taos and Acoma as secondary permanent centers and the other pueblos of the Rio Grande acting as middlemen in the trade relationship.

## THE NAVAJO PERIOD

Presented below is a brief discussion of Navajo history. This discussion will enable a basis for interpretation of the substantial Navajo components at sites NM-Q-23-60 (LA 38698), NM-Q-27-13 (LA 110304), NM-Q-23-57 (LA 110320), and NM-Q-23-58 (LA 110322). These sites comprise Navajo components dating to the Dinetah phase (ca. AD 1500 to 1700), and the late nineteenth to late twentieth centuries. These components span a time when the Navajo practiced a combination of hunting and gathering with horticulture and herding through the recent period of wage-based labor and a cash economy. These sites yield information regarding early settlement of the San Juan Basin and relationships with neighboring pueblos such as Zuni (particularly at site NM-Q-23-60), as well as the dramatic changes in Navajo political economy over the past 100 years.

### Navajo Origins in the American Southwest

The Navajo were probably part of the large-scale migration of Apacheans to the Southwest but the date of arrival of these southern Athabascans into the region is a source of debate (Kelley and Whiteley 1982; Towner 1996). Archaeologists suggest the presence of Athabascans in the Four Corners area at sometime between AD 800 and 1541 (Bailey and Bailey 1986). Brugge (1984)

asserts that the Four Corners was sparsely populated by a widespread Apachean population by AD 1400. By the 1600s, this population had increased and expanded southward. However, Schaafsma (1976, 1979) argues that the Athabascans arrived in the region sometime between the late 1500s and early 1600s. Wilcox (1981) presents two dominant opinions regarding the arrival of Athabaskan groups into the Southwest. The first hypothesis proposes dates of arrival between approximately AD 1350 and 1400 following a route through the mountains and valleys of present-day Utah and Colorado. The hypothesis implies that by the time of Spanish contact, large numbers of ancestral Navajo occupied the Dinetah area, concentrated in the Gobernador and Largo Canyon region of northwestern New Mexico. The second common hypothesis advocates a migration through the western High Plains where subsistence was based on buffalo. Initial arrival on the Plains is estimated to be around AD 1400, but these peoples are thought to have not moved west of the Sangre de Cristo Mountains until after 1540. At contact, they were referred to by the Coronado party as the "Querechos." The term Querecho is not found in modern Spanish and may be from Pecos Pueblo, as it closely resembles the Jemez word for "Apache" or "Navajo" (Opler 1983:387). These Querechos were reported in 1583 in the mountains west of the Rio Grande near Acoma (Opler 1983:387). The documents of Juan de Oñate seem to distinguish between Querechos, Vaqueros, and Apache (Opler 1983:387). After Coronado, early Spanish colonists, who entered the area in the mid-sixteenth century, called the Athabaskan peoples Apache, and those living west of the Rio Grande, Apaches de Navajo (Brugge 1986) but exactly when the Navajo became distinct from other Apacheans is unknown. Schaafsma (1979) suggests that the Navajo did not enter the San Juan drainage in any appreciable numbers until the time of the Pueblo Revolt of 1680. According to Kelley and Whiteley (1982:3), the use of the term "Navajo" by the early Spanish explorers was "haphazard" and referred to "miscellaneous, non-related wandering groups." According to Hester (1962), Navajo material remains are not recognizable archaeologically until the Protohistoric period (contact to AD 1860). Schaafsma (1993) reviews the use, disuse, and eventual reuse of the term "Dinetah phase" in the upper San Juan Basin, with the conclusion that although the time frame of AD 1500 to 1700 is valid, cultural affiliation remains inconclusive. That is, Dinetah phase sites are not necessarily Navajo sites and ceramics are still the key basis for assigning ethnicity. Schaafsma argues that Dinetah phase sites are Ute in origin thus supporting late entry into the region by the Navajo. Ancestral Navajo, Schaafsma contends, are associated with the Piedra Lumbre phase in the Chama Valley closer to the Rio Grande Pueblos.

The subsistence pattern of the early Navajo was probably based on a combination of horticulture combined with hunting and gathering. Early Spanish records indicate that the Navajo were farming by the early 1600s (McNitt 1972). But whether the Navajo adopted horticulture from the Puebloan peoples or from horticulturalists on the Plains prior to their arrival in the Dinetah is still subject to debate (Bailey and Bailey 1986). Betancourt (1980) uses the presence or absence of horticulture as the basis for distinction between the Navajo and other Athabaskan (Apachean) peoples. Making firm distinctions between Navajo and Apachean culture patterns is problematic. The distinction between a collapsed Navajo forked-stick hogan and Apache wickiup may be impossible to make accurately based on surficial evidence and, according to Kelley and Whiteley (1982), the forked-stick hogan persisted as a seasonal or temporary dwelling well into the Gobernador phase (AD 1696 to 1770) (Hester 1962). To the southeast of the N11(1&2) project area near Alamo, Walt (1989) identifies sites described as collapsed forked-stick hogans in association with pre-1700 Acoma ceramics, circular masonry storage buildings, and large amounts of burned

corn. As suggested by Walt (1989), these assemblages represent Navajo habitations distinct from those of the Gila Apache or other Apachean groups. Abbink (1986) states that the architecture of the early Alamo sites would definitely be termed Navajo if found to the north, and that assemblages of plain ceramics identified as Navajo-type define these sites apart from the Gila Apache.

The Spanish reconquest of New Mexico in 1692 led many Puebloan peoples to seek refuge in areas occupied by Navajo. Reeve (1956, cited in Kelley and Whiteley 1982:9) states that Navajo occupations at this time were centered in two locations, one along the Rio Puerco of the East between the Cebolleta Mountains and Mesa Prieta and the other in the San Juan drainage. This latter included the "Pueblitos," large masonry structures surrounded by forked-stick hogans, located in defensive positions along the sides of Largo and Gobernador Canyons (although similar structures are recorded elsewhere in the Dinetah). The close interaction of cultures at this time may have shaped the material culture recognized by archaeologists as distinctly Navajo. Van Valkenburgh (1974:209), among others, uses Navajo clan names as evidence of the impact that refugees among the Navajo made on their hosts.

The period after the Spanish reconquest also marks the beginning of combined Ute and Comanche raids on Navajo settlements. Sometime shortly after AD 1706, the Navajo became trapped between aggression from the Ute/Comanche alliance (who were well equipped with French firearms) to the north and northeast and the Spanish military to the southeast and east (Kelley and Whiteley 1982:11). By the 1740s the pressures of the Ute and Comanche raids and the Spanish presence were forcing increased numbers of Navajo from the Dinetah (Abbink 1986; Bailey and Bailey 1986). During the Spanish Colonial period (1598 to 1821), Navajo mobility increased due to the acquisition of the horse from the Spanish. By the mid-1700s, the influx of hunting and gathering peoples from other regions resulted in Navajo migrations to the south and west of the Gobernador area (Holmes 1989). Keur (1941) suggests that by AD 1750, the Navajo had settled in the area around San Mateo and Cebolleta, northwest and southeast respectively of Mount Taylor. Archaeological evidence of game corrals indicates that the Chaco Plateau may have been an important place for antelope hunts although this area is outside the assumed historic range of the Navajo. It is suggested that bands of Athabascan people were probably occupying a much larger area than is indicated by the current boundaries of the Dinetah (Bailey and Bailey 1986). By AD 1750, numbers of Navajo settled near the pueblos of Acoma and Laguna and "the archival record firmly establishes the Navajo in the area of the western pueblos and Gila Apache" by this time (Abbink 1986) The Navajo are also thought to have occupied the Gila and Datil mountains to escape either Spanish slave raiding, Apachean aggression, or Spanish retaliation for raids. As increasing numbers of Spanish ranchers were moved into western New Mexico as a result of the escalating land grant process, Navajo and Apache peoples were further displaced with the support of Spanish Colonial forces.

#### Navajo Political Economy 1750 to 1850

The Navajo apparently decreased their raiding activities and increased their reliance on a pastoral subsistence during the years prior to AD 1750 (Kelley and Whiteley 1982:11-12). The increasing Ute and Comanche pressures on the Navajo led to a decrease in Navajo raids on Spanish settlements, and apparently the Spanish declined the opportunity to attack Navajo settlements during

this time. Continuing pressure from Ute and Comanche raids, however, continued in the north and by about AD 1750 to 1770 the upper San Juan Basin (including the Dinétah) had been abandoned by the Navajo (Kelley and Whiteley 1982:17).

The Gobernador phase, in which masonry pueblitos were dominant and a strong Pueblo influence was seen in the Dinétah area, is, according to Hester (1962), winding down by AD 1750. A few isolated pueblitos from the late Gobernador phase are located at Coyote Canyon, Klagetoh, and Nazlini (Kelley and Whiteley 1982:20). Between about AD 1750 and 1770 there is a transition to the Cabezon phase (AD 1770 to 1850) marked by reliance on herding, stone-walled masonry hogans in small clusters of usually three (an indication of the extended family residence "outfit" similar to the present coresidence pattern), and a shift from Gobernador to Navajo Polychrome pottery.

According to Brugge (1986:142), Navajo in the Chaco Canyon district moved between masonry hogans and pueblitos situated in lowlands near farming areas and temporary forked-stick hogans in the higher elevation pinyon and juniper belt. Movement was probably seasonal but duration may have been based on pinyon yield, the success of that year's horticultural efforts, aggression from other tribes or from the Spanish, and hunting opportunities.

The Navajo had lost their best horticultural lands near the San Juan drainage, and Navajo horticultural yields were further weakened by two severe droughts in the periods AD 1755 to 1765 and AD 1772 to 1783 (Kelley and Whiteley 1982:21). Migration appears to have escalated to the west, to include the Chuska Mountains and Canyon de Chelly.

Starting shortly after AD 1750, the Spanish colonial government in Santa Fe began issuing increasing numbers of land grants to Spanish settlers on lands occupied or used by Navajo (Kelley and Whiteley 1982:13). As the result of these pressures by outsiders and increased Ute raids in which Navajo children were captured and turned over to the Spanish as slaves, the Navajo resumed raids on Spanish settlements (Kelley and Whiteley 1982:17, 21). Simultaneously, increasing contact (both hostile and peaceful) with Spanish colonists seems to have led to increasing wealth stratification among Navajo. This stratification escalated dramatically in the early 1800s. As wealthy Navajo ("ricos") increased their herds, they enlisted poorer Navajos ("pobres") to work for them as herding labor. In turn the migrations of these ricos and their followers (especially during drought or Spanish pressure) probably pressured other poor Navajo who began raiding Spanish colonists — presumably to accumulate herds (Kelley and Whiteley 1982:22). In conjunction with wealth stratification, ricos also likely became politically influential in dealings with the increased numbers of Spanish settlers. Ricos became the "headmen" who made treaties with the Spanish. Thus the period after about 1800 marks a shift in both the economic and political organization of the Navajo.

Between AD 1800 and 1821 (when Mexico seized control of the Southwest from the Spanish), the Navajo and Spanish engaged in a recurrent pattern of warfare, temporary truces through treaties signed by headmen, the inevitable breakdown of treaties as neither "authority" had control over those presumably represented, and resumption of warfare. This pattern was inherited by the Mexican government and continued into the period of United States control after AD 1848 (Bailey and Bailey 1986:17-18).

Despite the frequent warfare and raids that engaged the Navajo after AD 1770, Bailey and Bailey (1986:19) state that the Navajo population increased dramatically from AD 1800 to 1850. Using the average of 24 previous estimates they arrive at an AD 1850 population of 10,000 and further estimate that the Navajo population must have doubled or even tripled between AD 1800 and 1850. Herd sizes are estimated to vary widely from tens to hundreds of thousands of animals. Bailey and Bailey (1986:20) cite a human to sheep ratio of 1:30, stating that subsistence requires at least a 1:40 ratio and thus herding would have to be supplemented by intensive farming, hunting, and gathering. Kelley and Whiteley's (1982:27) estimates of livestock include goats, cattle, and horses in addition to sheep. They note that even with high estimates of animals, wealth stratification had become increasingly pronounced since 1800. Further they cite evidence that the successful Navajo farmers were also those who had the biggest herds. Thus, it appears that all resources were unequally distributed between ricos and pobres by AD 1846. This inequity would be a powerful incentive for many poor Navajo to raid the herds of Mexican and then U.S. settlers. It would also presumably increase tensions over land between settlers and both rich and poor Navajos.

### Navajo Political Economy 1850 to 1945

The Mexican Secession at the end of the Mexican-American War in AD 1848 opened the Southwest to U.S. citizens anxiously seeking new lands for livestock ranches. This incursion, fully supported by the actions of the U.S. military, placed tremendous hardship upon the Navajo people. Beginning in 1863, Federal troops under General James H. Carleton, aided by Anglo civilians and Ute and Puebloan volunteers, began an all-out war against the Navajo (Bailey and Bailey 1986). In the winter of AD 1864, 2000 to 3000 Navajos were forcibly marched to Fort Sumner or the Bosque Redondo ("Round Forest") in eastern New Mexico on the infamous Long Walk. Estimates are that between one-quarter and one-third of the Navajo who began the trip died. Ultimately about 8500 Navajo were imprisoned out of an estimated population of 10,000 (Bailey and Bailey 1886:19). Eventually, due to public outcry resulting from reports in eastern newspapers describing the conditions under which the Navajo were being held at Fort Sumner, and also due to the cost of supporting a large dependent population, the Fort Sumner reservation experiment failed. In AD 1868, the Navajo headmen signed a new treaty and were returned to Fort Wingate and later moved to the Executive Order Reservation in the vicinity of their original homeland.

The treaty of 1868 required that all Navajo not already living on the Executive Order Reservation take residence there. Although many families complied with this requirement initially, the U.S. government failed to supply the rations required under treaty on time (it was 1869 before the people at Fort Wingate received the U.S. government-promised rations). Because the Navajo did not have rations nor time to plant crops, many left Fort Wingate and began to expand into areas they had previously occupied. In large measure, most Navajo returned to the subsistence farming and ranching life they had adopted prior to the Long Walk. The reestablishment of the Navajo economy was hampered, however, by an extended drought and high erosion between 1886 and 1880 (Kelley and Whiteley 1982:41).

The introduction of the railroad into northern Arizona in 1881 allowed high-volume transport of livestock and other products to midwestern and eastern markets and greatly increased the competition for land between the Navajo and an ever-expanding population of Anglo settlers. The

competition for land outside the Reservation was escalated by the Stock Raising Homestead Act of 1916 that increased the homestead limit from 160 to 640 ac and reduced the residence requirement from five years to three. The result was that record numbers of Anglos, both legitimate settlers and "ringers" filing on behalf of large ranching interests, filed for homesteads on disputed lands outside the reservation (Bailey and Bailey 1986). The railroad brought increased opportunities for wage labor to the Navajo as well as a dramatic increase in Anglo traders and railroad employees. Navajo pobres began to supplement their subsistence farming and ranching with sales of wool and silversmithing. During this time, Navajo culture began the major transition from subsistence farming to increased reliance on the expanding Western cash economy.

Up to 1920, headmen continued to represent Navajo interests within their particular area of influence and increases in the size of the original Executive Order Reservation had made it difficult for the Indian Service to oversee activities across the reservation. Kelley and Whiteley (1982:55) note that in 1921 representatives of several oil companies asked the Commissioner of Indian Affairs to arrange a meeting with the Navajo Tribal Council (a nonexistent entity). This event foreshadowed future industrialization on the Navajo Nation and helped lead directly to the formation of the Navajo Tribal Council in 1923.

Schisms between headmen in various areas over the allocation of tribal funds led the Bureau of Indian Affairs to formalize local chapters by approving the expenditure of tribal funds for chapter house construction and other projects. Another cited incentive for the formation of chapters (early on also known as "farming clubs") was that it allowed Federal agents to more easily communicate government edicts during the stock reductions described below. (Young 1978, cited in Kelley and Whiteley 1982:59). In 1955, the Council made the chapters official parts of the Navajo government as a way to reallocate mineral and energy funds and possibly reduce Federal control over tribal revenues.

Through the late nineteenth and into the early twentieth centuries, increased cattle and sheep production severely degraded the Southwest range. In the 1920s, wealth differentiation in the Southern Navajo Agency was extreme and Navajos in the region had intensified the pattern in which ricos hired their poorer neighbors and possibly used these relationships to create buffer zones to resist further Anglo encroachment on prime grazing and farming land (Kelley and Whiteley 1982:61). In 1933, at the height of the Navajo's depression-era suffering, John Collier, then Commissioner of Indian Affairs, used inducements of increased wage labor on the reservation through public works and schools, as well as promises of having Congress increase the size of the reservation, to force strict livestock reductions on and adjacent to the Navajo Reservation (Bailey and Bailey 1986). Although most Navajo distrusted and resisted the notion of livestock reduction, finding it counterproductive both culturally and ecologically, Collier was able to use the authority of his office to arrange the "voluntary" reduction of hundreds of thousands of animals in the years 1934 and 1935 (Bailey and Bailey 1986). In 1936, the Soil Conservation Service divided the Reservation into districts and in 1940 implemented the current permit process as a way to control livestock populations. Tragically, household herd sizes were unevenly distributed before stock reduction and the program led to even greater economic inequality among the Navajo (Kelley and Whiteley 1982:85). In the N11(1&2) project area, sites NM-Q-22-46 (LA 110309) and NM-Q-22-47 (LA 110310) were stated by informants to have been abandoned during stock reduction.

## Navajo Political Economy Post-1945

Significant changes in the Navajo's relationship with the non-Navajo world, beginning at contact and steadily increasing over the next 400 years, were sealed by World War II as large numbers of Navajo men left the reservation as military recruits and volunteers. Bailey and Bailey (1986:228-230) note that the Navajo were still adjusting to the rapid changes brought by John Collier's administration and the stock reduction when the war began. Navajo participation in the war and changes in U.S. policy as a result of the war dramatically changed the social, economic, and political relationship between Navajo and Anglos. The most dramatic changes have been a shift from subsistence farming and herding augmented by sales of wool and other products and occasional wage work, to a greater reliance on part-time and full-time wage work. The system of public assistance introduced during the 1930s and 1940s also changed household and extended-family economics on the Navajo Nation. Corresponding changes involved an increasingly formalized and bureaucratic tribal government, the development of tribal services, and the development and expansion of tribally controlled economic enterprises.

The Navajo-Hopi Long Range Planning Act, passed in 1950, was a Congressional response to problems of economic development and expansion on the Navajo Nation. The act allocated over 88.5 million dollars for development of roads, schools, hospitals, and other services; studies and improvement of timber, soil, water, range, mineral, and other resources; and development of tribal industrial enterprises for clay, wood, and cement. Less money went towards developing tribal industry and attracting outside industry than went into services (Bailey and Bailey 1986:233). Also included in the act were provisions for the relocation of Navajo families to major urban centers—today seen as a major assimilation tactic of the federal government to eliminate the "Indian problem." An additional 20 million dollars was invested to provide administrative support for the development of programs under the act.

Perhaps more significant to the Navajo economy than Congressional acts were widescale changes in U.S. economics after World War II, as wartime production was transferred to civilian manufacturing and as energy development (including military and civilian nuclear power) expanded. Navajo lands became increasingly viewed as a source of energy for civilian and military projects. For example, between 1945 and 1960 the use of natural gas in the U.S. increased over 300% (Bailey and Bailey 1986:235). Added to this were another westward migration and large increases in the populations of New Mexico and Arizona (Bailey and Bailey 1986:235) leading to increased infrastructure and economic development in areas surrounding the Navajo Reservation. By 1975 dozens of corporations were making lease, royalty, and rental payments to the Navajo Nation for development of oil, gas, coal, uranium, and vanadium resources. According to Bailey and Bailey (1986:237) interest on accumulated payments in 1975 was about 4.2 million dollars or 15% of the Tribe's 27.5-million-dollar annual revenue.

Resource revenues were used by the Navajo Nation to take over or establish numerous services and industries on the reservation beginning in the 1950s. These include police and courts, utilities, housing, health, education, natural resources, economic opportunity, job training, Navajo Forest Products Industries, Navajo Agricultural Products Industries, the Navajo Indian Irrigation Project, and numerous others. This ability to establish and operate programs shaped the relationship

between the Navajo Nation and the Federal Government. According to both Kelley and Whiteley (1982) and Bailey and Bailey (1986) the rapid increase in per capita income as a result of increased employment in both industry and tribal programs shifted the Navajo economic pattern both on and off the reservation. Increased infrastructure of roads made off-reservation centers like Farmington, Gallup, and Flagstaff more accessible not only for employment, education, and as a source of services and products but also for residence. Phoenix, Denver, Salt Lake City, and Los Angeles also attracted more permanent and seasonal Navajo residents owing to improvements in the U.S. transportation infrastructure of the 1960s and 1970s.

The rapid changes of the past 40 years have led to concerns by the Navajo Tribe regarding the pace of development and its impact on resources that reflect the cultural history of the Navajo people. Many of these concerns are in addition to those concerns that led to the passage of the National Historic Preservation Act in 1966, the Archaeological Resources Protection Act in 1979, and the American Indian Religious Freedom Act in 1978. Section 1 of the Navajo Nation Cultural Resources Protection Act (CMY-19-88) approved by the Tribal Council in 1988 outlines the concerns of the tribe regarding the loss of cultural resources as a result of increased development. The *Navajo Nation Policy to Protect Traditional Cultural Properties* (NNHPD 1991:1), states that "As economic development proceeds in the Navajo Nation, a growing number of places of traditional significance to the Navajo people may be damaged by the land disturbance that accompanies development." The tribe's concern includes not only archaeological sites but places of special significance in the oral and ceremonial traditions of the people.

The investigations conducted at sites along N11(1&2), directed by these policies and legislation, have yielded and will continue to yield information adding to the cultural heritage of all peoples of the American Southwest.

## Chapter 4

### PREVIOUS RESEARCH

James W. Kendrick

This chapter presents a discussion of the previous research conducted in the project area. The discussion is divided into two sections. The first section discusses research that has been conducted in the general region of the project, including research conducted at the well-known Chaco-style great houses near the project area. The second section summarizes specific projects and site recordings within 1.6 km (1 mi) of the N11(1&2) project area.

### REGIONAL RESEARCH

This section will discuss the previous research conducted within the region of the eastern portion of Lobo Mesa and the Chaco Slope of the San Juan Basin. The most prominent archaeological sites in this region are Chaco-style great houses. Most of the research conducted in this region has focused on these great houses, or "Chacoan outliers", and their associated communities. Marshall et al. (1979) produced an extensive volume on these great houses and others in the southern San Juan Basin. Powers et al. (1983) also discuss a few of the great houses in the area.

The largest of the great houses in this region is Kin Ya'a, located approximately 3.2 km (2 mi) southeast of Crownpoint below Lobo Mesa on the Chaco Slope. Kin Ya'a, or as sometimes pronounced in the local area as Kin Yaa'ahi (Towered House), comprises at least 35 rooms, three enclosed surface kivas, and a four-story (12 m high) enclosed tower kiva (Marshall et al. 1979). A portion of the tower kiva continues to stand and can be seen for a considerable distance throughout the region.

Kin Ya'a dates to the Pueblo II period, and its occupants were actively engaged in the Chacoan regional system (Judge 1989). Many of the great houses were linked by a system of roads found throughout the San Juan Basin. One of the most visible roads is the Great South Road, which begins at Chaco Canyon's South Gap and leads southward. The Great South Road enters Kin Ya'a from the northeast. Along its way between Chaco Canyon and Kin Ya'a the Great South Road passes the great house of Upper Kin Klizhin and then the Bee Burrow great house (Marshall et al. 1979; Roney 1992). The road splits north of Kin Ya'a, one branch of which passes by a great kiva within the Kin Ya'a community, while the other passes by Kin Ya'a. The two roads then merge again into one road where it angles toward Hosta Butte, the most prominent landform in this region and easily visible from Chaco Canyon. Even though Roney (1992) describes construction of the Great South Road as intermittent along its course, it is a clear and undeniable link with the great houses of Chaco.

Discovery of the roads at Kin Ya'a has not occurred recently. Holsinger (1901) identified them, but described them as irrigation canals. Fewkes (1917) recognized the roads, seen on the

ground as 9-m-wide and 1-m-deep swales, but he noticed that the Great South Road extended up a nearby slope, and therefore ruled out the possibility of irrigation canals. Fewkes identified the swales as well-used trails (Marshall et al. 1979). The important point, however, is that the communities in the region where the N11(1&2) project is located were formally integrated into a system of interaction with other portions of the San Juan Basin.

Another prominent great-house community, and directly related to the current project, is the Muddy Water complex, located 4.2 km (2.6 mi) west of Crownpoint. The northernmost portion of the project is located within the Muddy Water Protection Area (MWPA). Technically, a discussion of Muddy Water should be in the next section of this chapter; however, it is a great-house community and also relevant to this section. Sites located in the vicinity of the Muddy Water complex are described in the next section in Table 4.1.

The Muddy Water great-house complex consists of three Chaco-style great houses, a great kiva, and numerous small habitations which comprise the Muddy Water community. The largest (and closest to the project area) of the Muddy Water great houses is the Hurley site (LA 10959). The Hurley site is an impressive mound of rubble over 3 m high, with an estimated 28 rooms within multiple stories. The great house contains two enclosed and elevated kivas and a large midden (Marshall et al. 1979). A great kiva with an estimated interior diameter of 17 m is located 135 m (443 ft) southeast of the Hurley site. The Hurley site, based upon surface tallies of ceramics, appears to have been used during the Pueblo II period. Kantner (1996), using mean ceramic dates, lists the occupation of the Hurley site between AD 960 and 1095, contemporaneous with Kin Ya'a.

The two other great houses in the Muddy Water complex are LA 10716 and 17257. Both Marshall et al. (1979) and Kantner (1996) believe these great houses were used in the late Pueblo II to early Pueblo III period. LA 10716 contains an estimated 22 rooms and 1 enclosed kiva, while LA 17257 contains an estimated 7 rooms and 2 enclosed kivas (one of these kivas is within an enclosed plaza).

Two prehistoric roads extend from the Muddy Water community to the south, toward Lobo Mesa. These roads extend into the current project area. Roney (1992) notes that attempts to trace the roads on top of Lobo Mesa have not been successful.

Previous investigations around the Muddy Water community include those of Davis (1976), who surveyed section 16 (T17N, R13W), and Marshall and Stein (1978), who surveyed section 14 (T17, R13W). Hammack (1964) excavated a small ruin (LA 2987) along Navajo Route 9 which was a habitation associated with the Muddy Water community.

Along with Marshall et al. (1979), Powers et al. (1983) also conducted an extensive investigation of great houses. Powers et al. focus on great houses in the northern portion of the San Juan Basin, yet also discuss great houses not included by Marshall et al. in the southern San Juan Basin. One of the great houses Powers et al. describe is Dalton Pass, named for the nearby physiographic feature. The Dalton Pass great house is located west of the Muddy Water community, within Dalton Pass Canyon (Powers et al. 1983). This great house, based on surface ceramics, dates primarily to the late Pueblo II period, and is therefore contemporaneous with the other great houses described above. Dalton Pass was probably a two-story structure with an estimated 20 rooms, two enclosed kivas, one extramural kiva, and possibly one great kiva (Powers et al. 1983:Figure 109).

Table 4.1. Previously Recorded Sites With Laboratory of Anthropology (LA) Numbers Within 1.6 km (1 mi) of the N11(1&2) Project Area.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
2987	Ancestral Pueblo	AD 900 to 1300	Pitstructure, roomblock, midden, ceramics	Hammack 1964
10716	Ancestral Pueblo	AD 1100 to 1300	Great house, ceramics, midden	-
10717	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics, lithic artifacts	Marshall et al. 1979
10959	Ancestral Pueblo	AD 900 to 1100	Great house, great kiva, ceramics	Marshall et al. 1979
10960	Ancestral Pueblo	AD 900 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
11563	Ancestral Pueblo	Unspecified	Mound, lithic artifacts, ceramics	Marshall et al. 1979
11564	Ancestral Pueblo	Unspecified	Mound, lithic artifacts, ceramics	Marshall et al. 1979
13633	Navajo	Unspecified	Corral, house foundation, sweatlodge	Grigg and Powell 1976
15898	Ancestral Pueblo	AD 900 to 1100	Mound, midden, lithic artifacts, ceramics	Fosberg 1977
17226	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics, lithic artifacts	Marshall et al. 1979
17227	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17228	Ancestral Pueblo	AD 900 to 1100	Roomblock, ceramics	Marshall et al. 1979
17229	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17230	Ancestral Pueblo	AD 900 to 1100	Roomblock, ceramics	Marshall et al. 1979
17231	Ancestral Pueblo	AD 900 to 1100	2 roomblocks, isolated room, ceramics	Marshall et al. 1979
17232	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17233	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17234	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17235	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17236	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17237	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17238	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17239	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17240	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17241	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17242	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17243	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
17244	Ancestral Pueblo	AD 700 to 900	Mound, midden, ceramics	Marshall et al. 1979
17245	Ancestral Pueblo	AD 500 to 700	Mound, midden, ceramics	Marshall et al. 1979
17246	Ancestral Pueblo	AD 700 to 900	Mound, midden, ceramics	Marshall et al. 1979
17247	Ancestral Pueblo	AD 700 to 900	Roomblock, midden, ceramics	Marshall et al. 1979
17248	Ancestral Pueblo	AD 700 to 900	Mound, ceramics	Marshall et al. 1979
17249	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17250	Ancestral Pueblo	AD 900 to 1100	Cist/bin, midden, ceramics	Marshall et al. 1979
17251	Ancestral Pueblo	AD 500 to 700	Mound, ceramics, fire-cracked rock	Marshall et al. 1979
17252	Ancestral Pueblo	AD 500 to 700	Ceramics	Marshall et al. 1979
17253	Ancestral Pueblo	AD 900 to 1100	Roomblock, ceramics	Marshall et al. 1979
17254	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17255	Ancestral Pueblo	Unspecified	Mound, ceramics	Marshall et al. 1979
17256	Ancestral Pueblo	AD 900 to 1100	Roomblock, hearth, ceramics	Marshall et al. 1979
17257	Ancestral Pueblo	AD 1100 to 1300	Possible great house	Marshall et al. 1979
17258	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17259	Ancestral Pueblo	AD 700 to 900	Roomblock, midden, ceramics	Marshall et al. 1979
17260	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17261	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17262	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17263	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17264	Ancestral Pueblo	AD 700 to 900	Roomblock, midden, ceramics	Marshall et al. 1979
17265	Ancestral Pueblo	AD 900 to 1100	Roomblock, depression, ceramics	Marshall et al. 1979
17266	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17267	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17268	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17269	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
17270	Ancestral Pueblo	AD 700 to 900	Mound, midden, ceramics	Marshall et al. 1979
17271	Unspecified	Unspecified	Midden	Marshall et al. 1979
17272	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17273	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17274	Ancestral Pueblo	AD 900 to 1100	Roomblock, hearth, ceramics	Marshall et al. 1979
17275	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
17276	Ancestral Pueblo	AD 1100 to 1300	Roomblock, midden, ceramics	Marshall et al. 1979
17277	Ancestral Pueblo	AD 900 to 1100	Roomblock, depression, ceramics	Marshall et al. 1979
17278	Ancestral Pueblo	AD 900 to 1100	Roomblock, depression, ceramics	Marshall et al. 1979
17279	Ancestral Pueblo	AD 900 to 1100	Roomblock, midden, ceramics	Marshall et al. 1979
19985	Ancestral Pueblo	AD 700 to 1100	Roomblock, depression, ceramics, lithic artifacts	Henderson 1980a
19986	Ancestral Pueblo	AD 500 to 1100	Pithouse, bin/cist, ceramics, lithic artifacts	Henderson 1980a
20890	Ancestral Pueblo	AD 900 to 1100	Depression, mound, ceramics, lithic artifacts	Ford 1980a
20891	Ancestral Pueblo	AD 900 to 1100	Roomblock	Ford 1980a
20892	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 Post-AD 1945	Mound, ceramics, ground stone, lithic artifacts Corral, trash, woodcutting debris	Ford 1980a
20893	Multicomponent: Archaic, Ancestral Pueblo, Navajo	Unspecified AD 1 to 700 Unspecified	Lithic artifacts, hearth Ceramics Trash	Ford 1980a
21131	Navajo	Post-AD 1945	Corral, trash	Ford 1980b
21132	Navajo	Post-AD 1945	Trash	Ford 1980b
21953	Ancestral Pueblo	AD 900 to 1300	Roomblock, ceramics, lithic artifacts	Naylor 1978
21956	Ancestral Pueblo	AD 900 to 1300	Mound, midden, ceramics, lithic artifacts	Burton 1980
21957	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 Unspecified	Mound, ceramics, lithic artifacts Hearth	Burton 1980
21958	Ancestral Pueblo	AD 700 to 1100	Mound, midden, ceramics, lithic artifacts	Burton 1980
21959	Ancestral Pueblo	AD 700 to 1100	Mound, kiva, midden	Burton 1980

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
21960	Ancestral Pueblo	AD 900 to 1300	Mound, midden, ceramics, lithic artifacts	Burton 1980
21961	Ancestral Pueblo	AD 900 to 1100	Mound, ceramics, lithic artifacts	Burton 1980
22168	Multicomponent: Ancestral Pueblo, Navajo	AD 700 to 1100 Post-AD 1945	Ground stone, ceramics Corral, trash	Ford 1980c
22169	Multicomponent Ancestral Pueblo, Historic Pueblo	AD 500 to 900 Unspecified	Isolated jacal room, ceramics Ceramics	Ford 1980c
22170	Multicomponent: Ancestral Pueblo, Navajo	AD 500 to 900 Unspecified	Isolated jacal room, isolated masonry room, ceramics Ceramics, trash	Ford 1980c
22171	Navajo	AD 1920 to 1945	Hogan, house foundation, sweatlodge	Ford 1980c
22172	Navajo	Post-AD 1945	Corral	Ford 1980c
22173	Navajo	Unspecified	Hogan	Ford 1980c
22182	Navajo	Unspecified	Corral, trash	Ford 1980d
22183	Multicomponent: Paleoindian, Ancestral Pueblo, Navajo	Unspecified AD 900 to 1100 AD 1920 to 1945	Hearth(?) Ceramics Hogan, sweatlodge	Kirkpatrick 1982
22184	Navajo	Unspecified	Hogan, corral	Naylor 1980a
22185	Ancestral Pueblo	AD 900 to 1300	Roomblock, ceramics, lithic artifacts	Naylor 1980a
22186	Navajo	Unspecified	Hearth, ceramics	Ford 1980d
22187	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 Unspecified	Hearth, ceramics Ceramics	Naylor 1980a
22188	Ancestral Pueblo	AD 700 to 1100	Roomblock, depression, ceramics, lithic artifacts	Ford 1980d
22189	Ancestral Pueblo	AD 700 to 1100	Mound, ceramics, ground stone, chipped stone	Naylor 1980a
22190	Navajo	Unspecified	2 hogans, corral	Ford 1980d
22191	Unspecified	Unspecified	Mound, lithic artifacts	Ford 1980d
22192	Unspecified	Unspecified	Rock alignment	Ford 1980d
22193	Navajo	Unspecified	Hearth, ceramics, lithic artifacts	Ford 1980d

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
22194	Multicomponent: Ancestral Pueblo, Unspecified	AD 900 to 1100 Unspecified	Ceramics Trash, hearth	Ford 1980d
26149	Ancestral Pueblo	AD 900 to 1100	Roomblock, kiva, ceramics	Naylor 1980b
26150	Navajo	AD 1920 to 1945	2 hogans, 3 hornos, trash	Naylor 1980b
26749	Multicomponent: Ancestral Pueblo,	AD 500 to 1100	Depression, ash stains, fire-cracked rock	Whitten 1982c
26791	Ancestral Pueblo	AD 900 to 1100	Isolated masonry room, ceramics, lithic artifacts	Henderson 1980b
26809	Ancestral Pueblo	AD 500 to 700	Ceramics, lithic artifacts	Whitten 1980
26810	Navajo	Unspecified	Hogan	Whitten 1980
26811	Navajo	Unspecified	Horno	Whitten 1980
27065	Ancestral Pueblo	AD 700 to 1300	Ceramics	Klager 1980
27066	Multicomponent: Ancestral Pueblo, Navajo	AD 700 to 900 Unspecified	Ceramics Masonry(?) wall	Klager 1980
27067	Unspecified	Unspecified	Petroglyph(s)	Klager 1980
27068	Ancestral Pueblo	AD 700 to 1300	Ceramics	Klager 1980
27069	Navajo	Unspecified	Hogan, trash	Klager 1980
27070	Ancestral Pueblo	AD 700 to 1100	Isolated masonry room, hearth, ceramics	Klager 1980
27071	Navajo	Unspecified	Hogan, corral, sweatlodge	Klager 1980
27072	Navajo	Unspecified	Hogan, ramada, corral	-
27665	Ancestral Pueblo	Unspecified	Ceramics, lithic artifact	Clifton 1980
29987	Ancestral Pueblo	AD 900 to 1100	Mound, ceramics, lithic artifacts	Hewett 1981
29988	Navajo	AD 1880 to 1920	Roasting pit	Reed 1981
30602	Ancestral Pueblo	AD 700 to 1100	Mound, ceramics, lithic artifacts, ground stone	Kirkpatrick 1982
30603	Ancestral Pueblo	AD 900 to 1100	Hearth(?), ceramics, rock alignment	Kirkpatrick 1982
30604	Ancestral Pueblo	AD 700 to 1100	Hearth, ceramics, ground stone	Kirkpatrick 1982
30605	Ancestral Pueblo	AD 900 to 1100	Ceramics, lithic artifacts, ground stone	Kirkpatrick 1982

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
30606	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 AD 1920 to 1945	Hearth(?), ceramics, chipped stone, ground stone Sweatlodge	Kirkpatrick 1982
30607	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 AD 1920 to 1945	Ceramics, lithic artifacts 2 hogans, 5 hornos, petroglyph(s)	Kirkpatrick 1982
30608	Ancestral Pueblo	AD 900 to 1100	Ceramics, lithic artifacts	Kirkpatrick 1982
30609	Navajo	AD 1880 to 1945	Hogan, hearth, trash	Kirkpatrick 1982
30610	Navajo	AD 1880 to 1920	3 hogans, hearth, trash	Kirkpatrick 1982
30611	Navajo	Post-AD 1945	4 car frames/bodies	Kirkpatrick 1982
30612	Navajo	AD 1920 to 1945	Hearth, ramada, trash	Kirkpatrick 1982
30613	Multicomponent: Ancestral Pueblo, Unspecified	AD 900 to 1100 Unspecified	Isolated room, midden, ceramics, lithic artifacts Historic trash	Kirkpatrick 1982
30614	Navajo	AD 1880 to 1982	4 hogans, 2 hornos, 4 sweatlodges, trash	Kirkpatrick 1982
30615	Navajo	AD 1880 to 1982	5 hogans, 2 hornos, 3 corrals, 1 extant house, 1 isolated masonry room	Kirkpatrick 1982
30616	Navajo	AD 1880 to 1920	2 hogans, trash	Kirkpatrick 1982
30617	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 AD 1880 to 1920	Isolated room, midden, ceramics, lithic artifacts 2 hogans, horno(s), trash	Kirkpatrick 1982
30618	Navajo	AD 1920 to 1945	Hogan, ramada, isolated masonry room	Kirkpatrick 1982
30619	Multicomponent: Ancestral Pueblo, Navajo	AD 700 to 1100 AD 1880 to 1920	Isolated room, hearth, midden Ramada, trash, woodcutting debris	Kirkpatrick 1982
30620	Navajo	AD 1920 to 1945	Hogan, trash	Kirkpatrick 1982
30621	Ancestral Pueblo	AD 900 to 1100	Hearth, ceramics, lithic artifacts, ground stone	Kirkpatrick 1982
30622	Navajo	AD 1920 to 1945	4 hogans, horno, woodcutting debris	Kirkpatrick 1982
30623	Navajo	AD 1880 to 1920	Hogan	Kirkpatrick 1982
31875	Unspecified	Unspecified	Chipped stone, ground stone, road/trail	DCA 1981
33008	Unspecified	Unspecified	Mound	USDI-BOR 1978
34391	Ancestral Pueblo	AD 500 to 900	Ceramics, lithic artifacts	Whitten 1982a

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
36195	Ancestral Pueblo	AD 900 to 1100	Depression, ceramics	Clements 1980
38084	Ancestral Pueblo	AD 700 to 1100	Roomblock, midden, hearth	Whitten 1982b
38085	Ancestral Pueblo	AD 700 to 900	Ceramics, lithic artifacts	Whitten 1982b
38086	Navajo	Post-AD 1945	Horno, trash	Whitten 1982b
38696	Ancestral Pueblo	AD 900 to 1100	Ceramics, lithic artifacts	Kirkpatrick 1982
38697	Navajo	Post-AD 1945	Hearth, tent base, woodcuttings	Kirkpatrick 1982
38698	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 Post-AD 1945	Hearth, ceramics, lithic artifacts 3 ramadas, trash	Kirkpatrick 1982
38699	Navajo	AD 1880 to 1920	3 hogans, 8 water control devices, petroglyph(s)	Kirkpatrick 1982
38700	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 AD 1920 to 1945	Hearth, ceramics Hogan, 8 petroglyphs, 2 water control devices	Kirkpatrick 1982
38701	Navajo	AD 1920 to 1982	Hogan, cairn, trash	Kirkpatrick 1982
38702	Navajo	AD 1880 to 1920	Hogan, hearth, sweatlodge	Kirkpatrick 1982
38703	Navajo	AD 1880 to 1920	Hogan, corral, ground stone	Kirkpatrick 1982
38704	Navajo	Post-AD 1945	Road/trail, stairway, petroglyph	Kirkpatrick 1982
38705	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 AD 1880 to 1920	Ceramics, lithic artifacts 2 hearths, 2 sweatlodges	Kirkpatrick 1982
38706	Multicomponent: Ancestral Pueblo, Navajo	AD 700 to 1100 AD 1880 to 1920	Ceramics, lithic artifacts Hearth, fire-cracked rock	Kirkpatrick 1982
38707	Multicomponent: Unspecified, Navajo	Unspecified AD 1920 to 1945	Lithic artifacts Sweatlodge	Kirkpatrick 1982
38708	Ancestral Pueblo	AD 900 to 1100	6 hearths, ceramics, lithic artifacts	Kirkpatrick 1982
38709	Navajo	AD 1920 to 1945	Sweatlodge, hearth, fire-cracked rock	Kirkpatrick 1982
38710	Ancestral Pueblo	AD 900 to 1100	Hearth, ceramics, lithic artifacts	Kirkpatrick 1982
38711	Ancestral Pueblo	AD 700 to 1100	Ceramics, lithic artifacts, fire-cracked rock	Kirkpatrick 1982

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
38712	Multicomponent: Ancestral Pueblo, Navajo	AD 900 to 1100 Post-AD 1945	Hearth, ceramics, lithic artifacts Sweatlodge	Kirkpatrick 1982
38713	Archaic	Unspecified	Hearth, chipped stone, ground stone	Kirkpatrick 1982
38714	Navajo	AD 1920 to 1945	Sweatlodge, hearth	Kirkpatrick 1982
38715	Navajo	AD 1880 to 1920	Sweatlodge, hearth	Kirkpatrick 1982
38716	Navajo	AD 1880 to 1920	Hogan, trash	Kirkpatrick 1982
38717	Ancestral Pueblo	AD 900 to 1100	Mound, ceramics, lithic artifacts	Kirkpatrick 1982
38718	Ancestral Pueblo	AD 900 to 1100	Ceramics, lithic artifacts	Kirkpatrick 1982
38719	Archaic	Unspecified	Hearth, lithic artifacts, fire-cracked rock	Kirkpatrick 1982
38720	Navajo	AD 1880 to 1920	Hogan, trash	Kirkpatrick 1982
38721	Navajo	Post-AD 1945	Ramada, 5 hearths, trash	Kirkpatrick 1982
38722	Navajo	AD 1920 to 1945	Ramada, woodcutting debris	Kirkpatrick 1982
38723	Archaic	Unspecified	Hearth, lithic artifacts	Kirkpatrick 1982
38724	Ancestral Pueblo	AD 900 to 1100	Mound, ceramics, lithic artifacts	Kirkpatrick 1982
38725	Navajo	AD 1920 to 1945	Ramada, horno, rock alignment	Kirkpatrick 1982
39149	Navajo	AD 1920 to 1945	Hearth, sweatlodge	Kirkpatrick 1982
46367	Navajo	AD 1880 to 1920	Hogan, trash	Lent 1978
51685	Ancestral Pueblo	AD 900 to 1300	Ceramics, chipped stone, ground stone	McEnany 1984
51686	Ancestral Pueblo	AD 900 to 1300	Hearth, ceramics	McEnany 1984
51687	Ancestral Pueblo	AD 900 to 1300	Mound, ceramics, lithic artifacts, ground stone	McEnany 1984
51692	Ancestral Pueblo	AD 1 to 700	Mound, ceramics	McEnany 1984
51693	Ancestral Pueblo	AD 900 to 1300	Hearth, ceramics	McEnany 1984
54967	Navajo	AD 1920 to 1945	Hearth, sweatlodge	Strnad 1980
54970	Navajo	AD 1920 to 1945	Hogan, trash	Strnad 1980
54971	Navajo	AD 1920 to 1945	Depression, hearth	Strnad 1980
54972	Navajo	Post-AD 1945	Hogan, corral, trash	Strnad 1980
54973	Navajo	Post-AD 1945	Hogan, corral, hearth	Strnad 1980
54974	Navajo	Post-AD 1945	Sweatlodge, hearth	Strnad 1980
54975	Ancestral Pueblo	AD 900 to 1300	Isolated room, ceramics	Strnad 1980

(continued)

Table 4.1. Continued.

LA No.	Culture	Temporal Affiliation	Site Features and Assemblage Data	Report Author and Year
54997	Unspecified	Unspecified	Historic water control feature	Strnad 1980
54998	Navajo	Unspecified	Quarry	Strnad 1980
56757	Ancestral Pueblo	AD 900 to 1300	Ceramics, chipped stone, ground stone, fire-cracked rock	Copeland 1986
65279	Ancestral Pueblo	AD 900 to 1300	Roomblock, kiva, midden	Davis 1976
65280	Ancestral Pueblo	AD 900 to 1300	Midden	Davis 1976
65286	Ancestral Pueblo	AD 500 to 700	Pitstructure, ceramics, chipped stone, ground stone	Davis 1976
65500	Ancestral Pueblo	AD 700 to 1100	Roomblock, midden, ceramics, lithic artifacts	Hunt 1987
68860	Ancestral Pueblo	AD 1100 to 1300	Ceramics, lithic artifacts	Gomolak 1988
70611	Navajo	Unspecified	Hogan, corral	Nelson 1988
71375	Ancestral Pueblo	AD 700 to 1100	Ceramics, lithic artifacts	Correll 1977
81076	Ancestral Pueblo	AD 900 to 1300	Ceramics	Miner 1988
81077	Ancestral Pueblo	AD 900 to 1300	Ceramics, lithic artifacts	Copeland 1989
81088	Ancestral Pueblo	AD 900 to 1100	3 mounds, ceramics, lithic artifacts	Swidler 1989
86872	Ancestral Pueblo	Unspecified	Roomblock, mound(s), midden, ceramics, lithic artifacts	Francis 1991
87044	Navajo	AD post-1945	Depression, trash	Yazzie 1990
87414	Multicomponent: Ancestral Pueblo, Navajo	Unspecified Post-AD 1945	Stairway, water catchment Road, water catchment, petroglyph(s)	Begay 1990
89251	Navajo	Unspecified	Hogan, 2 hornos	Correll 1975a
89252	Ancestral Pueblo	Unspecified	Roomblock, kiva	Correll 1975a
89306	Ancestral Pueblo	AD 900 to 1100	Ceramics	Correll 1975b
89899	Ancestral Pueblo	AD 900 to 1300	Roomblock (12 rooms), depression, midden, ceramics, ground stone, chipped stone	Michalik 1992
99960	Ancestral Pueblo	AD 700 to 1100	Roomblock, ceramics, lithic artifacts	Cleland 1977
100011	Multicomponent: Ancestral Pueblo, Navajo	AD 700 to 1100 AD 1880 to 1920	Ceramics, lithic artifacts Trash, woodcutting debris	Cleland 1977
109277	Navajo	Post-AD 1945	<i>Ana'i Ndaá</i> (Second Night Enemy Way site)	Gilbert 1994

Key: LA = Laboratory of Anthropology

Kantner's (1996) study of great houses in this region describes two isolated great houses, one of which (known as Section 8) is located between Dalton Pass and Muddy Water; the other (known as LA 72343) is located between Muddy Water and Kin Ya'a. Section 8 was described by Marshall et al. (1979), while LA 72343 has not been described. Section 8 is a small ruin comprising an estimated eight rooms and two kivas within a single story structure. It is believed to date from the early AD 1000s to the early 1100s (Kantner 1996). Kantner also discusses the great house of Bluewater Spring, located approximately 10 km (6.3 mi) south-southwest of Kin Ya'a. The great house at Bluewater Spring (LA 59643) contains an estimated 29 rooms and dates to the late Pueblo II period. A great kiva with an estimated diameter of 20 m and habitations comprising the community are associated with the great house (Kantner 1996:Table 2).

The primary focus of Kantner's study was to examine great-house communities north and south of Lobo Mesa, and the role political competition may have played in their development (Kantner 1996). The great-house communities of Kin Sani, Casamero, Andrews, Tse Bee Kintsoh, Haystack, and Redonda are all located on the south side of Lobo Mesa in the Red Mesa Valley, and therefore not within the San Juan Basin. These southern communities are described in Marshall et al. (1979). When compared with the northern communities described above, Kantner found several interesting differences. Northern communities contain more habitations than the southern communities, and the habitations in the northern communities are larger and contain more rooms. The northern communities contain fewer kivas than the southern communities. Great houses north of Lobo Mesa are also larger and contain more rooms than their southern contemporaries. Interestingly, the southern communities contain two or more great houses that appear to be contemporaneous, while only one of the northern communities (Muddy Water) comprises more than one great house. If the two smaller great houses at Muddy Water postdate the Hurley site, then the community would have contained only one great house for most of the Pueblo II period.

Isolated great houses, such as Section 8 and LA 72343, seemingly occur only north of Lobo Mesa. These isolated structures occur between communities. Another interesting difference is that for the northern communities, only one great kiva is present per community. In the southern communities, there are typically two or more great kivas per community. These southern great kivas also tend to be larger than the ones in the north (Kantner 1996:85).

Kantner uses a model of political competition to examine these differences. After examining the distribution of soil types, he found that more productive agricultural soils north of Lobo Mesa are "restricted to narrow fingers of alluvium that come off Lobo Mesa and descend into the San Juan Basin" (Kantner 1996:85). Agricultural lands south of Lobo Mesa, however, are much more widespread and homogenous. Water resources also differ between the two areas. Water tends to be restricted north of Lobo Mesa to springs and ephemeral drainages, while there are several permanent drainages south of the mesa.

Kantner believes that these resources, agricultural lands and water, could have potentially been monopolized north of Lobo Mesa. These resources would not have been as easily controlled in the south, and may have led to political competition resulting in multiple great-house communities. In essence, the scarcity of productive agricultural lands in the San Juan Basin would have "stimulated centralization of authority and power" (Kantner 1996:86). In this model,

individuals or factions in the northern communities could have used surpluses to help construct the larger and more formal great houses such as Kin Ya'a and the Hurley site at Muddy Water. Surpluses of food stuffs could have also been used to sponsor large ceremonial events, increasing the power and prestige of these individuals or factions. If authority became centralized in the southern communities, members may have been able to fission more easily from those communities. Resources would not have been as monopolizable and surpluses may not have been as easily controlled by individuals or factions of the community.

## LOCAL RESEARCH AND CULTURAL RESOURCE INVESTIGATIONS

This section provides information regarding recorded archaeological sites and previous investigations within the immediate N11(1&2) project area. During the inventory phase of the current project, records searches of the NNHPD project records in Window Rock, Arizona, and the New Mexico Archaeological Records Management System (NMARMS) in Santa Fe, New Mexico, were conducted by ZCRE personnel. The records searches were restricted to identification of cultural resources within 1.6 km (1 mi) of the N11(1&2) project area as defined in the task order. Prior to the inventory conducted by ZCRE, 234 cultural resources had been previously recorded within 1.6 km (1 mi) of the project area (Zimmerman and Abbott 1996). Many of these resources were recorded within the Muddy Water Protection Area (mentioned above) near the end of the project area, or as a result of energy resource development activities (Marshall et al. 1979; Zimmerman and Abbott 1996). A moderately high density of sites has been recorded near the beginning (or southern portion) of the project, as a result of development within the community of Mariano Lake (Zimmerman and Abbott 1996).

The previously recorded cultural resources range from Chaco-style great houses, such as the Hurley site in the Muddy Water complex, to extensive Navajo habitations. The sites range in age from Paleoindian to recent (post-AD 1945), with most dating to the Pueblo II period. All of the 234 recorded cultural resources identified within 1.6 km (1 mi) of the project area are presented in Tables 4.1 and 4.2. Table 4.1 includes the Laboratory of Anthropology site number (LA number), a description of cultural affiliation(s), temporal affiliation(s), and feature and assemblage data for each site. Also included within Table 4.1 are the report author and year of report for each site. Table 4.2 lists the same information for cultural resources that apparently lack LA numbers. For these resources the field numbers assigned by the recording party have been used. Both Tables 4.1 and 4.2 were originally presented in Zimmerman and Abbott (1996:Tables 5.1 and 5.2). The locations of these resources were originally presented in Confidential Appendix B.5 of that same report. In order to provide contextual information and to facilitate interpretation of the 17 sites tested along N11(1&2), the locations of these sites are presented in Confidential Appendix D of this report (bound separate).

During the cultural resource inventory ZCRE personnel identified or reassessed 23 sites, 1 in-use property, 1 historic burial, and 17 isolated occurrences (Zimmerman and Abbott 1996). The sites and isolated occurrences are summarized in Tables 4.3 and 4.4, and narrative descriptions can be found in Zimmerman and Abbott (1996).

Table 4.2. Previously Recorded Cultural Resources Without Laboratory of Anthropology (LA) Numbers Within 1.6 km (1 mi) of the N11(1&2) Project Area.

Site or Feature No.	Culture/Temporal Affiliation	Site or Feature Description	Report Author and Year
199	Chacoan	Road segment; heavily eroded swale	Nials 1987:138
200	Possible Chacoan	Road segment; deep, wide swale and earthwork mound	Nials 1987:138
201	Possible Chacoan	Road segment; faint swale with hematite gravel from deflated berms	Nials 1987:138
202	Possible Chacoan	Road segment	Nials 1987:138
203	Possible Chacoan	Road segment	Nials 1987:138
204	Possible Chacoan	Road segment; very wide swale	Nials 1987:141
205	Possible Chacoan	Possible continuation of Road Segment 204; prehistoric ceramic scatter	Nials 1987:141
206	Historic	Historic wagon trail	Nials 1987:141
No number	Navajo	In-use area: <i>Ana'i Ndáá</i> (Second Night Enemy Way site)	Francis 1991
AICC-N11-1	Indeterminate	Light lithic artifact scatter	AICC 1982
AICC-N11-2	Indeterminate	Light lithic artifact scatter with biface fragment	AICC 1982
AICC-N11-5	Anasazi: AD 900 to 1300	Ceramic scatter	AICC 1982
AICC-N11-8	AD 500 to 1982	Disturbed multicomponent assemblage of ceramic and lithic artifacts, and architectural remains without clear cultural or temporal affiliation	AICC 1982
AICC-N11-10	Anasazi: AD 900 to 1300	Ceramic scatter	AICC 1982
AICC-N11-13	Unknown	Missing site description	AICC 1982
AICC-N11-14	Unknown	Missing site description	AICC 1982
AICC-N11-15	Anasazi: AD 500 to 9900	Ceramic scatter and circular depressions within active dune field	AICC 1982
AICC-N11-16	Anasazi: AD 500 to 900	Ceramic scatter and circular depressions within active dune field	AICC 1982
AICC-N11-17	Anasazi: AD 500 to 900	Exposed midden deposits in existing N11 road cut	AICC 1982
AICC-N11-22	Indeterminate	Two chalcedony flakes	AICC 1982
AICC-N11-23	Anasazi: AD 900 to 1300	Small architectural feature with light ceramic scatter	AICC 1982
AICC-N11-24	Anasazi: AD 900 to 1300	Ceramic scatter	AICC 1982
AICC-N11-25	Anasazi: AD 500 to 900	Light ceramic scatter	AICC 1982
AICC-N11-27	Anasazi: AD 900 to 1300	Three- to four-room pueblo and ceramic scatter	AICC 1982

Key: LA = Laboratory of Anthropology

Table 4.3. Sites within N11(1&2) Project Area As Identified During Archaeological Inventory and Reassessment.

NNAD No.	LA No.	Culture	Site Features and Assemblage Data
NM-Q-27-13	110304	Anasazi and Navajo	Anasazi lithic and ceramic artifact scatter with thermal features; Historic Navajo component (pre-1915).
NM-Q-27-14	110306	Navajo	Historic forked-stick hogan (AD 1870 to 1916)
NM-Q-27-15	110307	Anasazi	Sandstone rock alignment
NM-Q-22-45	110308	unknown	Sandstone rock alignment
NM-Q-22-46	110309	Navajo	Historic forked-stick hogan (AD 1910 to 1933)
NM-Q-22-47	110310	Navajo	Historic sweatlodge (AD 1910 to 1933)
NM-Q-22-48	110311	Anasazi	Possible Anasazi rubble mound
NM-Q-22-49	110312	Anasazi and Navajo	Anasazi rubble mound and midden and Historic Navajo sweatlodge (pre-1900)
NM-Q-22-50	110313	Anasazi	Rubble mound, midden, and extramural features (AD 1050 to 1150)
NM-Q-22-51	110314	Euro-American	Sandstone rock alignments, culvert
NM-Q-22-52	110315	Anasazi	Lithic and ceramic artifact scatter (AD 900 to 1150)
NM-Q-22-53	110316	Anasazi	Lithic and ceramic artifact scatter (AD 1000 to 1150)
NM-Q-22-54	110317	Anasazi	Rubble mound and midden (AD 1050 to 1150)
NM-Q-23-55	110318	Anasazi	Lithic and ceramic artifact scatter (AD 900 to 1150)
NM-Q-23-56	110319	Anasazi	Lithic and ceramic artifact scatter (AD 1050 to 1150)
NM-Q-23-57	110320	Navajo	Multiple stone hogans and extramural features
NM-Q-23-58	110322	Anasazi	Lithic and ceramic artifact scatter, subsurface feature (AD 750 to 850)
NM-Q-23-59	110323	Anasazi	Lithic and ceramic artifact scatter (AD 900 to 1050)
NM-Q-23-60	38698	Anasazi and Navajo	Lithic and protohistoric ceramic artifact scatter, modern Navajo occupation
NM-Q-23-61	110324	Navajo	Habitation/corral (AD 1920 to 1945)
NM-Q-23-62	110325	Anasazi	Lithic and ceramic artifact scatter (AD 1 to 700)
NM-Q-23-63	110326	Anasazi	Lithic and ceramic artifact scatter (AD 500 to 900)
NM-Q-23-64	110327	Anasazi	Lithic and ceramic artifact scatter (AD 500 to 900)
ZCRE-N11-B-1	-	Navajo	Historic Burial
ZCRE-N11-IUP-1	-	Navajo	IN-USE Property

Source: Zimmerman and Abbott 1996

Table 4.4. Isolated Occurrences (IO) Along N11 (1&2) Project Area As Identified During Archaeological Inventory and Reassessment.

IO No.	Count	Artifact Class	Date (AD)	Comments
1	8	Unidentified black-on-white sherds	900 to 1200	Probable Cibola White Ware; larger temper, streaky slip, and wide black band
2	1	Plain whiteware sherd	900 to 1200	Probable Cibola White Ware
3	3	Red Mesa Black-on-white sherds	900 to 1050	
	1	Unidentified black-on-white sherd	900 to 1200	Probable Cibola White Ware
4	3	Indented corrugated grayware sherds	1000 to 1275	
	1	Unidentified black-on-white sherd	900 to 1200	Probable Cibola White Ware
5	1	Unidentified plain whiteware sherd	900 to 1200	Probable Cibola White Ware
6	1	Unidentified black-on-white sherd	900 to 1200	Probable Cibola White Ware; very thin cross section
7	6	Unidentified black-on-white sherds	900 to 1200	Probable Cibola White Ware
8	1	Unidentified black-on-white sherd	900 to 1200	Probable Cibola White Ware
9	1	Red Mesa Black-on-white sherd	900 to 1050	
	1	Plain whiteware sherd	900 to 1200	Probable Cibola White Ware
10	1	Indented corrugated grayware sherd	1000 to 1275	
	1	Plain whiteware sherd	900 to 1200	Probable Cibola White Ware
	1	Tested quartzite cobble	Unknown	95% cortex; single flake removed
11	1	Unidentified black-on-white sherd	900 to 1200	Probable Cibola White Ware
	3	Plain whiteware sherds	900 to 1200	Probable Cibola White Ware
12	1	Worked unidentified black-on-white sherd	900 to 1200	Probable Cibola White Ware
	4	Indented corrugated grayware sherds	1000 to 1275	
	2	Unidentified black-on-white sherds	900 to 1200	Probable Cibola White Ware
13	1	Indented corrugated grayware sherd	1000 to 1275	
14	3	Pieces of modern china (white)	Unknown	
15	1	Plain whiteware sherd	900 to 1200	Probable Cibola White Ware
	1	Reserve White Ware sherd	1050 to 1200	
16	1	Solder-top square can lid	Pre-1920	
17	1	Unidentified plain whiteware sherd	900 to 1200	Probable Cibola White Ware

Source: Zimmerman and Abbott 1996

## Chapter 5

### RESEARCH DESIGN

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This chapter describes the general research orientation that the Zuni Cultural Resource Enterprise (ZCRE) pursues in the Four Corners Region. This orientation is based on four research domains, and involves aspects of an integrated approach to archaeology that emphasizes human behavior and cultural evolutionary processes. It contains fundamental research issues that ZCRE considers appropriate to a variety of archaeological investigations in this region. The research design also includes some general research requirements essential for interpretation of data directly related to the research issues.

All of the research issues described here are addressed to the extent that data pertaining to them is thought to be contained in the sites within the present project area and to the extent that these data can be produced by the Phase I Data Recovery (Nature and Extent Testing). Because every site is unique, and only a portion of many of the sites in the project area can be investigated, the sites may not contain sufficient data to address all of the research issues presented here. The following discussion is a modification of Fletcher (1994), Eck and Waseta (1995), Dello-Russo and Zimmerman (1995), and Zimmerman and Abbott (1996). A focused research design for further data recovery is presented in Chapter 33.

Presented below are the four research domains. Within each of these domains are research issues selected from current research interests in Southwest archaeology according to their relevance to the N11(1&2) Phase I Data Recovery (Archeological Testing for Content and Extent).

1. The research domain of environment and economy involves the relationships between humans and the environment. Research issues for this phase of work focus primarily on mobility/sedentism, site function, and land use.
2. The research domain of population and demography involves human populations and their characteristics, such as age-sex ratio, life expectancy, and temporal trends of growth, decline, and expansion. Research issues for this phase of work focus on local and regional population growth and abandonment.
3. The research domain of social and labor organization involves intragroup relationships — the social, economical, political, and ideological mechanisms of both horizontal and hierarchical group formation and integration. Research issues for this phase of work focus on the formation of groups and communities at the local level.
4. The research domain of regional relationships involves intergroup relationships — the mechanisms of regional interaction that integrate individuals and groups into wider networks and delineate the nature and extent of regional systems. Research issues for this phase of work focus on cultural affiliation and boundaries, and processes within regional systems.

## ENVIRONMENT AND ECONOMY

Research concerning the relationships between humans and the environment are addressed through studies of mobility/sedentism and land use that define a settlement and subsistence system. Past interpretations of settlement and subsistence strategies in prehistoric Southwestern societies outlined a unidirectional development from mobile hunting and gathering to sedentary agriculturalism. Ethnographic studies, though, illustrate that mobility and agriculture are not mutually exclusive (Buskirk 1986; Graham 1989) and that changes in the strategies of land and use do not necessarily proceed in a unilinear fashion.

Research throughout the Four Corners region has shown that major changes in settlement and subsistence systems and land use occur between the Basketmaker II and Pueblo III periods. Particularly interesting is how and when groups changed from a seasonally mobile society to one that became more sedentary. What was the impetus for this change and how did the economy drive and reflect this? The mechanisms continue to be debated. This project is in a position to examine data derived from the time between the Late Archaic/Basketmaker II periods to the Pueblo II period, and thus to address these issues.

### Mobility/Sedentism

Mobility/sedentism may be addressed through studies of two aspects of occupation duration (Lightfoot and Jewett 1984; Rafferty 1985): residential stability (the length of time spent in any one location), and use duration (the aggregate of time that one location is occupied). The issue of mobility/sedentism can also be addressed through an organizational perspective, which includes studies of site spatial structure, seasonality, land use, site reuse, and modes of abandonment.

### Occupation Duration

Inferring occupation duration requires an estimation of residential stability (Lightfoot and Jewett 1984). For example, Gilman (1987) argues that pitstructure occupation should be related to a biseasonal pattern of mobility in which the pitstructures are occupied at least through the winter. Annual reoccupation of a site may create a disturbed and enriched area where weedy plants flourish, like members of the goosefoot family (Chenopodiaceae) (Smith 1987). A study of frequencies and distribution of annual plants in the archaeobotanical assemblage can provide information on occupation duration, and also on diet and subsistence practices (Fritz 1984; Smith 1987).

Rafferty (1985) suggests that increased sedentism is manifested in 1) increased labor investment in habitation construction, 2) changes in dwelling shape from circular to rectangular, 3) increasingly formalized storage facilities, 4) ceremonial or integrative structures, and 5) evidence of community planning.

Artifact diversity and density may indicate occupation duration (Lightfoot and Jewett 1984) when population size and artifact use-life are consistent (Schiffer 1975; Schlanger 1990). A higher diversity of artifacts is assumed to indicate a wider range of activities and longer residential stability. Similarly, the size and depth of the midden are expected to be greater at sites with longer duration.

## Site Spatial Structure

Ethnoarchaeological studies (Arnold 1987; Binford 1978, 1983, 1987; Dodd 1989; Graham 1989; Killion 1987; O'Connell 1987; Yellen 1977) suggest that limited factors influence the distribution of activities at a site for both hunter-gatherers and agriculturalists. The organization of activities is affected by climate, topography, subsistence practices, intended length of occupation, the nature of the activity, the composition of the household, and the size and composition of the group (Graham 1989:259; O'Connell 1987). Therefore, observable relationships exist between variables such as length and intensity of occupation, and the site's spatial structure.

Graham (1989) has suggested that at least three assemblage criteria can be used to distinguish different kinds of refuse areas: item size, item diversity, and material density. In addition, a range of postoccupational, noncultural processes can produce both patterned size distributions and spatial dispersion of materials. Therefore, a range of analytic techniques must be applied to archeological data sets to evaluate rather than assume the causes of patterning.

## Season(s) of Occupation

A variety of data classes can contribute to determining the specific seasons of the year that a location was occupied. As mentioned above, Gilman (1987) argues that the presence of pitstructures and formal storage facilities generally indicates a winter occupation. The location of hearths in relation to structures may indicate summer versus winter and year-round habitations (Dodd 1987; Lightfoot and Jewett 1984; Powell 1983).

The presence of species available only at certain times of the year can indicate seasonal occupation (Stuart 1977). The age of immature specimens can also indicate seasons of use because the season of birth for many animals is limited to spring.

The presence of seasonally available plants or plant parts, especially those that are used soon after processing and are not usually stored, may also help indicate the season of site occupation (Bohrer 1975; Reichardt and Nabhan 1980; Sebastian 1983).

## Site Reuse

Reuse refers to how often a location was used (Stevenson 1982). Reuse may be long or short term and may involve a portion of a site, or an entire site. Long-term reuse refers to occupation for long periods of time after long temporal breaks between occupations — for example, a multicomponent site with Archaic and Puebloan occupations (such as NM-Q-23-60). Absolute and relative dating, vertical stratigraphy, feature superimposition, and type-based seriation can provide data on patterns of long-term site reuse.

Information pertinent to short-term reuse includes secondary burial, fine-scale chronometrics, and evidence of renovation and remodeling. Renovation (multiple floors or remodeling of features) may occur while a site or facility is still in use.

## Modes of Abandonment

Modes of abandonment refer to the rate of abandonment (Stevenson 1982), the distance moved (e.g., Schiffer 1972), whether abandonment was intentional (Graham 1989), and whether an intent to return to the site was present (Stevenson 1982).

Data about modes of abandonment are likely found in the condition of structures and the content of floor and activity area assemblages. Such information includes whether structures were burned and how much construction materials have deteriorated. Information from floor assemblages should include type and abundance of de facto refuse, and the usability and portability of objects.

Studies of the processes of abandonment should also consider cultural and natural postabandonment processes (Schiffer 1987). The scale as well as mode of abandonment may affect postabandonment process. For example, if only a portion of a site is abandoned, de facto refuse may be scavenged (Cameron 1991) or, if only a portion of the population moves, structures may be reoccupied by the remaining population (Horne 1990). Natural processes of deposition and erosion affect patterning as well. These patterns of deposition and erosion can be examined in fill contexts.

Interpretation of abandonment involves studying artifact curation (Binford 1973, 1976, 1979) and the presence or absence of de facto refuse (Schiffer 1972, 1976, 1987). Availability of resources, effort in production, and value will also affect whether objects are curated or left behind.

Rapid abandonment (Stevenson 1982) should leave the following indicators: abundant de facto refuse abandoned in its activity loci (Montgomery 1990; Reid 1973), an abundance of items that otherwise would have been curated, and little secondary refuse (refuse not in original location). The opposite patterning would be expected with slow abandonment.

Planned abandonment involves organized processes that are relatively slow in contrast to unplanned abandonment. Where abandonment is planned, usable objects are likely to be curated. If site reuse is not intended, structures or objects may be destroyed (Cameron 1990; Wilshusen 1986). As with rapid abandonment, abundant de facto refuse as well as items that would normally be curated would be present at sites where abandonment was not planned.

When the distance of a move is large, heavy or bulky objects such as metates are less likely to be curated than small, portable objects. When the distance is short both small objects and large, heavy, bulky objects that are still usable are likely to be moved. Previously occupied structures may be dismantled and their construction materials reused (Nichols and Smiley 1984).

Material culture patterning is also affected by whether or not return to a site was anticipated. Caches of artifacts indicate an intent to return, although the return was not realized. Sites that have been abandoned with no intent to return have little de facto refuse, and structures or objects left behind may be destroyed or dismantled.

## Land Use

Variables in land use include environmental location (Berry 1982), which is assumed to be correlated with the potential of a site for resource use; site function (Camilli et al. 1989; Reid 1982a, 1982b); diet (Minnis 1985); and subsistence practices (Thomas 1973). Basic to analyzing the first variable is an understanding of the natural resource landscape (Blanton 1985:116). Information needed to understand the natural resource landscape of a region includes range of raw materials, location of raw materials, distribution, nature of the deposit, geologic context, accessibility, quality, quantity, extraction energy, and postextraction energy (such as heat treatment and transport costs). For lithic resources, size range, shape, cortex type, and ability to flake are also among the important factors to consider. Specific physical properties of clays relating to pot construction and firing behavior are meaningful variables on which information should be gathered (Rice 1987). Diet and subsistence practices are defined by resource use, and can provide additional information about patterns of production and consumption.

### Environmental Location

In this framework, environmental location specifically refers to the characteristics of the natural environment and the concomitant potential of a location for resource use. The concept of a natural resource landscape necessarily overlaps into the concept of environmental location. The primary data for examining resource use include geomorphology, hydrology, elevation, slope, location relative to sources of water, vegetation, types of soils, and types of fauna.

### Site Function

A major focus of examining patterns of land use concerns reconstructing the settlement system and how sites functioned within the system (Parsons 1972), which requires delineating the range of activities conducted. Site function can be evaluated across three related dimensions: habitation and nonhabitation sites, range of economic activities, and total range of activities.

The first level of identification of site function concerns whether or not the site was used for habitation. As discussed above, the range of habitation or residential use of a site can be quite varied. Activities at habitation sites are often described as generalized, while activities at nonhabitation sites are described as specialized (e.g., Dean et al. 1985). This distinction does not indicate the type or range of activities taking place at a site, and may obscure variability (Binford 1982; Whittlesey and Reid 1982).

Economic activities are categorized as procurement, manufacturing, maintenance, processing, and use-related. Varying combinations of these types of activities may take place at a site. Available data can help determine what types of social, economic, domestic and/or ceremonial, subsistence or nonsubsistence activities occurred.

To assess site function both artifact assemblage and nonassemblage data are necessary. Artifact assemblage data include artifact class, type, and frequency and diversity of classes or types as they relate to artifact function (Reid 1982b). Nonassemblage data include spatial and architectural information such as presence or absence of structures, frequencies of hearths and other features, and site area.

Information on ceramics, flaked stone, ground stone, botanical remains, fauna, artifact diversity, and the relationships between these data are useful to determine the kinds and range of activities conducted at sites (Whittlesey and Reid 1982).

### Diet and Subsistence Practices

Data concerning subsistence practices and diet provide information on resource use as well as on patterns of production and consumption. Primary data come from botanical and faunal remains. Additional data may be gathered from studies of architecture and features, ceramics, flaked stone, and ground stone. Major concerns of subsistence studies are subsistence change, increasing diet breadth, and intensification, particularly increasing dependence on agriculture.

## POPULATION AND DEMOGRAPHY

Population growth refers to increases in overall population size and density. Increases in population have been attributed to the presence of favorable environments (Euler et al. 1979; Graves et al. 1982; Gumerman 1988), increased sedentism and dependence on agriculture (Swedlund and Sessions 1976), and the social, economic, and political draw of elites in some communities (Lightfoot 1984). The sources of population growth may include immigration, aggregation, and biological reproduction.

Archaeologists have attributed increases and decreases in the number of sites to population change through biological growth (Christensen 1990; Dean et al. 1985; Jett 1964; Swedlund and Sessions 1976), emigration and immigration (Berry 1982), or mortality and emigration (Colton 1960; Davis 1965; Linton 1944). These shifts in settlement pattern have been compared to changes in long-term regional land use (Nelson 1993), fluctuations between stable and resilient adaptations (Upham 1984), and short-distance moves (Berry 1982; Gumerman 1988). Examination of small habitation and limited-activity sites have become important sources of data for interpreting alternate uses of local and regional areas (Nelson 1993).

Abandonment refers to decreased evidence of habitation of any magnitude or duration in a locus of previous occurrence (Fish et al. 1990). The causes of local and regional abandonments are inferred to be catastrophic events (Colton 1960; Linton 1944; Parsons 1939), long-term systemic processes relating to fluctuation in environmental conditions (Cordell 1975; Gumerman 1988), population pressure (Zubrow 1975), and increased internal conflict (Titiev 1944). Mechanisms of abandonment include emigration, population dispersion, and death.

To address local population questions, accurate estimates are needed of local area population size, density, and changes through time. Prerequisites for making these estimates are an understanding of the settlement system and patterns of mobility/sedentism, evaluations of demographic variability (fertility and mortality rates, rates of immigration and emigration), and identification of the scale and processes of abandonment in the area.

It should also be noted that, for many of the current explanatory models for the occurrence of Chaco-style great houses throughout the San Juan Basin and its peripheries, estimates of

population and the timing of population changes is critical. Models that support emigration and Chacoan colonies (e.g., Vivian 1990) as the basis for these great houses outside of Chaco Canyon require population data to be tested.

## SOCIAL ORGANIZATION

Studies of social organization include studies of intragroup interaction and the mechanisms of group formation, integration, and differentiation. The delineation of the group (such as a household or task group) defines the scale of interaction and integration.

Current research issues focus on community development, that is, what mechanisms play a role in community development and how this can be manifested in the data collected from archaeological sites. A definition for community is in order at this point. A community may be thought of as a minimal spatially defined locus of human activity that incorporates social reproduction, subsistence production, and self-identification (Kolb and Snead 1997:611).

### Local Group Formation

Group development pertains to the interactions among individuals at the household or task-group level, and the formation of local social and labor organizations (Binford 1991) above the level of the household. Task-specific organization may be inferred from the patterned spatial relationships between features, tools, and subsistence-related debris.

### Community Development

Community development pertains to interactions between households at the local level, the formation of local social organizations above the level of the household, and the social, economic, political, and ideological mechanisms that integrate and organize groups at the local level. There is growing recognition that dispersed groups of sites and multiple settlements, not just large nucleated pueblos, form communities (Kintigh 1990; Lekson 1990; Lightfoot 1978). Attention has turned to the causes of community development and their organizational structure and complexity.

The development of settlement aggregates and communities has been related to highly productive environments (Graves et al. 1982), the development of organizational complexity and community integration by political elites (Lightfoot 1984; Lightfoot and Feinman 1982; Upham 1982), and a conflict minimization strategy triggered by scalar stress resulting from population growth (Orcutt et al. 1990).

To examine community development, we need to identify patterns of intersite integration within a local area, and the structure and complexity of community organization. Community integration may vary with the spatial size of the community, the intensity of linkages between units in the community, and the kinds of economic, social, political, and ideological mechanisms integrating the community. The structure and complexity of community organization may vary horizontally (households and residence groups) and vertically (ranked divisions made within the community; Flannery 1972; McGuire 1983).

To address the issue of community development, data dealing with intersite integration, horizontal differentiation, vertical differentiation and inequality, and demographic and environmental variables are needed. Patterns of integration among sites can be found through studies of spatial patterning of settlements, distribution of stylistic attributes, distribution of features, and distribution of artifacts. Horizontal and vertical differentiation can be addressed through spatial and architectural information that provides insights on patterns of production, distribution, and use of goods and resources. Local demographic variables were discussed in the previous section, and environmental variables are discussed below in the Environmental Study Requirements section of this chapter.

### Horizontal Organization

It is important to discuss both horizontal and vertical differentiation within local groups, particularly since dramatic changes in these areas occurred during the Pueblo II period in the project area. Horizontal structure pertains to the nature and extent of internal segmentation and integration within the community. Spatial and architectural data can be used to infer internal divisions and groups within the community (e.g., Dean 1969; McGuire 1983; Rohn 1971). Determination of the degree of functional interdependence among units can help define groups such as households or household clusters within the community. As with intersite integration, the aim is to identify clusters of interaction based on patterns of production, distribution, and use of goods and resources.

Ceramic and lithic material analyses are helpful in determining the nature of interaction. Trace-element analyses of ceramics combined with knowledge of clay sources are extremely useful in understanding the degree of interaction among local (and regional) groups. The studies of flaked stone production, distribution, and use are also helpful for these analyses. Contemporaneous units must be compared and both cultural and natural formation processes must be investigated.

### Vertical Organization

Differential access to space, goods, and resources, and differential energy expenditure on habitations or burials (Lightfoot and Feinman 1982; Plog and Upham 1983) may indicate the nature and extent of vertical differentiation and inequality within communities.

Spatial and architectural information can be used to consider differential access to space and energy expenditure. Site size differences, supported by functional differences, are often used to infer settlement hierarchies (Lightfoot 1984). Again, habitation and nonhabitation sites and seasonally occupied sites must be differentiated before propositions about settlement hierarchies are made (Lightfoot and Most 1989).

Investigations of inequalities in access to goods or resources can be made by considering the degree of spatial concentration within the community of types of goods related to economic inequality and social status (Lightfoot and Feinman 1982). These types of data are most often found in habitation and burial contexts. Concentrations of resources that are nutritionally significant might indicate preferential access. Therefore, the spatial distribution of botanical and faunal remains within communities (Lightfoot and Feinman 1982) as well as dietary and pathological analyses of human remains (Powell 1988) can be useful.

## REGIONAL RELATIONSHIPS

Studies to delineate the nature and extent of regional relationships include examination of intergroup relationships beyond the community level, and the mechanisms of regional interaction and communication that tie groups into wider networks. The issues that relate primarily to this research domain are cultural affiliation and boundaries, and processes within or at the peripheries of regional systems.

### Cultural Affiliation and Boundaries

Historically, cultural traditions and areas were defined by sets of shared traits (Haury 1936; Kidder 1927, 1936; Wissler 1923), based on the idea that cultural areas represented different cultural groups and that shifts in boundaries reflected the mass movements of people. When different sets of traits were found at one location it was inferred that different culture groups were living side-by-side (Wasley 1960). Currently, broad patterns of spatial and temporal similarities and differences are interpreted as corresponding to patterns of adaptation, interaction, and ethnicity (Braun and Plog 1982; Plog 1984; Wobst 1977).

The issues of cultural affiliation and boundaries are concerned with the identification, development, and material correlates of social territories, and what territories and their related boundaries signify culturally. Do material culture similarities and differences indicate environmental adaptations, group integration and/or differentiation, or the intensity of interaction between groups, in which apparent boundaries are the result of a lack of interaction? These propositions are not mutually exclusive and different explanations may characterize different areas or time periods.

Evaluating these propositions requires data on interaction and communication: stylistic variation, exchange, and human physical variation or biological distance. Data pertaining to stylistic variability and exchange provide complementary information on social interaction and information exchange (Braun and Plog 1982). Technological organization links material culture variability and environmental adaptation and provides information on styles of manufacture and use as well. Human physical variation can be used to demonstrate biological proximity of different populations (Mackey 1980).

### Style

Style can be defined as patterned variation in the communicational aspects of form (DeBoer 1990; Wiessner 1983). The similarities of stylistic behaviors among social groups have been directly related to the amount of interaction between those groups (Deetz 1965; Leone 1968; Tuggle 1970). Style may also function to integrate and differentiate social groups, communicating information concerning social identity and marking social boundaries (Conkey 1978; Wobst 1977).

Archaeologically, stylistic variation usually pertains to attributes of artifacts related to decorative design, and attributes of design such as the shape of a projectile point (Wiessner 1983). However, researchers must be careful to distinguish between design attributes associated with

communication and variation associated with utilitarian or technological factors. For example, the shape of a projectile point may have to do with decoration for communication, hafting, or resharpening (Wills 1988).

Stylistic variation is most commonly analyzed using data from ceramics, lithic artifacts, and architecture. Analysis of decorative design attributes of ceramics through time and space (e.g., Braun and Plog 1982; Plog 1980, 1990) or of utility wares (Brunson 1985; Fowler 1994; Mills 1987) can be undertaken to this end. Analyses of lithic artifact manufacture and use are thought by some to provide distinctions among different temporally or culturally affiliated groups.

Differences in village plan and architecture (specifically architectural types) and spatial and technological organization may help define cultural affiliations (Bradford 1980; Dosh 1986). Data on pitstructure attributes (such as size, shape, the presence and spatial placement of internal features, and design attributes) must be collected.

### Exchange

The presence of materials or resources from distant sources is a more direct indication of interaction between groups than is stylistic data. Nonlocal materials probably result from exchanges between groups rather than direct procurement, particularly if populations increase or become more sedentary or territorial.

The type and magnitude of exchange may reflect boundary dynamics. Proportions of exchange goods and the patterning they reflect can be plotted across space (Hodder 1974, 1979; Renfrew et al. 1968). A decrease in magnitude of an item has been interpreted as the location of a boundary. Spatial changes in magnitude through time might indicate shifts in boundary dynamics.

Patterns of exchange can be examined by comparing raw material sources with raw material distribution. Ceramics, flaked stone, and to a lesser extent ground stone are ubiquitous at most sites and can provide such data. Boundaries may also be reflected in raw material preference and patterns of procurement (Hantman 1984; Wills 1988).

In addition, the presence of nonlocal flora and fauna in archaeological deposits may indicate exchange. Botanical and faunal information may indicate the presence of species that are nonlocal, obtained by exchange either directly with groups where these species are native or as part of down-the-line exchange. Identification of plant and animal taxa, as well as their ranges, are needed to determine the presence of nonlocal vegetation or wildlife.

### Regional Systems

The development of regional systems has recently become a major focus of research in the Southwest (Braun and Plog 1982; Crown and Judge 1991; Hantman 1983, 1984; Plog 1983, 1984). The three regional systems most commonly identified include Casas Grandes to the south (DiPeso 1974; Minnis 1989), Chaco to the east (Judge 1989), and Salado/Hohokam (Wilcox 1979) to the south. Attention has also turned to more localized systems in the so-called "areas in between"

(Cordell 1984), such as the Mimbres Valley (LeBlanc 1983). These systems developed during Pueblo II or later and are represented by some of the archaeological resources, such as the Muddy Water complex, in the project area.

Data on the nature and timing of changes in such factors as subsistence practices, mobility patterns, and sociopolitical development provide indirect evidence of regional system links. Information needed to examine the nature and timing of these changes includes chronology for the area based on absolute dates, subsistence and land-use practices and how they change through time, developments in patterns of mobility/sedentism, and sociopolitical organization and how it changed.

The Chaco regional system directly influenced the archaeological record we see in the project area during the Pueblo II period. How do the data from the project area show relationships to processes that were ongoing in the Chaco area? How did the small Pueblo II habitations benefit from the proximity of the Muddy Water complex? As discussed in the previous chapter, political competition may have played a role in the community patterns that we see in the project area. Do the Basketmaker III sites in the northern portion of the project provide information regarding the development of political competition in these communities prior to the construction of the great houses? These are the types of questions that ZCRE is examining during the investigation of the N11(1&2) project area.

## FUNDAMENTAL RESEARCH REQUIREMENTS

Fundamental research requirements fall into four categories: archaeological description and material analysis, chronology, past environmental conditions, and formation processes of the archaeological record.

### Archaeological Description and Material Analysis

Consistent and thorough descriptive information is mandatory for each site, feature, and artifact class. This descriptive information includes (1) description of field and analytical methods used, (2) description of findings, and (3) classificatory information on all archaeological data classes including spatial; architectural/feature; additive technologies (ceramics, etc.); reductive technologies (flaked stone, etc.); botanical, faunal, and human remains; chronometrics; and historic documentation. These categories represent standard information collected in this region of the Southwest and by ZCRE, regardless of research issues.

Basic descriptive information is collected for each major artifact class. The list below provides a set of basic descriptive data requirements that can be applied to all architectural/feature and artifact classes.

1. Architectural/feature
  - a. Measurements (length, width, height, thickness)
  - b. Morphology
  - c. Qualitative data (details of construction, raw material type)

- d. Type (where appropriate)
  - e. Function (where definable)
  - f. Evidence for remodeling/reuse
2. Additive technologies (ceramics, etc.)
- a. Type
  - b. Technological attributes (paste, temper, paint)
  - c. Clay source
  - d. Form (vessel shape, vessel portion)
  - e. Measurements (dimensions, thickness, weight)
  - f. Count (by provenience unit)
3. Reductive technologies (flaked stone and ground stone, for example)
- a. Primary artifact type (flake, core, or tool, for example)
  - b. Secondary artifact type (flake type and metate type, for example)
  - c. Raw material type
  - d. Raw material source
  - e. Measurements (length, width, thickness, weight)
  - f. Count (by provenience unit)
4. Botanical remains
- a. Taxon
  - b. Plant part
  - c. MNI (minimum number of individuals)
  - d. Measurements
    - length, width, thickness (for domesticates)
    - weight (for wood)
  - e. Pollen concentration and intensive systematic microscopy (Dean 1994)
  - f. Maize analysis (Bird 1990)
5. Faunal
- a. Taxon
  - b. Skeletal element(s)
  - c. MNI (minimum number of individuals)
  - d. MNS (minimum number of species)
  - e. NISP (number of individual species present)
  - f. Weight
6. Burials
- a. Human remains (in-field recording)
    - Age
    - Sex
    - Skeletal elements present
    - MNI (minimum number of individuals)

- Skeletal morphological attributes relating to health status, nutrition, diet, trauma, and affinity

- b. Type of interment (primary or secondary, for example)
- c. Location (pit or midden, for example)
- d. Type and location of associated grave goods
- e. Measurements

#### 7. Historic artifacts

- a. Object type (can or bottle, for example)
- b. Material type (glass or metal, for example)
- c. Date
- d. Dimensions

#### 8. Geomorphology/stratigraphy

- a. Profile
- b. Sediment characteristics
- c. Inclusions
- d. Horizontal and vertical location

Because of the large numbers of artifacts that are usually collected, artifacts must be sampled for analysis. Similarly, locations and contexts for special samples such as pollen, phytolith, flotation, and waterscreening must be carefully selected. Since only portions of project sites are excavated during investigations, sampling bias will be present. Every effort, however, is made to identify these biases.

A major focus of the N11(1&2) project is an examination of patterns of land use, settlement strategy, and community development. A key element of analysis is how sites functioned within the system. Interpreting site function requires delineating the types and the range of types of activities conducted at sites and within sites.

An additional consideration has to do with interpreting the archaeological patterns to determine how sites function in the settlement system. Studies of technological organization follow material culture from its origin to ultimate deposition in the archaeological record. At the same time, research efforts have been made to understand the formation processes, both cultural and natural, that affect patterning in material culture (see the section on formation processes below). Simple relationships between material culture patterns and site function are rare. Therefore, interpretation of material culture patterns associated with site function should incorporate the results of such studies.

To assess the range of variation in site function, studies involving both artifact assemblages and nonassemblage data are required. Artifact assemblage data include artifact class, artifact type, and frequency and diversity of classes or types, as they relate to artifact function (Reid 1982a). Nonassemblage data refer to spatial and architectural information including presence or absence of masonry architecture, numbers of rooms at a site, and site area.

## Architectural/Spatial Studies

The presence or absence of masonry architecture has been frequently used to distinguish between habitation and nonhabitation sites (Dean et al. 1985). In addition, the number of structures or rooms within a settlement has been used to distinguish differing functions of sites with masonry architecture, creating a typology of sites which functioned as villages, farmsteads, and fieldhouses (e.g., Hogan 1985). In situations without clear evidence of masonry architecture, site area has been used to determine habitation sites, with the larger sites assumed to be habitations and the smaller sites assumed to be limited activity sites (Whalen 1984).

Spatial and architectural evidence may be useful for distinguishing habitation from nonhabitation sites. However, additional information is needed to determine the specific function of the structures or rooms, and similarly, extramural features. The presence and identification of function of internal features such as hearths, storage cists, mealing bins, or *sipapus* can aid in the determination of structure or room function. Similar information can aid in the interpretation of extramural feature function. Data on feature form, construction, location, and nature of fill are collected and examined to aid in these determinations.

Analyses of artifact assemblages from sites are the most useful ways to determine the kinds and range of activities conducted at sites (e.g., Whittlesey and Reid 1982). Data on all classes of artifacts as well as the relationships between these data can inform on site function.

## Ceramics

Several attributes of ceramics provide data that can be used to interpret site function. One must be able to provide plausible inferences of vessel function or at least identify functional differences before secure inferences about activities at sites can be made. Vessel function is reflected in several ways, including vessel form (bowl vs. jar) and ware color (slipped/painted versus unslipped/unpainted wares), vessel volume, and use-wear (Blinman 1988).

It is assumed that variability in vessel form can provide a strong indication of the activities that took place at a site. Ratios of bowls to jars and painted to unpainted (utility) wares have been used in this regard (Plog 1980; Reid 1982a; Sebastian 1983). Unpainted and painted bowls are assumed to have been used for serving or ceremonial functions, while unpainted jars are assumed to have been used for cooking. Painted jars are often interpreted as being used for storage.

Several site function typologies have been developed using these functional interpretations of ceramics. Plog (1980) proposes that permanent habitation sites are expected to have higher proportions of storage jars and lower proportions of cooking and serving vessels. Reid (1982b) found that as settlement function became increasingly specialized, the proportion of jars increased. This is contrary to Plog's expectations, assuming that more generalized activities occurred at habitation sites. Similarly, Sebastian (1983) argues that bowl-dominant assemblages indicate habitation sites, while jar-dominant assemblages characterize fieldhouse sites.

In relation to such studies, it should be remembered that numerous other variables besides site function can influence the proportions of sherds left from different functional ceramic classes on a site. For example, differential use-life for variant functional classes may be influenced by toughness or resistance to breakage caused by use of different clays, tempers, production methods, etc. Also, levels of exchange may influence ratios, especially for more easily transported forms such as bowls. Such factors as these must be considered when designing and interpreting research into site function by examination of ceramic functional classes.

### Flaked Stone

Flaked stone and other reductive artifact classes are important for understanding site function within the N11(1&2) project area, because information on different stages of the life cycles of the artifacts is commonly present in the archaeological record. Analyses of flaked stone are essential for the determination of site function, because flaked stone debris provides information on activities related to production, maintenance, and use. Identification of artifact type and the range of types present is necessary for interpretations of site function. Artifact type identification can be made using a combination of morphological, technological, and functional analyses.

For studies of site function, the full range of flaked stone debris must be recovered. Analyses of debitage may be most relevant to discussion of methods and locations of manufacture as well as the tools manufactured, because it is generally discarded near the location of production. The tools themselves are often used and discarded elsewhere and thus may not be reliably representative of manufacture in flaked stone assemblages. Variability in tool use-lives may also affect assemblage characteristics. Although different classes of flaked stone debitage are important for determining different stages of manufacture, analysis of microdebitage may provide the most information on tool production, maintenance, and use activities. (Site NM-Q-23-60 has the most microdebitage of all the 17 sites tested.) In order to recover the full range of flaked stone artifacts and refuse (including microdebitage), screening of at least a portion of sediments collected from different proveniences through 1/8-in or 1/16-in mesh, or collection of waterscreen samples, may be necessary.

Although tool type often implies function, studies of use-wear and residue analysis can provide information on actual artifact use. Use-wear and residue analyses should examine artifacts that might be informal as well as formal tools. In addition, use-wear and residues may be found on microdebitage removed during tool resharpening or modification. Identification of use can be most effectively accomplished with high-power magnification use-wear studies combined with the low-power approach. Residue analysis, while useful, is time consuming and requires special handling of artifacts to be analyzed. These types of analyses should be conducted during the data recovery phase for the current project.

### Ground Stone

The amount, types, and distribution of ground stone artifacts also have implications for interpreting site function. Ground stone implements, such as manos and metates, are generally associated with activities related to plant processing (Lancaster 1986), but have other uses as well. With regard to plant processing, the types, shapes, and amount of ground stone present on a site have

implications for the kinds of activities conducted at sites (Reid 1982a) as well as activity intensity (Hard 1990). Use-wear and residue analyses may be useful in determining the types of activities in which ground stone implements were involved (Adams 1988). Such studies may be able to distinguish between activities associated with plant processing, sherd grinding, pigment grinding, and hide softening.

### Faunal Data

Faunal data may also be used to examine the subsistence-related activities at sites. The types of animal parts represented within the faunal assemblages of sites or portions of sites can help distinguish between locations where butchering and meat processing took place as opposed to locations of consumption. Locations where butchering and processing took place probably contain only the portions of the animal that were not utilized, while faunal remains where consumption took place will include those parts that were utilized. Cooking activities may be identified by the presence of burned bones.

### Botanical Data

Botanical remains aid interpretations of site function. In studies of crop production, processing, and consumption, activities related to processing most often take place in habitation areas. Crop processing encompasses activities such as preparation, storage, cooking, and the use and deposition of edible and inedible plant parts. The collection and analysis of flotation, pollen, and phytolith samples from specific contexts can be used to selectively examine the intensity of various activities related to processing.

### Artifact Assemblage Studies

In addition to studies of artifact assemblage type and composition, artifact assemblage diversity may also inform on site function (Leonard and Jones 1989; Reid 1982a, 1982b). It is assumed that assemblage diversity is related to range of activities conducted. Highly diverse assemblages are associated with a wide range of activities, while less diverse assemblages are associated with specialized activities. Assemblage composition and therefore diversity, however, depend on artifact use-lives, replacement/deposition rates, and occupation duration (Schiffer 1975; Schlanger 1990). Thus, Schlanger (1990:111) cautions that "ratios involving artifacts of different deposition rates ... appear to be yielding information more directly relevant to the length of occupation than site function."

### Chronology

A chronological sequence provides a temporal framework in which to place site-occupational events. Together, descriptive and chronological information are used to construct cultural historical frameworks and form a basis for interpretations within a processual framework. Thus, dating of archaeological resources is an essential endeavor of all the research issues described below. Precise dating will usually require a combination of absolute and relative dating techniques.

Absolute dating provides specific ages to that which is being investigated. Relative dating provides information regarding age only in relationship to another unit of study. That is, artifacts or sites, for example, can only be said to be older or younger than each other. Absolute dating in the American Southwest is typically provided by dendrochronology and radiometric dating techniques. Archaeomagnetic dating can also be used if burned features are present.

One of the most important chronological issues is dating ceramic, and otherwise undated, artifact scatters. Placement of these sites into temporal periods would allow for examination of the full range of research issues. For example, chronological data for Archaic or Puebloan period artifact scatters may give archaeologists the opportunity to improve the developmental and occupational histories and determine contemporaneity among sites.

Seriated ceramic styles, projectile point forms, and architectural types have been used to create relative chronological frameworks for dating sites in the absence of more precise chronometric data. Dates derived from relative techniques can be refined and calibrated using chronometrics (Plog and Hantman 1986).

### Environmental Studies

Delineation of past environmental conditions is necessary for developing and testing explanatory models linking cultural processes with environmental conditions and/or change. Thus, knowledge of paleoenvironments is crucial to understanding the adaptive patterns of prehistoric and historic populations in the N11(1&2) project area. Inferring past environments requires combining information on the modern environment with paleoenvironmental reconstruction. Paleoenvironmental reconstruction is based on a uniformitarian approach to the study of previous climatic and geomorphological processes. The effects of these processes in a regional setting can be inferred through proximate data from tree rings, fossil pollen cores, packrat middens, and measures of soil development. Specifically, an understanding of the geomorphology, hydrology, soils, climate, and biotic communities is essential to determining past environmental conditions.

### Geomorphology and Hydrology

Geomorphological studies can reveal erosional and depositional patterns in the project area and how they changed through time. These studies also provide data on the integrity of and potential for buried archaeological deposits. Geomorphological studies should include studies of microstratigraphic sequences to identify cultural and natural depositional processes at archaeological sites. Information on potential water sources is also needed. Data can be collected on stream flow for major ephemeral streams to determine the times of year water is available and the rates at which it flows. Locational data on springs, seeps, and natural ponds should also be collected. Chapter 24 of this volume presents the geomorphic analyses of the project area conducted by Thompson.

### Soils

Researchers have a relatively good understanding of the nature and variability of soils in the project area (Maker et al. 1974). Studies can be undertaken that examine the agricultural potential

of soils, and how differences may reflect the variability we see within sites along N11(1&2), as discussed in the previous chapter regarding great-house variability.

### Vegetation

A general level of knowledge exists concerning vegetation in the project area. However, further study of modern vegetation can provide more details concerning vegetation zones and fuel wood availability. Pollen and phytolith studies of natural contexts, usually off-site sampling columns, examine past vegetation patterns. Pollen and phytolith samples taken within certain contexts from sites may provide information regarding seasonality. Data on modern vegetation can be compared with the results of micro- and macrobotanical data recovered from archaeological contexts. Chapter 28 of this volume presents the macrobotanical analyses for the project area conducted by McBride, while Chapter 29, by Cummings and Moutoux, provides pollen analyses for several sites.

### Fauna

Field studies can provide information on the types of wildlife that presently use the project area. Faunal assemblages from archaeological contexts provide information on the types of wildlife that previously used the area as well as modern intrusions. Knowledge of both vegetation and fauna provide information on past environmental conditions. Zunie presents his analyses on the faunal assemblage in Chapter 27 of this volume.

### Climate

Modern records of temperature and precipitation are useful for examining climatic changes in the recent past. Dendroclimatology and palynology studies can be conducted to provide information on climate and natural vegetation.

## Formation Processes

Meaningful interpretation of archaeological data requires an understanding of both the cultural and the environmental processes that created the archaeological record (Schiffer 1987). Cultural and natural formation processes create the patterns of evidence from which archaeologists interpret past societies and environments (Schiffer 1983, 1987). Formation processes can be identified by measuring spatial relationships among artifacts which, in turn, requires an understanding of the simple and complex properties of artifacts (Schiffer 1983).

### Simple Properties of Artifacts

Simple properties of artifacts include size, density (specific gravity), shape, in-situ orientation and dip, use-life, damage, and accretions (Schiffer 1983). Recording these properties can help identify the responsible formation process(es). One-sixteenth or 1/8-in screen can be used to enable collection of the entire range of artifact sizes present.

### Complex Properties of Artifacts

Complex properties of artifacts involved in formation processes include vertical and horizontal distribution, artifact diversity, artifact density, and disorganization (Schiffer 1983). Understanding the erosional and depositional processes that led to the formation of each stratigraphic unit is important. Evaluating the effects of vertical movement of artifacts within and between depositional units is also necessary. Geomorphological studies of macro- and microstratigraphy can provide such information.

## Chapter 6

### METHODS

James W. Kendrick and Janet Hagopian

This chapter presents a discussion of archaeological methods employed during the investigation of 17 sites along N11(1&2). Procedures for the collection of data were uniform for all 17 sites, and followed those outlined in the ZCRE Data Recovery Manual (Eck 1997). The site-specific work plan (Zimmerman and Abbott 1996:131-135) provided the basic structure for testing each site to determine its nature and extent. Laboratory procedures for the processing of all artifacts and samples followed the ZCRE Laboratory Manual (Avallone and Hagopian 1997). Synopses of both field and laboratory methods are provided below. Samples of data recording forms used in the field and laboratory are shown in Appendix A.

#### FIELD METHODS

The methods for investigating each site followed a uniform approach. Initially, the original site datum established by ZCRE personnel during the Inventory Assessment of N11(1&2) was located. Following identification of the datum, the project centerline and right-of-way boundaries were established and marked with lath. The ZCRE crew then systematically surveyed the immediate area in 2-m transects in order to reestablish or redefine site boundaries, marking the location of each artifact with a pin flag. Most of the sites tested were found to have slightly different boundaries than those originally defined, but were not sufficiently different to alter the testing plan.

Following the establishment of site and project boundaries, a grid system was overlaid on each site for the control of horizontal provenience. The grid was marked using wooden stakes, chaining pins, or large nails. A Sokkia Optical Transit was used to position the grid across all but two sites, NM-Q-23-62 (LA 110325) and NM-Q-23-63 (LA 110326). On these two sites, a Sokkia Set F-5 Total Station was used to position the grid due to the sites' size and complexity. The grids for all sites were tied into the original site datum, and oriented to magnetic north. Once grids were in place, data were collected through a series of steps beginning with the surface collection of all artifacts, followed by hand excavation of small study units (ranging from 0.5 by 1 m to 2 by 2 m), to mechanical excavation of larger study units (described in the field as backhoe trenches). The following is a discussion of the methods employed for each of these steps.

#### Surface Collection

All surface artifacts within the right-of-way on each of the 17 sites were systematically collected. Unique aspects of each site, however, necessitated a flexible approach to the collection method. Provenience for each surface collection unit was based upon its southwest corner grid coordinates. The areas of surface collection units were determined according to the number and density of artifacts visible on the surface. In general, artifacts from sites with low artifact density

or with obviously fewer than 50 artifacts present were point-provenienced. Artifacts from four sites were collected in this way: sites NM-Q-22-54 (LA 110317), NM-Q-23-55 (LA 110318), NM-Q-23-58 (LA 110322), and NM-Q-23-59 (LA 110323). For sites with higher artifact densities or higher numbers of artifacts, surface artifacts were collected in blocks ranging from 4 by 4 m to 10 by 10 m. Artifacts from five sites (NM-Q-23-60 [LA 38698], NM-Q-27-13 [LA 110304], NM-Q-22-48 [LA 110311], NM-Q-22-53 [LA 110316], and NM-Q-23-56 [LA 110319]) were collected in 10-by-10-m collection units. Artifacts from site NM-Q-23-64 (LA 110327) were collected in 5-by-5-m units. Artifacts from two sites (NM-Q-23-62 [LA 110325] and NM-Q-23-63 [LA 110326]) were collected in 4-by-4-m units. Artifacts from site NM-Q-22-52 (LA 110315) were collected in 5-by-5-m units north of the site datum and in 10-by-10-m units south of the site datum. On site NM-Q-23-57 (LA 110320), a combination of point-proveniencing and 5-by-5-m units was used. Sites NM-Q-27-15 (LA 110307), NM-Q-22-45 (LA 110308), and NM-Q-22-51 (LA 110314) had no surface artifacts.

### Hand Excavation

Hand-excavated units were placed in various locations across the sites. Primarily, hand-excavated units were placed in areas of high artifact density, where indications of features were observed from the surface, or where there was a high probability of subsurface cultural deposits. On some sites, such as NM-Q-23-56 (LA 110319), extant stable landforms were the only suitable locations to place hand-excavated units. The grid coordinates of the southwest corner provided the provenience of each unit. Vertical control was provided by placing a subdatum with a known elevation near the hand-excavated unit, or by using a transit placed over the main site datum or subdatums. Before excavation, each hand-excavated unit was given a study unit number. Study unit numbers could be given to any defined space on the site, such as surface collection units, backhoe trenches, hand-excavated units, or even to the site itself.

Hand-excavated units were typically excavated in arbitrary 10-cm levels. The units were not excavated by natural and cultural strata. Arbitrary levels excavated to define feature boundaries, sterile sediments, or other natural or cultural phenomena were not necessarily 10 cm thick. Each arbitrary level, no matter its thickness, was given a Field Specimen (FS) number. The FS system used is further explained in the provenience section below. Artifacts from each level were recovered by screening the fill 1/4-in hardware mesh and bagged by artifact type, such as ceramic, chipped stone, ground stone, etc. All artifacts from a level were given the same FS number (corresponding with the level's FS number) and recorded on the FS catalog sheet.

In general, all hand-excavated units were continued to a minimum of two sterile levels (levels that are absent of cultural material) below the last level containing cultural material, except in those instances when bedrock was encountered sooner. In many cases, units were continued for more than two levels past sterile. This was considered necessary because several of the sites are covered by considerable aeolian overburden, in some cases over 1 m deep. It was believed that deeper units were needed in these areas on the chance that cultural deposits were present under the aeolian cover. Once the excavation of a unit was discontinued, at least one representative profile was drawn to scale and all natural and cultural strata were described in detail (The form used to describe strata

is provided in Appendix A). In certain circumstances where the stratigraphy warranted greater description, several profiles were drawn and described. In some cases, units were created for the purpose of surface-stripping an area, and were not continued to the depth of sterile deposits. Profile drawings were not made for these units.

### Backhoe Excavation

A backhoe was used in order to facilitate the determination of nature and extent on 13 sites in the project. These trenches were excavated in order to confirm site boundaries and depth of cultural deposits and to locate features. Each backhoe trench was monitored during the entire excavation by a ZCRE archaeologist to identify the presence of cultural materials and to prevent the accidental destruction of features by the backhoe. All trenches were scraped and inspected for cultural deposits. For trenches 10 m long or less, at least one 1-m-wide profile was drawn and all strata described in detail. For trenches over 10 m in length, at least two representative profiles were drawn. If cultural material was present, the entire trench wall was profiled. All trenches were excavated with a 61-cm-wide bucket.

### Features

Features are defined in the field by the Supervisory Archaeologists and the Project Director. Features are defined as "any subset of site space that might be noted during investigations and deemed important enough to deserve special attention" as discussed by Eck (1997:Section 3, Part 3). Use of the concept of *feature* can, therefore, be quite subjective. Eck (*ibid.*) continues by noting "[f]eatures need not be obviously cultural phenomena. The term *feature* may be applied to any part of site space that warrants special consideration." Features, then, may be cultural or natural in origin.

Once a feature is defined, it is assigned a number and recorded on the Feature Log form. Features are typically excavated in halves. First, one half is removed to define its morphology. Profile drawings, plan views, and photographs document this stage of excavations. Then, the other half is removed, a Feature Summary form is completed, and final photographs are taken of the fully-excavated feature.

## RECORDING AND PROVENIENCE METHODS

### Provenience

A hierarchical system of provenience for artifacts, study units, and features was employed on all sites investigated. As mentioned above, all hand-excavated units were given a study unit number and corresponding grid coordinates for their southwest corner were recorded. These locational data were then given an FS number and recorded on the Excavation Unit Log and Field Specimen Catalog Sheet (a sample is shown in Appendix A). Any area or specific location of the site could be given an FS number, thus the hierarchical system. In this system the smallest possible portion of site space is a single artifact or sample, and the largest possible portion is the entire site (Eck 1997). Any discrete subsection of the site can be an individual portion, subject to three-dimensional definition. Thus, each arbitrary level could be given an FS number, as could any point-provenienced artifact.

For each FS number, one line of data is entered onto the Field Specimen Catalog Sheet. These data include the number of the study unit and feature, if applicable. The grid coordinates, dimensions of the study unit, and elevations associated with the portion of site space are all recorded. The characteristics of the individual portion are noted, including screen size used in excavation, stratum designation, and arbitrary level number, as applicable. The initials of the excavators and the date(s) of excavation or study are noted. Finally, the classes of archaeological materials recovered are recorded, using the single-letter codes presented on the Unit Level Excavation form (a sample is shown in Appendix A), and sterile deposits are positively identified by checking a null column, signifying no materials were recovered.

### Records

Numerous forms enabled the field crews to record the various data collected from each site. The Field Specimen Catalog Sheet has been described above, and was one of the primary tracking forms used on the project. The Unit Level Excavation form was used during the excavation of all arbitrary levels. All of the entry data required on this form is a real number or label, or a simple check. Plan views of the base of each level were drawn on this form.

Specific logs enabled the supervisory archaeologists to track information. For each site investigated, individual logs were kept for study units, features, subdatums, film, and photographs. Examples of these forms are provided in Appendix A. In addition, the supervisory archaeologists kept daily field logs and notes during the entire project.

## LABORATORY METHODS

Artifacts and associated Field Specimen Catalog Sheets were submitted to the lab on a weekly basis. Upon arrival in the lab, artifact bags were checked to make sure that the provenience information on the bag matched the Field Specimen Catalog Sheet entry. For those that did not match, the bags and paperwork were returned to the supervisory archaeologist in charge of that site for correction.

Artifacts were processed following the guidelines outlined in the ZCRE Laboratory Manual (Avallone and Hagopian 1997). Ceramics, flaked stone, and ground stone were washed in tap water and allowed to dry on drying racks. Faunal remains, shell, and miscellaneous artifacts were dry-brushed and wrapped in acid-free paper, as necessary. Unmodified stone and historic items were either washed in tap water or dry-brushed, depending on the material type. The artifacts were then bagged in 4-ml plastic ziplock bags. Small boxes, vials, or capsules were used for the fragile items. Bag tags that were created in the field served as the permanent provenience identifier for the rebagged artifacts.

Samples, such as vegetal, radiocarbon, flotation, waterscreen, pollen, and tree-ring, were allowed to dry for at least a week before rebagging or processing. Vegetal samples were wrapped in acid-free paper, placed in vials or boxes, and bagged in plastic bags. Radiocarbon samples remained in their aluminum foil packaging and were bagged in plastic bags. The flotation and waterscreen samples remained in their original paper bags until they were processed. After

processing, the light and heavy fractions were bagged separately in plastic bags so that the light fraction could be sent for analysis. The archaeobotanical chapter (Chapter 28 by McBride) provides further information on the actual processing of samples. The pollen samples were collected in paper bags and allowed to dry without opening the bags, to prevent contamination. The tree-ring samples were wrapped in acid-free paper and cotton batting, following the procedures recommended by the Laboratory of Tree-Ring Research at the University of Arizona.

All artifacts and samples were boxed by material type and site, inventoried, and prepared for distribution to the various analysts.

SECTION II  
ARCHAEOLOGY

## Chapter 7

### SITE NM-Q-27-13 (LA 110304)

Harding Polk II and Steve Lonjose

Site NM-Q-27-13 is a small multicomponent ancestral Pueblo and historic Navajo site. The site is located on a small, southeast-facing, basin-shaped hillside 45 m east of the existing N11 roadway. The site overlooks the valley where the now-dry Mariano Lake bed is located. Several ephemeral drainages flow southeastward from the site area toward a tributary of the Rio Puerco of the West bypassing Mariano Lake. The site sits at an elevation of 2219 m (7280 ft). Soils are Los Lucas-Little-Persayo association consisting of a thin pebbly sand colluvium overlying Mancos Shale bedrock. There are isolated juniper trees (*Juniperus*) around the site area with an understory of assorted short grasses, sagebrush (*Artemisia*), snakeweed (*Xanthocephalum*), and rabbitbrush (*Chrysothamnus*).

#### SURVEY DATA

Site NM-Q-27-13 was recorded in 1995 by Zuni Cultural Resource Enterprise (ZCRE) as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included mapping with a Brunton compass, in-field artifact analyses, and site photography. The in-field analyses included identification of prehistoric ceramic types, lithic material types and stages of lithic artifact reduction as well as identification of historic materials. In addition, artifact counts and mapping of surface artifact distribution were conducted. The site consisted of an artifact scatter comprising historic glass, prehistoric lithic artifacts and ceramics, and two possible thermal features. The features consisted of charcoal staining and burned rock. Lithic artifacts included a chert cortical flake, a chert core, two obsidian core reduction flakes, and a gray quartzite mano. Identified ceramics included Gallup, Puerco, and Escavada black-on-whites probably from a Pueblo II occupation. A scatter of amethyst-colored glass may result from a pre-World War I activity. The site appeared relatively intact with no major impacts. Minor erosion has likely transported artifacts downslope.

#### NATURE AND EXTENT TESTING

From 28 May to 5 June and 16 and 17 June 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine extent and content of site NM-Q-27-13. Surface collection, hand-excavated units, shovel test excavations, and backhoe trenching were conducted to redefine the boundaries of the site. A total of six hand test units totaling 8 sq m were excavated as well as backhoe excavation of three trenches totaling 49.5 m (Figure 7.1).

To aid in organization of the investigation, the site was divided into a number of study units. Study units are arbitrary designations of space in which the investigator wants to direct special focus. It can encompass as much or as little area as deemed necessary by the investigator. That focus may

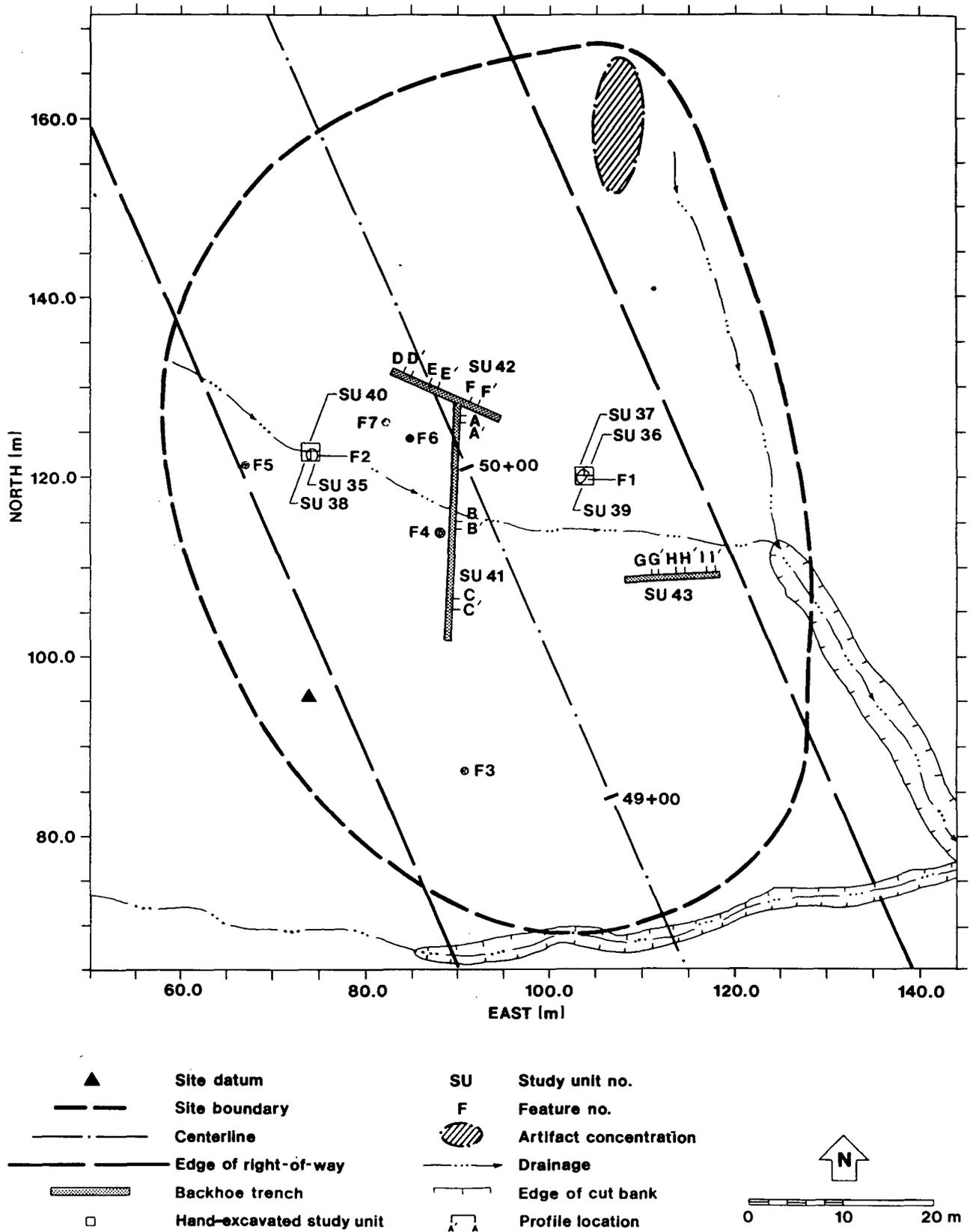


Figure 7.1. Site NM-Q-27-13, Nature and Extent Testing.

be a feature, a single excavation unit, a group of excavation units, a backhoe trench, a surface collection area, or even the entire site. Consequently one study unit may be situated within another. At a minimum, each excavation unit and backhoe trench has been designated with a study unit (SU) number.

### Surface Collection

Artifacts were collected from an area along approximately 90 m of the proposed road right-of-way. Surface collection units of 100 sq m (10 by 10 m) were utilized. The artifacts were then tabulated on Field Specimen (FS) catalog sheets. All artifacts from one collection unit were assigned a single FS number, however, artifacts of different material types were grouped separately within the assigned FS numbers. Thirty-four collection units yielded artifacts at site NM-Q-27-13. The surface assemblage consisted of a variety of prehistoric and historic materials. Prehistoric materials included ceramic sherds, flakes, ground stone fragments, and faunal material. Historic materials included 15 ceramic sherds and 81 glass fragments (described by Polk in Chapter 30).

### Shovel Testing

A portion of site NM-Q-27-13 was shovel-tested to check for subsurface cultural deposits. Shovel-test units were excavated at 5-m intervals in a pattern aligned with the proposed centerline. Approximately 144 shovel tests were dug. The shovel-test units were dug to culturally sterile soil or bedrock. The shovel testing revealed the presence of four possible features, Features 3 through 7, described below.

### Hand Excavation

Hand excavation of six test units (SU 35 to 40) encompassing 8 sq m was conducted in order to determine the extent, depth, and density of cultural deposits at site NM-Q-27-13. The total of 8 sq m was derived from four 1-by-1-m units and two 1-by-2-m units. The locations of previously identified features and artifact concentrations guided the placement of test units. Most hand-excavated units were dug in arbitrary 10-cm levels except where circumstances dictated the removal of a thinner layer of soil. All soils were screened through 1/4-in hardware mesh. Soil descriptions were made using Munsell soil charts to identify soil color.

### Study Unit 35

SU 35 was a 1-by-1-m unit located at grid coordinates N122, E74. The study unit was placed within a dark soil stain, identified as Feature 2 during the survey, to test the integrity of deposits. SU 35 was excavated to a depth of 60 cm in six levels. Profiles of the south (Figure 7.2) and west walls were drawn exhibiting five soil strata. Stratum I was 6 cm thick and consisted of a dry, pale olive brown (5YR6/3) sandy loam with a 5% matrix of dark ashy deposits and reddish oxidized sand. Stratum II was 10 cm thick and consists of a light olive brown (2.5Y5/3) sand, with inclusions of dark ash and charcoal (5%) with reddish oxidized sand and sandstone pebbles (10%). The inclusions represent the Feature 2 matrix which is shown in the south and west wall profiles (Figures 7.2 and 7.10) and described in more detail below. Stratum III was 6 cm thick consisting of light reddish brown (5YR6/4) sandy loam. Reddish oxidized sand (5%) with calcium carbonates was noted in the

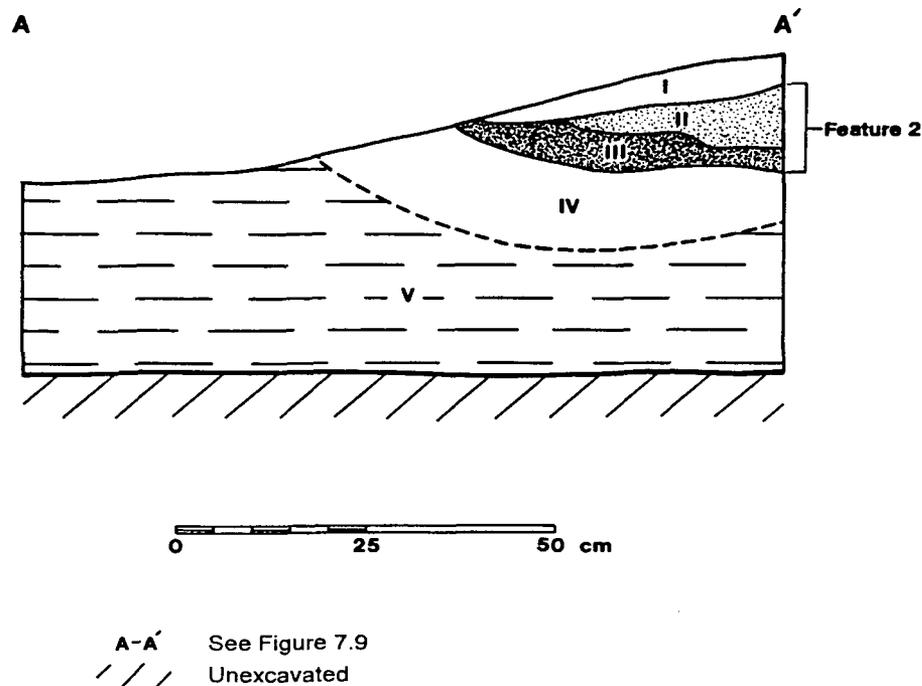


Figure 7.2. Site NM-Q-27-13, Study Unit 35, South Wall Profile, Feature 2.

matrix. Stratum VI was 13 cm thick and consists of a dense white (7.5YR8/1) calcium carbonate layer. Stratum VI was only present below Feature 2. Stratum V was 36 cm thick and consists of a pale olive (5Y6/3) sandy clay loam with calcium carbonate (5%). Subangular sandstone gravel comprises 10% of the matrix. Artifacts were recovered from Levels 1 to 3. Level 1 contained only one ceramic sherd, Level 2 a few ceramics, and Level 3 one ceramic sherd. The southeast portion of Feature 2 was defined at the base of Level 3. Levels 4 to 6 were excavated to determine if any other cultural levels lay below Feature 2. Levels 4 to 6 were determined to be sterile. Study Unit 38 was established to immediately to the west to further define the feature's boundaries.

### Study Unit 36

SU 36 was a 1-by-1-m unit located at grid coordinates N120, E103.5. The unit was set up where dark ashy soil was noted and identified as Feature 1. SU 36 was excavated to a depth of 12 cm in 2 levels. The unit was only excavated to a depth to identify the boundary of the feature after which excavation was halted in this phase. Stratum I was 10 cm thick and consisted of a dark yellowish brown (10YR5/4) sandy loam. Inclusions of charcoal (0.5%) and sandstone pebbles (10%) were noted in the matrix. Stratum II was 2 cm thick and consisted of a dark yellowish brown (10YR4/4) sandy loam. Charcoal and reddish oxidized sand (5%) and burned sandstone pebbles (10%) were noted in the matrix. One ceramic sherd was recovered from Stratum II, the only one in this study unit. The northeast boundary of Feature 1 was defined at the base of Stratum II. SU 37 (described below) was established to further explore and define the feature's boundaries.

### Study Unit 37

SU 37 was a 1-by-1-m unit located at grid coordinates N120, E102.5. The study unit was placed west of SU 36 to further define Feature 1. SU 37 was excavated to a depth of 15 cm in two levels. The unit was only excavated to a depth to identify the boundary of the feature after which excavation was halted in this phase. Stratum I was 10 cm thick and consisted of yellowish brown (10YR5/4) sandy loam. Inclusions of charcoal (5%) and natural sandstone pebbles (10%) were noted in the matrix. Stratum II was 5 cm thick and consisted of yellowish brown (10YR5/4) sandy loam with inclusions of charcoal and reddish oxidized sand (5%) and natural sandstone pebbles (10%). This level represented the Feature 1 matrix. No artifacts were recovered from this study unit. The northwestern boundary of Feature 1 was defined at the base of Stratum II. SU 39 (described below) was established to further explore and define the feature.

### Study Unit 38

SU 38 was a 1-by-1-m unit located at grid coordinates N122, E73. The study unit was placed immediately west of SU 35 to further define Feature 2. SU 38 was excavated to depth of 28 cm in three levels. The unit was only excavated to a depth to identify the boundary of the feature after which excavation was halted in this phase. Stratum I was 8 cm thick and consisted of a pale yellow (2.5Y7/3) sandy loam with dark ashy deposits and reddish oxidized sand comprising 5% of the matrix. Stratum II was 10 cm thick and consisted of a yellowish brown (10YR5/4) sand, with dark ashy deposits and reddish oxidized sand (5%) and sandstone pebbles (10%) noted in the matrix. Stratum II comprised the Feature 2 matrix. Artifacts (a few ceramic sherds) were recovered only from the lower part of Stratum II. The western boundary of Feature 2 was defined at the base of Stratum II. SU 40 was established to define the northern boundary of Feature 2.

### Study Unit 39

SU 39 was a 1-by-2-m unit oriented east-to-west and located at grid coordinates N119, E102.50. The study unit was placed to define the southern boundary of Feature 1. SU 39 was excavated to a depth of 36 cm in four levels. Profiles of the west and north walls exhibited five strata. The west wall profile (Figure 7.3) shows the study unit wall with a small portion of Feature 1 and the north wall profile (Figure 7.8) shows the cross section of Feature 1. Only the west wall is described below; the north wall profile is shown with the description of Feature 1. Stratum I was 5 cm thick and consisted of a dark yellowish brown (10YR4/4) sandy loam. Sandstone pebbles and roots comprised 10% of the matrix. Stratum IV was 16 cm thick and consisted of a dark reddish brown (5YR3/4) sandy loam. Stratum III was 28 cm thick and consisted of a light brownish gray (10YR6/2) sandy clay loam. Dark gray clay deposits comprised 50% of the matrix. Feature 1 includes Strata II, IV, and V. Stratum III was excavated below the Feature 1 fill to determine if any other cultural strata lay below. No cultural materials were recovered from Stratum III.

### Study Unit 40

SU 40 was a 1-by-2-m unit oriented east-to-west and located at grid coordinates N123, E73. The study unit was placed to define the northern boundary of Feature 2. SU 40 was excavated to a depth of 10 cm in one level. The unit was only excavated to a depth to identify the boundary of the

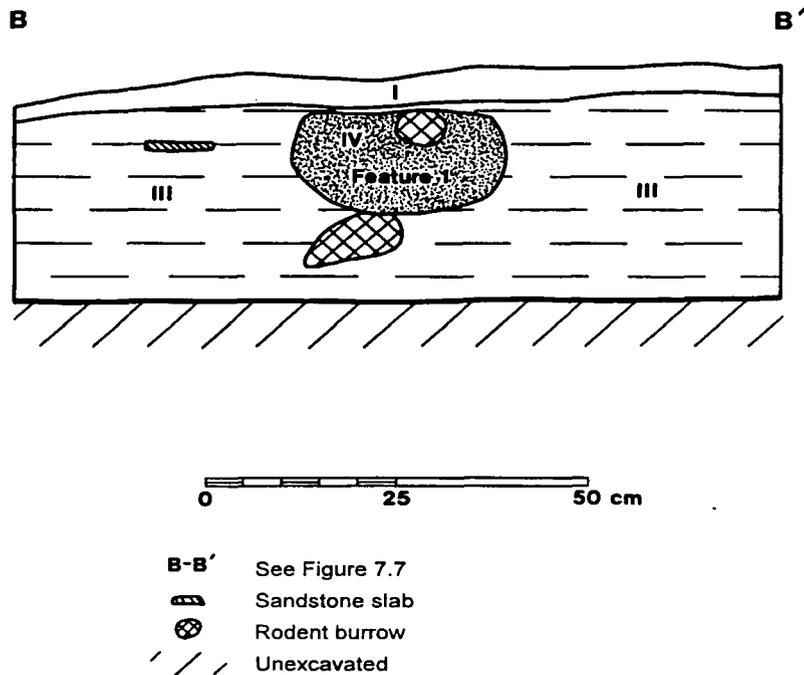


Figure 7.3. Site NM-Q-27-13, Study Unit 39, West Wall Profile.

feature after which excavation was halted in this phase. Stratum I consisted of a yellowish brown (10YR5/4) sandy loam. Dark ashy deposits and reddish oxidized sand (5%) and sandstone pebbles (10%) were noted in the matrix. One fragment of glass and one bone fragment were recovered from the unit. The northern boundary of Feature 2 was defined at the base of this stratum.

#### Backhoe Trench Excavation

The mechanical excavation of three trenches (SU 41, 42, and 43) was conducted to explore for potential buried cultural deposits on site NM-Q-27-13. A backhoe with a 61-cm-wide (2-ft-wide) bucket was employed to excavate soil deposits deeper and over a broader area in a shorter time than could be practically completed by hand. Trench excavation was closely monitored by a ZCRE archaeologist. Excavation was halted whenever a closer inspection of the trench walls or bottom was deemed necessary by the monitor. SU 41, 42, and 43 measured 26.5, 13, and 10 m in length, respectively. They ranged in depth from 110 to 152 cm. A total of 49.5 m of trenches were excavated. Three representative soil profiles were drawn for each trench. The location of identified features and the results of hand- and shovel-test excavations generally guided the placement and length of backhoe trenches.

Study Unit 41

SU 41 was located in the central part of the site and was oriented north-to-south at an acute angle to the proposed centerline. The trench extended almost due north from N101.8, E88.6 for 26.5 m to N127.3, E89.8. Three 1-m wide profiles (A-A', B-B', and C-C') were drawn of the east wall and four strata were identified (Figure 7.4). Stratum I was 4 to 5 cm thick and consisted of a light olive brown (2.5Y5/4) sandy loam. Inclusions of small sand stone pebbles and roots were noted. Stratum I was present in all three profiles. Stratum II was only observed in profile B-B'. It consisted of 18 cm of dark brown (10YR3/3) sandy loam with charcoal comprising 5% of the matrix. Stratum III was present in all three profiles. Stratum III was 26 to 42 cm of pale yellow (2.5Y7/3) fine sandy loam with inclusions of gray shaley clay. Stratum IV was present in all three profiles. Stratum IV varied from at least 76 to 96 cm thick. It consisted of a compact olive brown (2.5Y4/4) sandy clay loam with a mixture of gray shaley clay deposits and inclusions of sandstone pebbles.

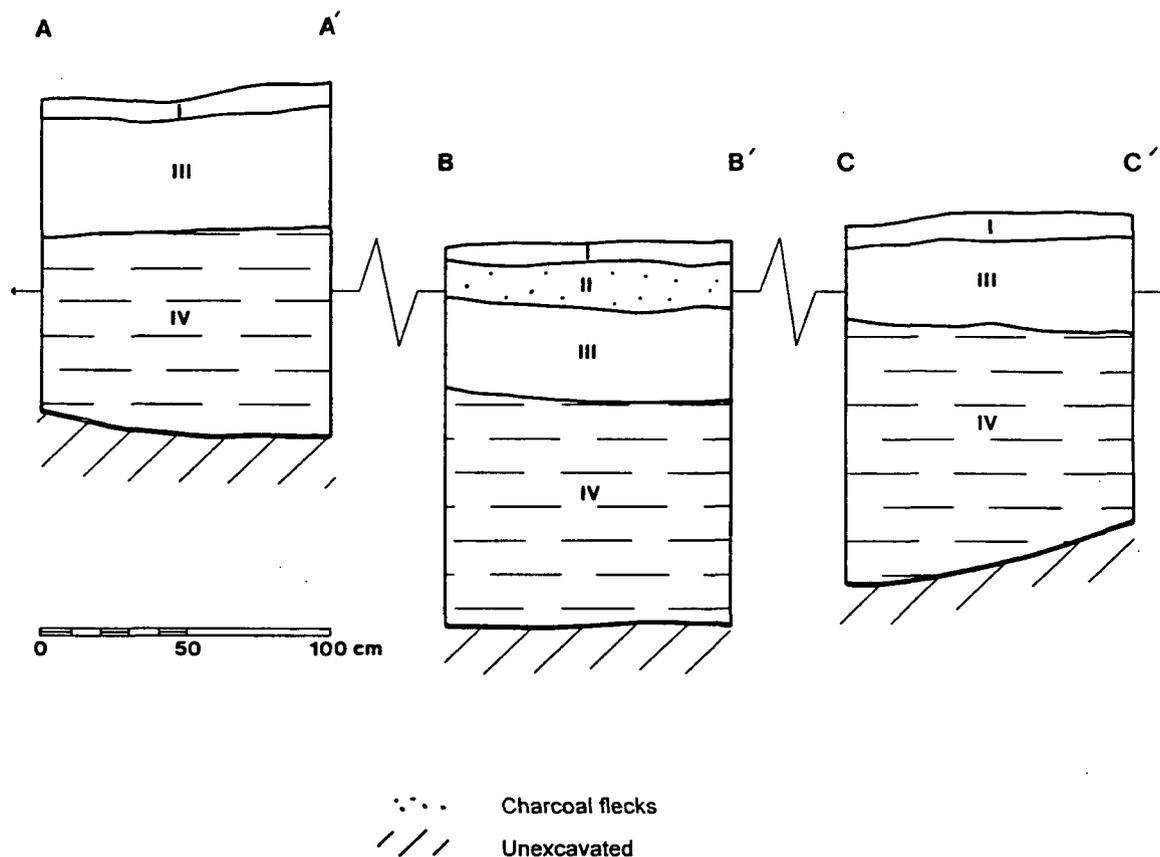


Figure 7.4. Site NM-Q-27-13, Study Unit 41, East Wall Profiles A-A', B-B', and C-C'.

Study Unit 42

SU 42 crossed the north end of SU 41 at a roughly perpendicular angle, forming the arms of a T. The trench extended from N126.99, E94.75 northwestward to N132.28, E82.87. Three 1-m-

wide profiles (D-D', E-E', and F-F') were drawn of the northeast wall and exhibited three strata (Figure 7.5). Stratum I was 4 to 10 cm thick and consisted of a light olive brown (2.5Y5/4) sand. Inclusions of sandstone gravels were noted with minor root disturbance. Stratum II was 8 to 32 cm thick and consisted of a pale yellow (2.5Y7/3) sand. Inclusions of sandstone gravels and roots were noted. Stratum III consisted of an olive brown (2.5Y4/4) sandy clay loam with inclusions of sandstone gravels and root disturbance. Stratum III is at least 48 to 76 cm thick in Profiles D-D' and E-E' and 104 cm thick in profile F-F'.

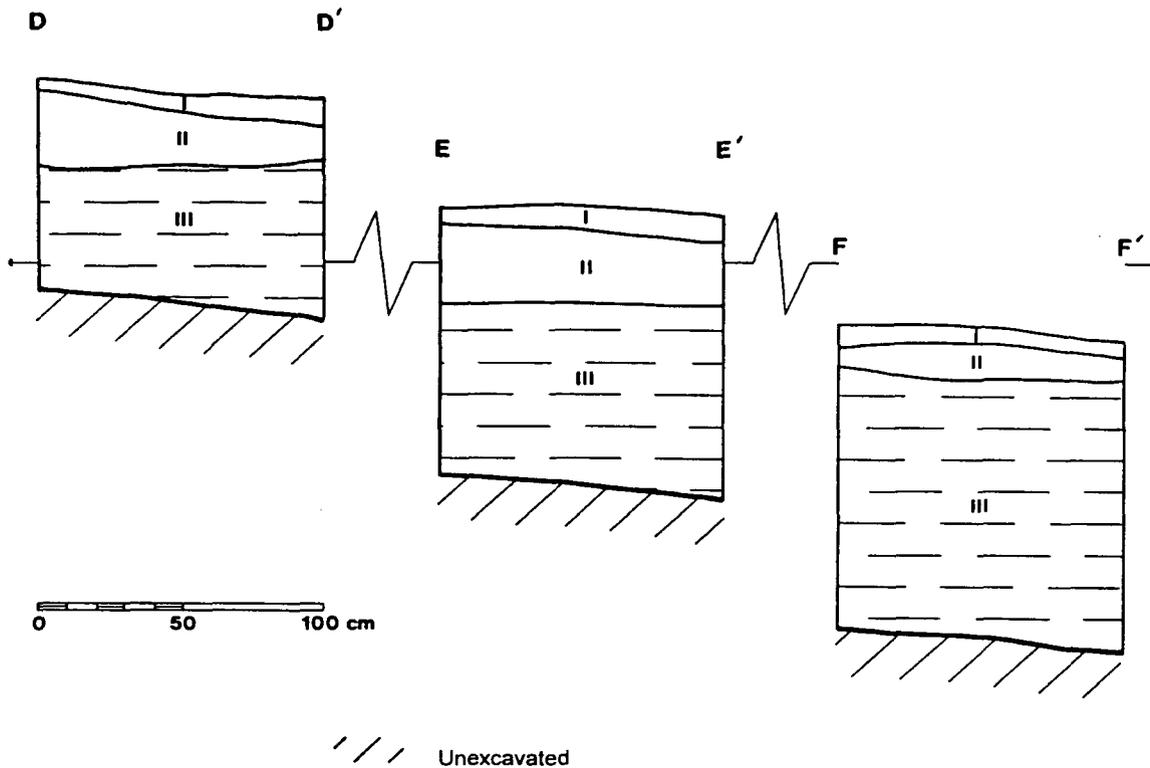


Figure 7.5. Site NM-Q-27-13, Study Unit 42, Northeast Wall Profiles D-D', E-E', and F-F'.

### Study Unit 43

SU 43 was located downslope near the eastern boundary of the right-of-way. The trench was oriented east-to-west and extended from N109.59, E119.24 westward to N108.78, E108.18. Three 1-m-wide profiles (G-G', H-H', and I-I') were drawn of the north wall, identifying three strata (Figure 7.6). Stratum I ranged from 6 to 10 cm thick and consisted of a light olive brown (2.5Y5/4) sandy loam. Inclusions of sandstone pebbles and root disturbance were noted. Stratum II was 20 to 50 cm thick and consisted of a pale yellow (2.5Y7/3) sandy loam. Inclusions of sandstone rocks and gravels were present. A layer of tabular sandstone blocks, up to 40 cm thick but thinning toward the eastern end, separates Strata II and III. Stratum III consisted of a light olive brown (2.5Y5/3) sandy clay loam with inclusions of sandstone pebbles. Stratum III was at least 80 to 102 cm thick in profiles G-G' and I-I' and 112 cm thick in profile H-H'.

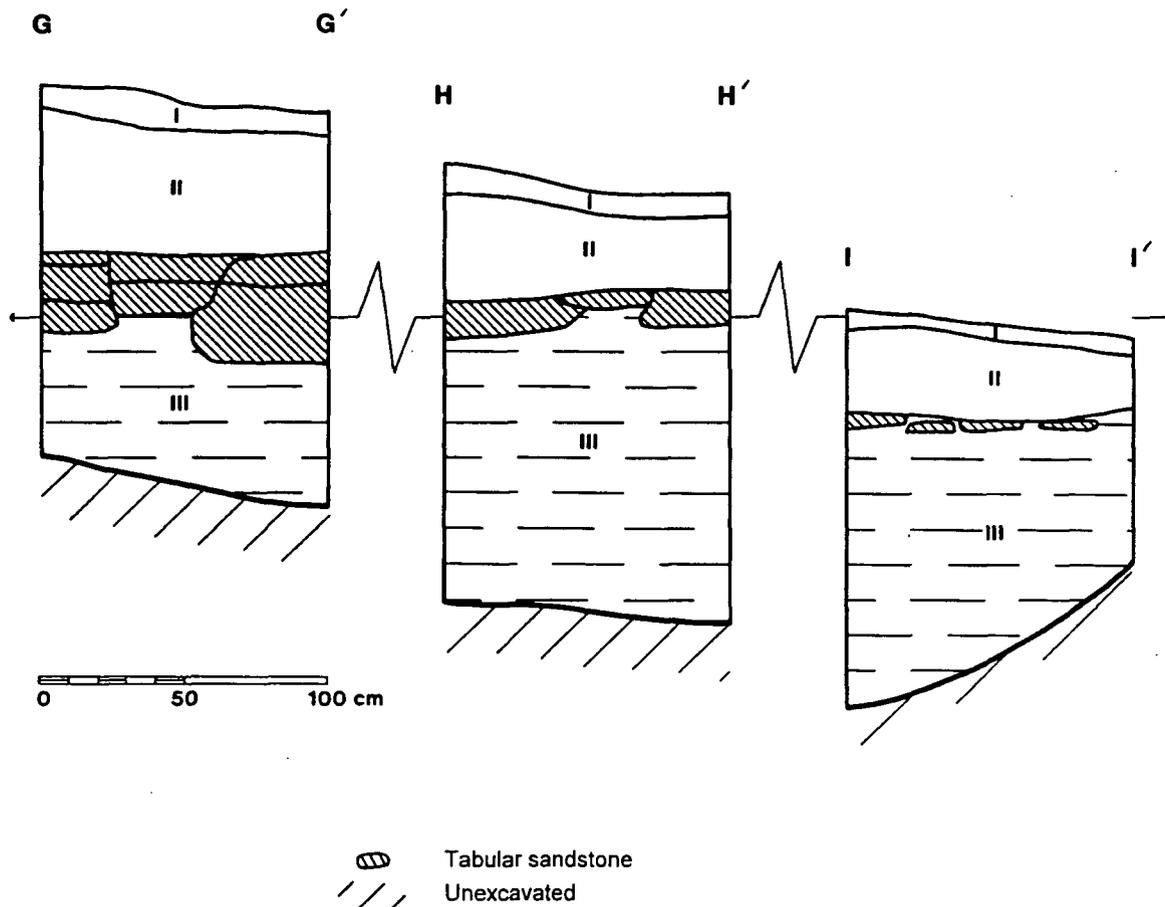
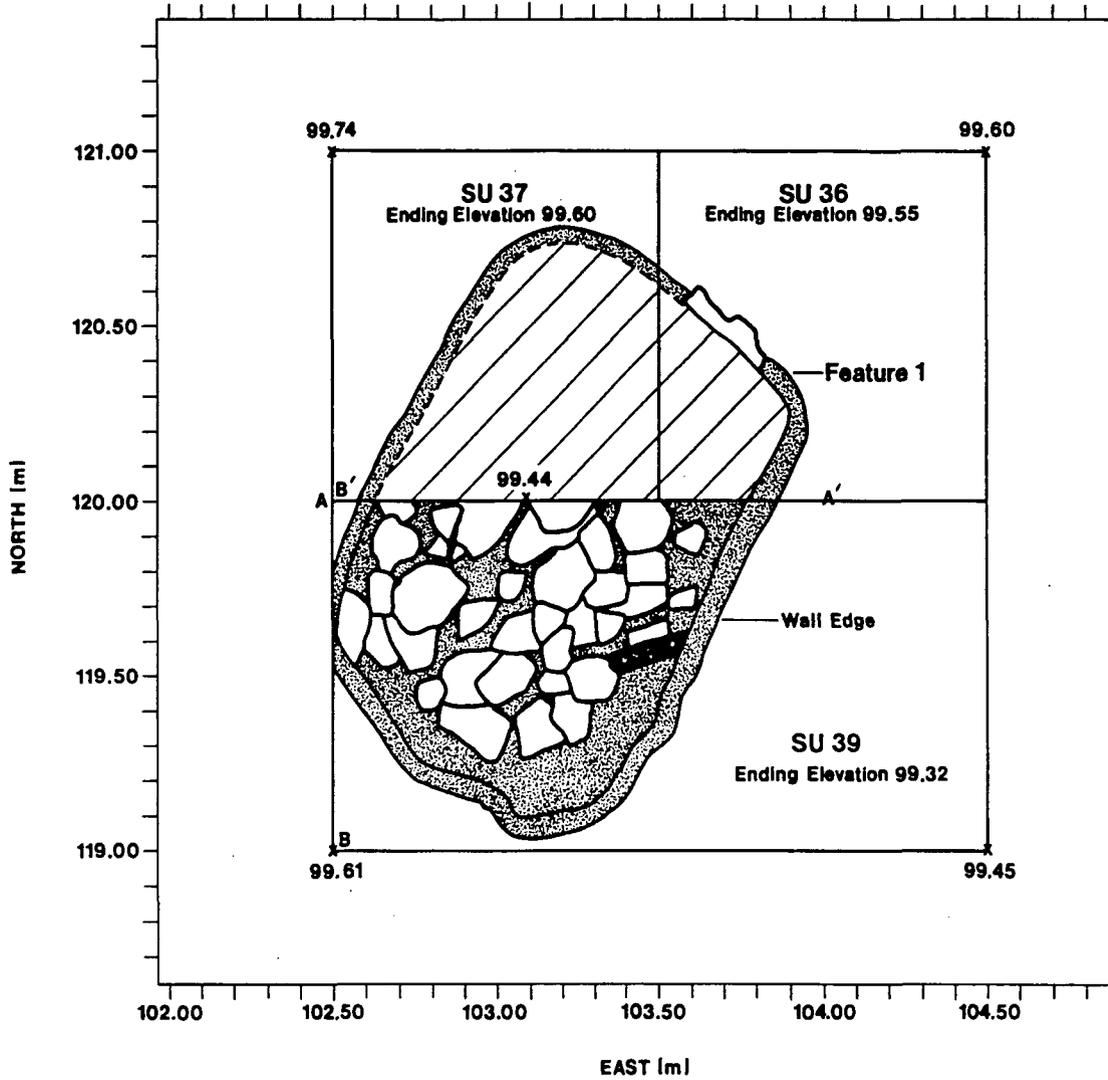


Figure 7.6. Site NM-Q-27-13, Study Unit 43, North Wall Profiles G-G', H-H', and I-I'.

### Features

#### Feature 1

Feature 1 was a subrectangular slab-lined thermal pit measuring 105 by 152 cm (Figure 7.7). It was located at N119.8, E103.1 between the proposed centerline and the eastern edge of the right-of-way. This feature was defined by the presence of a deeply stained soil in association with a light surface artifact scatter. A cross sectional profile revealed three strata (Strata II, IV, and V) of cultural deposits in the north wall of SU 39 (Figure 7.8). The lower stratum (IV) consisted of heavily burned earth. Above the burned earth lay 2 to 4 cm of dense charcoal, ash, and burned wood. Sandstone slabs lay on top of the ash and charcoal deposit. Stratum II above the slabs lay 10 to 14 cm of dark yellowish brown (10YR3/4) sandy loam mottled with dense charcoal, ash and burned earth. The matrix also contained inclusions of natural sandstones and some root disturbance. No artifacts were recovered below the surface from Feature 1. Tree-ring, flotation, and radiocarbon samples were collected for laboratory analysis. The results of the tree-ring analysis were not available in time for inclusion for this report. The radiocarbon sample (FS 55, Beta-110376) yielded a calibrated 2 sigma date range of AD 995 to 1235 (conventional radiocarbon age  $940 \pm 60$ BP).



- x Elevation point
- Edge of excavated study unit
- SU 36 Study unit no.
- Burned earth
- Burned sandstone slab
- Tree-ring sample
- /// Partially excavated
- A-A' See Figure 7.8
- B-B' See Figure 7.3

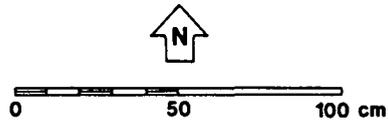


Figure 7.7. Site NM-Q-27-13, Study Unit 36, 37, and 39, Plan View of Feature 1.

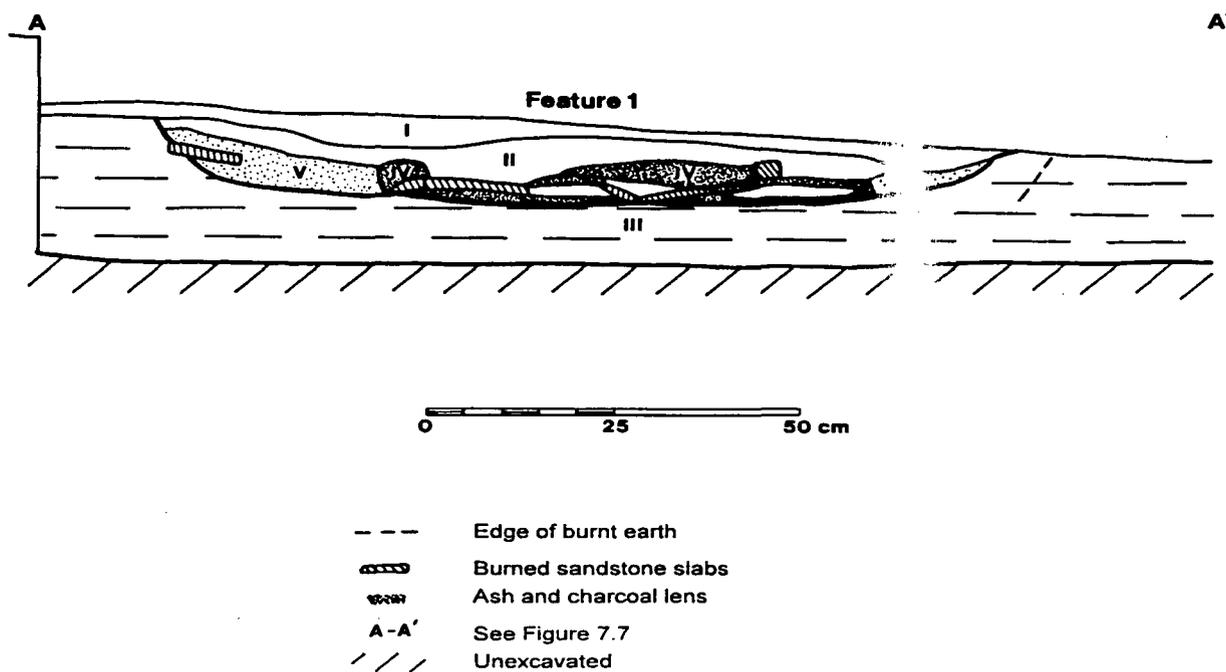


Figure 7.8. Site NM-Q-27-13, Study Unit 39, North Wall Showing Feature 1.

### Feature 2

Feature 2 was an oval-shaped thermal pit measuring 109 by 125 cm (Figure 7.9). It was located at N122.6, E74.2 in a small ephemeral drainage near the west edge of the right-of-way. The feature was defined by the presence of a deeply stained soil in association with a light surface artifact scatter. Deposits in Feature 2 were 24 cm thick at the southern extreme and 7 cm thick near the northern limit as shown in the west wall profile of SU 35 (Figure 7.10). The northern portion of the feature has probably been disturbed by erosion from the drainage in which it lies. The feature matrix consisted of a pale olive (5Y6/3) sandy loam mottled with reddish brown burned sand mixed with dense charcoal, ash, and burned sandstone fragments. Inclusions of sandstone gravel and root disturbance were present. Several partially burned corrugated grayware ceramic sherds and one animal bone were recovered from the feature. Flotation and radiocarbon samples were obtained for laboratory analysis. The radiocarbon sample (FS 58, Beta-110377) yielded a calibrated 2 sigma date range of AD 785 to 1020 (conventional radiocarbon age 1120±60 BP).

### Feature 3

Feature 3 is located at N88, E90. The feature is a thermal feature consisting of burned earth and ash. The feature was discovered during the course of shovel testing. The feature was not formally excavated. The age or precise function could not be determined.

### Feature 4

Feature 4 is located at N113.8, E88.1. The feature is a dark organic stain manifested on the surface. The feature was not excavated. The age or precise function could not be determined.

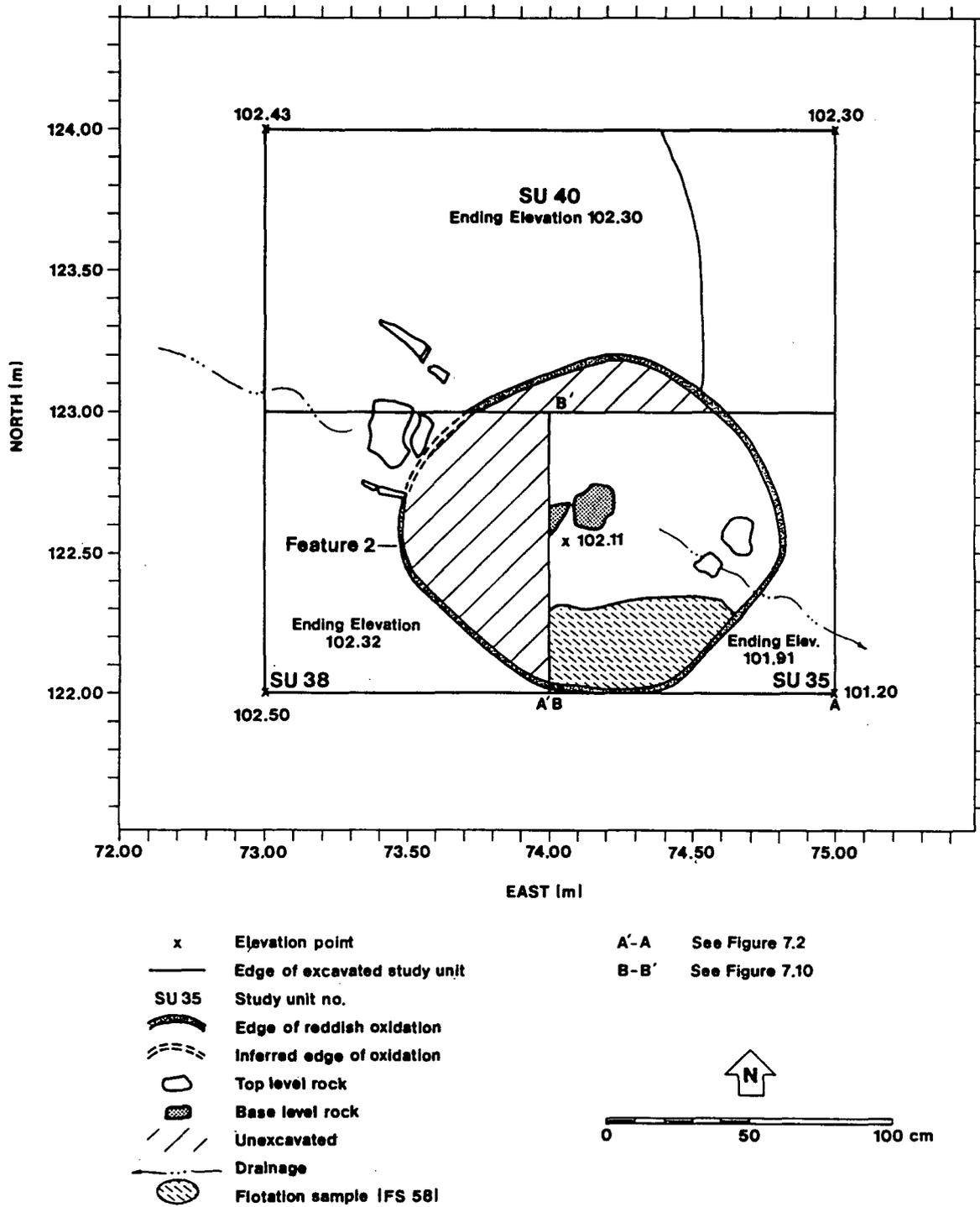


Figure 7.9. Site NM-Q-27-13, Study Units 35, 38, and 40, Plan View of Feature 2.

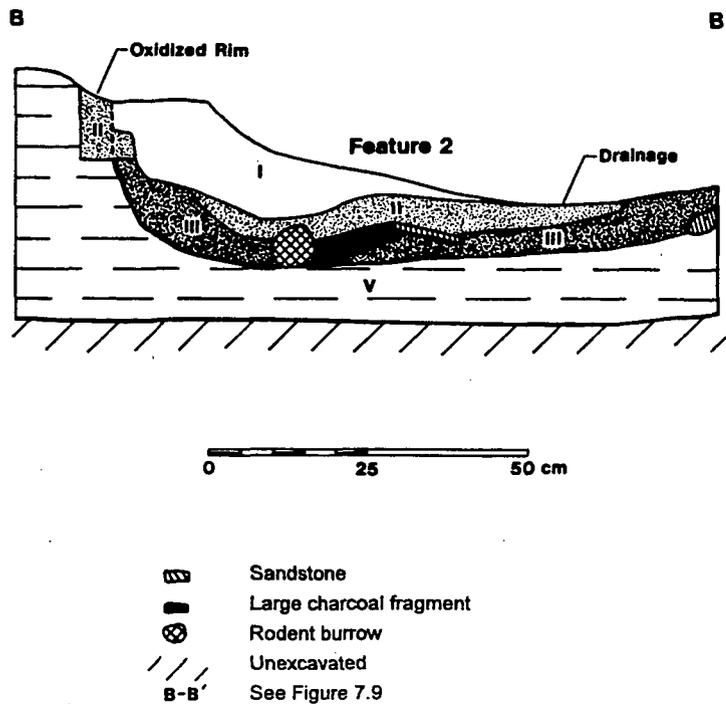


Figure 7.10. Site NM-Q-27-13, Study Unit 35, West Wall Profile Showing Feature 2.

#### Feature 5

Feature 5 is located at N121.2, E67. The feature consists of ash and burned rock. No artifacts were associated with it. The feature was not excavated. The age or precise function of the feature could not be determined.

#### Feature 6

Feature 6 is located at N124.6, E84.7. The feature consists of charcoal and reddened thermal staining. No artifacts were associated with the feature. The feature was not excavated. The age or precise function of the feature could not be determined.

#### Feature 7

Feature 7 is located at N126.4, E81.8. The feature consists of an upright sandstone slab. No artifacts were associated with it. The feature was not excavated. The precise function of the feature could not be determined. From its integrity, it may be relatively recent.

### SUMMARY AND INTERPRETATION

Phase I Data Recovery testing of site NM-Q-27-13 resulted in the collection of 281 artifacts of which 161 were ceramics, 17 were flaked stone, 3 were ground stone, 4 were faunal fragments, and

96 were historic materials. Most of the artifacts were recovered from surface contexts. Seven features were identified consisting mostly of thermal features. Two thermal pit features were partially excavated; one was slab-lined. No features, occupation surfaces, or cultural levels were exposed in the backhoe trenches.

The results of testing revealed at least three occupations of site NM-Q-27-13. Artifacts and analysis indicate occupations during the Pueblo II (possibly dating back to the Pueblo I period) and historic Navajo periods. Most of the artifactual evidence points to Pueblo II period occupation(s). Reed and Goff (Chapter 25) suggest the occupation is not much earlier than AD 1000. The ancestral Pueblo components indicate activity areas with the possibility of habitations nearby but well outside the right-of-way. Although no evidence of historic Navajo structures was identified, the artifact assemblage is interpreted to suggest a possible habitation. The historic Navajo presence at this site may also be activity-oriented with a habitation nearby, but outside the right-of-way.

The prehistoric occupation of site NM-Q-27-13 was manifested by a broad, low-density artifact scatter and at least two thermal features (Features 1 and 2). The artifact scatter included ceramic sherds, flaked stone, and ground stone. No architecture was identified.

Features 1 and 2 were nearly identical in size, shape, and construction. The functions of Features 1 and 2 could not be precisely determined; however, several possibilities exist. The pits may have been roasting pits. The slab floor in Feature 1 may have been used to separate the hot coals from the food being cooked, or may divide two episodes of use. Alternatively, Reed and Goff (Chapter 25) suggest the features may represent pottery kilns. Reed and Goff indicate that the size and configuration are typical for this type of structure. Two factors may further support this supposition: 1) sherds were recovered from the excavation units containing the features, and 2) most of this site is situated on a moderate slope, not particularly suitable for habitation structures. Kilns often take advantage of upslope wind currents to provide draft to ensure a more thorough firing. Both of these features are located on a slope. A third factor should also be considered: the relatively close proximity of Mariano Lake may have provided a nearby source of clay for the production of pottery. Radiocarbon samples from Features 1 and 2 yielded conventional radiocarbon dates of 940 and 830 AD  $\pm$  60 years BP (Beta-110376 and Beta-110377), respectively. These dates likely represent old wood used for fuel, rather than occupations earlier than the ceramic data indicate.

A reconnaissance of the area during the investigation revealed a possible habitation location. A circular depression and a concentration of ceramics were noted on the west side of the N11 roadbed beyond the boundaries of the site shown on the site map; they were interpreted as a possible Pueblo II pitstructure location.

The historic occupation of site NM-Q-27-13 is rather ephemeral. The historic component consists of a broad, low-density scatter of glass and ceramic sherds. The historic artifacts are believed to result from an occupation dating to World War I or immediately thereafter. No features or architecture relating to this time period were identified at the site. The quantity and type of historic artifacts probably indicate more than a casual visit to the site; most of the artifacts reflect an occupation. The fact that no historic architecture was identified may indicate a scavenging or reuse of materials comprising the structure. The identification of nonarchitectural historic features is

confounded on a multicomponent site without the context of architecture. The level of this investigation did not allow for in-depth examination and temporal determination of every feature at the site.

The historic artifacts may reflect a trash disposal pattern. Trash and hearth cleanings are often discarded into small drainages to be carried away by runoff. Following typical Navajo site configuration, the disposal area would lie in the quadrant east of the hogan or other habitation structure. If this is the case at this site, then the hogan would be located on the more level, higher ground to the west outside the right-of-way. A more thorough investigation in that direction may reveal the location of a structure.

### RECOMMENDATIONS

Based on the presence of at least two intact subsurface features and the possibility of at least five more, and the potential for important archaeological data contained therein, it is recommended that additional archaeological investigations be conducted at NM-Q-27-13 to mitigate the adverse impacts of road construction. In particular, the possibility that Features 1 and 2 represent prehistoric pottery kilns provides a unique opportunity to investigate a feature type rarely documented despite the preponderance of its product. If that these features were kilns, they could be especially significant since they could provide an insight into the evolution of a technology that figured so prominently in prehistoric life. This evolutionary view covers a period from when pottery production was in its infancy into a period where it manifested itself as a fully matured craft. The investigations should include the continued excavation of the remaining portions of the identified features. Additional mechanical stripping of the site should be conducted to reveal any shallowly buried features, with subsequent excavation.

## Chapter 8

### SITE NM-Q-27-15 (LA 110307)

#### Harding Polk II and Ardale R. Delena

Site NM-Q-27-15 is a small sandstone rock alignment situated along a small ephemeral drainage within a broad open valley on the west side of the proposed N11(1) route. The site drains northward toward the Rio Puerco of the West 0.3 km (0.2 mi) away. The site sits at an elevation of 2176 m (7140 ft). Vegetation at the site consists of assorted grasses and forbs with isolated junipers (*Juniperus*) in the surrounding area.

#### SURVEY DATA

Site NM-Q-27-15 was recorded in 1995 by Zuni Cultural Resource Enterprise (ZCRE) as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping and photography. No artifacts were observed at the site. The site consists of a linear rock alignment 4 m long and 1 m wide located in a small ephemeral drainage. It was thought the rock alignment may represent a water-control device such as a check dam. The rock alignment was thought to be in unstable condition as it is threatened by erosion and undercutting from the drainage.

#### NATURE AND EXTENT TESTING

On 28 July and 4 and 5 August 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the nature, extent, and content of site NM-Q-27-15. Two trenches measuring 7.7 and 10.5 m long (Study Units [SU] 2 and 1, respectively) were excavated by backhoe (Figure 8.1). The trenches were placed east and west of the previously identified rock feature. No hand excavations were conducted.

#### Surface Artifacts

Two artifacts were observed within the site area during a site visit by the Project Director on 23 October 1997. These consisted of a small petrified wood flake and a quartzite cobble with battering and possible flaking. The artifacts were not considered significant enough to alter the interpretation of the site, and they were not collected.

#### Backhoe Trench Excavation

The mechanical excavation of two trenches was conducted to explore for potential buried cultural deposits on site NM-Q-27-15. A backhoe with a 61-cm-wide (2-ft-wide) bucket was employed to excavate soil deposits deeper, over a broader area, and within a shorter time span than could be practically completed by hand. Trench excavation was closely monitored by a ZCRE archaeologist. Excavation was halted whenever a closer inspection of the trench walls or bottom was deemed necessary by the monitor.

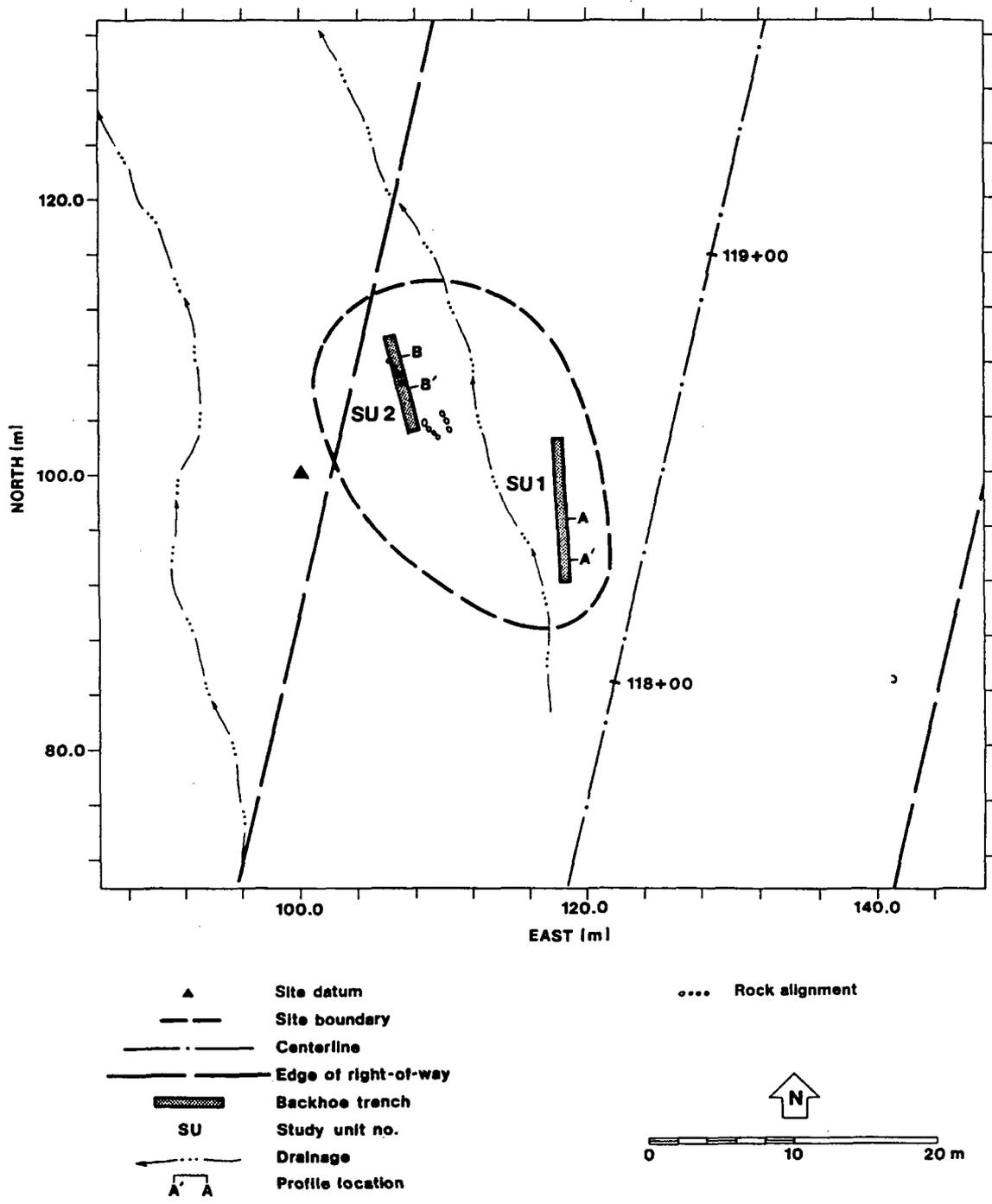


Figure 8.1. Site NM-Q-27-15, Nature and Extent Testing.

The two trenches (SU 1 and 2) totalled 18.2 m in length. The location of the rock alignment guided the placement and length of backhoe trenches. One representative soil profile was drawn for each trench. Soil descriptions were made using Munsell soil charts to identify soil color.

### Study Unit 1

SU 1 was a 10.5-m-long trench. The trench extended from grid coordinates N92.32, E119.01 northward to N102.75, E118.32. The trench was located between the proposed centerline and the small drainage where the rock alignment is located. A 3-m-long profile (A-A') averaging 177 cm in depth was drawn of the east side of the trench. Three strata were identified (Figure 8.2). Stratum I consisted of 12 to 28 cm of brown (10YR4/3) loamy sand containing 50% gravel and sandstone rocks. No artifacts were observed or collected. At the south end of the profile a 20-cm deposit of gravel and rocks with coal fragments was noted between Strata I and II. Stratum II consisted of 40 to 55 cm of compact dark yellowish brown (10YR3/4) loamy sand containing 25% gravel and sandstone rocks. No artifacts were observed or collected. A 10- to 25-cm layer of platy bands of sandstone, caliche, and orangish iron oxidation separated Strata II and III. Stratum III consisted of at least 100 cm of compact olive brown (2.5Y4/4) clay loam with 10% gravel and rocks. A natural layer of sandstone slabs was noted 25 cm from the top of Stratum III. No artifacts were noted or recovered from this stratum.

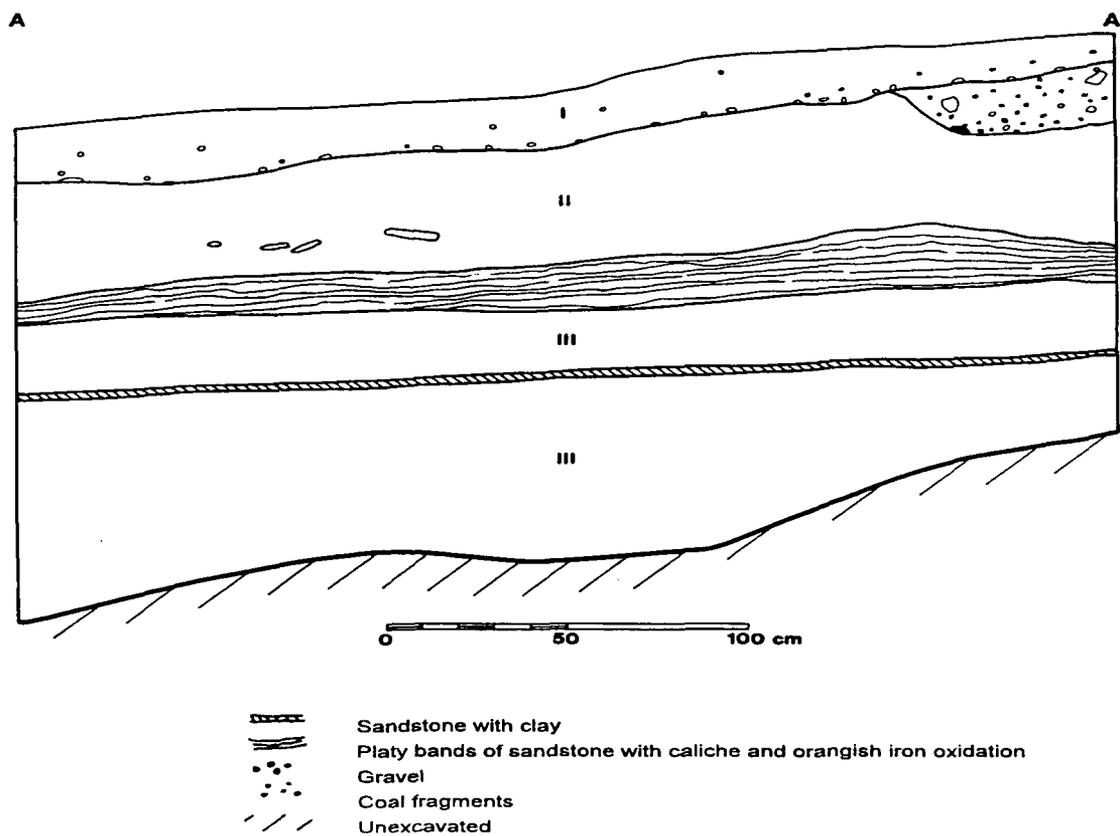


Figure 8.2. Site NM-Q-27-15, Study Unit 1, East Wall Profile.

## Study Unit 2

SU 2 was a 7.7-m-long trench. The trench extended from grid coordinates N103.27, E108.38 northward to N110.45, E105.89. The trench was located between the small drainage where the rock alignment is located and the western right-of-way boundary. A 2-m-long profile (B-B') averaging 160 cm in depth was drawn of the east side of the trench. Three strata were identified (Figure 8.3). Stratum I consisted of 10 cm of brown (10YR4/3) loamy sand containing 50% gravel and sandstone rocks. No artifacts were observed or collected. Stratum II consisted of 10 to 20 cm of hard compact dark yellowish brown (10YR3/4) loamy sand containing 25% gravel and sandstone rocks. No artifacts were observed or collected. A natural lens of tabular sandstone separated Strata II and III. Stratum III consisted of at least 135 cm of compact olive brown (2.5Y4/4) clay loam with 10% gravel and rocks. A natural layer of sandstone slabs was noted 25 cm from the top of Stratum III. A second natural layer of sandstone slabs was noted 70 cm below the previous layer. No artifacts were noted or recovered from this stratum.

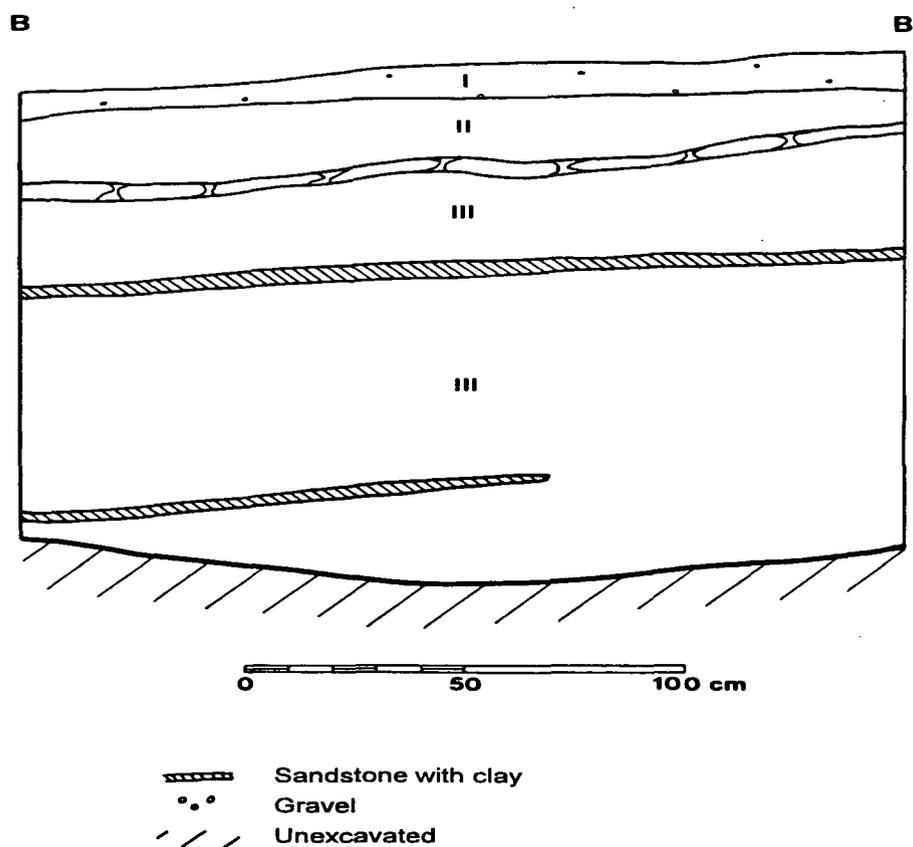


Figure 8.3. Site NM-Q-27-15, Study Unit 2, East Wall Profile.

## SUMMARY, INTERPRETATION, AND RECOMMENDATIONS

It was concluded that the possible rock water-control feature identified as site NM-Q-27-15 is a naturally occurring rock outcrop and does not represent a cultural manipulation of the landscape. The two artifacts noted at this site do, however, indicate a cultural presence, if only limited. Finding isolated artifacts along such a significant water course as the Rio Puerco would not be surprising. The ancestral Puebloans likely practiced agriculture in this area and fields were likely located all along the floodplain. As a result, occasional cultural materials would have been randomly lost or discarded over time. Their presence would not represent specific cultural activities or constitute an archaeological site. Alternatively, the lithics may represent the casual disposal of materials by Archaic peoples in this area. Therefore it is recommended that no further archaeological investigations are necessary at site NM-Q-27-15.

## Chapter 9

### SITE NM-Q-22-45 (LA 110308)

#### Harding Polk II

Site NM-Q-22-45 is a small sandstone rock alignment situated along a small ephemeral drainage on the east side of the N11 roadbed (Figure 9.1). The rock alignment is perched on the edge of a steep 2-m high road cut. The site is located on the east side of a small unnamed valley that drains southwestward toward the Rio Puerco of the West 2.4 km (1.5 mi) away. The site sits at an elevation of 2201 m (7220 ft). The rock alignment is within a small meadow, but the surrounding area is covered by a stand of mature pinyon (*Pinus edulis*) and juniper (*Juniperus*) with an understory of assorted grasses and sagebrush (*Artemisia*).

#### SURVEY DATA

Site NM-Q-22-45 was recorded in 1995 by Zuni Cultural Resource Enterprise (ZCRE) as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping and photography. No artifacts were observed at the site. The site consisted of a linear rock alignment 4 m long and 0.5 m wide. The rock alignment is presently in unstable condition as it is threatened by erosion and undercutting from the nearby steep road cut. The slabs' placement in and adjacent to the small ephemeral drainage was thought to indicate that the feature could be a water control/check dam feature. The age of the site could not be determined.

#### NATURE AND EXTENT TESTING

On 9 June 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent and content of site NM-Q-22-45. A single hand-excavated test unit was dug. Backhoe excavation was deemed unnecessary and no artifacts were present on the surface to collect.

Hand excavation of one test unit (Study Unit [SU] 1) encompassing 3 sq m was conducted in order to determine the extent and depth of the stone feature and to determine if cultural deposits were present at site NM-Q-22-45. The location of the rock alignment guided the placement of the test unit. The test unit was excavated in arbitrary 10-cm levels and all soils were screened through ¼-in hardware mesh. Soil descriptions were made using Munsell soil charts to identify soil color.

SU 1 was a 1-by-3-m unit located at grid coordinates N100.09, E96.50. The unit was placed over the main concentration of numerous medium-sized sandstone slabs (Figure 9.2).

SU 1 was excavated a maximum of 40 cm (four levels) although that varied due to the uneven elevation of the surface. Two soil strata were revealed (Figure 9.3). Stratum I consisted of approximately 5 cm of dark grayish brown (10YR4/2) sandy loam with 25% gravel/rocks and grass and forb roots. Only the southeastern (uphill) half of the unit was excavated in Level 1 because of the slope. However, Stratum I, a thin colluvial layer, covered the entire unit. No artifacts were

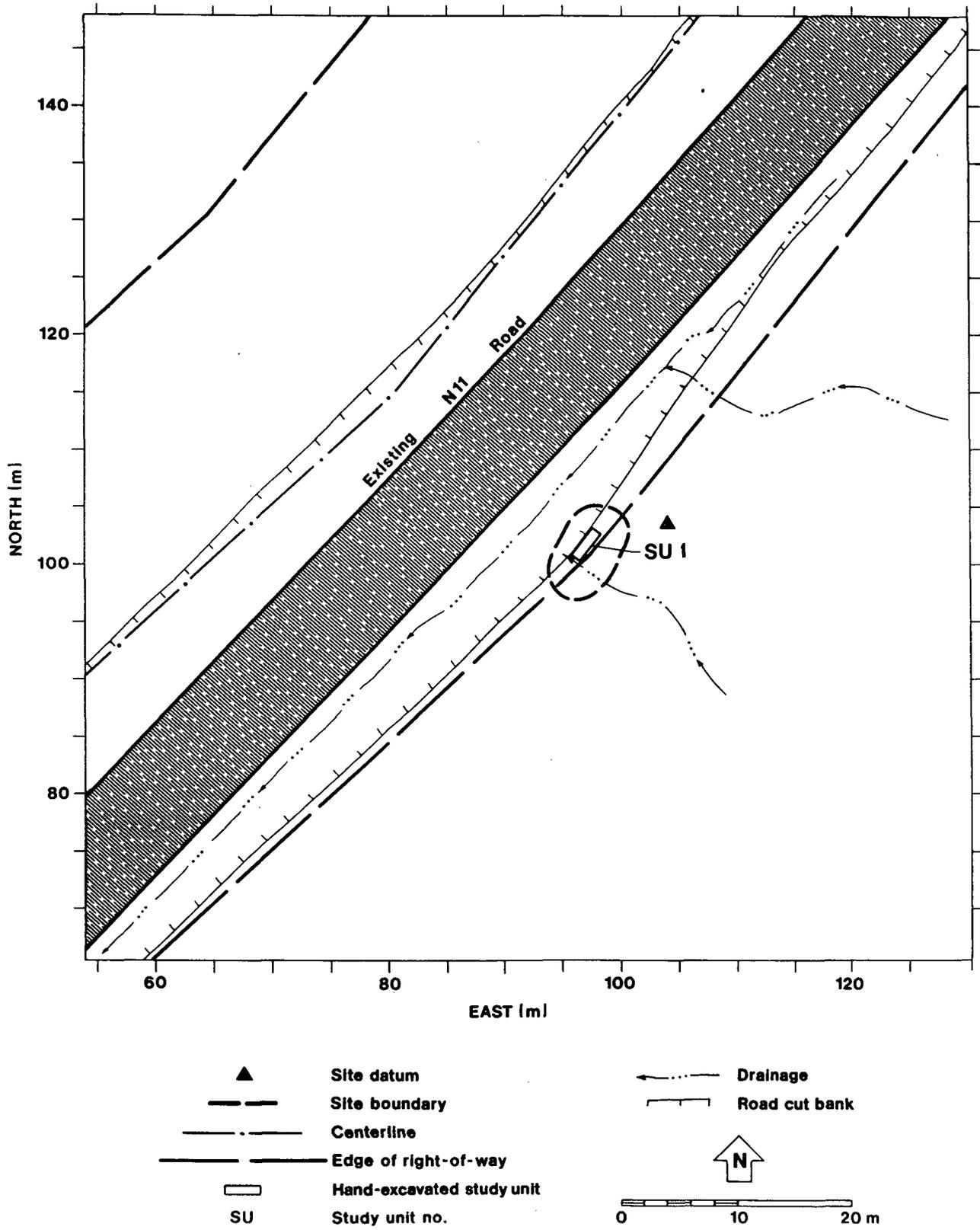


Figure 9.1. Site NM-Q-22-45, Nature and Extent Testing.

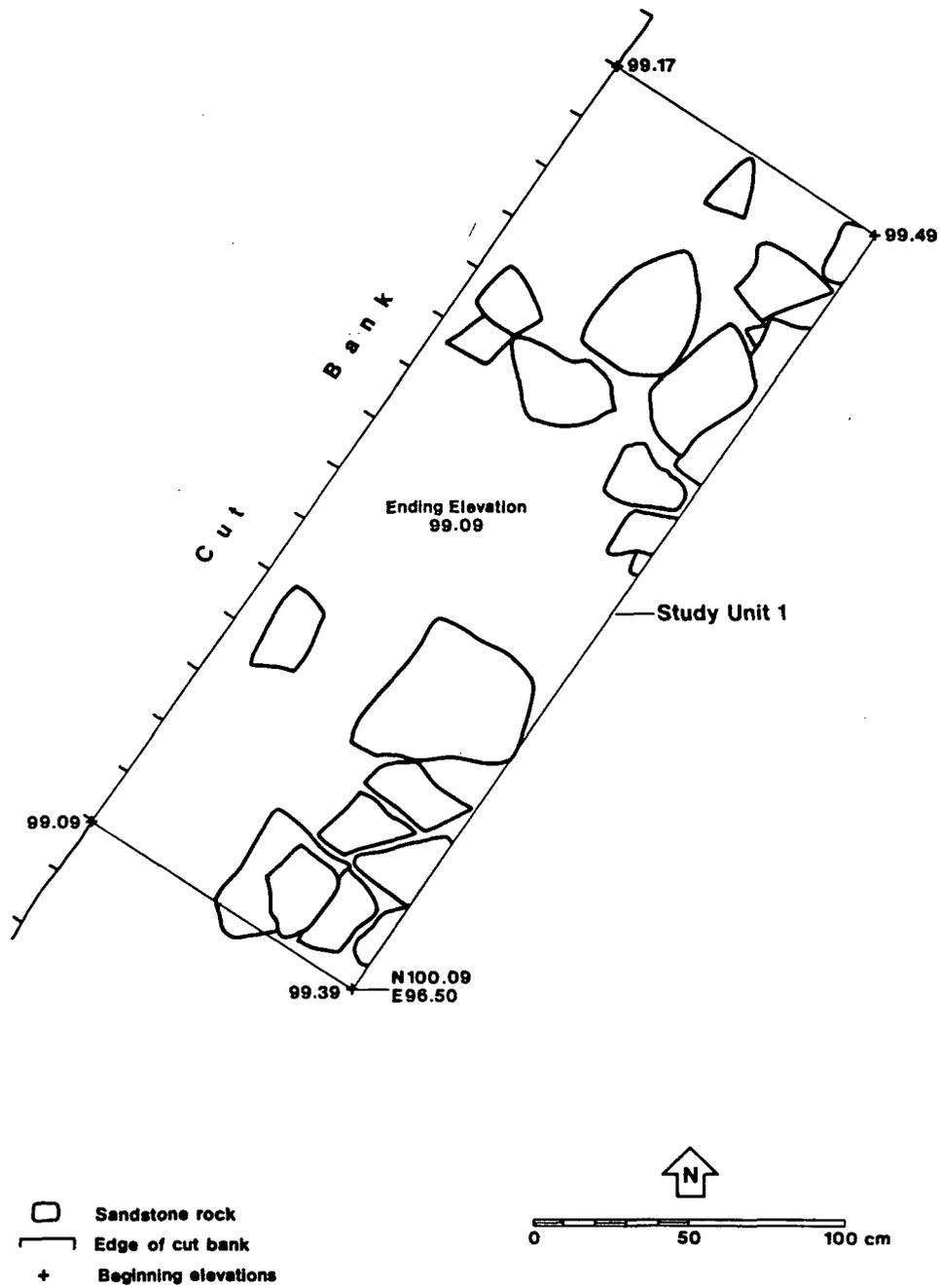


Figure 9.2. Site NM-Q-22-45, Study Unit 1, Plan View.

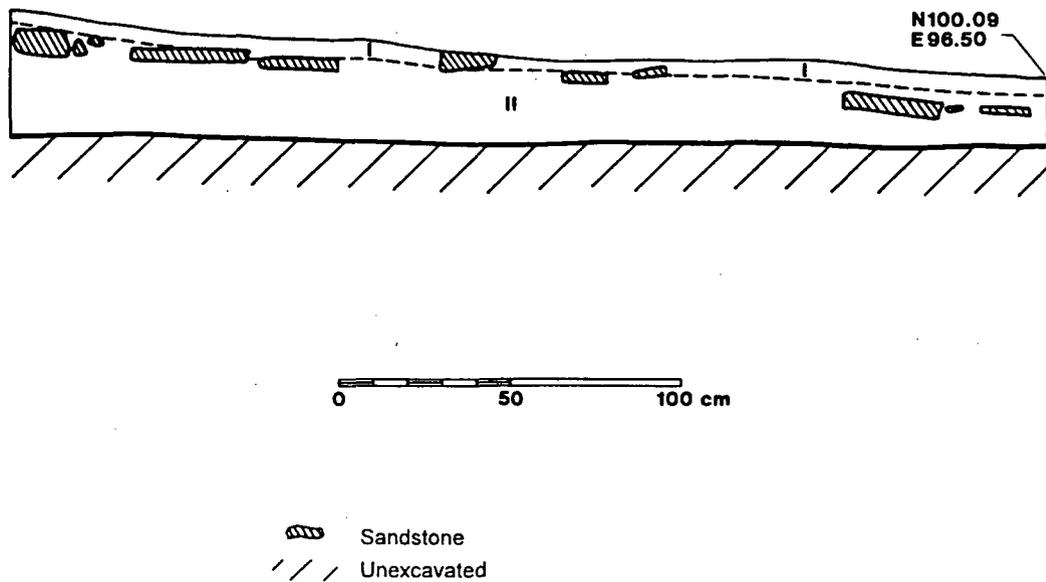


Figure 9.3. Site NM-Q-22-45, Study Unit 1, East Wall Profile.

recovered from Stratum I. Stratum II consisted of least 30 cm of very dark grayish brown (10YR3/2) sandy loam with 25% gravel. The sandstone slabs defined the boundary between Strata I and II. No artifacts were recovered from Stratum II.

#### SUMMARY, INTERPRETATION, AND RECOMMENDATIONS

It was concluded that site NM-Q-22-45 represents a naturally occurring rock exposure. Alternatively the rocks may have been pushed up into this location by road construction and maintenance. It was thought that if this had been a purposely constructed water-control feature, then there would have been more than one course of slabs or they would have been set on edge, neither of which was observed at this site. Additionally no cultural materials were observed or recovered from the site. Since it appears that this is not a cultural manifestation, it is recommended that no further archaeological investigations are necessary at this site.

## Chapter 10

### SITE NM-Q-22-48 (LA 110311)

Harding Polk II and Steve Lonjose

Site NM-Q-22-48 is a small ancestral Pueblo ceramic scatter. The site is located along the east side of the N11 roadbed on the south side of a small unnamed valley. The valley forms the headwaters of a small drainage flowing toward the Rio Puerco of the West 1.5 km (0.9 mi) to the south. The site is situated at an elevation of 2254 m (7395 ft). The site is covered by a stand of mature pinyon (*Pinus edulis*) and juniper (*Juniperus*) with an understory of assorted grasses and sagebrush (*Artemisia*).

### SURVEY DATA

Site NM-Q-22-48 was recorded in 1995 by Zuni Cultural Resource Enterprise (ZCRE) as part of the N11(1&2) road survey (Zimmerman and Abbott 1996). ZCRE recording activities included mapping with a Brunton compass, in-field artifact analysis, and site photography. The in-field analysis consisted of identification of ceramic types. No lithic artifacts were noted. In addition, artifact counts and mapping of surface artifact distribution were conducted. The site was believed to consist of a possible small rubble mound with two features. The mound measured approximately 5 by 2.5 m, and possibly contained a single room. Feature 1 was a 1-by-1-m area of tabular sandstone on the mound possibly representing a floor. Feature 2 was an area of charcoal staining located immediately northeast of the mound. A ceramic sherd scatter extended approximately 7 m east of the mound. Identified ceramics included indented corrugated grayware, plain whiteware, and Escavada and Reserve Black-on-white. Site NM-Q-22-48 has been severely impacted over time from maintenance grading activities along N11. The grading may have obliterated as much as 50% of the site. The site was tentatively determined to represent a small Pueblo II to early Pueblo III period ancestral Pueblo roomblock.

### NATURE AND EXTENT TESTING

From 10 to 16 and 17 to 19 June 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent, nature, and content of site NM-Q-22-48. Test excavations, complete surface collection of all artifacts, and a redefinition of site boundaries within the right-of-way were conducted. Subsurface investigations included hand excavation of eight test units totaling 8 sq m and backhoe excavation of seven trenches totaling 61.3 m in length. Site boundaries were expanded to the south and east (Figure 10.1).

To aid in organization of the investigation of the site, the site is divided into a number of study units. Study units are arbitrary designations of space in which the investigator wants to direct special focus. It can encompass as much or as little area as deemed necessary by the investigator. That focus may be a feature, a single excavation unit, a group of excavation units, a backhoe trench, a surface collection area or even the entire site. Consequently one study unit may be situated within another. At a minimum, each excavation unit and backhoe trench has been designated with a study unit (SU) number.

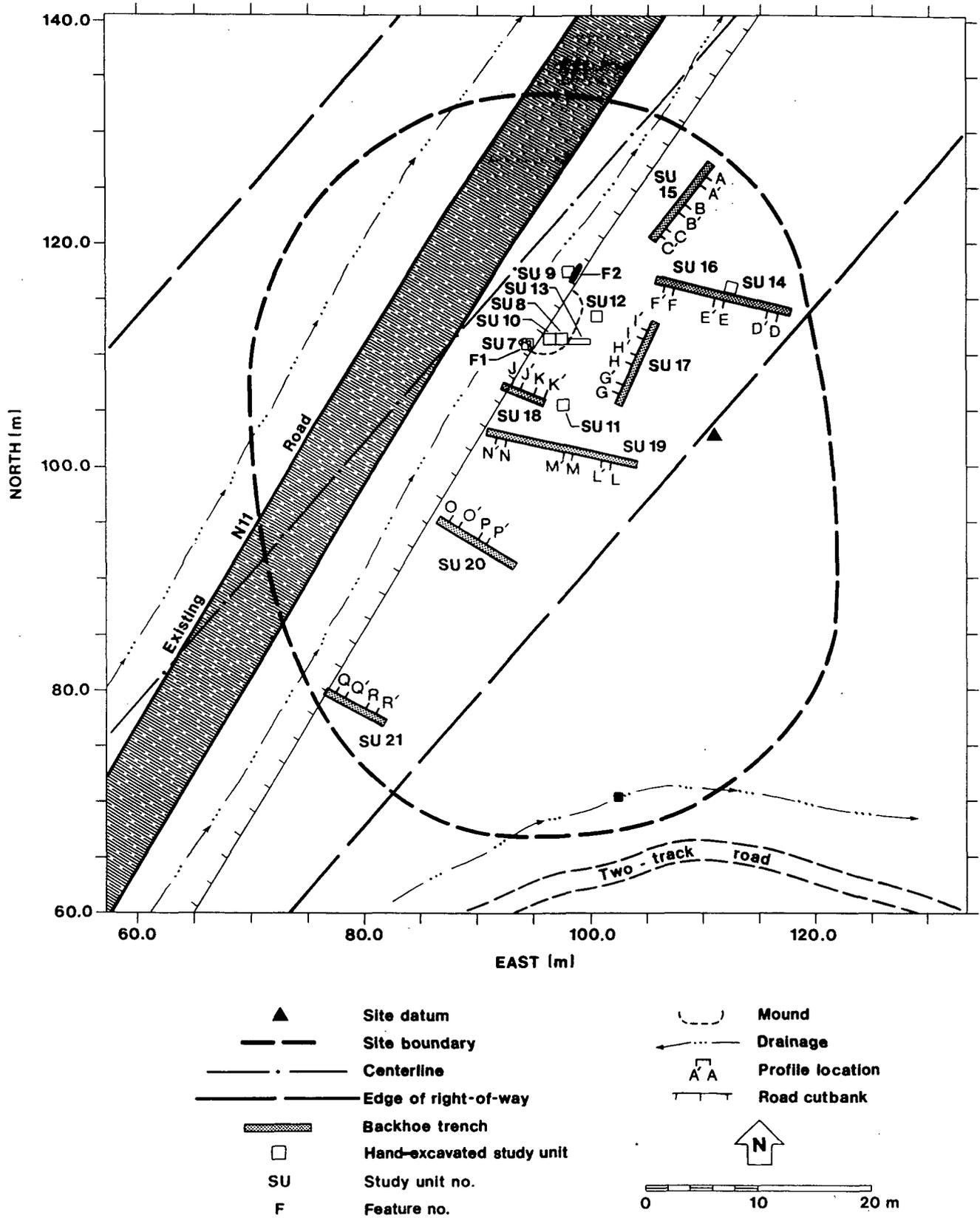


Figure 10.1. Site NM-Q-22-48, Nature and Extent Testing.

### Surface Collection

Surface artifacts were collected from an area along approximately 70 m of the proposed road right-of-way. Surface collection units of 100 sq m (10 by 10 m) were utilized. The artifacts were then tabulated on Field Specimen (FS) catalog sheets. All artifacts from one collection unit were assigned a single FS number; however, artifacts of different material types were grouped separately within the assigned FS numbers. Only six surface collection units yielded artifacts at site NM-Q-22-48 (SU 1 through 6). Study Units 1 through 6 were located at N100, E90, N100, E80, N110, E90, N110, E100, N120, E90, and N130, E110, respectively. The surface assemblage consisted of ceramic sherds and ground stone.

### Hand Excavation

Hand excavation of eight test units (SU 7 through 14) encompassing 8 sq m was conducted in order to determine the extent, depth, and density of cultural deposits at site NM-Q-22-48. The total of 8 sq m was derived from seven 1-by-1-m units and one 2-by-0.5-m unit. The location of the previously identified features, the distribution of surface artifacts, and the results of the backhoe trenching guided the placement of test units. Most test units were excavated in arbitrary 10-cm levels except where circumstances dictated the removal of a thicker layer of soil. In all but one case soils were screened through 1/4-in hardware mesh. Soil descriptions were made using Munsell soil charts to identify soil color.

#### Study Unit 7

SU 7 was a 1-by-1-m unit located at grid coordinates N110.50, E94. The study unit was placed along the southeast cut bank of the existing N11 road, where a possible slab floor surface was identified as Feature 1 during the survey. SU 7 was excavated to a depth of 20 cm in 2 levels. The east wall profile showed two stratigraphic layers (Figure 10.2). Stratum I was 2 to 8 cm thick and consisted of a brown (10YR4/3) sandy loam with inclusions of natural sandstone gravel and root disturbance. Stratum II was 10 cm thick and consisted of an olive yellow (2.5Y6/6) sandy loam that was moderate in structure with inclusions of natural sandstone gravel and large tree root disturbances. One ceramic sherd was recovered from the upper portion of Stratum II. A natural sandstone bedrock surface was encountered at the base of Stratum II. No evidence of any cultural deposits were detected at this level.

#### Study Unit 8

SU 8 was a 1-by-1-m unit located at grid coordinates N111, E97. The study unit was placed on the supposed rubble mound to test for integrity of deposits and explore for intact architectural elements identified as Feature 1 in the survey. The unit was excavated to a depth of 49 cm in five levels. The west wall profile showed four stratigraphic layers (Figure 10.3). Stratum I was 3 to 9 cm thick and consisted of an olive brown (2.5Y4/4) sandy loam with inclusions of charcoal (5%), natural sandstone gravel (10%), and root disturbance. Stratum II was 10 cm thick and consisted of a dark grayish brown (10YR4/2) sandy loam with inclusions of charcoal (5%), sandstone gravel (10%), pine needles, and root disturbance. An additional 9 to 12 cm thick layer of Stratum II was encountered

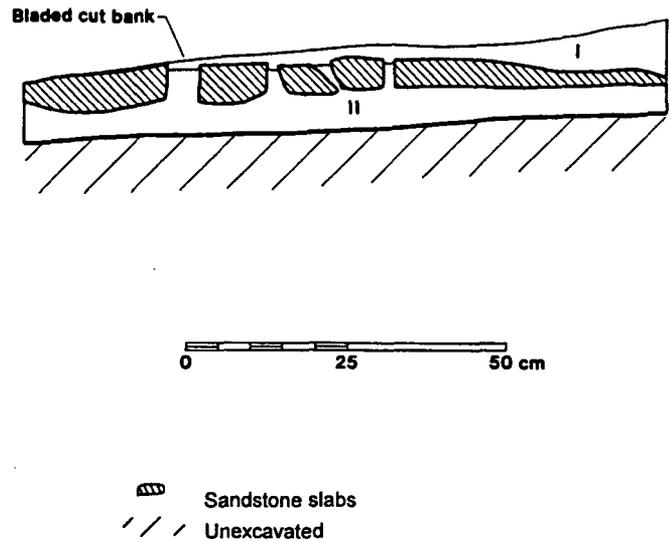


Figure 10.2. Site NM-Q-22-48, Study Unit 7, East Wall Profile.

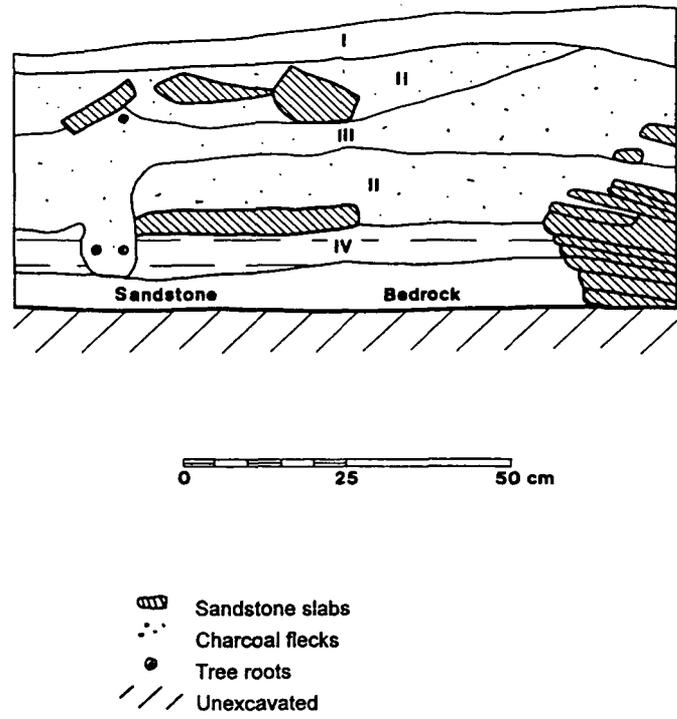


Figure 10.3. Site NM-Q-22-48, Study Unit 8, West Wall Profile.

below Stratum III. Stratum III was 5 to 16 cm thick and consisted of a dark brown (10YR3/3) sandy loam with inclusions of charcoal (5%), natural sandstone gravel (25%), pine needles, and root disturbance. Stratum IV was 6 cm thick and consisted of an olive brown (2.5Y4/4) sandy loam with inclusions of sandstone gravel (25%) and root disturbance. Sandstone bedrock was encountered at the base of Stratum IV. Artifacts were recovered from every level of this unit. Level 1 yielded one piece of ground stone. Level 2 yielded one ceramic sherd and one piece of flaked stone. Level 3 yielded ceramic sherds and a piece of ground stone. Level 4 yielded a few ceramic sherds. Level 5 yielded only one ceramic sherd.

### Study Unit 9

SU 9 was a 1-by-1-m unit located at grid coordinates N117,E97.50. The study unit was placed along the southeast cut bank of N11 to look for intact cultural deposits at the north end of the supposed rubble mound. SU 9 was excavated to a depth of 20 cm in two levels. The south wall profile revealed two stratigraphic layers (Figure 10.4). Stratum I was 8 cm thick and consisted of an olive yellow (2.5Y6/6) sandy loam with inclusions of sandstone gravels and tree root disturbance. A layer of tabular sandstone was noted between these strata. Stratum II was 10 cm thick and consisted of an olive brown (2.5Y4/4) sandy clay loam with inclusions of sandstone gravels. No artifacts were recovered or cultural deposits noted in the unit. Sandstone bedrock was exposed at the base of Stratum II.

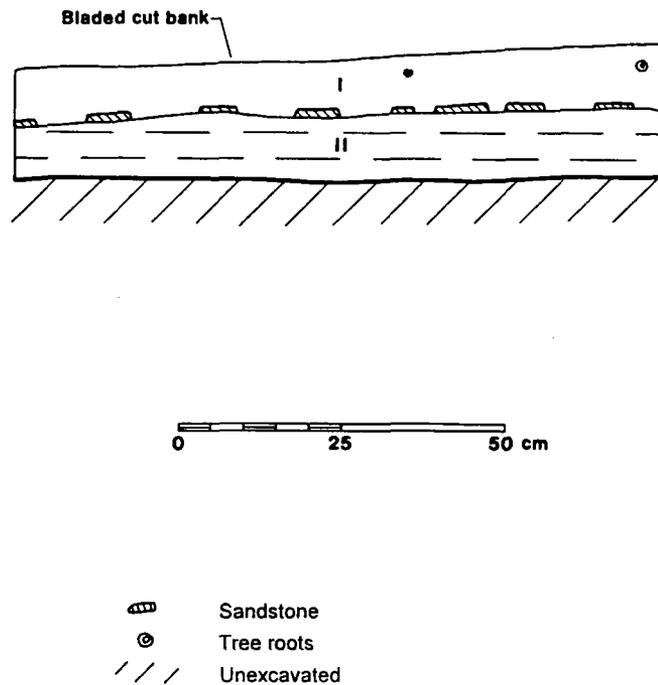


Figure 10.4. Site NM-Q-22-48, Study Unit 9, South Wall Profile.

Study Unit 10

SU 10 was a 1-by-1-m unit located at grid coordinates N111,E96. The study unit was placed immediately west of SU 8 to further test the deposits in the mound in the survey. The unit was excavated to a depth of 50 cm in 5 levels. The west wall profile revealed four stratigraphic layers (Figure 10.5). Stratum I was 12 cm thick and consisted of an olive brown (2.5Y4/3) sandy loam with inclusions of sandstone gravels (25%), pine needles, and root disturbance. Stratum II was 18 cm thick and consisted of a compact dark grayish brown (10YR4/2) sandy loam with inclusions of charcoal (1%), flat sandstones and gravels (25%), and some root disturbance. Stratum III was 5 to 8 cm thick and consisted of a compact dark brown (10YR3/3) sandy loam with 1% charcoal and dense inclusions of sandstone gravels and some tree root disturbance. Stratum IV was 10 cm thick and consisted of a compact olive brown (2.5Y4/4) sandy clay loam with inclusions of dense sandstone gravel and some tree roots. Sandstone bedrock was encountered at the base of Stratum IV.

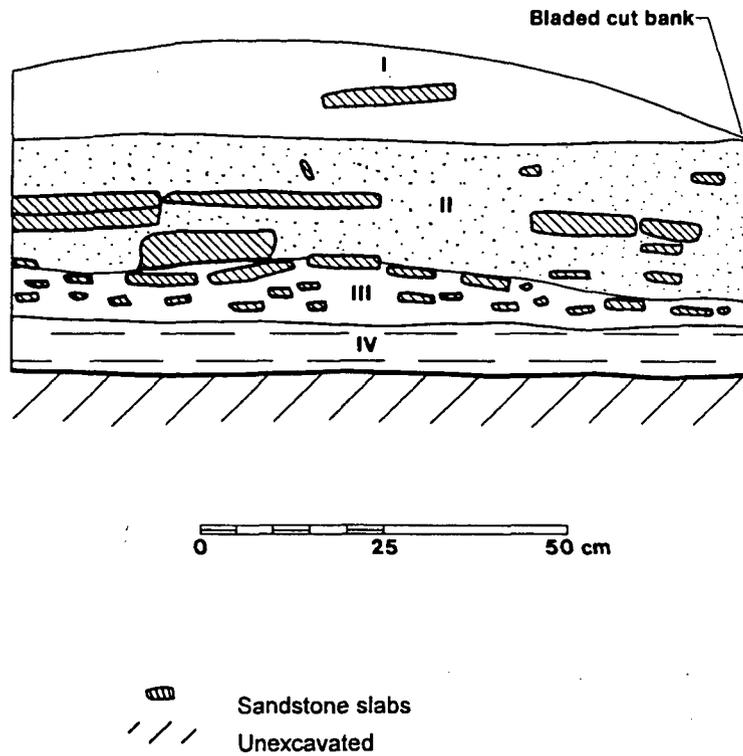


Figure 10.5. Site NM-Q-22-48, Study Unit 10, West Wall Profile.

Study Unit 11

SU 11 was a 1-by-1-m unit located at grid coordinates N105,E97. The study unit was placed south of the supposed small rubble mound to test that portion for cultural manifestations. SU 11 was excavated to a depth of 70 cm in seven levels. The west wall profile revealed three stratigraphic layers (Figure 10.6). Stratum I was 3 cm thick and consisted of an olive brown (2.5Y4/3) sandy loam with inclusions of pine needles (25%) and sandstone rocks (10%). Strata II was split into Strata IIa and IIb, essentially identical strata separated by Stratum III. Stratum IIa was 22 to 30 cm thick and consisted of a compact olive brown (2.5Y4/4) sandy loam with 25% inclusions of colluvial gravels, and tree root and rodent disturbances. Stratum III was a compact olive brown (2.5Y4/3) sandy loam with 25 to 50% inclusions of tabular sandstone rocks and colluvial gravels. Tree root disturbance was also present. Stratum IIb was at least 28 cm of a compact olive brown (2.5Y4/4) sandy loam with 25% inclusions of colluvial gravels, and tree root and rodent disturbances. Sandstone bedrock was encountered at the base of Stratum IIb. Artifacts were recovered from Levels 3 to 5. Level 3 yielded one ceramic sherd and a few historic glass fragments. Level 4 yielded some ceramic sherds. Level 5 yielded a few ceramic sherds and one piece of flaked stone.

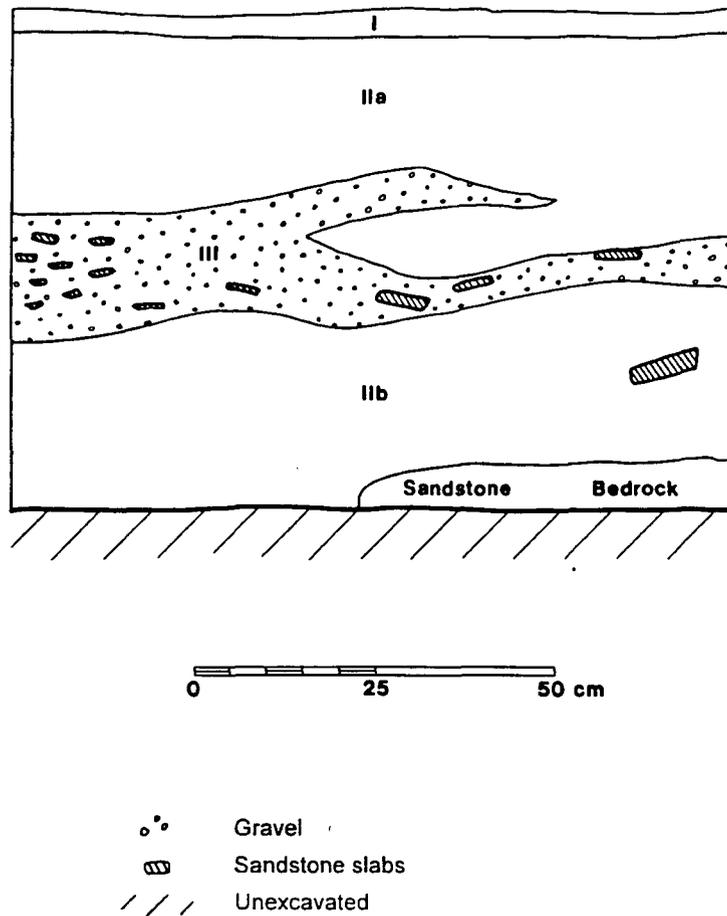


Figure 10.6. Site NM-Q-22-48, Study Unit 11, West Wall Profile.

## Study Unit 12

SU 12 was a 1-by-1-m unit located at grid coordinates N113,E100. The study unit was placed near the northeast end of the supposed rubble mound to test the diffuse ashy deposits where Feature 2 had been identified during the survey. SU 12 was excavated to a depth of 40 cm in four levels. The west wall profile revealed three stratigraphic layers (Figure 10.7). Stratum I was 5 cm thick and consisted of an olive brown (2.5Y5/4) sandy loam. Small burned rocks comprised 5% of the stratum with some root disturbance. Stratum II was 16 cm thick and consisted of a compact dark yellowish brown (10YR4/4) sandy loam with inclusions of charcoal (1%), sandstone rocks and gravels (25%), and root disturbance. Stratum III was 14 to 18 cm thick and consisted of a compact dark yellowish brown (10YR3/4) sandy loam with inclusions of dense sandstone gravels and tree root disturbance. Sandstone bedrock was encountered at the base of Stratum III. Artifacts were recovered from Levels 1 to 3. Level 1 yielded two ceramic sherds. Level 2 yielded some ceramic sherds. Level 3 yielded a few ceramic sherds and one piece of ground stone.

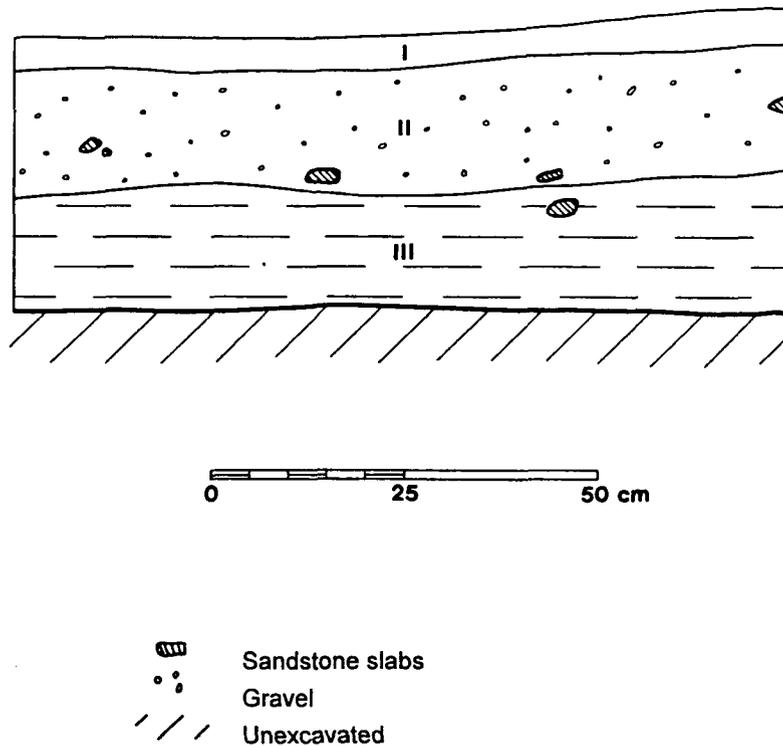


Figure 10.7. Site NM-Q-22-48, Study Unit 12, West Wall Profile.

### Study Unit 13

SU 13 was a 0.5-by-2-m unit located at grid coordinates N111,E98. The study unit was placed immediately east of SU 8 to further test the deposits of the low mound to see if any architectural elements were present. The unit was excavated to a depth of 57 cm in one level. It was felt that excavation by 10-cm levels was not necessary based on the negative data regarding cultural deposits from the other nearby units. The north wall profile revealed three stratigraphic layers (Figure 10.8). Stratum I was 5 cm thick and consisted of a loose olive brown (2.5Y4/4) sandy loam with a 10% inclusion of sandstone and root disturbance. Stratum II was 5 to 14 cm thick and consisted of a dark grayish brown (10YR4/2) sandy loam with inclusions of charcoal (5%) and of sandstone rocks (10%). A layer of tabular sandstone was noted separating Strata II and III, particularly at the west end of the trench. Stratum III was a compact olive brown (2.5Y4/4) sandy loam, 14 to 38 cm thick, with inclusions of gray clay deposits and sandstone rocks (50%) and root disturbance. Sandstone bedrock was encountered at the base of Stratum III. Ceramic, flaked lithic, and ground stone artifacts were recovered.

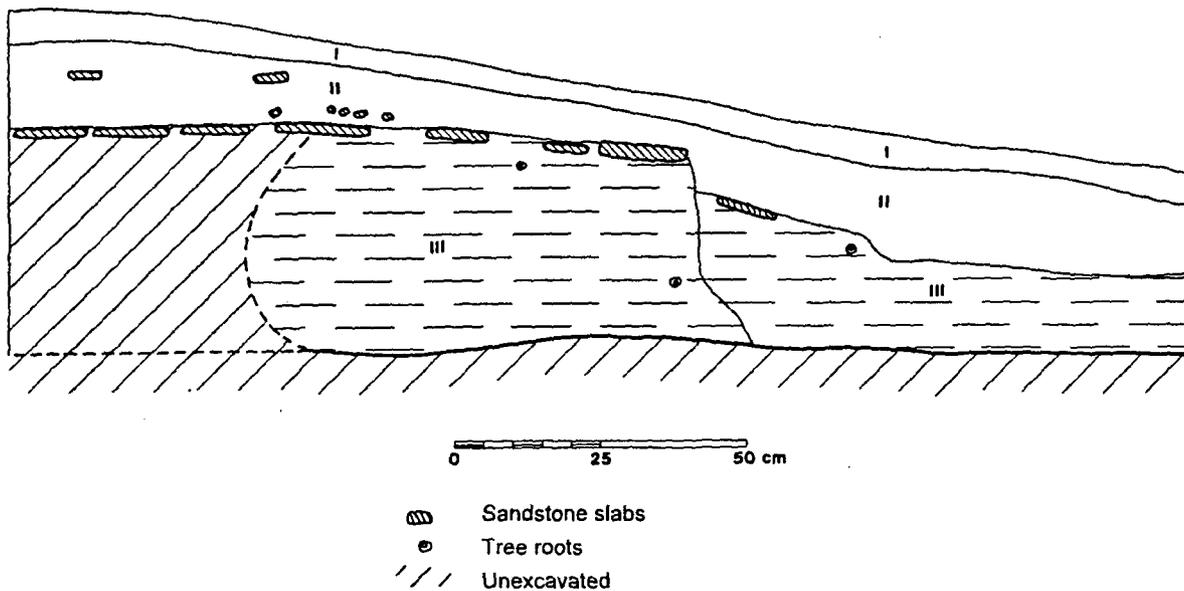


Figure 10.8. Site NM-Q-22-48, Study Unit 13, North Wall Profile.

### Study Unit 14

SU 14 was a 1-by-1-m unit at grid coordinates N115.57, E111.49. The study unit was placed along the north edge of backhoe trench SU 16 to further test and define a charcoal-flecked stain with burned pebbles seen in that trench. The unit was excavated to a depth of 113 cm in two levels. Level 1 was 99 cm thick and consisted of the overburden above the charcoal-flecked stain. Level 2 was 14 cm thick and consisted of a very dark brown (10YR2/2) sandy loam with pebbles and abundant charcoal. This charcoal lens is the same lens seen in Stratum III of SU 16, described below. No artifacts were noted or recovered in either level. A radiocarbon sample and two flotation samples were collected from the dark stain but not analyzed.

## Backhoe Trench Excavation

The mechanical excavation of seven trenches (SU 15 to 21) was conducted to explore for potential buried cultural deposits on site NM-Q-22-48. A backhoe with a 61-cm-wide (2-ft-wide) bucket was employed to excavate soil deposits deeper, over a broader area, and in a shorter time span than could be practically completed by hand. Trench excavation was closely monitored by a ZCRE archaeologist. Excavation was halted whenever a closer inspection of the trench walls or bottom was deemed necessary by the monitor. Backhoe trenches at NM-Q-22-48 ranged in length from 6 to 14 m and ranged in maximum depth from 60 to 180 cm. A total of 61.3 m of trenches was excavated. Two or three representative soil profiles were drawn for each trench, with a total of 18 trench profiles drawn at site NM-Q-22-48. The location of identified features and the results of hand excavations generally guided the placement and length of backhoe trenches.

### Study Unit 15

SU 15 was the northeasternmost trench dug at site NM-Q-22-48. It was located 3 m from the southeast cut bank of the N11 roadbed and oriented parallel to it. SU 15 extended 8.6 m from N120.26,E105.71 northeast to N127.47,E110.39. Three 1-m-wide profiles (A-A', B-B', and C-C') were drawn of the southeast wall of the trench revealing three strata (Figure 10.9). Stratum I was 6 to 12 cm thick and consisted of a light olive brown (2.5Y4/4) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum II was 18 to 34 cm thick and consisted of a yellowish brown (10YR5/4) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III consisted of a light yellowish brown (2.5Y6/3) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III was at least 52 to 105 cm thick in profiles A-A' and C-C' and 122 cm thick in profile B-B'.

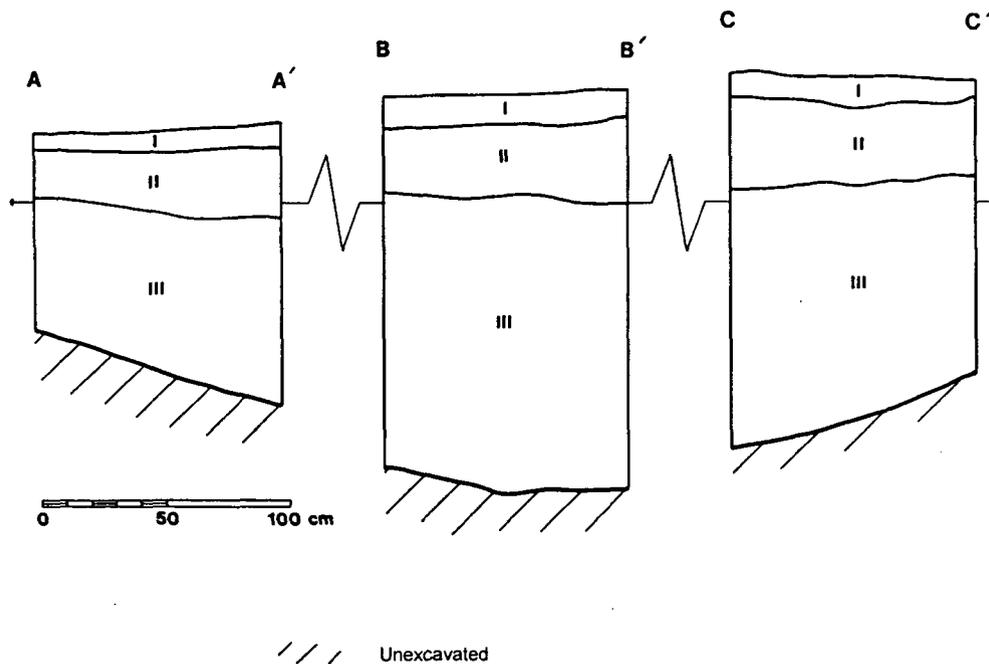


Figure 10.9. Site NM-Q-22-48, Study Unit 15, Southeast Wall Profile A-A', B-B' and C-C'.

Study Unit 16

SU 16 was located on the south side of SU 15 near the eastern right-of-way boundary. The trench extended 12.4 m from N114.34, E116.85 westward to N117.24, E105.21. Three 1-m-wide profiles (D-D', E-E', and F-F') were drawn of the south wall of the trench and three strata were identified in the profile (Figure 10.10). Stratum I consisted of a light olive brown (2.5Y5/4) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum I was at least 6 to 12 cm thick in profiles D-D' and F-F' and 8 to 24 cm thick in profile E-E'. Stratum II consisted of a light olive brown (2.5Y5/4) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum II was 22 to 48 cm thick in profile D-D' and 38 to 50 cm thick in profiles E-E' and F-F'. Stratum III consisted of a pale yellow (2.5Y8/3) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III was 72 cm thick in profile D-D', 76 to 98 cm thick in profile E-E', and 76 to 88 cm thick in profile F-F'. Stratum III also exhibited a 6-to-10-cm-thick layer of dark charcoal stain mixed with a very dark brown (10YR2/2) sandy loam. It was present in profiles D-D' and E-E'. Apparently burned sandstone pebbles were also noted in the matrix. As mentioned above, this layer also appeared in SU 14 from 99 to 113 cm below the surface. It was believed that this charcoal-flecked lens may represent a cultural deposit.

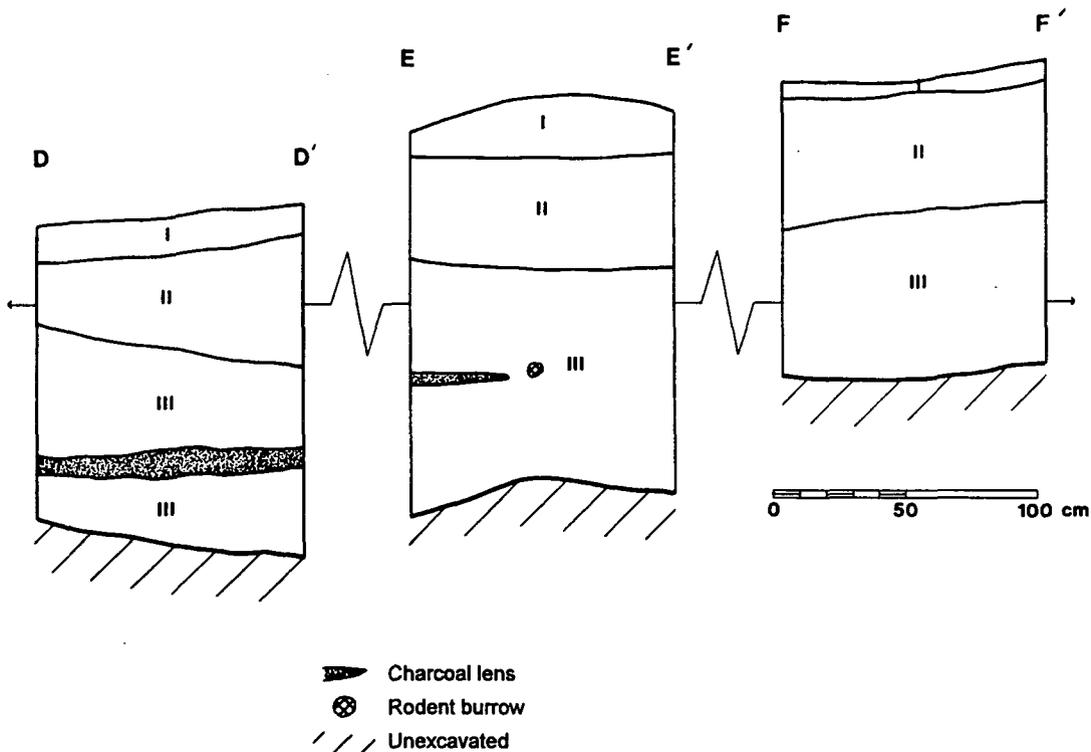


Figure 10.10. Site NM-Q-22-48, Study Unit 16, South Wall Profiles D-D', E-E', and F-F'.

Study Unit 17

SU 17 was located immediately east of the supposed rubble mound. The study unit extended 8 m from N105.57, E101.99 northward to N112.88, E105.24. Three 1-m-wide profiles (G-G', H-H', and I-I') were drawn of the northwest wall of the trench and three strata were identified (Figure 10.11). Stratum I was a light olive brown (2.5Y5/4) sandy loam, with inclusions of sandstone gravels and root disturbance. Stratum I was 8 cm thick in profile G-G', 8 to 14 cm thick in profile H-H', and 5 cm thick in profile I-I'. Stratum II consisted of an olive brown (2.5Y4/4) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum II was 51 cm thick in profile G-G', 20 cm thick in profile H-H', and 26 cm thick in profile I-I'. In profile G-G' tabular sandstone and gray platy clay separated Strata II and III. Stratum III consisted of a pale yellow (2.5Y7/3) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III was 20 to 60 cm thick in profile G-G', 70 cm thick in profile H-H', and 60 cm thick in profile I-I'. A 10 to 15 cm layer of the gray platy clay was noted in Stratum III in Profile H-H'. The platy clay layer was not observed in Profile I-I'. The platy clay layer was not observed in Profile I-I'.

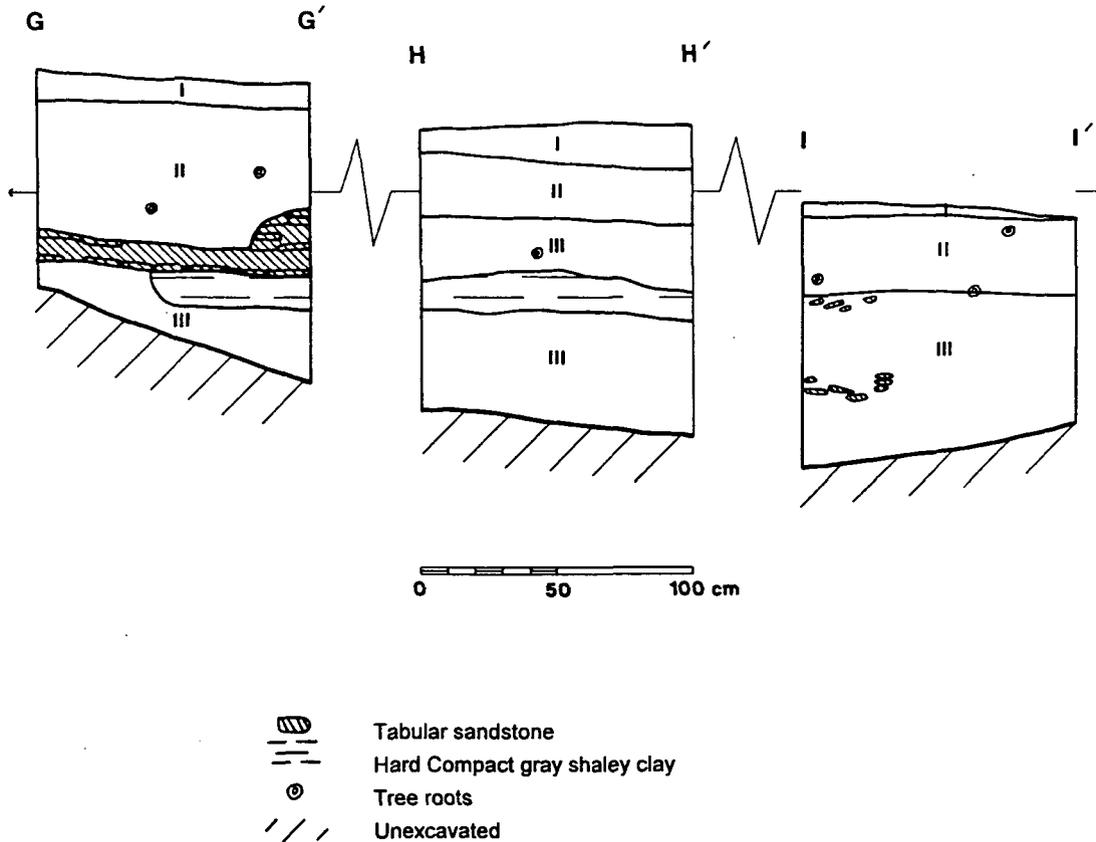


Figure 10.11. Site NM-Q-22-48, Study Unit 17, Northwest Wall Profiles G-G', H-H', and I-I'.

## Study Unit 18

SU 18 was located along the eastern cut bank of N11 southwest of the supposed rubble mound. The study unit extended 4.3 m from N107.05, E92.05 southeast to N105.37, E96.10. Two 1-m-wide profiles (J-J' and K-K') were drawn of the northeast wall of the trench and three strata were identified (Figure 10.12). Stratum I was 4 to 8 cm thick and consisted of a light olive brown (2.5Y5/4) sandy loam, with inclusions of sandstone gravels and root disturbance. Stratum II consists of an olive brown (2.5Y4/3) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III consisted of a light olive brown (2.5Y5/3) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III lay on sandstone bedrock which is shown in profile J-J'. Stratum III was at least 20 to 30 cm thick.

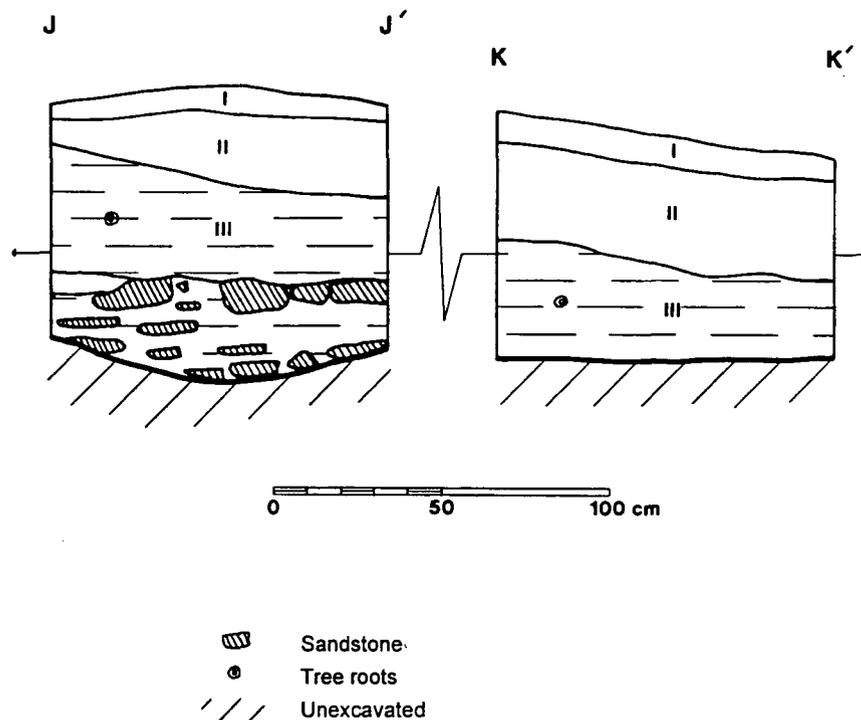


Figure 10.12. Site NM-Q-22-48, Study Unit 18, Northeast Wall Profiles J-J', and K-K'.

## Study Unit 19

SU 19 was located south of the supposed rubble mound and extended from the cut bank almost to the edge of the southeast right-of-way boundary. The study unit extended 14 m from N102.77, E90.60 southeast to N98.86, E104.29. Three 1-m-wide profiles (L-L', M-M', and N-N') were drawn of the south wall of the trench and three strata were identified (Figure 10.13). Stratum I was 10 cm thick and consisted of a light olive brown (2.5Y5/4) sandy loam, with inclusions of sandstone gravels and root disturbance. Stratum II consisted of a light olive brown (2.5Y5/4) sandy loam, with

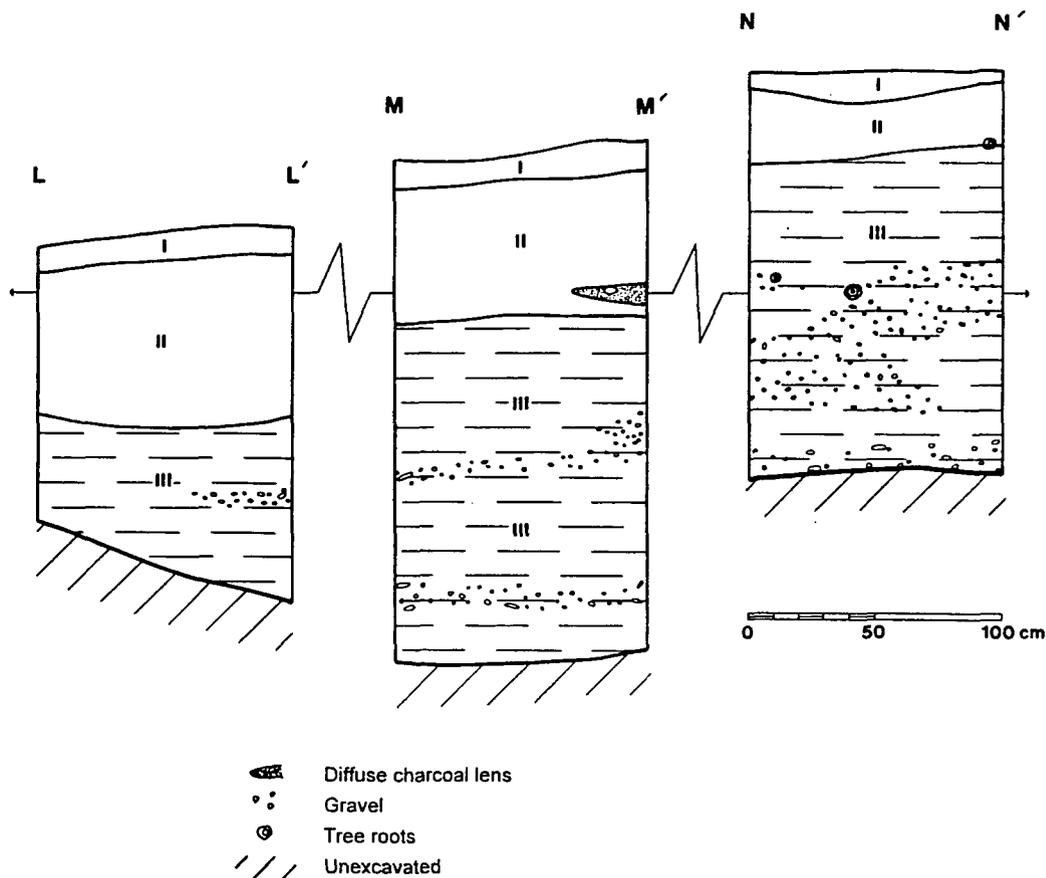


Figure 10.13. Site NM-Q-22-48, Study Unit 19, South Wall Profiles L-L', and M-M', and N-N'.

inclusions of sandstone gravels and root disturbance. Stratum II was 66 cm thick in profile L-L', 54 cm thick in profile M-M', and 20 to 30 cm thick in profile N-N'. A small diffuse charcoal lens was noted near the bottom of Stratum II in Profile M-M'. It was determined to be noncultural. Stratum III consisted of a light olive brown (2.5Y5/4) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III was 56 cm thick in profile L-L', 138 cm thick in profile M-M', and 124 cm thick in profile N-N'.

### Study Unit 20

SU 20 was located near the southeast cut bank of N11, south of SU 19. The study unit extended 8 m from N91.50, E93.47 northwest to N95.74, E86.69. Two 1-m-wide profiles (O-O' and P-P') were drawn of the northeast wall of the trench and three strata were identified (Figure 10.14). Stratum I was 10 cm thick and consisted of a light olive brown (2.5Y5/4) sandy loam, with inclusions of sandstone gravels and root disturbance. Stratum II consisted of a light olive brown (2.5Y5/4) sandy loam, with inclusions of sandstone gravels and root disturbance. A large tree root was noted near the bottom of Stratum II. Stratum II was 64 cm thick in profile O-O' and 84 cm thick in profile P-P'. Stratum III consisted of a light olive brown (2.5Y5/4) sandy loam, with inclusions of sandstone gravels and root disturbance. Stratum III was 80 cm thick in profile O-O' and 60 to 76 cm thick in profile P-P'.

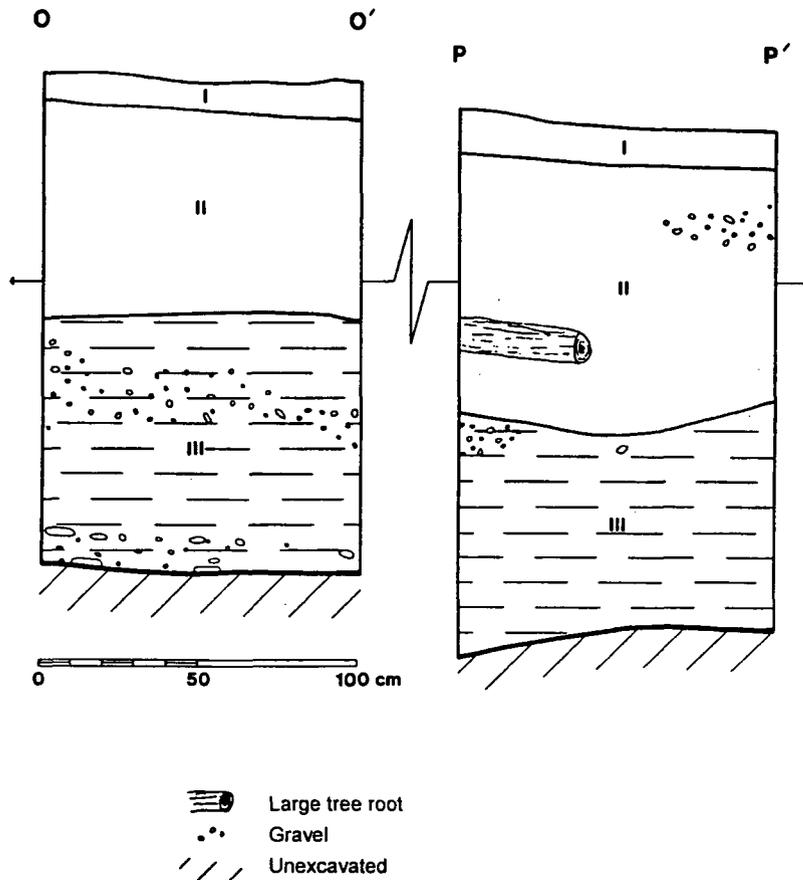


Figure 10.14. Site NM-Q-22-48, Study Unit 20, Northeast Wall Profiles O-O' and P-P'.

### Study Unit 21

SU 21 was the furthest southwest of the backhoe trenches and was oriented perpendicular to the cut bank. The study unit extended 6 m from N77.43, E81.77 northwest to N80.34, E76.52. Two 1-m-wide profiles (Q-Q' and R-R') were drawn of the northeast wall (Figure 10.15). Three strata were identified in profile Q-Q' and two strata were identified in profile R-R'. Stratum I was present in both profiles and consisted of a light olive brown (2.5Y5/4) sandy loam, with inclusions of sandstone gravels and root disturbance. Stratum I was 8 cm thick in profile Q-Q' and 20 cm thick in profile R-R'. Stratum II was present in both profiles and consisted of an olive brown (2.5Y4/4) sandy loam, with inclusions of sandstone gravels and root disturbance. Stratum II was 22 cm thick in profile Q-Q' and 10 cm thick in profile R-R'. Stratum III was only present in profile Q-Q' and consisted of a light yellowish brown (2.5Y6/4) sandy loam with inclusions of sandstone gravels and root disturbance. Stratum III was at least 34 cm thick.

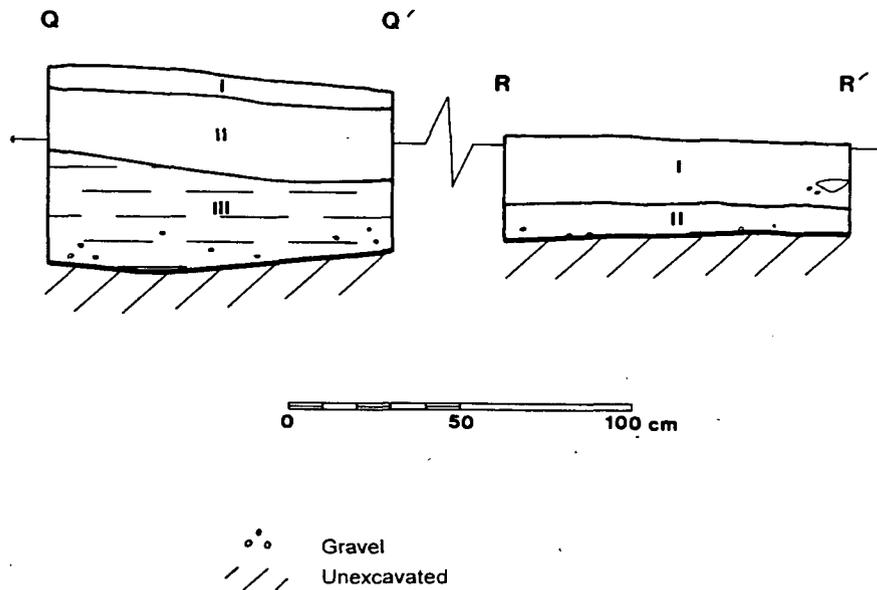


Figure 10.15. Site NM-Q-22-48, Study Unit 21, Northeast Wall Profiles Q-Q', and R-R'.

### SUMMARY AND INTERPRETATIONS

The investigations at site NM-Q-22-48 revealed a site with modern severe adverse impacts and less cultural presence than was originally thought. Excavation revealed disturbances from the maintenance grading along N11. Those units along the cut bank showed evidence of disturbed soil profiles. The grading has impacted the site in two ways: first, by removal of intact soil deposits, and second, by reburying portions of the site with soil dragged in from other locations. The latter may be exemplified by the presence of multiple layers of the same strata as seen in Figures 10.3, 10.6, or 10.11. The site surveyors (Zimmerman and Abbott 1996) suggested the possibility of a small roomblock at this location. Excavation revealed the sandstone rock slabs thought to be part of a slab floor (called Feature 1) are noncultural and are, in fact, exposures of the local sandstone bedrock. The testing has revealed that no architectural elements are present at this site at all. The testing phase of excavation could not relocate the charcoal stain identified as Feature 2 in the survey. Nevertheless, SU 9 was excavated in the approximate location, but did not detect any cultural material or manifestations.

Despite the adverse impacts that have occurred at site NM-Q-22-48, portions of it retain integrity. Intact soil profiles were identified at locations removed from the cut bank. One potential cultural feature (a buried layer of charcoal-stained soil) was identified in SU 14 and 16. This feature lies deeper than any of the other cultural material investigated at this site and may represent an occupation earlier than the Pueblo II period identified during the survey. However, since this appears to be an isolated charcoal lens with no associated artifacts, and therefore questionable cultural association, analysis of the radiocarbon and flotation samples was not performed. Furthermore, the

presence and types of artifacts indicate that some activity occurred here during the Pueblo II period. The small size and limited quantity of artifacts indicates a relatively limited use and/or short period of occupation.

The original assumption of a small masonry structure and a small ceramic-dominated assemblage led to the presumption that this site might represent a fieldhouse. The site's location in the bottom of a valley supported this interpretation. Fieldhouses are often described as small structures located near agricultural fields and used for shelter during the growing season. The soil in the valley would have been suitable for agriculture and the topography of the valley would have helped to channel water resources to allow successful crop-raising. The authors observed a number of small (less than 2 ha or 5 ac) Navajo corn plots in the vicinity during the course of the project. Additionally, the artifact assemblages of fieldhouse sites tend to be dominated by jar fragments. Reed and Goff (Chapter 25) identified 86% of the ceramics from this site as jars.

As noted above, fieldhouses are often thought of as small one room masonry structures with low-density artifact assemblages. Sebastian (1983:403), however, points out that the results from the Navajo Mine Archaeological Program showed that there was quite a variation in what constituted a fieldhouse. She notes that they range from multiple room masonry structures to masonry half-walls with wooden superstructure, to ramadas, to lean-tos, to stacked-brush shades. She also notes that there is considerable morphological overlap between fieldhouses and gathering camps. The latter were often distinguished from the former by the lack of architecture. As Sebastian describes it, the function of site NM-Q-22-48 might fall into either category.

From the quantity and type of artifacts in the assemblage, a short-term or seasonal habitation during the Late Pueblo II to III period is suggested. The assemblage also may reflect multiple activities occurring at the site. The utility wares indicate transport, storage, and processing of foodstuffs. A two-hand mano indicates processing of grain-type foods. The possible polishing stone may have been used in ceramic production, and the few lithic flakes indicate chipped stone tool modification and utilization.

## RECOMMENDATIONS

It is recommended that no further archaeological investigations are necessary at this site. This recommendation is based on the facts that portions of the site have had severe adverse impacts, and the remaining intact portions have been sufficiently investigated and documented. The site was determined to contain limited research potential in the form of potential cultural deposits seen in SU 14 and 16. Therefore, in the event that other undiscovered cultural features are present, monitoring of construction activities by an archaeologist is recommended.

## Chapter 11

### SITE NM-Q-22-51 (LA 110314)

#### Harding Polk II

Site NM-Q-22-51 is located in the N11 roadbed at a point where the proposed N11(2) roadbed begins to diverge to a more northeasterly direction. The site is situated approximately halfway between the near-vertical sandstone cliffs to the northwest and the alluvial flats to the southeast. The drainage forms the headwaters of a small unnamed valley draining to the Rio Puerco of the West. The site is situated at an elevation of 2262 m (7420 ft) with the surrounding cliffs rising to over 2408 m (7900 ft). There is no vegetation on the site proper; however, there are two distinct zones of vegetation that border the road. An adjacent right-of-way fence delineates zones of disturbance (within the right-of-way) and nondisturbance (outside the right-of-way). Within the right-of-way the vegetation consists of grasses and forbs such as slender wheatgrass (*Agropyron trachycaulum*), Russian thistle (*Salsola kali*), morning glory (*Ipomoea* spp.), globemallow (*Sphairalcea* spp.), desert sunflower (*Gerea canescens*), and cowpen daisy (*Verbesina encelioides*). Outside the right-of-way the vegetation is dominated by sagebrush (*Artemisia*), with lesser quantities of fourwing saltbush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), winterfat (*Eurotia lanata*), blue grama grass (*Bouteloua gracilis*), slender wheatgrass (*Agropyron trachycaulum*), and purple aster (*Aster* spp.). A pinyon and juniper woodland forms an overstory between N11 and the base of the cliffs.

#### SURVEY DATA

Site NM-Q-22-51 was recorded in 1995 by Zuni Cultural Resource Enterprise (ZCRE) as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping and photography. Site NM-Q-22-51 consisted of one feature (Feature 1) comprising three rock wall alignments. The first alignment was 6 m long and ran northeast-to-southwest, roughly parallel to the road (The location of this alignment is shown in Zimmerman and Abbott 1996:Figure 6.10). The other two lay 4 m southwest of the first and perpendicular to it across the road (northwest-to-southeast). These two alignments were approximately 3.5 m long and lay 0.8 m apart parallel to each other. Site NM-Q-22-51 has been severely impacted over time from maintenance grading activities along N11. The extent of damage could not be determined at this level of investigation. The site was tentatively determined to represent a Pueblo II to III period ancestral Pueblo occupation based on the rock alignments and the presence of other Pueblo II to III architectural sites in the area. Alternatively, ethnographic data were interpreted as evidence that this site is a historic cattle guard or culvert structure dating to the 20th century.

#### NATURE AND EXTENT TESTING

On 28 July 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent and content of site NM-Q-22-51. Subsurface investigations consisted of backhoe excavation of the area around the two smaller parallel rock alignments (The other rock

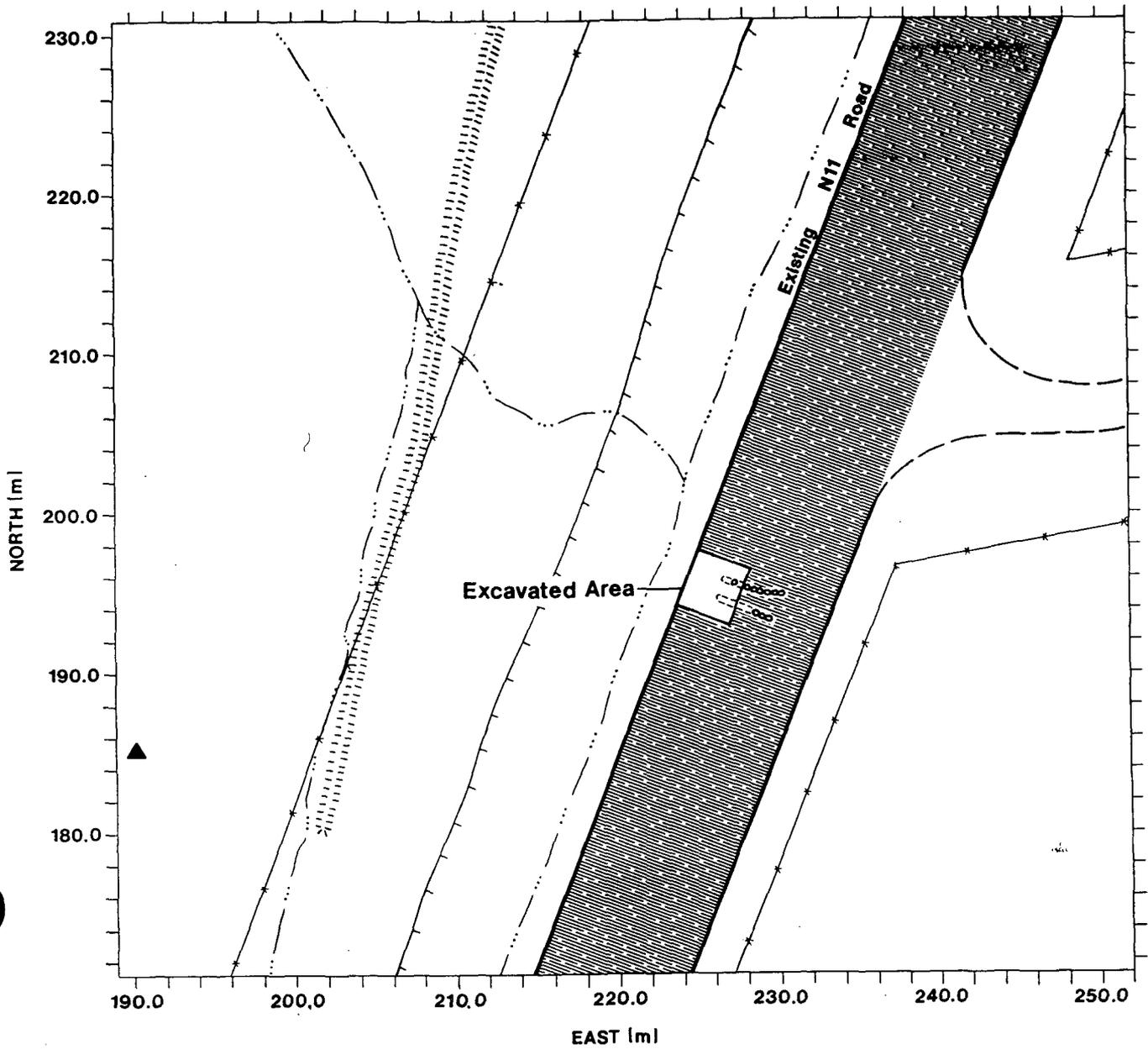
alignment is discussed below in the Summary and Interpretations section). The excavated area extended from approximately the middle of the N11 roadbed to near the northwest shoulder of the road. No surface artifacts were observed to be associated with the rock alignments during either the survey or testing, therefore no surface collection was necessary. It was decided that the initial use of mechanical excavation was the most expedient method of testing, and would immediately resolve whether the feature was historic or prehistoric. Once the nature of the site was established, further investigation at site NM-Q-22-51 could proceed as necessary.

Mechanical excavation was conducted to further expose the rock alignments visible in the N11 roadbed at site NM-Q-22-51 (Figure 11.1). A backhoe with a 61-cm-wide (2-ft-wide) bucket was employed to excavate soil deposits 61 cm deeper and over a broader area than could be practically completed by hand. There were several impediments to hand excavation. Since this is an actively used road, the soil surrounding the rock alignments has become extremely compact and would have been very difficult to excavate by hand, but easily excavated with a backhoe. Prolonged hand excavation would have exposed crewmembers to unnecessary risk of N11 traffic. Furthermore, the contract stipulated that excavation units could not be left open overnight within the roadbed, necessitating quick excavation and backfilling. Mechanical excavation was closely monitored by a ZCRE archaeologist. Excavation was halted whenever a closer inspection of the trench walls or bottom was deemed necessary by the monitor.

Excavation was begun on the northwest side of N11 between the two parallel wall alignments of Feature 1. Both faces of the two walls were exposed. An area approximately 2.5 by 3.0 m was excavated to a depth of approximately 1 m. Excavation revealed the squared-off northwest ends of the two walls (Figure 11.2). The walls stand 1.3 m apart. The walls are 40 cm wide and constructed of shaped and squared sandstone. Sections 1.2 m long of both walls were exposed. The walls were constructed of dry-laid masonry (approximately 40 cm in height). The northern wall had four courses and the southern wall had three courses (Figure 11.3). Remnants of an additional course were visible on both walls, but it could not be determined whether that represented the top course or additional courses were above that. The walls were constructed on the natural clayey subsoil with no formal foundation prepared for them. A spike at least 15 cm (6 in) long was the only artifact noted in association with the walls. The spike was seen briefly in the backdirt and was subsequently covered with more backdirt before it could be collected or examined more closely.

## SUMMARY AND INTERPRETATION

Excavation and exposure of two of the three rock alignments at site NM-Q-22-51 revealed the squared ends of two dry-laid walls which had been truncated by road grading. Based on an examination of the walls it is believed that this site represents the lower remains of a historic culvert and/or cattle guard structure. There are several factors that lead to this conclusion. First, there was no connecting masonry between the walls as might be expected for an enclosed structure such as a habitation or other similar type of enclosed structure. Secondly, no foundation was prepared for the walls, thus these were not believed to be loadbearing walls such as would be seen in an enclosed structure or even freestanding walls of substantial height. (Lekson [1984:15] points out that even nonloadbearing walls of Chacoan architecture have prepared foundations). Thirdly, although no definitive association of the spike to the walls could be made, from the general proximity it is



- ▲ Site datum
- Wall alignment (Feature 1)
- x—x— Fence line
- Dirt road
- Berm
- >—>— Drainage
- |—|— Road cut bank

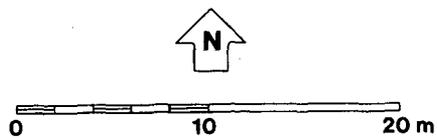


Figure 11.1. Site NM-Q-22-51, Nature and Extent Testing.

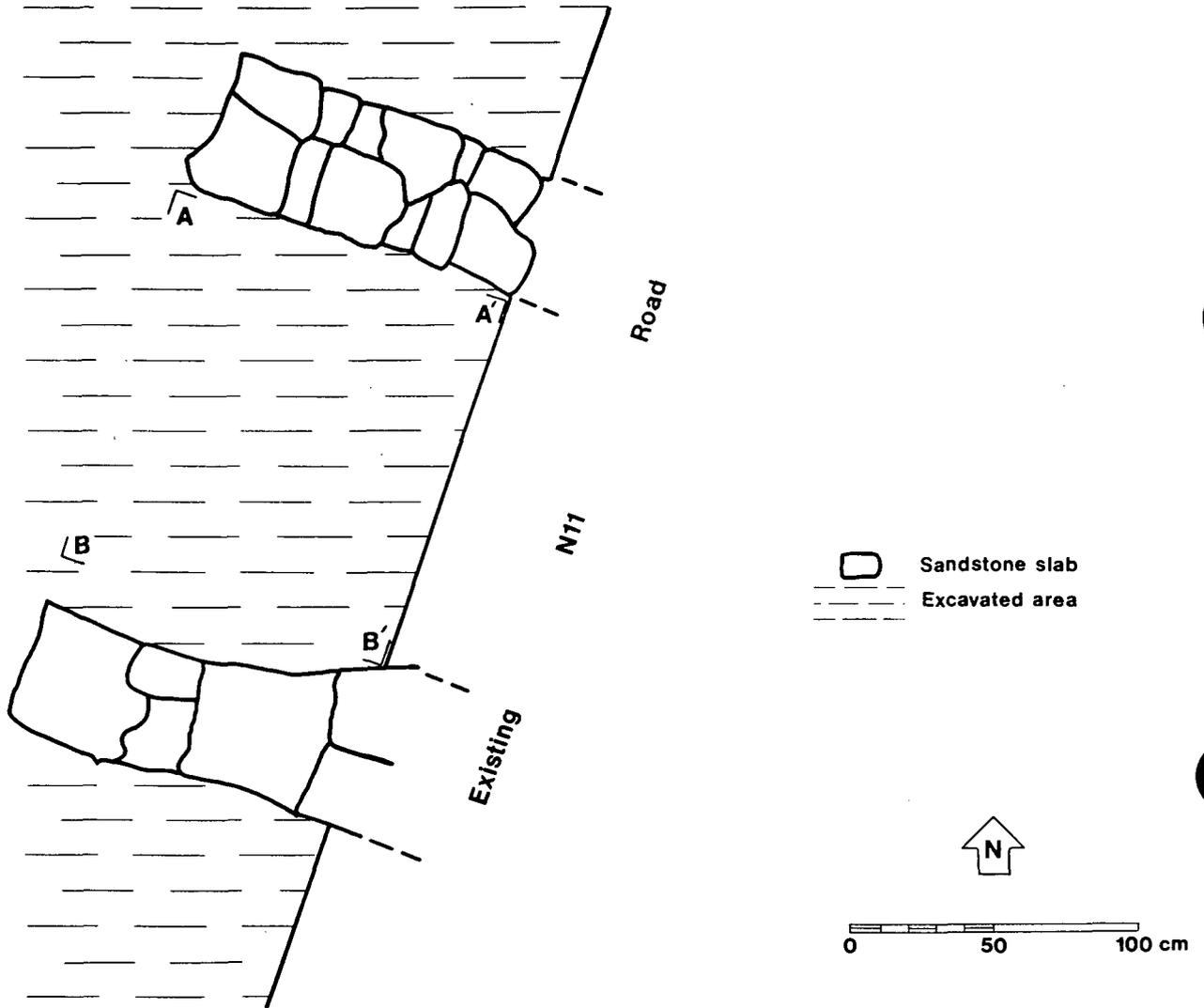
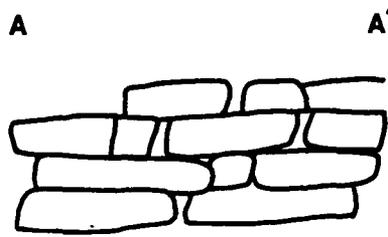


Figure 11.2. Site NM-Q-22-51, Plan View of Western Ends of Two Exposed Wall Segments.

**Cross Section A-A'**



**Cross Section B-B'**

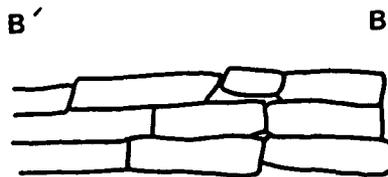
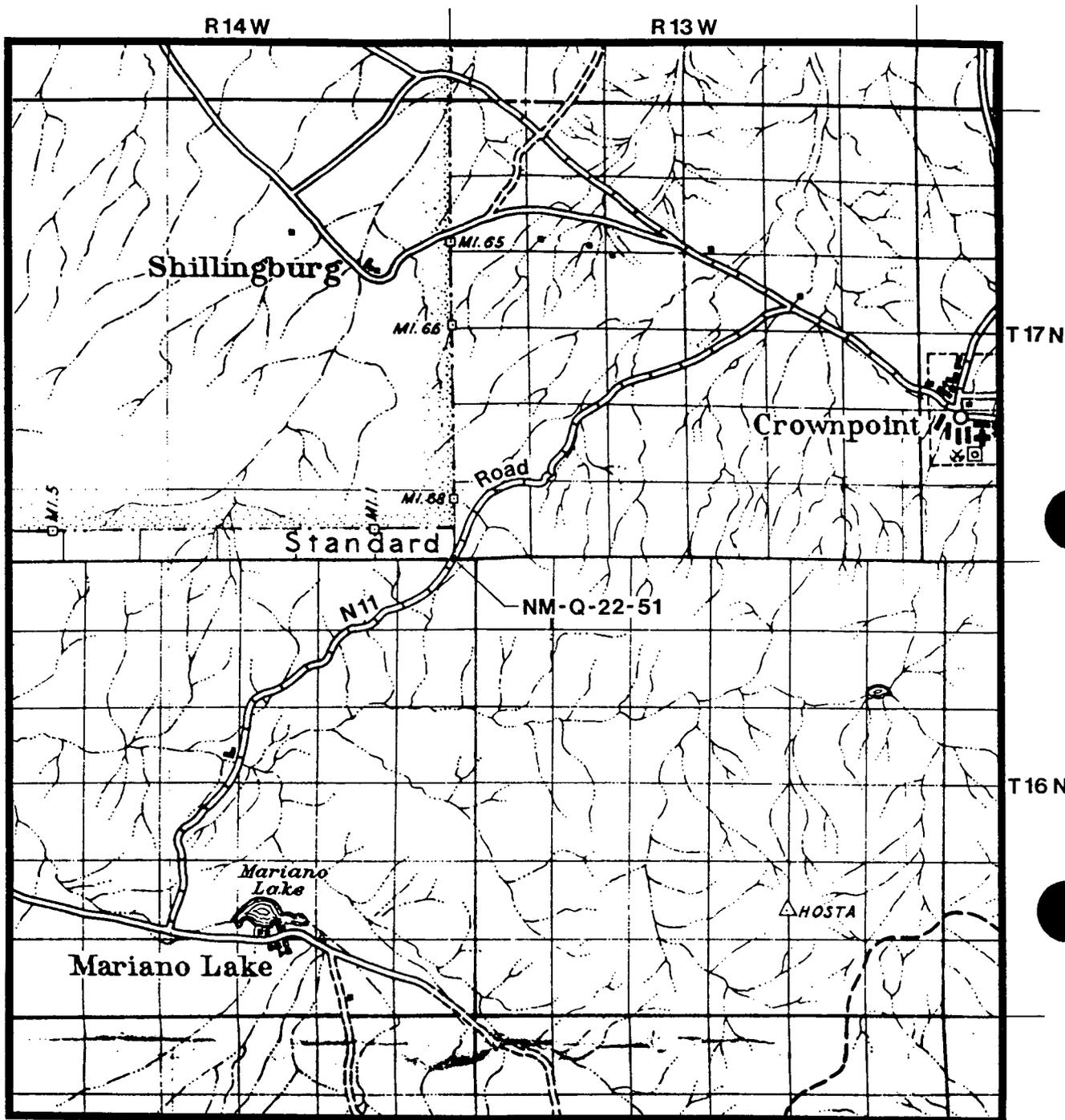


Figure 11.3. Site NM-Q-22-51, Cross Sections A-A' and B-B' of Exposed Wall Segments.



Taken from New Mexico State Highway Department, GENERAL HIGHWAY MAP, MCKINLEY CO., NM [1938]

-  Graded and drained road
-  Archaeological site

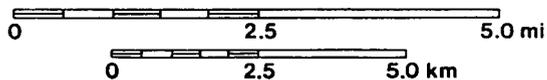


Figure 11.4. General Highway Map, McKinley County, 1938.

suggested that the spike might have been used in the construction of a wooden span or framework for a railroad-iron cattle guard to allow traffic to pass over it. Fourthly, the structure is located precisely on a section and township line with a fence line extending due eastward from N11 along that section line. Fence lines typically follow section lines and utilize cattle guards rather than gates where they intersect roads, particularly with well-trafficked roads.

The construction style does not appear to reflect the identified formally coursed Chacoan styles of wall construction, but more resembles historic rough-coursed construction styles. It is likely that this structure was built in the first half of the 20th century and possibly as one of the public works projects during the Depression era. During the Depression numerous Civilian Conservation Corps (CCC) camps operated in this region. Roberts and Roberts (1988:184) note that there were special CCC camps for young Indians to work on flood-control and irrigation projects. It was typical during that period to construct culverts, bridges, and other structures using locally available resources (i.e., sandstone). The workmanship was often quite skillful as can be seen at this site and others along N11, as well as others in the region (cf. Polk 1993). The N11 road was possibly built during the Depression era. The post-World War II period saw an increased use of galvanized steel corrugated culvert pipes. If this feature were constructed after World War II one would expect to see such a culvert here. Since there is no evidence of a culvert pipe it can be assumed that this structure was constructed before 1940.

There is reason to believe that N11 is a relatively young road. Several turn-of-the-twentieth-century regional maps (found in the collection of the Map and Geography Information Center of the University of New Mexico's Centennial Engineering Library) do not depict the road at all. However, a 1938 McKinley County map in the same collection depicts the road as a graded and drained road (Figure 11.4). Although the map is quite detailed, it unfortunately did not have specific symbols for cattle guards or culverts.

The 6-m-long alignment of rocks oriented parallel with the roadbed also requires interpretation. This is likely the result of the routine maintenance grading. During the course of this project the author was able to see the results of grading on this and other parts of the road. In other locations along N11 rocks were turned up and consequently transported to the shoulder of the road by the grader's blade. The result was linear alignments of widely spaced rocks very similar in appearance to the single alignment observed at this site. Repeated grading and reshuffling of the roadbed dirt would rebury the mechanically aligned rocks which could be reexposed with erosion or later grading, thus giving the appearance of a buried rock alignment.

It is concluded that this site represents a culvert or cattle guard constructed prior to World War II, probably during the Depression era, possibly by a Civilian Conservation Corps unit. The feature has suffered severe impacts from routine grading to maintain N11. The upper portions have been truncated with an unknown portion removed; however, the lower elements of the structure appear intact. At a minimum, the wood or iron span between the walls has been long since removed. More likely the span and at least one masonry course have been removed and the channel between them filled.

## RECOMMENDATIONS

It is recommended that no further archaeological investigations are necessary to mitigate the further impacts of road construction at site NM-Q-22-51. This recommendation is based on the facts that the site has been severely impacted, its remains have been sufficiently documented, and other examples of this type of structure are present along N11. Although no additional archaeological investigations are recommended, additional historical research should be conducted to further document this site, N11, and other features like this along the route. Research might involve records and map searches at Navajo Nation Roads Department, McKinley County Roads Department, and various state or federal agencies or archival repositories.

## Chapter 12

### SITE NM-Q-22-52 (LA 110315)

#### Harding Polk II

Site NM-Q-22-52 is located adjacent to N11 near the headwaters of a small but broad, unnamed alluvial valley bordered by sheer-edged sandstone mesas. The site is situated at an elevation of 2263 m (7425 ft) but the surrounding mesas rise to over 2408 m (7900 ft). The valley drains to the southwest towards the Rio Puerco of the West 3.5 km (2.2 mi) away. Vegetation at the site is dominated by sagebrush (*Artemisia* spp.), with lesser quantities of fourwing saltbush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), fringed sagebrush (*Artemisia frigida*), Indian ricegrass (*Oryzopsis hymenoides*), grama grass (*Bouteloua* spp.), prickly pear cactus (*Opuntia* spp.), and various forbs. A small cluster of wolfberry bushes (*Symphoricarpos oreophilus*) were noted at the highest portion of the site along the N11 right-of-way. Young pinyon (*Pinus edulis*) have proliferated across the site and are particularly concentrated around the south and southeast portions of the site.

#### SURVEY DATA

Site NM-Q-22-52 was originally recorded by American Indian Cultural Consultants (AICC 1982) as N11-5. Site NM-Q-22-52 was rerecorded in 1995 by Zuni Cultural Resource Enterprise (ZCRE) as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping, in-field artifact analyses, and photography. The in-field analyses included assessment of lithic artifact reduction and material identification, ceramic identification, artifact counts, and gross surface distribution mapping of artifacts. ZCRE recorded the site as a lithic and ceramic artifact scatter of moderate density (100 to 200 artifacts). Ceramics identified at the site included Red Mesa, Gallup, and Puerco black-on-whites, indented corrugated grayware, neckbanded corrugated grayware, plain grayware, and possibly Kiatuthlanna Black-on-white. Based on the ceramics the site was determined to represent a Pueblo II period ancestral Pueblo occupation dating between AD 900 and 1150. The condition of the site was believed to be stable with some maintenance grading impacts along its northwest edge.

#### NATURE AND EXTENT TESTING

From 6 May to 16 June 1997 personnel from ZCRE conducted Phase I Data Recovery testing to more precisely determine the boundaries, depth of deposits, date(s) of occupation, and nature of occupation or activities at site NM-Q-22-52. A redefinition of the site boundaries and a complete surface collection of all artifacts within the right-of-way were conducted. Subsurface investigations included hand excavation of 17 test units totaling 20.875 sq m and backhoe excavation of eight trenches totaling 144.75 m. Site boundaries were expanded to the north and southeast of those defined during the survey (Figure 12.1).

To aid in organization of the investigation of the site, the site is divided into a number of study units. Study units are arbitrary designations of space in which the investigator wants to direct special focus. It can encompass as much or as little area as deemed necessary by the investigator.

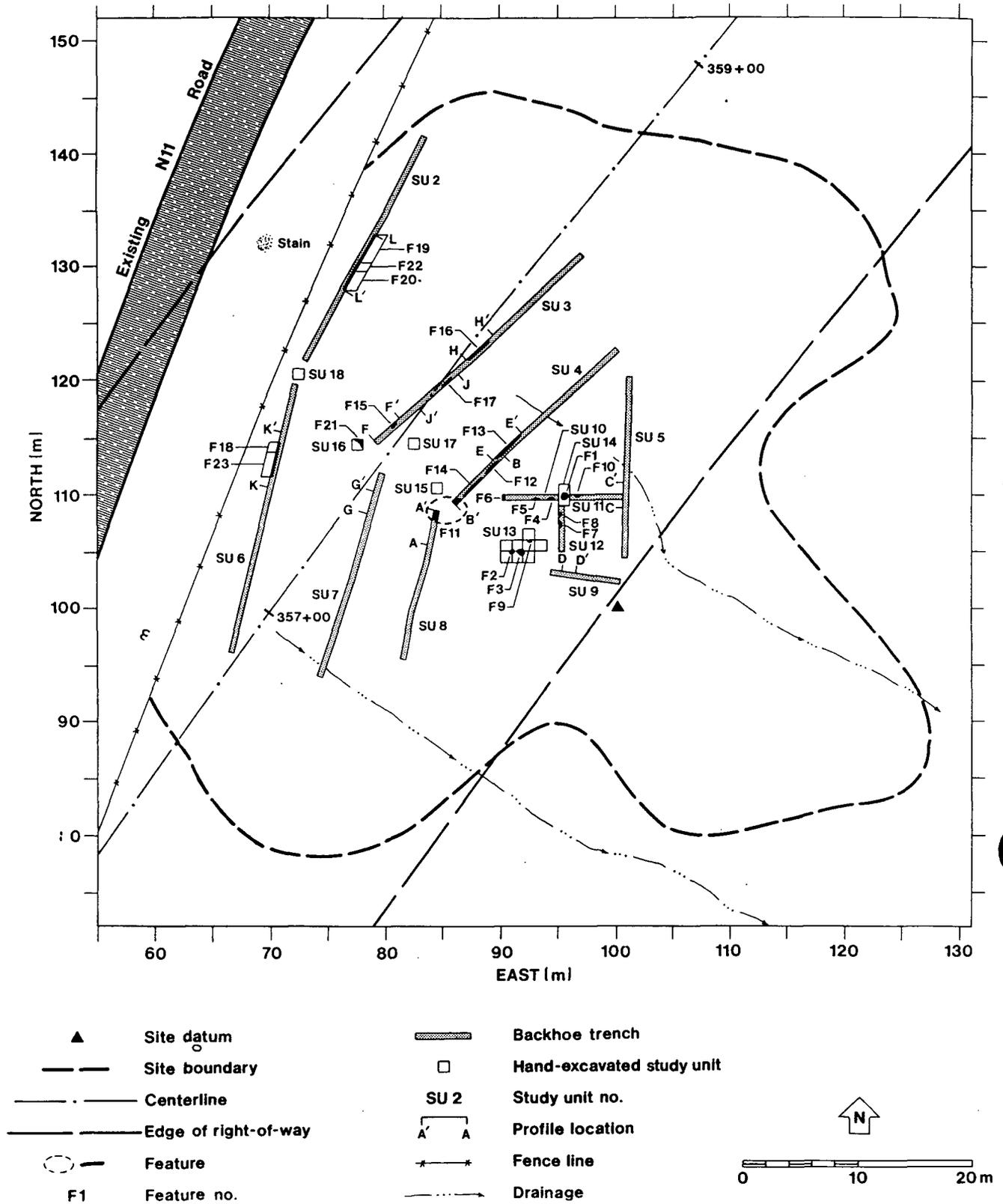


Figure 12.1. Site NM-Q-22-52, Nature and Extent Testing.

That focus may be a feature, a single excavation unit, a group of excavation units, a backhoe trench, a surface collection area, or even the entire site. At this site SU 1 was assigned as a general site wide study unit. Consequently one study unit may be situated within another. At a minimum each excavation unit and backhoe trench has been designated with a study unit (SU) number.

### Surface Collection

Surface artifacts were collected from an area encompassing 3775 sq m at site NM-Q-22-52 (Figure 12.2). The surface collection area was defined on the southeast edge by the right-of-way boundary and on the northwest side by a barbed wire fence roughly demarcating the present N11 right-of-way. This provided a useful boundary since no artifacts were noted between the fence and the N11 roadbed. Surface collection units of 25 sq m and 100 sq m were utilized. For those collection units that partially extended beyond the fence or outside the right-of-way, only that portion within the right-of-way was collected and the recorded surface area reflected the actual area collected. North of the main site datum (MSD; N100,E100) and encompassing the core of the site, 5-by-5-m collection units were utilized (n=103), however, southwest of datum, in a more peripheral area with less artifact density, the collection units were enlarged to 10-by-10-m units (n=12). Twenty-four units encompassed less than 25 sq m. The artifacts were then tabulated on Field Specimen (FS) catalog sheets. All artifacts from one collection unit were assigned a single FS number; however, artifacts of differing material types were grouped separately within the assigned FS numbers. Only 32 collection units yielded artifacts at NM-Q-22-52. Artifact types included ceramics, flaked stone, and ground stone. One hundred thirty-six ceramic sherds were recovered from the surface. These include Gallup and Red Mesa black-on-white, indeterminate Pueblo I/II black-on-white and plain, corrugated, and banded graywares likely indicating an occupation during the Pueblo II period. Of the surface collected ceramics 93 were jar sherds and 10 were bowl sherds. The majority of the artifact scatter was located inside the right-of-way in the northwest quadrant from datum. The scatter extended downslope southwest of datum between two ephemeral drainages. The density quickly decreased in this direction.

### Hand Excavation

Hand excavation of 17 test units encompassing 20.875 sq m was conducted in order to determine the nature and depth of cultural deposits on site NM-Q-22-52. These were designated SU 10 to 18, with some study units encompassing two or more smaller provenience units. The total of 20.875 sq m was derived from 14 1-by-1-m test units, one 4-by-0.5-m test unit, one 5-by-0.5-m test unit, and one 4.75-by-0.5-m test unit (Table 12.1). The location of the surface artifacts guided the placement of test units. Most test units were excavated in arbitrary 10-cm levels and all soils were screened through 1/4-in hardware mesh except in three hand-excavated trenches where the topsoil was removed. A Munsell soil chart was used to identify soil color within each level.

### Study Unit 10

SU 10 was a 5-by-0.5-m unit oriented east-to-west with the southwest corner located at grid coordinates N109.5, E90 (Figure 12.3). This unit was extended westward from SU 14 where Feature 1, a slab-lined thermal feature, was located in an attempt to define the western boundary of that feature. SU 10 was shovel-scraped to an arbitrary depth where the western boundary of Feature 1

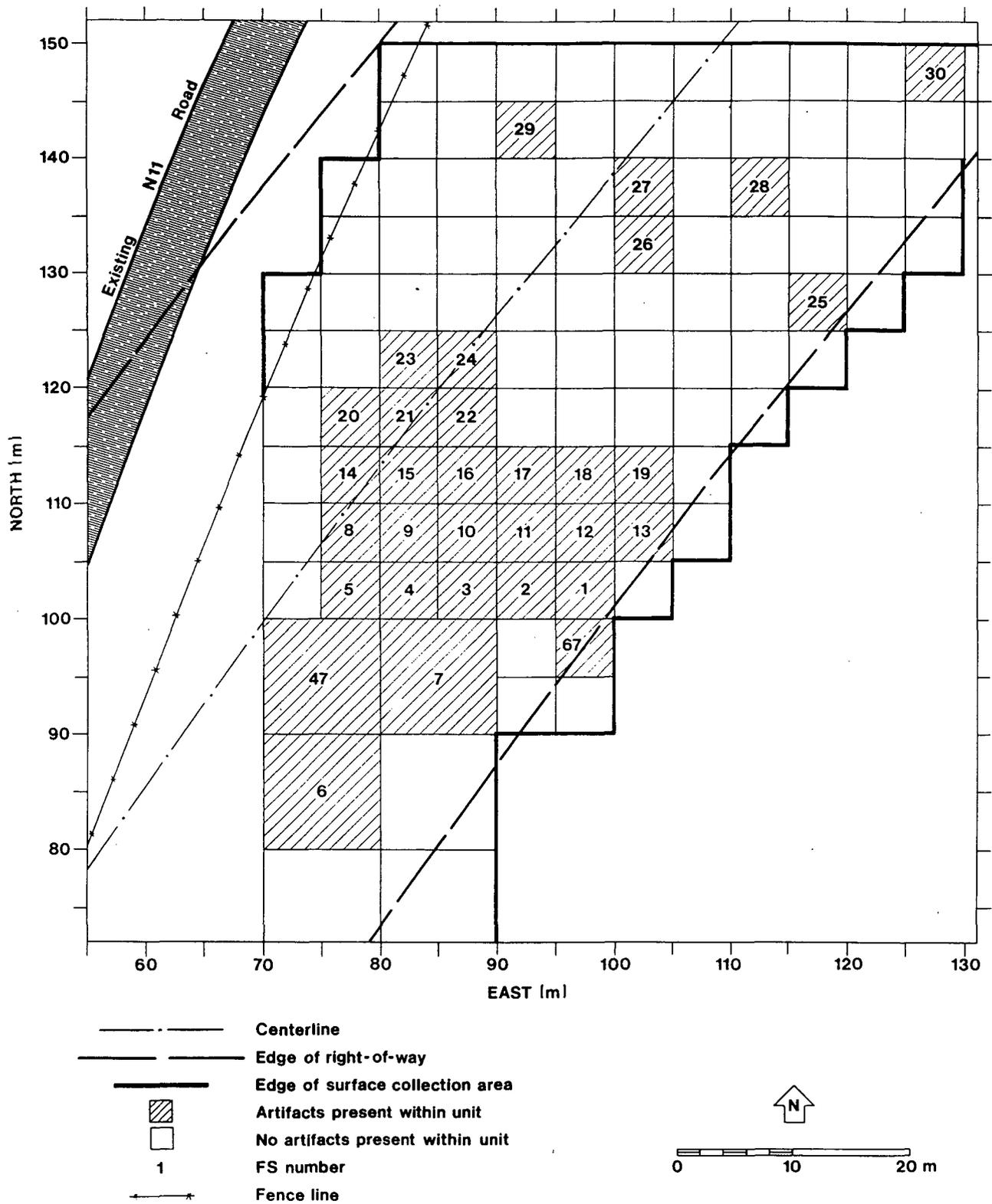


Figure 12.2. Site NM-Q-22-52, Presence or Absence of Artifacts from Gridded Surface Collection.

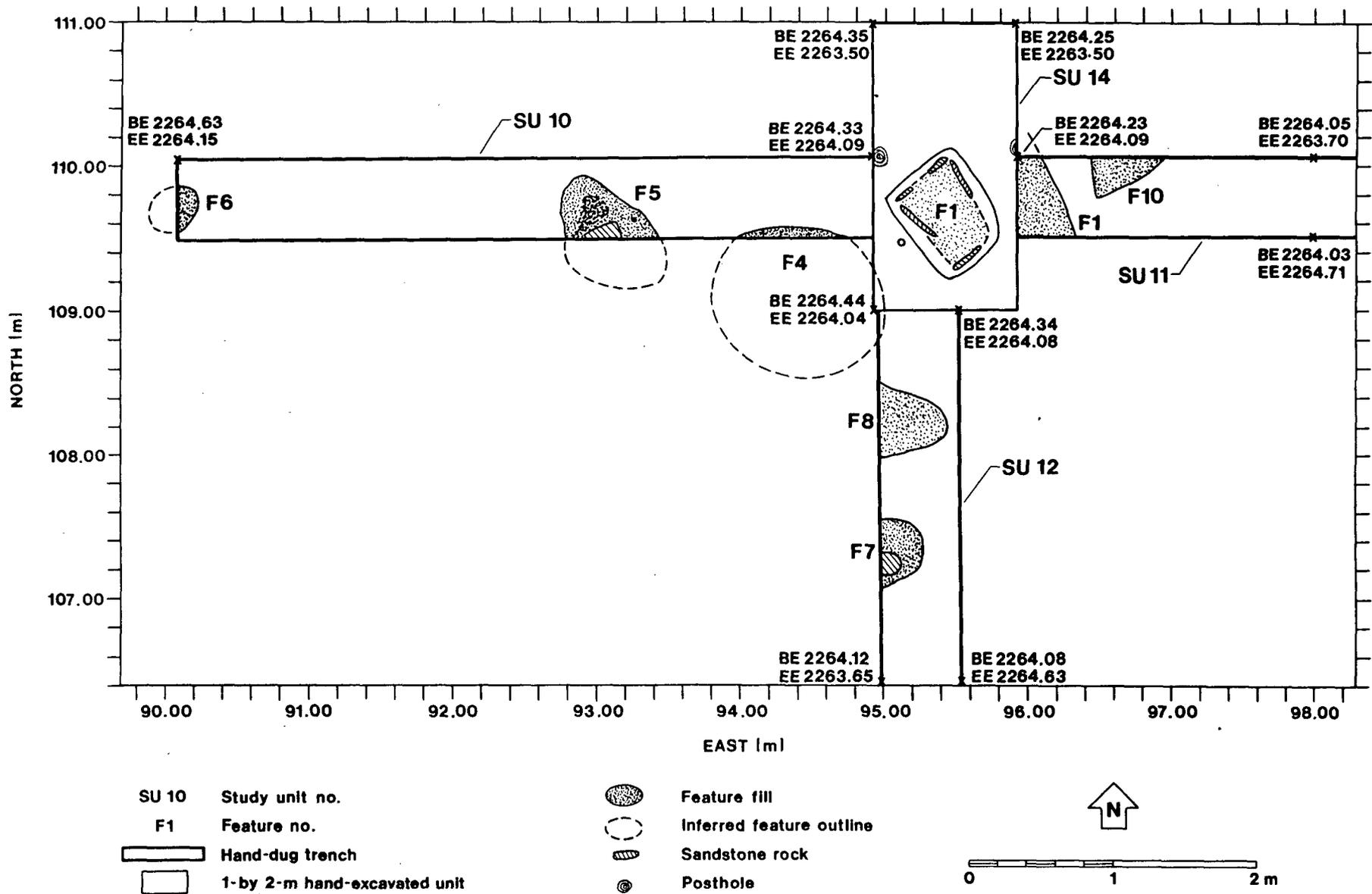


Figure 12.3. Site NM-Q-22-52, Study Units 10, 11, 12, and 14, Plan View Showing Features 1, 4, 5, 6, 7, 8, and 10.

Table 12.1. Summary of Hand-excavated Units at Site NM-Q-22-52.

SU No.	Provenience	Dimensions (m)	Depth (cm)	Volume (cu m)	Levels with Artifacts	Features Present
10	N109.50, E90.00	5.00 by 0.50	34*	0.85	None	4, 5, 6
11	N109.50, E95.90	4.75 by 0.50	23*	0.55	1	1, 10
12	N105.00, E95.00	4.00 by 0.50	36*	0.72	1	7, 8
13	N104.00, E90.00	1.00 by 1.00	7*	0.07	1	2
13	N104.00, E91.00	1.00 by 1.00	5*	0.05	1	2, 3
13	N104.00, E92.00	1.00 by 1.00	5*	0.05	1	3
13	N105.00, E90.00	1.00 by 1.00	78	0.78	2, 3, 4, 5, 6	2
13	N105.00, E91.00	1.00 by 1.00	16*	0.16	1	2, 3
13	N105.00, E92.00	1.00 by 1.00	7*	0.07	1	3, 9
13	N105.00, E93.00	1.00 by 1.00	7*	0.07	1	None
13	N106.00, E92.00	1.00 by 1.00	17*	0.17	1	9
14	N109.00, E94.90	1.00 by 1.00	38	0.38	1, 2, 3, 4	1
14	N110.00, E94.90	1.00 by 1.00	83	0.83	1, 2, 6, 7, 8	1
15	N110.00, E84.00	1.00 by 1.00	116	1.16	1, 8	None
16	N113.85, E77.15	1.00 by 1.00	80	0.80	1, 2, 3	21
17	N114.00, E82.00	1.00 by 1.00	74	0.74	1, 2, 3, 5, 7	None
18	N120.00, E72.00	1.00 by 1.00	80	0.80	None	None
Totals		20.875 sq m	41.5	8.25		

\*Average depth  
 SU = Study Unit

should have been apparent. Since the overburden was removed to reveal other features, the soil was not screened. The depth of the excavation ranged from 23 cm at the east end to 48 cm at the west end. In the process of excavation three other features were exposed. The northern portions of Features 4 and 5 and the eastern portion of Feature 6 extended into SU 10 (see Feature Descriptions below). The boundary of Feature 1 was not apparent, and the feature may have ended at the juncture of SU 10 and 14. No profile was drawn of SU 10. The features were noted to be in Stratum II and extending into Stratum III, as described below for SU 14.

### Study Unit 11

SU 11 was a 4.75-by-0.5-m unit oriented east-to-west with the southwest corner located at grid coordinates N109.5, E95.9 (Figure 12.3). This unit was extended eastward from SU 14 where Feature 1 was located in an attempt to define the eastern boundary of that thermal feature. SU 11 was shovel-scraped to an arbitrary depth to expose the eastern boundary of Feature 1. Since the overburden was removed to reveal other features, the soil was not screened. The depth of this excavation ranged from 14 cm at the west end to 35 cm in the center of the unit to 14 cm at the east end. In the process of excavation one other feature was exposed. The southern portion of Feature 10 extended into SU 11 (see Feature Descriptions below). The boundary of Feature 1 extended a maximum of 40 cm eastward into SU 11. No profile was drawn of SU 11.

### Study Unit 12

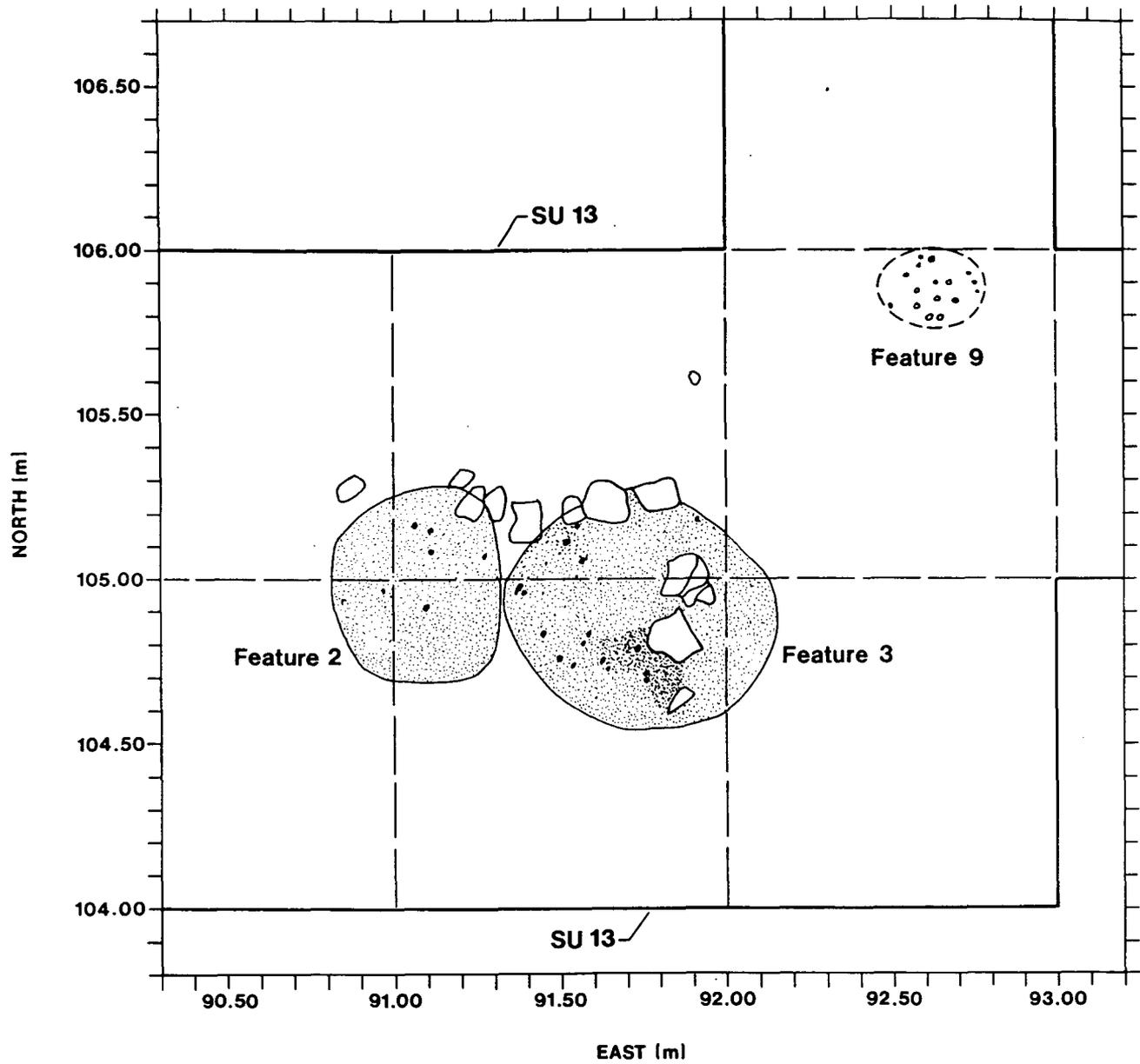
SU 12 was a 4-by-0.5-m unit oriented north-to-south with the southwest corner located at grid coordinates N105, E95 (Figure 12.3). This unit was extended southward from SU 14 where Feature 1 was located in an attempt to define the southern boundary of that feature. SU 12 was shovel-scraped to an arbitrary depth to expose the southern boundary of Feature 1. Since the overburden was removed to expose other features it was not screened. Excavation depths ranged from 26 cm at the north end to 47 cm at the south end. In the process of excavation two other features were exposed. The eastern portions of Features 7 and 8 extended into SU 12 (see Feature Descriptions below). The boundary of Feature 1 could not be defined in SU 12. No profile was drawn of SU 12.

### Study Unit 13

SU 13 was a group of eight 1-by-1-m test units (Table 12.1). The southwest corner of SU 13 was located at grid coordinates N104, E90 (Figure 12.4). Initially a low-density artifact scatter was noted in this vicinity. Excavation began with 1-by-1-m unit (N105, E90) where Feature 2 was exposed in the southeast corner. The additional units were excavated to expose the full horizontal extent of Feature 2, which, in turn, revealed Features 3 and 9.

Only 1-by-1-m unit, N105, E90 was excavated more than one 10-cm level. It was excavated 78 cm through five strata as seen in the east wall profile (Figure 12.5). Stratum I consisted of 3 to 8 cm of loose brown (10YR5/3) sandy clay with numerous grass and forb roots. Rodent disturbance was noted in northwestern portion of the unit. No artifacts were recovered from Stratum I. Stratum II consisted of approximately 8 cm of dark grayish brown (10YR4/2) sandy clay with roots and a moderate amount of gravel. Rodent burrowing has impacted the central portion of the unit. A single corrugated grayware sherd was recovered from Stratum II. Stratum III consisted of 16 to 36 cm of compact yellowish brown (10YR5/4) silty sand with gravel. Some rodent disturbance was noted in this stratum. Three sherds were recovered from Stratum III consisting of corrugated graywares and a Gallup Black-on-white. All were jar fragments. Feature 2 was excavated into this stratum and is described below. Stratum IV was wedged between Strata III and V and consisted of up to 25 cm of yellowish brown (10YR5/4) compact silty sand with some roots and light charcoal flecking. No artifacts were recovered from Stratum IV. Stratum V consisted of at least 27 cm of loose yellowish brown (10YR5/4) silty sand with few roots and light charcoal flecking. No artifacts were recovered from Stratum V. Some rodent bone was recovered from the upper part of the stratum but likely represents rodent burrowing. Numerous burrows were noted in this and other levels.

The remaining 1-by-1-m test units of SU 13 (N104, E90, N104, E91, N104, E92, N105, E91, N105, E92, N105, E93, N106, E92) were all excavated one level ranging from 5 to 17 cm thick. The units were excavated to expose the entire horizontal extent of Feature 2 and, as they were discovered, Features 3 and 9. Level 1 incorporated Stratum I seen in the east wall profile of N105, E90. Unlike N105, E90 the remainder of Feature 2 was covered by only a single stratum. This single stratum consisted of a loose brown sandy clay with numerous pebbles and charcoal flecks. Rodent burrowing was observed throughout the area. A small quantity of artifacts were recovered from the entire area consisting of 12 sherds and 2 flakes. The sherds included plain, corrugated, and banded graywares as well as Kiatuthlanna, Red Mesa, and Gallup black-on-white. Most were jar fragments.



- Edge of study unit
- SU 13 Study unit no.
- 1-by-1-m unit within study unit
- Feature fill
- Inferred feature outline
- ◻ Sandstone rock

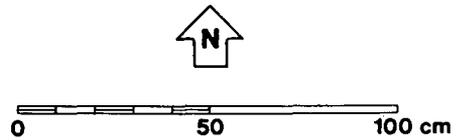


Figure 12.4. Site NM-Q-22-52, Study Unit 13, Plan View Showing Features 2, 3, and 9.

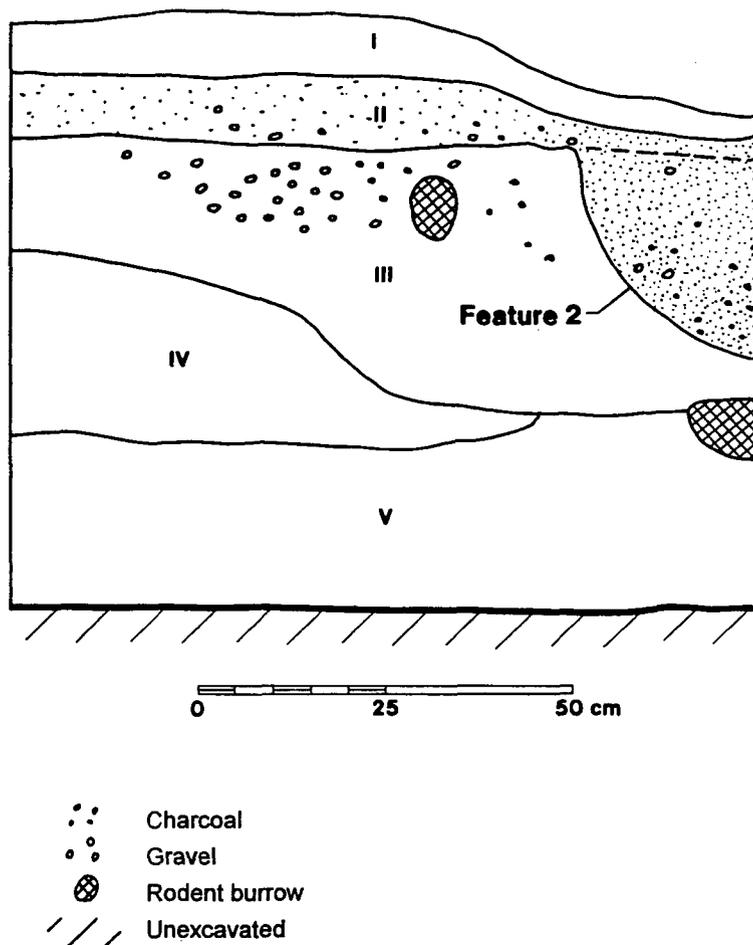


Figure 12.5. Site NM-Q-22-52, Study Unit 13, N105, E90, East Wall Profile Showing Feature 2.

### Study Unit 14

SU 14 consisted of two adjacent 1-by-1-m test units, oriented north-to-south. The southwest corner of SU 14 was located at grid coordinates N109, E94.9. Initially a low-density artifact scatter was noted in this vicinity. Excavation began with unit N110, E94.9 where Feature 1 was exposed along the south wall. Excavation was expanded to unit N109, E94.9 to expose the full horizontal extent of Feature 1.

Test unit N110, E94.9 of SU 14 was excavated 83 cm through four strata (Figure 12.6). Stratum I consisted of up to 12 cm of loose brown (10YR5/3) fine sand with roots and slight gravel deposits. A small number of artifacts was recovered from Stratum I and included ceramics, flaked stone, and ground stone. Stratum II consisted of up to 20 cm of compact grayish brown (10YR5/2) fine sand with roots and a moderate amount of gravel. Rodent burrowing was noted in this stratum. Artifacts recovered from Stratum II included ceramics, flaked stone, ground stone, and faunal bone. Stratum III consisted of 10 to 25 cm of slightly compact pale brown (10YR6/3) fine sand with heavy

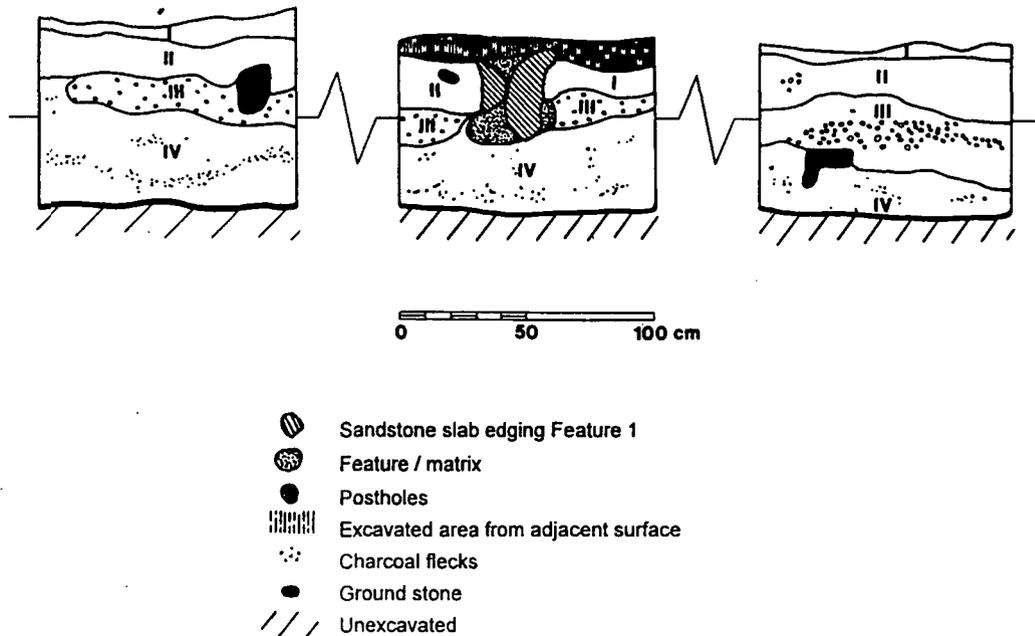


Figure 12.6. Site NM-Q-22-52, Study Unit 14, N110, E94.9; East, South, and West Wall Profiles Showing Feature 1 and Postholes.

gravel deposits and some rodent disturbance. Ceramics and flaked stone were recovered from Stratum III. Stratum IV consisted of at least 50 cm of loose brown (10YR5/3) fine sand with bits of charcoal. Minor rodent disturbance and root intrusion were noted. A small quantity of artifacts were recovered from the upper levels of Stratum IV. Feature 1 (see Feature Descriptions below) extended vertically to the bottom of Stratum III. Stratum III may be related to the construction and use of Feature 1 as it did not extend across the unit from Feature 1. Single postholes were noted near the southeast and southwest corners of the unit, respectively; they began or ended in Stratum III.

Unit N109, E94.9 was excavated 38 cm into two strata. Strata I and II were identical to those in unit N110, E94.9. Feature 1 occupied most of this unit and was partially excavated (see Feature Descriptions below). Most of the ceramics from this study unit consisted of plain graywares, although some corrugated wares, and Kiatuthlanna and Gallup black-on-whites were also recovered. Most were jar forms.

### Study Unit 15

SU 15 was a 1-by-1-m test unit. The southwest corner of SU 15 was located at grid coordinates N110, E84. This unit was placed toward the upslope end of the surface artifact scatter. This placement was based on the assumption that surface artifacts have migrated downslope, through erosion, from their original deposition. Therefore, it was believed there was a better probability that subsurface features were present upslope from the artifact concentration.

SU 15 was excavated 116 cm through four strata (Figure 12.7). Initially this unit was excavated only 48 cm. Two backhoe trenches, SU 4 and 8, were excavated immediately to the east and south, respectively, of SU 15 and a large pitstructure (Feature 11) was noted in their proximal ends. In an effort to intercept another portion of Feature 11 and better determine its boundaries, it was decided to continue excavation of SU 15. Stratum I consisted of up to 12 cm of loose brown (10YR5/3) fine sand with roots and slight gravel deposits. Two sherds were recovered from this stratum including one banded grayware jar sherd. Stratum II consisted of up to 23 cm of slightly compact, grayish brown (10YR5/2), loam with some roots and gravel. A number of sandstone cobbles up to 6 cm were noted in this stratum. No artifacts were recovered from Stratum II. Stratum III consisted of 40 to 53 cm of pale brown (10YR6/3) fine sand with bedded gravel deposits and rodent burrows. A single flaked lithic tool was recovered from the bottom of Stratum III. Stratum IV consisted of at least 55 cm of loose brown (10YR5/3) fine sand with pockets of yellowish brown (10YR5/4) and dark yellowish brown (10YR4/4) sandy clay. Flecks of charcoal were noted throughout the stratum. Numerous rodent burrows were also noted. No artifacts were recovered from Stratum IV. No evidence of Feature 11 was noted in this unit, despite its exposure in the adjacent trenches.

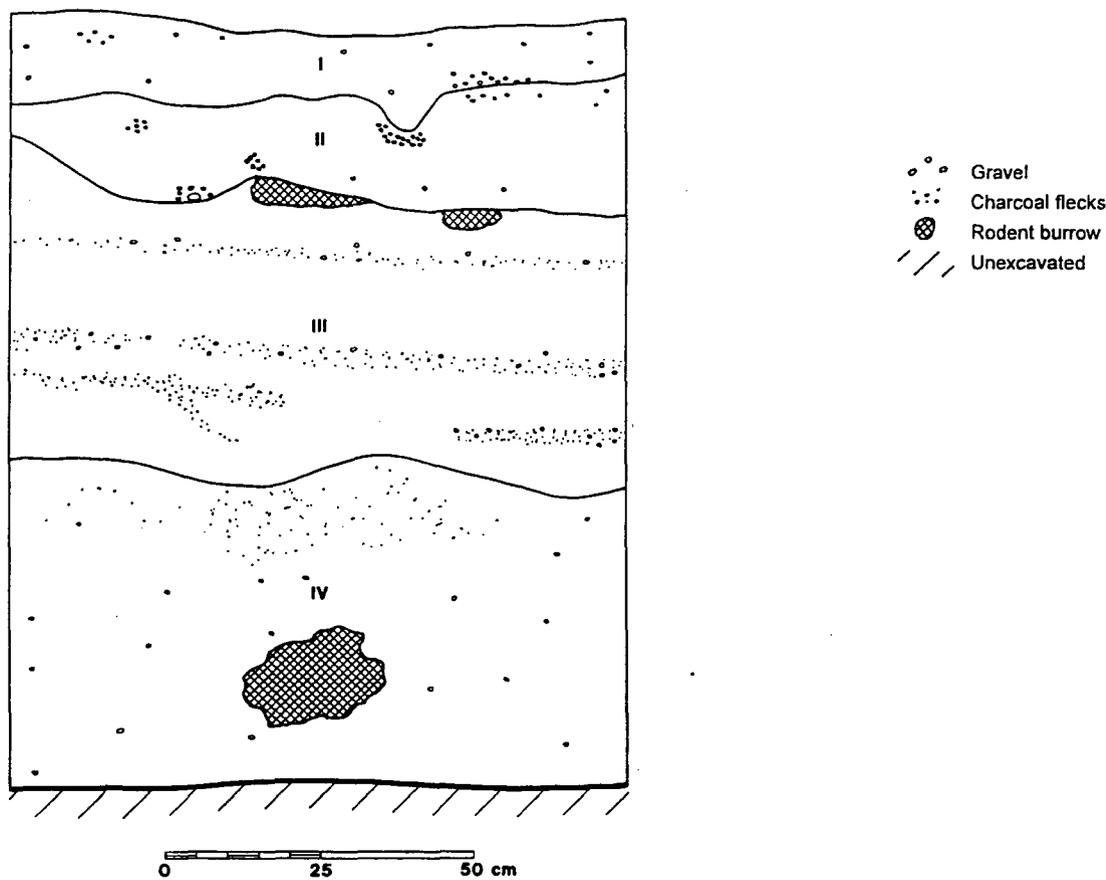


Figure 12.7. Site NM-Q-22-52, Study Unit 15, North Wall Profile.

## Study Unit 16

SU 16 was a 1-by-1-m test unit. The southwest corner of SU 16 was located at grid coordinates N113.85, E77.15. This unit was placed at the upslope end of the surface artifact scatter. This placement is based on the assumption that surface artifacts have migrated downslope by erosion from their original deposition. Therefore, it was believed there was a better probability that subsurface features were present upslope from the artifact concentration.

SU 16 was excavated 80 cm through four strata (Figure 12.8). Stratum I consisted of up to 7 cm of loose brown (10YR5/3) fine sand with roots, slight gravel deposits, and flecks of charcoal. Seven sherds were recovered from this stratum. Stratum II consisted of 12 to 21 cm of slightly compact dark brown (10YR4/3) fine sand with some roots, gravel, and charcoal flecking. Rodent burrows were noted at the bottom of this stratum. A small quantity of sherds were recovered from Stratum II. The identifiable sherds from Strata I and II consist of corrugated grayware jar sherds. Stratum III consisted of 26 to 45 cm of hard compact, brown (10YR5/3) fine loamy sand and light gravel deposits. Rodent burrows course through this stratum. No artifacts were recovered from Stratum III. Stratum IV consisted of at least 30 cm of loose brown (10YR5/3) fine sand with few pebbles scattered through the matrix. No artifacts were recovered from Stratum IV. Feature 21 was manifested in this stratum as a thin, discontinuous lens of ashy, charcoal-flecked, dark brown sandy soil (see Feature Descriptions below).

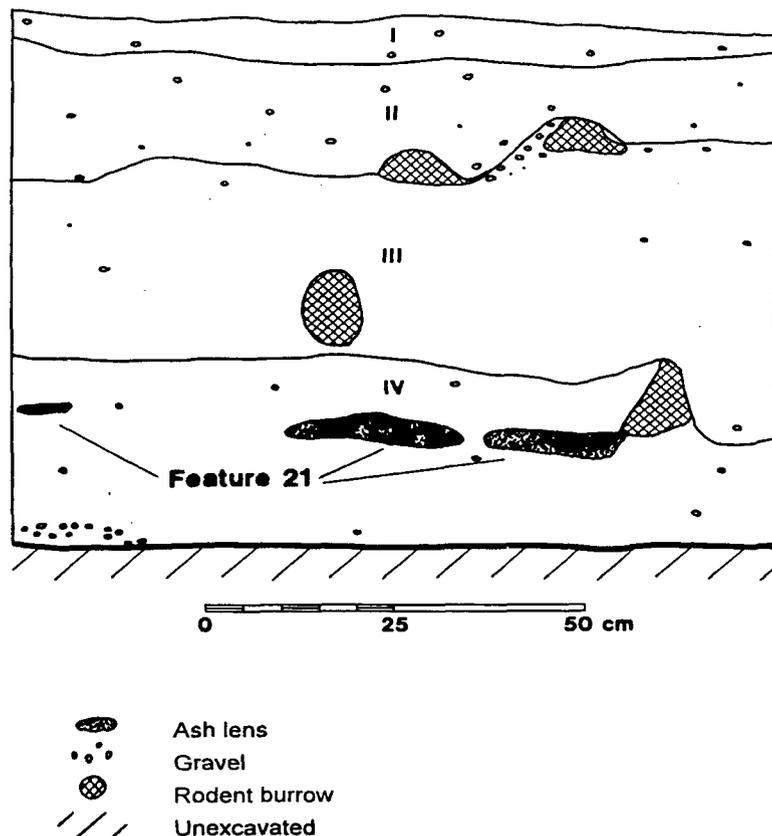


Figure 12.8. Site NM-Q-22-52, Study Unit 16, North Wall Profile Showing Feature 21.

## Study Unit 17

SU 17 was a 1-by-1 m excavation unit. The southwest corner of SU 17 was located at grid coordinates N114, E82. This unit was placed at the upslope end of the surface artifact scatter. This placement was based on the assumption that surface artifacts have migrated downslope by erosion from their original deposition. Therefore, it was believed there was a better probability that subsurface features were present upslope from the surface artifact concentration.

SU 17 was excavated 74 cm through four strata (Figure 12.9). Stratum I consisted of up to 8 cm of loose brown (10YR5/3) fine sand with roots and flecks of charcoal. Several sherds were recovered from this stratum, one of which was a Gallup Black-on-white bowl sherd. Stratum II consisted of 24 to 43 cm of hard compact, dark grayish brown (10YR4/2) fine sand with roots and moderate amounts of gravel and charcoal flecking. Several sandstone cobbles up to 10 cm were noted in this stratum. A small quantity of sherds, flaked stone, and ground stone were recovered from Stratum II. The sherds consisted of plain, banded, and corrugated grayware jar sherds. Stratum III consisted of 13 to 28 cm of hard compact brown (10YR4/3) fine sand with some gravel. Artifacts recovered from Stratum III included one ceramic sherd and a piece of ground stone. Stratum IV consisted of at least 30 cm of loose brown (10YR5/3) fine sand with some gravel, charcoal flecking, and rodent burrows. No artifacts were recovered from Stratum IV.

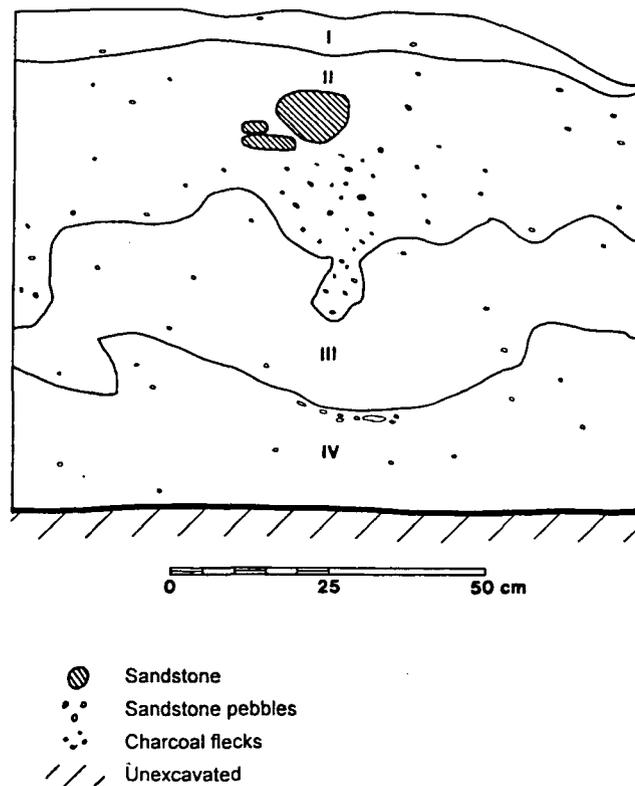


Figure 12.9. Site NM-Q-22-52, Study Unit 17, East Wall Profile.

## Study Unit 18

SU 18 was a 1-by-1-m test unit. The southwest corner of SU 18 was located at grid coordinates N120, E72. This unit was placed at the upslope end of the site adjacent to the barbed wire fence. This placement was guided by the presence of wolfberry bushes in this vicinity. Wolfberry bushes are an indicator species often noting the presence of subsurface cultural features. Additionally, as noted above, there may be a better probability that subsurface features lie slightly upslope from the surface artifact scatter.

SU 18 was excavated 80 cm in three strata (Figure 12.10). Stratum I consisted of up to 3 cm of loose brown (10YR5/3) sand with roots. No artifacts were recovered from this stratum. Stratum II consisted of 26 to 33 cm of loose brown (10YR5/3) sand with roots and rodent burrowing. Toward the bottom of the stratum the soil became more silty with gravel and mottling. No artifacts were recovered from Stratum II. Stratum III consisted of at least 50 cm of brown (10YR5/3) sandy loam with some gravel and charcoal flecking. Rodent burrows were noted in the upper portion of the stratum. The quantity of gravel increased dramatically at the bottom of the unit and the soil became more clayey. No artifacts were recovered from Stratum III.

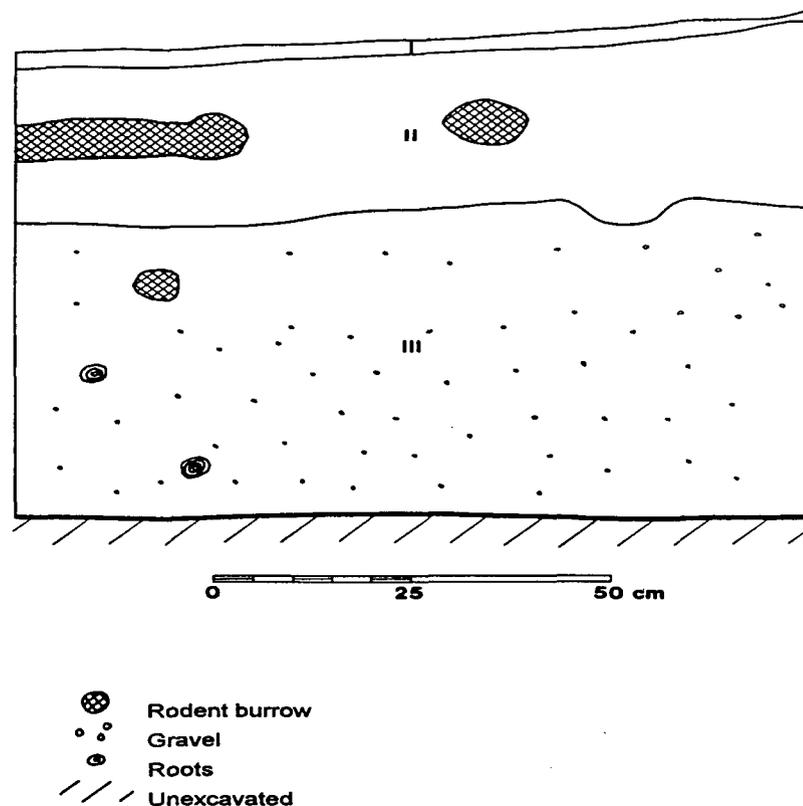


Figure 12.10. Site NM-Q-22-52, Study Unit 18, West Wall Profile.

### Backhoe Trench Excavation

The mechanical excavation of eight trenches was conducted to explore for potential buried cultural deposits on site NM-Q-22-52 (Table 12.2). A backhoe with a 61-cm-wide (2-ft-wide) bucket was employed to excavate soil deposits deeper and over a broader area than could be practically completed by hand. Trench excavation was closely monitored by a ZCRE archaeologist. Excavation was halted whenever a closer inspection of the trench walls or bottom was deemed necessary by the monitor. Backhoe trenches at site NM-Q-22-52 ranged in length from 6 to 24.5 m and varied in depth, but averaged 1.62 m. A total of 144.75 m of trenches were excavated. At least one representative soil profile was drawn for each trench, and a total of 11 trench profiles were drawn. The distribution of surface artifacts and the results of hand-excavated units guided the placement and length of backhoe trenches.

Table 12.2. Summary of Backhoe Trenches at Site NM-Q-22-52.

SU No.	Provenience	Dimensions (m)*	Average Depth (m)	Approx. Volume (cu m)	Features Present
2	From: N121.75, E72.75 To: N141.60, E83.25	0.7 by 22.50	1.90	29.93	19, 20, 22
3	From: N114.75, E78.75 To: N131.10, E97.00	0.7 by 24.50	1.70	29.16	15, 16, 17
4	From: N109.50, E86.00 To: N122.75, E99.80	0.7 by 19.25	1.53	20.62	11, 12, 13, 14
5	From: N104.40, E100.50 To: N120.20, E101.00	0.7 by 16.00	1.49	16.69	None
6	From: N96.20, E66.10 To: N119.75, E71.75	0.7 by 24.25	1.63	27.67	18, 23
7	From: N94.10, E73.75 To: N112.00, E79.50	0.7 by 18.75	1.62	21.26	None
8	From: N95.50, E81.00 To: N108.75, E84.25	0.7 by 13.50	1.47	13.89	11
9	From: N103.00, E94.25 To: N102.00, E100.00	0.7 by 6.00	1.63	6.85	None
<b>Totals</b>		<b>0.7 by 144.75</b>	<b>1.62**</b>	<b>166.07</b>	

\*Width of 0.7 m represents width of bucket (0.61 m) plus extra excavating room.

\*\*Average depth of all trenches

SU = Study Unit

#### Study Unit 2

SU 2 extended from grid coordinates N121.75, E72.75 north-northeastward to N141.6, E83.25. SU 2 was placed at the northwestern extreme of the site, nearby parallel to the barbed wire

fence roughly demarcating the present N11 right-of-way boundary. Placement was partially influenced by the presence of wolfberry bushes which, as noted above, can be an indicator species for subsurface cultural features. Secondly, this location would test the northwestern extreme of the site for buried cultural features. SU 2 was 22.5 m long and had an average depth of 1.9 m. One 6-m-long profile (L-L') was drawn of SU 2 in the middle of the trench. The profile shows the east side of the trench and eight strata were recorded (Figure 12.11).

Stratum I was a 16- to 31-cm layer of loose, brown (10YR5/3), very fine, sandy clay with numerous roots. Approximately 30% of the matrix consisted of sandstone gravel and another 5% of charcoal flecking. No artifacts were noted in this stratum. Stratum II was a 13- to 24-cm layer of yellowish brown (10YR5/4) fine silty sand with little root disturbance. The matrix also included sandstone gravels (10%). Numerous rodent burrows were present in this stratum. No artifacts were noted in the stratum. Stratum III was a 5-cm layer of slightly compact grayish brown (10YR4/2) clay with 2% charcoal flecking. No artifacts were noted in this stratum. Stratum IV was up to 15 cm of dark grayish brown (10YR4/2) to brown (10YR5/4) very fine silt with 5% No artifacts were noted in this stratum. There were numerous interbedded layers of Strata III and IV that totalled 60 cm in depth. These strata were heavily impacted by rodent burrowing. Features 19 and 20 lay immediately below a final layer of Stratum IV. Stratum V was the Feature 19 matrix and consisted of a lens of very dark grayish brown (10YR3/2), very fine silty sand with charcoal and burned sand comprising 50% of the matrix. No artifacts were noted in the fill. Stratum VI was the Feature 20 matrix. The upper 15 cm (VIa) consisted of a dark grayish brown (10YR4/2) clay with 10% charcoal. No artifacts were noted in this portion of the feature fill. The lower portion of Feature 20 (VIb) was up to 60 cm thick and consisted of brown (10YR5/4) silty sand and clay and 20% charcoal. Some dense pockets of charcoal and a burned lens were noted near the bottom. A single plain grayware jar sherd was noted in the matrix. A large flat sandstone rock separated Strata VIa and VIb. Stratum VII was at least 110 cm of loose, brown (10YR5/4), very fine sand with pockets of clay and 5% charcoal. Feature 20 had been excavated into this stratum. Stratum VIII was the Feature 22 matrix and consisted of a yellowish red (5YR4/6), very fine sandy loam. The feature fill included ash, highly burned soil, and fire-reddened rocks. No artifacts were noted in the fill. Feature 22 projected upward 20 cm from the bottom of the trench and almost met Feature 20. Where the two features came closest together, Feature 20 had its densest deposits of burned sand, ash, and charcoal.

### Study Unit 3

SU 3 extended from grid coordinates N114.75,E78.75 northeastward to N131.1, E97. SU 3 was placed roughly parallel to the centerline of the proposed N11 right-of-way. Placement was partially influenced by the presence of a thin ashy lens seen in SU 16 (Feature 21) and a desire to test along the centerline in the northern part of the site. SU 3 was 24.5 m long and had an average depth of 1.7 m. Profiles F-F', H-H', J-J' were drawn of SU 3 at the southwest end, in the middle, and between the first two, respectively.

Profile F-F' shows the northwest side of the trench and seven strata were recorded (Figure 12.12). Stratum I was up to 14 cm of loose brown (10YR5/3) fine aeolian sand with numerous roots and some sandstone gravel. No artifacts were noted in this stratum. Stratum II was 12 to 28 cm of loose dark brown (10YR3/3) fine sand with little root disturbance. The matrix also included charcoal flecking (10%). Numerous rodent burrows were present in this stratum. A single

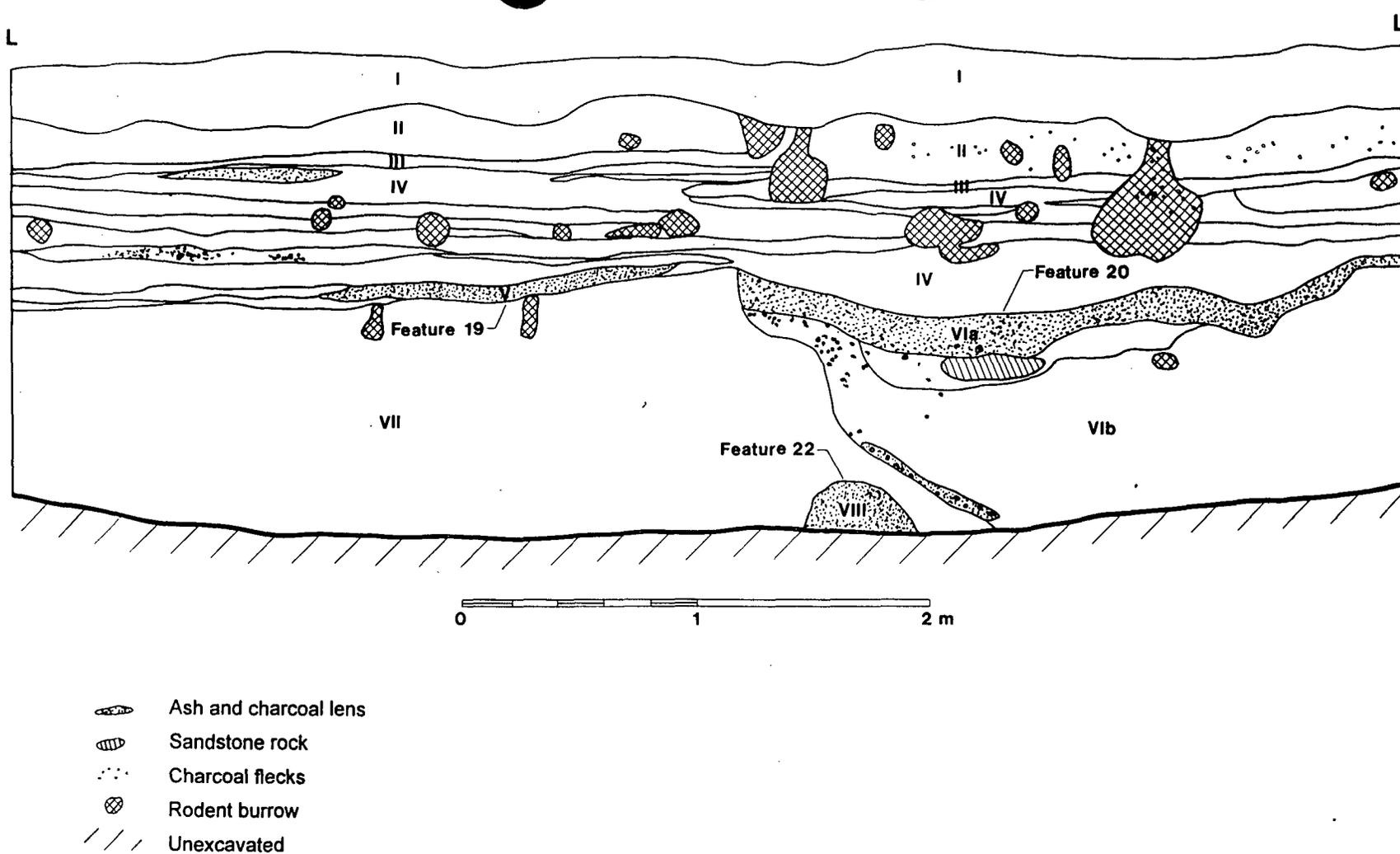


Figure 12.11. Site NM-Q-22-52, Study Unit 2, East Wall Profile L-L' Showing Features 19, 20, and 22.

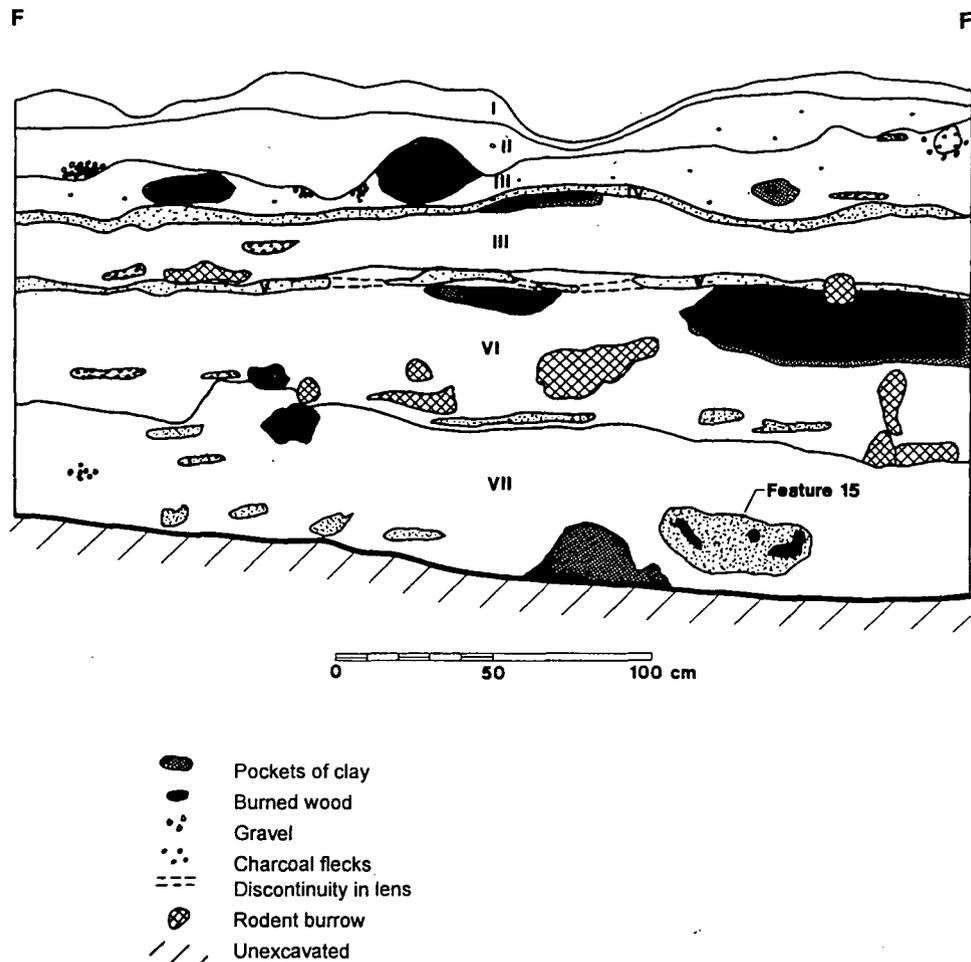


Figure 12.12. Site NM-Q-22-52, Study Unit 3, Northwest Wall Profile F-F' Showing Feature 15.

corrugated grayware jar sherd was noted near the top of the stratum. Stratum III was 22 to 50 cm of slightly compact yellowish brown (10YR5/4) loam with charcoal flecking, gravel, and some roots. Some rodent burrowing was noted in the lower portions of the stratum. The stratum generally increased in depth to the northeast. Pockets of clay were noted in the matrix. No artifacts were noted in this stratum. Stratum IV was less than 5 cm of dark yellowish brown (10YR4/4) silt with some caliche. No artifacts were noted in this stratum. Stratum IV was sandwiched between two layers of Stratum III. Stratum V was a 3-cm-thick discontinuous layer of dark soil similar to Stratum IV. Some rodent disturbance cut through this thin stratum. No artifacts were noted in the stratum. Stratum VI consisted of 35 to 45 cm of a loose brown (10YR5/3) fine sand with charcoal flecking and some gravel. Numerous rodent burrows were noted in this stratum. No artifacts were noted in this stratum. Stratum VII was at least 50 cm of loose yellowish brown (10YR5/4) fine sand with pockets of clay, gravel deposits, and charcoal. Feature 15 was located near the bottom of the trench and consisted of a heavily charcoal- and burned wood-laden deposit.

Profile H-H' shows the northwest side of the trench and seven strata were recorded (Figure 12.13). Stratum I was up to 20 cm thick, a layer of loose dark grayish brown (10YR4/2) fine sand with numerous roots and some sandstone gravel. Several artifacts were collected from the surface of this stratum. Feature 16 was located beneath Stratum I and consisted of a slightly compact, dark grayish brown (10YR4/2), sandy clay with charcoal flecks and 10% gravel. No artifacts were recovered from the feature. Feature 16 had been excavated into Stratum II. Stratum II was a layer, up to 35 cm thick, of slightly compact brown (10YR5/3) silt with gravel (30%) and clay (10%) inclusions. Some rodent disturbance was noted in the stratum. No artifacts were noted in this stratum. Stratum III was a 7-cm layer of compact, dark grayish brown (10YR4/2), sandy clay with charcoal flecking, and 10% gravel inclusions. Significant rodent burrowing was noted in the stratum. No artifacts were noted in this stratum. Stratum IV consisted of 30 cm of compact dark brown (10YR4/3) loam with some caliche, charcoal flecking, and 20% gravel inclusions. Rodent burrows were noted in the stratum. No artifacts were noted in this stratum. Stratum V consisted of 35 to 50 cm of slightly compact, dark grayish brown (10YR4/2), loam with clay (30%) and gravel (10%) inclusions. Very light charcoal flecking was seen in the stratum. The stratum contained much more caliche in the upper portion of the stratum (labelled Va on the profile). A large deteriorated tree root was noted in the stratum. No artifacts were noted in the stratum. Stratum VI consisted of 45 to 65 cm of a loose brown (10YR5/3), loam with charcoal flecking and some gravel. No artifacts were noted in this stratum. Stratum VII was at least 15 cm of very loose, brown (10YR5/3), loam with pockets of clay.

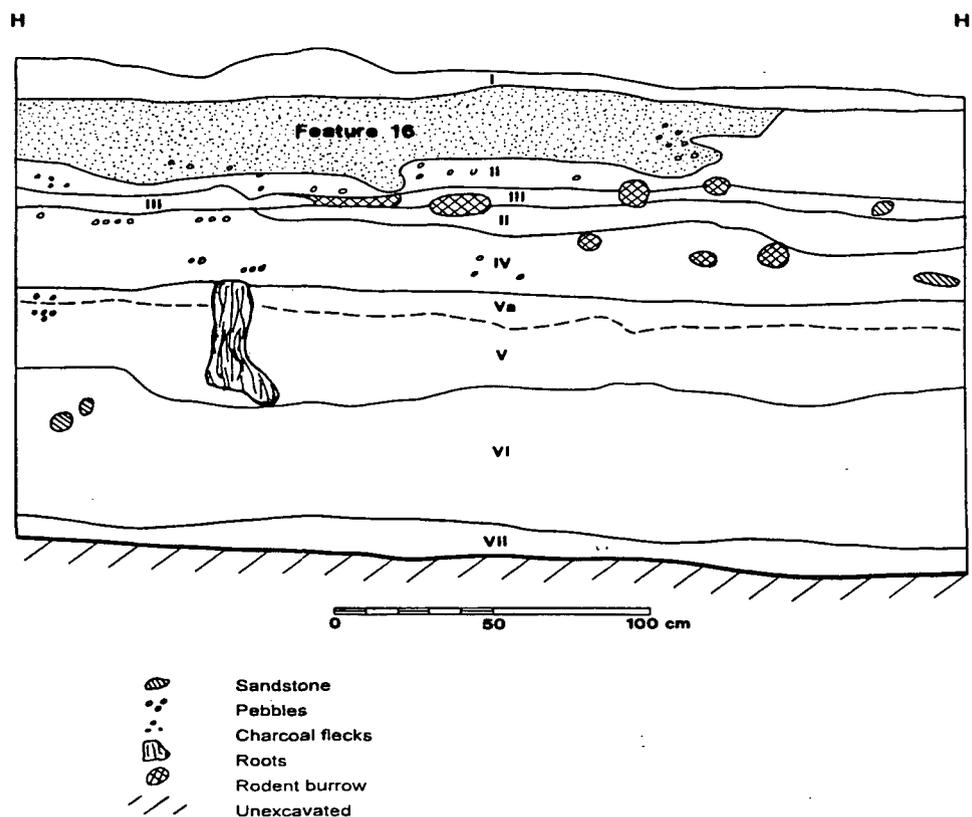


Figure 12.13. Site NM-Q-22-52, Study Unit 3, Northwest Wall Profile H-H' Showing Feature 16.

Profile J-J' shows the southeast side of the trench and four strata were recorded (Figure 12.14). Stratum I was up to 35 cm of loose pale brown (10YR6/3) fine sand with roots, some sandstone gravel, and charcoal flecks. No artifacts were noted in this stratum. Feature 17 intruded into Stratum II. Stratum II was a layer, up to 35 cm thick, of slightly compact yellowish brown (10YR5/4) fine sand with charcoal flecking and gravel (30%). Some rodent disturbance was noted in the stratum. Feature 17 was located within Stratum II and consisted of 25 cm of a dark yellowish brown (10YR4/2) sandy clay with charcoal flecks and gravel. No artifacts were recovered from the feature. At least four corrugated grayware sherds were recovered from Stratum II. Stratum III was approximately 100 cm of compact brown (10YR5/3) silty clay with charcoal flecking and gravel inclusions. Significant rodent burrowing was noted in the stratum. No artifacts were noted in the stratum. Near the bottom of Stratum III was a thin discontinuous darker lens of soil with charcoal flecks. Stratum IV was at least 15 cm of loose dark yellowish brown (10YR4/4) fine sand with deposits of gravels and charcoal flecks. No artifacts were noted in the stratum.

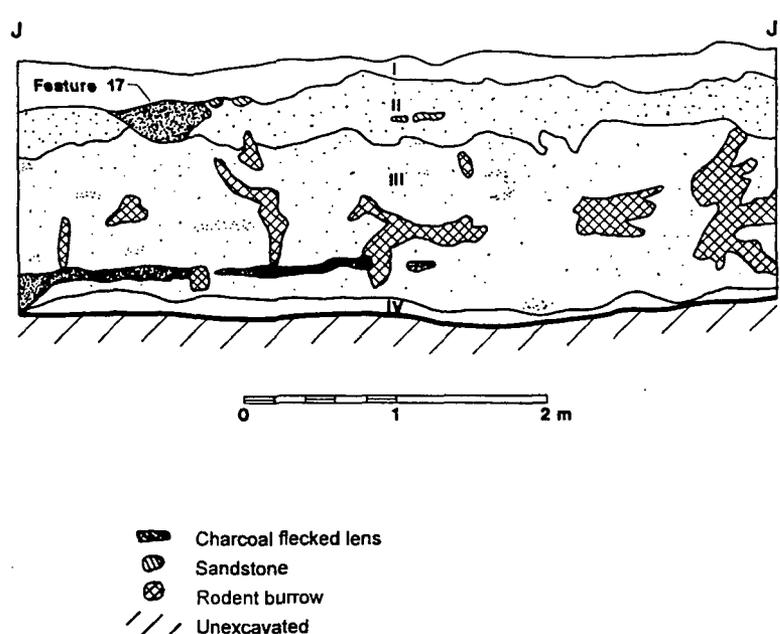


Figure 12.14. Site NM-Q-22-52, Study Unit 3, Southeast Wall Profile J-J' Showing Feature 17.

A total of 21 sherds were recovered from SU 3 (Chapter 25). The ceramic types represented include plain and corrugated graywares, and Red Mesa and Gallup black-on-whites. In addition a Lino Gray rim and a Mancos erect corrugated rim were also recovered. Most represent jar forms; however, the later whitewares were bowls.

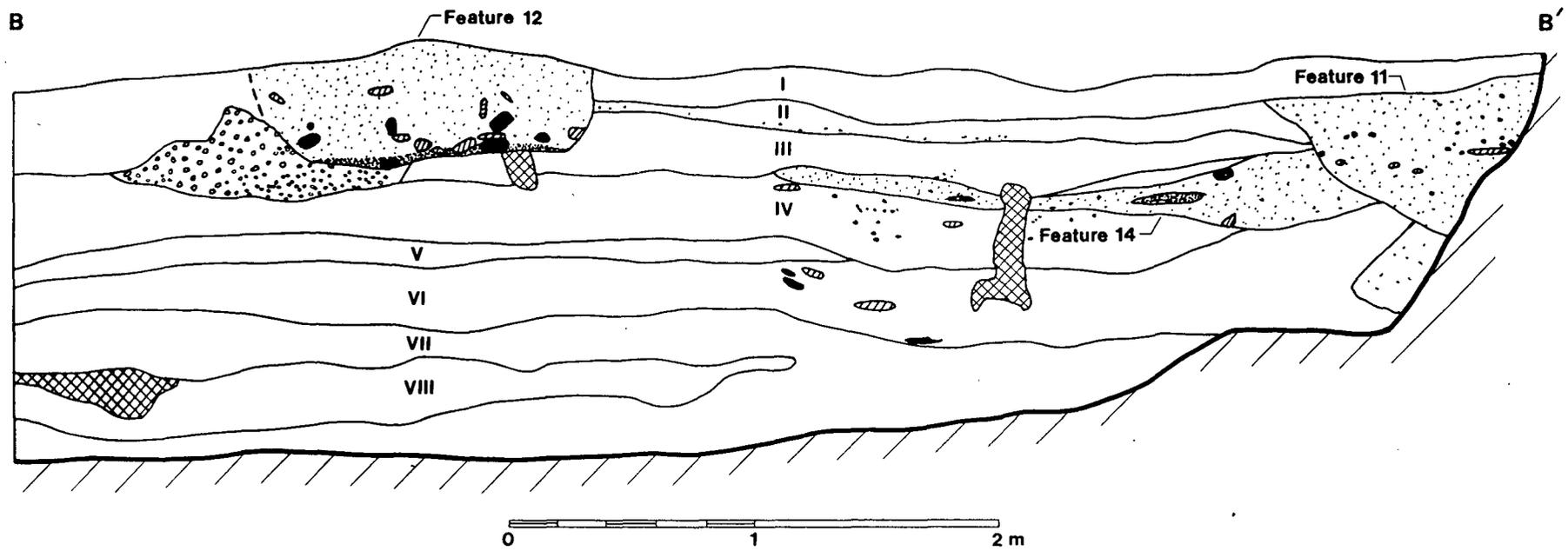
#### Study Unit 4

SU 4 extended from grid coordinates N109.5, E86 northeastward to N122.75, E99.8. SU 4 was placed 7 to 10 m southeast of the new N11 centerline and roughly parallel to it. Placement was

guided by the presence of 10 features in SU 10 through 14 and a desire to test the area north and northwest of them. SU 4 was 19.25 m long and had an average depth of 1.53 m. Profiles B-B' and E-E' were drawn of SU 4 at the southwest end and near the middle portions of the trench, respectively.

Profile B-B' shows the southeast side of the trench where eight strata were revealed (Figure 12.15). Stratum I was a 12- to 35-cm layer of loose, brown (10YR5/3), sandy clay with numerous roots. Approximately 5% of the matrix was flecked with charcoal. Ceramic and lithic artifacts were noted in this stratum or collected from its surface. Feature 12, a broad deep ashy pit, had been excavated through Stratum I. The Feature 12 matrix consisted of a compact, grayish brown (10YR4/2) very fine sandy clay. Numerous flat sandstone cobbles, both burned and unburned, were found within the matrix, particularly along the base of the feature. The base of the feature also exhibited fire-reddened soil. Corrugated ceramics and ground stone were recovered from the feature matrix. Stratum I abutted the entire northeast side of Feature 12, however, the southwest side was bordered by Strata I, II, and III. Additionally a large pocket of gravel separated a portion of Stratum I from Feature 12 on the northeast side. Stratum II was a 3- to 13-cm layer of yellowish brown (10YR5/4) loam with a few sandstone pebbles and some charcoal flecks. No artifacts were noted in the stratum. Feature 11, a pit structure, had been excavated into Strata II, III, and IV. The Feature 11 matrix consisted of a compact, grayish brown (10YR5/2), sandy clay. The matrix contained 10% charcoal flecks and sandstone rocks. A piece of burned tabular sandstone was noted in the matrix. A radiocarbon sample (FS 119, Beta-110379) from the upper part of this feature yielded a date of AD 1040 to 1195 (1 sigma calibration). Stratum III was up to 25 cm of slightly compact, dark grayish brown (10YR4/2), sandy clay with some roots and charcoal flecking. No artifacts were noted in this stratum. Stratum III underlay a portion of Feature 12. Stratum IV was approximately 30 cm of brown (10YR5/3), silty sand with a 20% gravel inclusion and scattered flecks of charcoal. No artifacts were noted in this stratum. Feature 14, an ash stain abutting Feature 11, overlay a portion of Stratum IV. Feature 14 consisted of up to 30 cm of very dark brown (10YR2/2) ash, burned sand, and pebbles. Some of the rock was burned. Rodent disturbance had impacted the feature. Stratum V was a 12-cm-thick layer of dark grayish brown (10YR4/2), sandy clay. No charcoal or other inclusions were present in the stratum. Stratum V was pinched out at the southwest end of the trench. No artifacts were noted in the fill. Stratum VI was a 15- to 40-cm-thick layer of brown (10YR5/3), loam with 30% gravel and 5% charcoal flecking inclusions. Several pieces of tabular sandstone, some fire-reddened, were noted in this fill. Additionally, a corrugated grayware jar sherd was recovered from the matrix in the vicinity of the sandstone. Stratum VII was at least 60 cm of slightly compact brown (10YR5/3), loam with no inclusions. Stratum VII was the lowest stratum in the trench. Stratum VIII was interbedded in Stratum VII and consisted of up to 28 cm of brown (10YR5/3), loam with 30% gravel inclusions. Stratum VIII pinched out at the same location along the trench wall as Stratum V. A large rodent burrow with large deteriorated tree roots were noted in the stratum.

Profile E-E' shows the northwest side of the trench where six strata were revealed (Figure 12.16). Stratum I was a 2- to 20-cm layer of loose, grayish brown (10YR4/2) sandy clay with numerous roots. No artifacts were noted in this stratum. Stratum II was a 22- to 40-cm layer of slightly compact, grayish brown (10YR4/2), sandy clay with 20% sandstone pebbles and 5% charcoal flecks. Some ceramic sherds were noted in the stratum. Stratum III was 35 cm of slightly compact, brown (10YR5/3), loam with some roots and charcoal flecking. No artifacts were noted



- Sandstone
- Burned sandstone rock
- Burned soil
- Charcoal flecks
- Gravel
- Rodent burrow
- Unexcavated

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Figure 12.15. Site NM-Q-22-52, Study Unit 4, Southeast Wall Profile B-B' Showing Features 11, 12, 14.



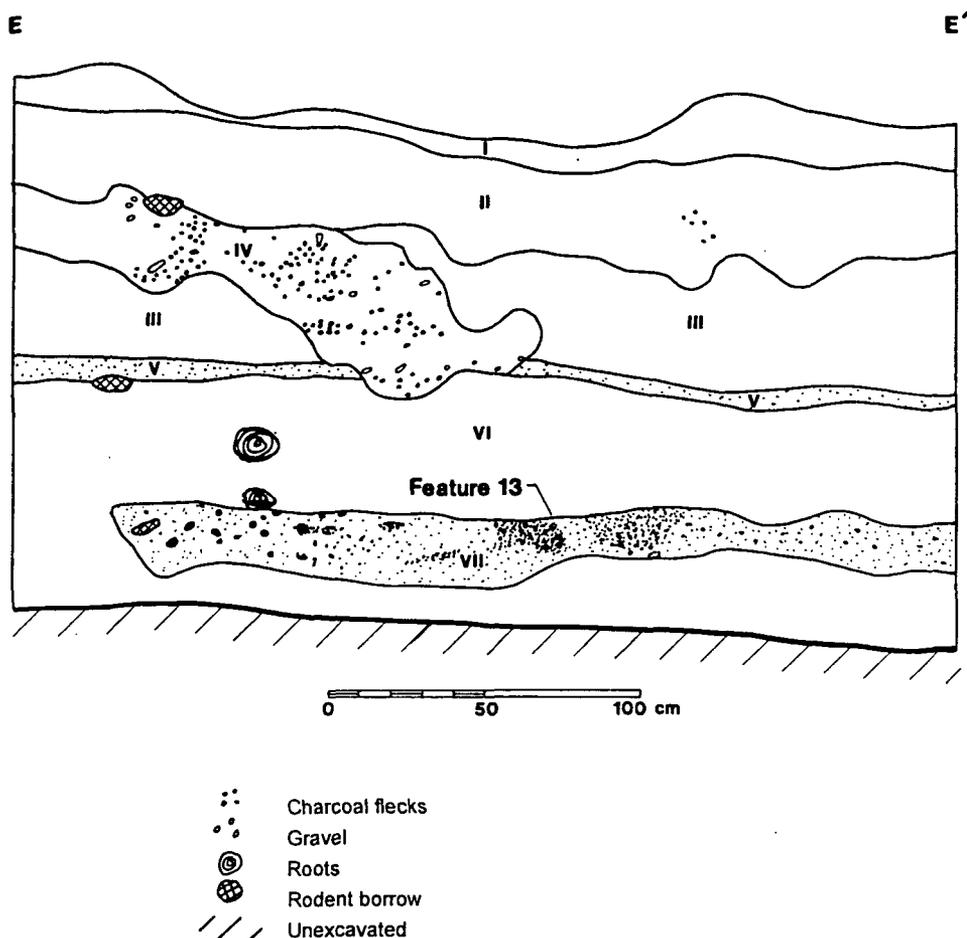


Figure 12.16. Site NM-Q-22-52, Study Unit 4, Northwest Wall Profile E-E' Showing Feature 13.

in this stratum. Stratum IV was approximately 30 cm of yellowish brown (10YR5/4), loam with a large quantity of sandstone gravel and small cobbles and scattered flecks of charcoal. No artifacts were noted in this stratum. Stratum IV cut diagonally through Stratum III and may represent an alluvial gravel-filled large rodent burrow. Stratum V was a layer, less than 5 cm thick, of slightly compact, dark grayish brown (10YR4/2), sandy clay. Approximately 10% charcoal fleck inclusions were present in the stratum. No artifacts were noted in the fill. Stratum VI was at least 75 cm thick; it was a layer of brown (10YR5/3), loam with 30% gravel and 5% charcoal flecking. A large mass of tree root with bark and charring was noted on the opposite side of the trench at this stratum. Stratum VII was the Feature 13 matrix. It was interbedded into Stratum VI and consisted of approximately 20 cm of brown (10YR4/3) to very dark brown (10YR2/2) loam with 10% gravel and 40% charcoal inclusions. No artifacts were noted in this stratum. A large tree root with bark was noted in this and the Stratum VI matrix.

## Study Unit 5

SU 5 extended from grid coordinates N104.4, E100.5 north to N120.2, E101. SU 5 was placed almost due north-to-south at an oblique angle to the centerline. Placement was guided by the presence of 10 features in SU 10 through 14 and a desire to test the area east and northeast of them. Placement at this location would test the eastern boundaries of the site for buried cultural features. SU 5 was 16 m long and had an average depth of 1.49 m. One 2-m-long profile (C-C') was drawn of SU 2 near the middle of the trench where it intersected with SU 11, a hand-excavated trench. The profile shows the west side of the trench and five strata were recorded (Figure 12.17).

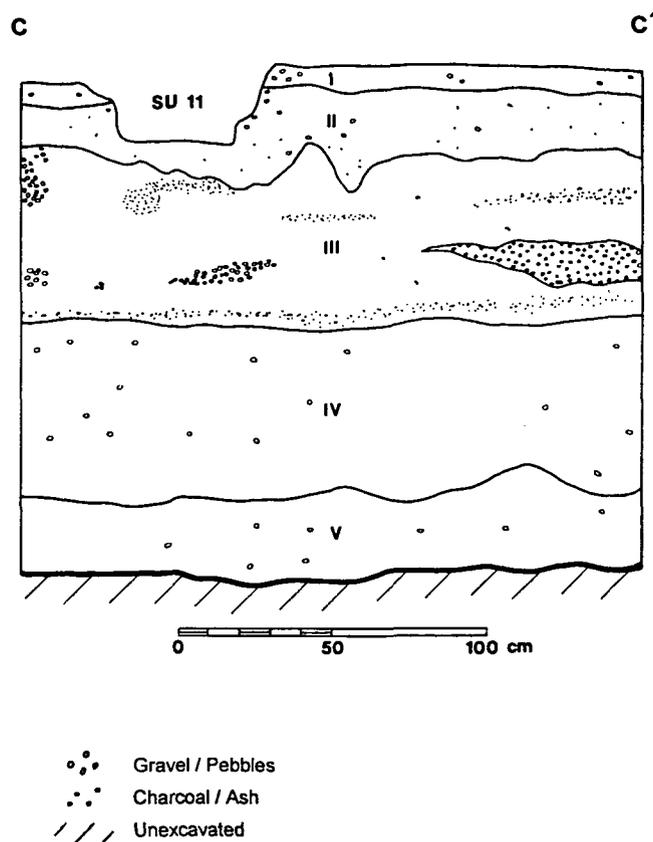


Figure 12.17. Site NM-Q-22-52, Study Unit 5, West Wall Profile C-C'.

Stratum I was a 5-cm layer of a loose pale brown (10YR6/3) fine sand with numerous roots and little gravel. Stratum II was 20 to 33 cm of slightly compact grayish brown (10YR5/2) fine sand with little root disturbance and some gravel deposits. A single corrugated grayware sherd was recovered from this stratum. Stratum III consisted of 55 cm of loose pale brown (10YR6/3) fine sand with thin lenses of charcoal and dense deposits of gravel. No artifacts were noted in this stratum. Stratum IV consisted of 55 cm of loose brown (10YR5/3) very fine sand with slight deposits of gravel. No artifacts were noted in this stratum. Stratum V consisted of at least 35 cm of loose pale brown (10YR6/3) loam. No artifacts were noted in this stratum.

## Study Unit 6

SU 6 extended from grid coordinates N96.2, E66.1 north-northeastward to N119.75, E71.75. SU 6 was placed roughly parallel to the barbed wire fence demarcating the present N11 right-of-way boundary. This placement would test the western boundary of the site. SU 6 was 24.25 m long and had an average depth of 1.63 m. One 5-m-long profile (K-K') was drawn of SU 6 in the northern half of the trench. The profile shows the west side of the trench and four strata were recorded (Figure 12.18).

Stratum I was 15 to 30 cm of a loose yellowish brown (10YR5/4) fine sand with little gravel, charcoal flecks, and roots. Stratum II was up to 65 cm of slightly compact, light brownish gray (10YR6/2) sandy clay. Some root disturbance, gravel deposits, and charcoal flecks were present in the stratum. Features 18 and 23 were located within Stratum II. Feature 18 was a densely charcoal-flecked sandy clay. The soil ranged from very dark grayish brown (10YR3/2) to dark grayish brown (10YR4/2). No artifacts were present in the feature. The Feature 23 matrix was a moderately densely charcoal-flecked sandy clay. The soil ranged from dark yellowish brown (10YR3/4) to dark grayish brown (10YR4/2). No artifacts were present in the feature. The feature matrix extends southward from Feature 18, however the charcoal flecking was slightly denser at the southern extreme making the soil slightly darker. Stratum III consisted of at least 100 cm of loose light yellowish brown (10YR6/4) fine sand. The stratum exhibited an erosional cut-and-fill episode. The cut has been filled with a dense deposit of alluvial sandstone gravel (Stratum IV). No artifacts were present in the stratum.

## Study Unit 7

SU 7 extended from grid coordinates N94.10, E73.75 north-northeastward to N112, E79.5. SU 7 was placed parallel to and approximately 8 m east of, SU 6. The north end almost intersected the new N11 centerline. This location tested the area south of SU 16 where Feature 21 was located. SU 7 was 18.75 m long and had an average depth of 1.62 m. One 2-m-long profile (G-G') was drawn of SU 7 near the northern end of the trench.

Profile G-G' shows the west side of the trench where seven strata were revealed (Figure 12.19). Stratum I was 7 to 15 cm of loose, dark grayish brown (10YR4/2), sandy clay with 20% gravel and numerous roots. No artifacts were noted in this stratum. Stratum II was 20 to 25 cm of slightly compact, dark grayish brown (10YR4/2), sandy clay with 20% sandstone pebbles and 5% charcoal flecks. Stratum III was 5 to 15 cm of compact, dark grayish brown (10YR4/2), sandy clay with some roots. No artifacts were noted in this stratum. Stratum IV was up to 70 cm of brown to dark brown (10YR4/3), loam with a dense pocket of yellowish brown (10YR5/4) sandstone gravel and 5% flecks of charcoal. No artifacts were noted in this stratum. Stratum V was 16 to 25 cm of loose brown (10YR5/3), loam with 50% gravel inclusions. No artifacts were noted in the stratum. Stratum VI was a 7-cm lens of slightly compact, dark grayish brown (10YR4/2), sandy clay. No artifacts were noted in this stratum. Stratum VII was at least 40 cm of loose, brown (10YR5/3), loam. No artifacts were noted in this stratum.

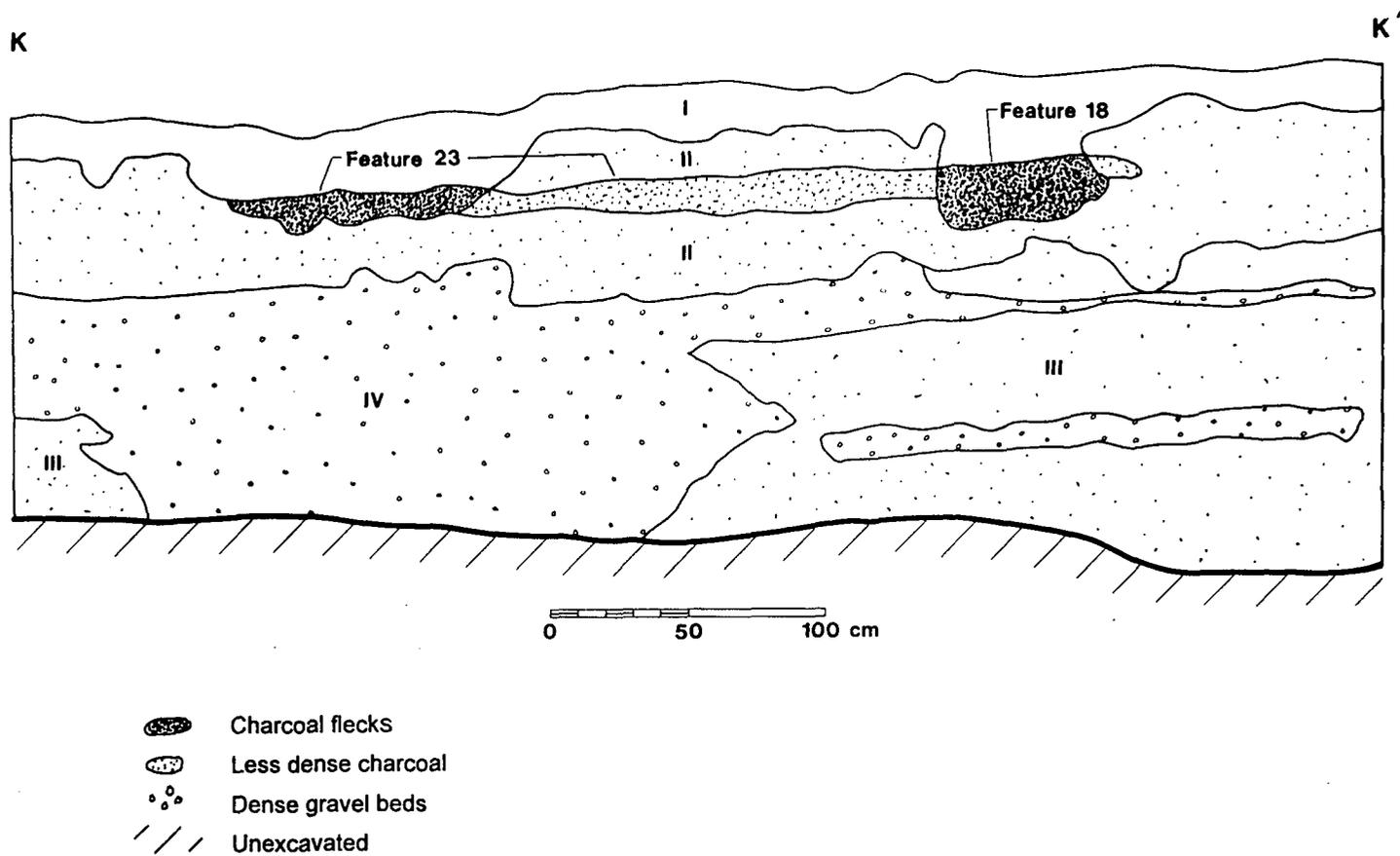


Figure 12.18. Site NM-Q-22-52, Study Unit 6, West Wall Profile K-K' Showing Features 18 and 23.

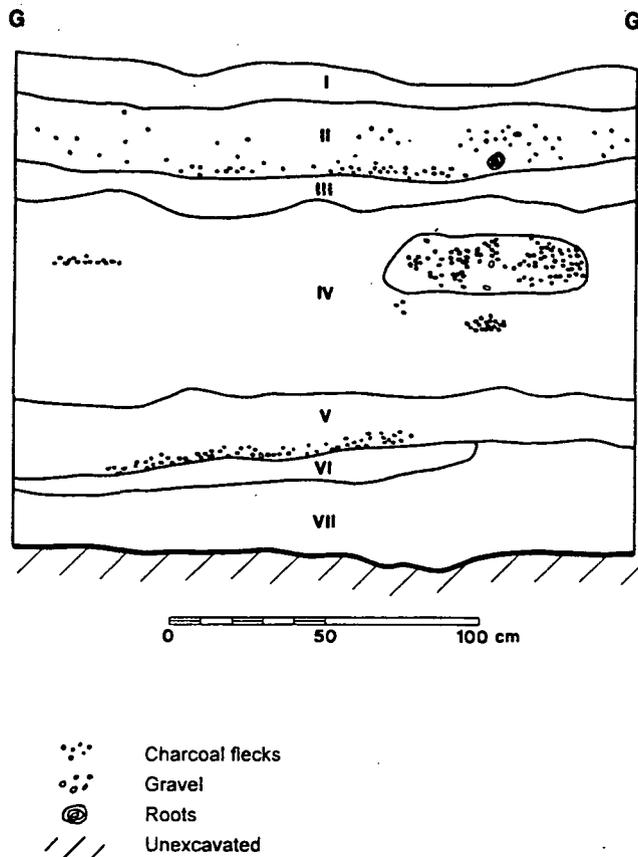


Figure 12.19. Site NM-Q-22-52, Study Unit 7, West Wall Profile G-G'.

### Study Unit 8

SU 8 extended from grid coordinates N95.5, E81 north-northeastward to N108.75, E84.25. SU 8 was placed parallel to and 5 m east of SU 7. This trench was used primarily to see how far south Feature 11, a pitstructure, extended, but also to explore the area farther south for buried cultural features. SU 8 was 13.5 m long and had an average depth of 1.47 m. One 3-m-long profile (A-A') was drawn of SU 8 at the northern end of the trench. The profile shows the west side of the trench. Profile A-A' shows four strata and a cross section of Feature 11 (Figure 12.20).

Stratum I was 15 to 30 cm of compact brown (10YR5/3), very fine aeolian sandy clay with 10% gravel and numerous roots. Stratum II was 10 to 20 cm of slightly compact, brown (10YR5/3), sandy clay with 20% sandstone pebbles and 5% charcoal flecks. Rodent burrows were present in the stratum. Feature 11 had been excavated through Strata II and III. The Feature 11 matrix consisted of brown to dark brown (10YR4/3) loam with 30% gravel and 20% charcoal flecks and chunks. Stratum III was 7 to 15 cm of loose, yellowish brown (10YR5/4), loam with 60% gravel and less than 5% charcoal flecks. The gravel seemed to be more concentrated closer to Feature 11. No artifacts were noted in this stratum. Stratum IV was at least 110 cm of mottled brown (10YR5/3)

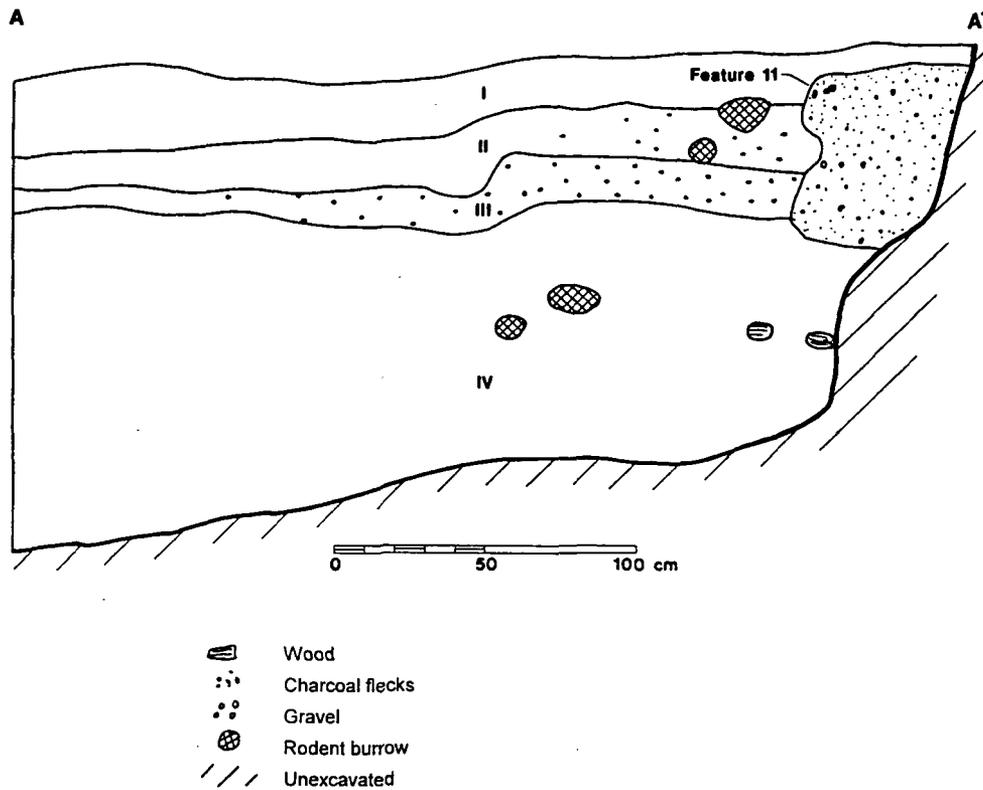


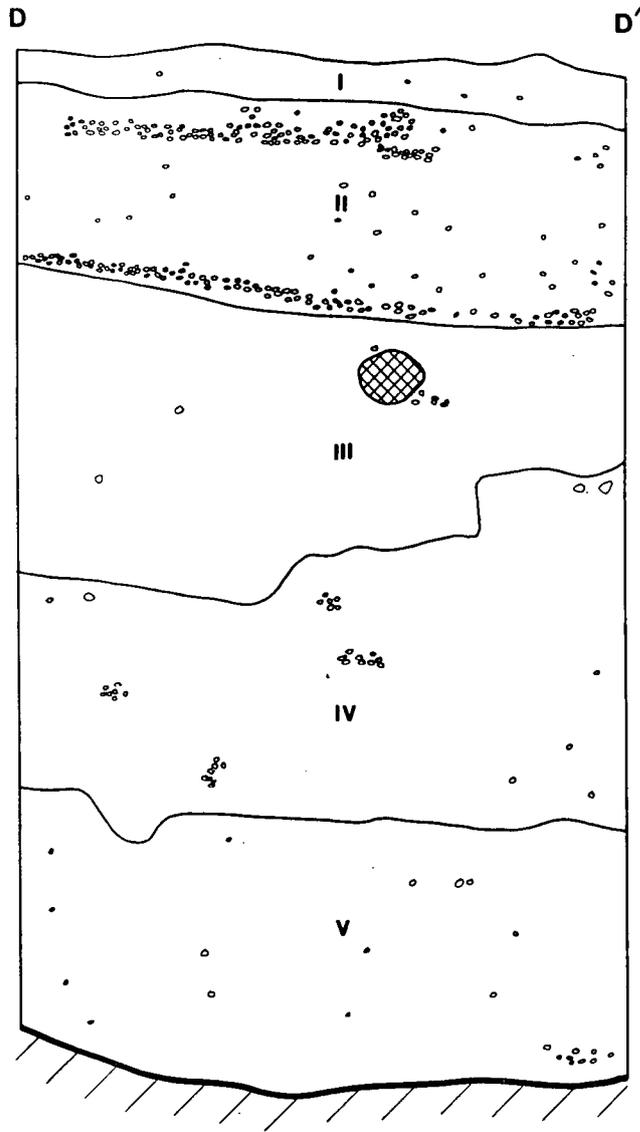
Figure 12.20. Site NM-Q-22-52, Study Unit 8, West Wall Profile A-A' Showing Feature 11.

to yellowish brown (10YR5/4) loam with a trace of charcoal flecking. Several rodent burrows were noted in the stratum. Two fragments of wood (tree roots?) were also noted in the stratum approximately 30 cm below Feature 11.

### Study Unit 9

SU 9 extended from grid coordinates N103.00, E94.25 eastward to N102, E100. SU 9 was placed perpendicular to SU 5. The trench was used to test the area southeast of SU 13 and the area south of SU 10, 11, 12 and 14 where a cluster of 10 features was located. SU 8 was 6 m long and had an average depth of 1.63 m. One 1-m-long profile (D-D') was drawn of SU 8 at the western end of the trench.

The profile shows the north side of the trench and five strata were recorded (Figure 12.21). Stratum I was 7 cm of loose grayish brown (10YR5/2) fine sand with slight gravel deposits and roots. Stratum II was 30 to 35 cm of loose dark yellowish brown (10YR3/6) fine sand with 40% sandstone gravel. Caliche deposits were noted in the stratum. Although no artifacts were noted in Strata I and II, the soil composition and color are identical to that seen in SU 12 which contained a



- • • Gravel / Pebbles
- ⊗ Rodent burrow
- /// Unexcavated

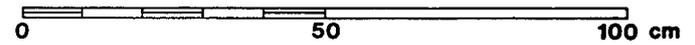


Figure 12.21. Site NM-Q-22-52, Study Unit 9, North Wall Profile D-D'.

number of ceramic artifacts and features. Stratum III was 25 to 50 cm of slightly hard compact, brown (10YR5/3) fine sand with few gravel deposits. Some rodent disturbances were noted in the stratum. No artifacts were noted in this stratum. Stratum IV was 35 to 60 cm of pale brown (10YR6/3) fine sand with few gravel deposits and slight caliche formation. No artifacts were noted in this stratum. Stratum V was at least 45 cm of loose pale brown (10YR6/3) fine sand with few gravel deposits and slight caliche formation. Some charcoal flecks and rodent disturbance were also noted. No artifacts were noted in this stratum.

### Features

#### Feature 1

Feature 1 was a rectangular, sandstone slab-lined thermal feature (Figure 12.22). It was located in SU 14 and occupied most of excavation unit N109, E94.9. The feature was oriented northwest-to-southeast and measured 60 by 48 cm. The feature fill consisted of loose, dark yellowish brown (10YR3/4) fine sandy loam with pebbles and considerable quantities of charcoal and ash. An undetermined area around the feature also contained this darker ashy soil. This dark soil extended northeastward for 50 cm; however, it was not as distinct in the other directions. The feature was approximately 35 cm deep as exposed in unit N110, E94.90 (Figure 12.6). The remains of two possible postholes were found north of Feature 1. The interior of the feature was partially excavated to obtain flotation and radiocarbon samples. Sherds, flaked stone, ground stone, and small mammal bone were also recovered from this feature. From the thermally-altered sandstone slabs, their vertical orientation, and the high quantities of ash and charcoal, this feature was probably utilized as a roasting pit. The radiocarbon sample (FS 76, Beta-110378) yielded a 1 sigma calibrated date of AD 690 to 875 (conventional radiocarbon age of 1250±60 BP).

#### Feature 2

Feature 2 was a relatively small, circular pit (Figures 12.4 and 12.5). It was located in SU 13 and was centered near grid point N105, E91. The feature measured 56 by 47 cm, being slightly longer in the north-to-south axis. The feature fill consisted of dark loam with pebbles and bits of charcoal. Only the northwest quadrant of Feature 2 was excavated. The feature was approximately 26 cm deep as exposed in unit N105, E90 (Figure 12.5). Feature 2 was not readily apparent during the excavation of unit N105, E90. After the unit was entirely excavated (to a depth of 68 cm) and after light and environmental conditions changed, only then did Feature 2 become visible in the walls of the southeast corner of the unit. Several sherds were recovered from the stratum containing Feature 2; unfortunately, it could not be determined if the artifacts were recovered from the feature or the surrounding matrix. From the shape and depth of the feature, it may have functioned as a small storage pit.

#### Feature 3

Feature 3 was a 70-cm-diameter dark stain lying immediately east of Feature 2 in SU 13. Most of Feature 3 straddled the boundary between unit N104, E91 and N105, E91 (Figure 12.4). The overlying surface deposits (Stratum I) were removed to expose the feature but the feature was not excavated. Approximately five small sandstone slabs lay on top of the Feature 3 matrix. Some of

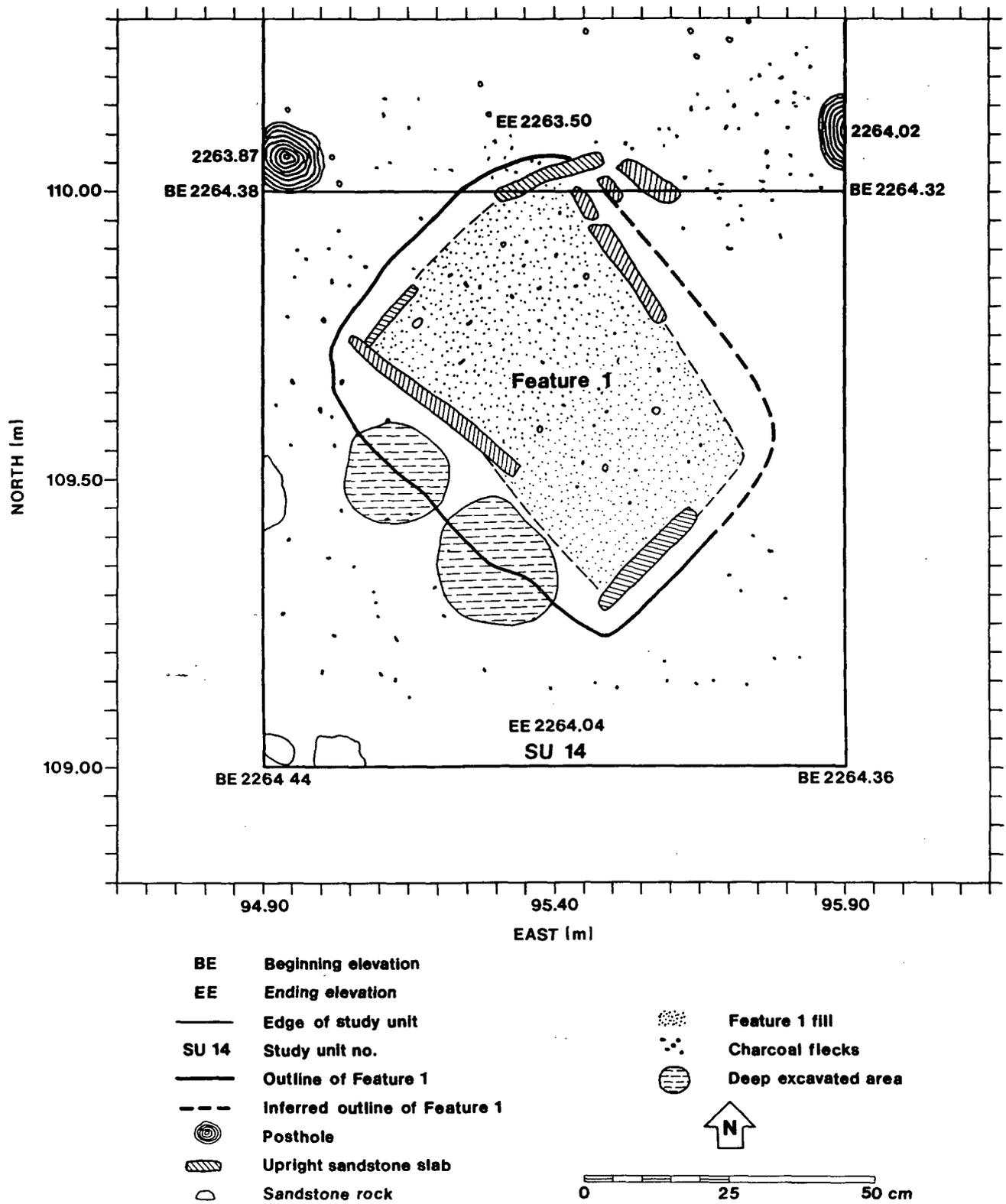


Figure 12.22. Site NM-Q-22-52, Study Unit 14, Plan View of Feature 1.

the slabs were fire-reddened. Feature 3 contained a similar matrix to that of Feature 2 with more pebbles and bits of charcoal. Several sherds and flaked lithic artifacts were recovered from the top of the feature. The function of the feature could not be determined; however, from its size and situation next to Feature 2, it may also be a storage pit.

#### Feature 4

Feature 4 was an ash and charcoal stain exposed in the wall and floor at the east end of SU 10 (Figure 12.3). The feature extended 10 cm into the study unit and was exposed for 70 cm along the south wall. From this small exposure, it is suggested the feature was circular in shape and approximately 1 m in diameter. The feature fill consisted of a dark clay loam with sandstone pebbles and bits of charcoal. The feature was not excavated and therefore the depth of the deposit could not be determined. No artifacts were collected from the feature or noted in the matrix. The function of Feature 4 could not be determined, but it is probably related to Feature 1, a slab-lined roasting pit adjacent to the east, and/or Feature 5, 50 cm to the west.

#### Feature 5

Feature 5 was an ash and charcoal stain exposed in the wall and floor near the center of SU 10 (Figure 12.3). The feature extended 45 cm into the study unit and was exposed for 60 cm along the south wall. This portion of the feature had an irregular outline but the entire feature may have been roughly oval or circular. The feature fill consisted of a dark clay loam with ash and flecks of charcoal. The matrix also contained numerous sandstone pebbles and larger chunks of charcoal. The feature was not excavated; however, 16 cm of deposit was exposed in the trench wall. No artifacts were collected from the feature or noted in the matrix. The function of Feature 5 could not be determined, but it is probably related to Features 1 and 4 to the east.

#### Feature 6

Feature 6 was an ash and charcoal stain exposed in the wall and floor at the west end of SU 10 (Figure 12.3). The feature extended 15 cm into the study unit and was exposed for 30 cm along the west wall. From this small exposure, the feature appeared circular in shape and no more than 50 cm in diameter. The feature fill consisted of a dense ash and charcoal deposit of dark clay loam with sandstone pebbles and bits of charcoal. The feature was not excavated; however, at least 14 cm of deposit was exposed. A fire-reddened sandstone slab was noted lying above the deposit. No artifacts were collected from the feature or noted in the matrix. The function of Feature 6 could not be determined but it may be a storage pit similar to Features 2 and 3. Feature 6 may be related to Feature 14 exposed in the southeast wall of SU 4 at approximately the same depth and less than 2 m away.

#### Feature 7

Feature 7 was an ash and charcoal stain exposed in the wall and floor at the center of SU 12 (Figure 12.3). The feature extended 22 cm into the study unit and was exposed for 44 cm along the west wall. The feature appeared roughly circular in shape and approximately 50 cm in diameter. The feature fill consisted of a dark clay loam with numerous sandstone pebbles and bits of charcoal.

The feature was not excavated; however, at least 10 cm of deposit was exposed. A fire-reddened sandstone slab was noted lying above the deposit. No artifacts were collected from the feature or noted in the matrix. A few sherds were recovered from the trench fill but it could not be determined if they came from the feature or the general trench matrix. The ceramic types represented include plain and corrugated graywares, and Red Mesa and Escavada black-on-whites. A piece of unfired clay was also recovered. The Escavada sherd is a bowl form and the others are jar forms. The function of Feature 7 could not be determined; however from the similarity to Features 2 and 3, Feature 7 may be a small storage pit. Feature 7 may be related to Feature 8 exposed approximately 50 cm to the north.

#### Feature 8

Feature 8 was an ash and charcoal stain exposed in the wall and floor near the north end of SU 12 (Figure 12.3). The feature extended 34 cm into the study unit and was exposed for 50 cm along the west wall. From this limited view, the feature appeared oval-shaped. The feature fill consisted of a dark brown clay loam with numerous sandstone pebbles. The soil was characterized by ash and flecks and chunks of charcoal. The feature was not excavated; however, at least 7 cm of deposit was exposed. A fire-reddened sandstone slab was noted lying above the deposit. No artifacts were collected from the feature or noted in the matrix. A few sherds were recovered from the trench fill but it could not be determined if they came from the feature or the general trench matrix. The function of Feature 8 could not be determined. Feature 8 may be related to Feature 7, approximately 50 cm south, and Feature 1, 1 m north of Feature 8.

#### Feature 9

Feature 9 was a small ash and charcoal stain exposed in grid unit N105, E92 of SU 13 (Figure 12.4). It was oval shaped and measured 25 by 33 cm, oriented east-to-west. The feature fill consisted of a dark charcoal-flecked sandy loam with numerous pebbles. The matrix also contained larger bits of charcoal and apparently burned sandstone pebbles. Feature 9 was hard to define from the surrounding matrix because of its similar color and composition, therefore its boundaries were tentative. The depth of the deposit could not be determined since it was not excavated. The function of Feature 9 could not be determined but it is probably related to the utilization of Features 2 and 3, 1 m to the southwest, or the other features centered around Feature 1.

#### Feature 10

Feature 10 was an ash and charcoal stain exposed in the wall and floor near the west end of SU 11 (Figure 12.3). The feature extended 20 cm into the study unit and was exposed for 45 cm along the north wall. From this limited exposure, the feature appeared rectangular. The feature fill consisted of a dark sandy clay loam with sandstone pebbles and bits of charcoal. The feature was not excavated and therefore the depth of deposit could not be determined. Two plain grayware and one Mancos erect corrugated rim sherd were recovered from the feature matrix. All three sherds represent jar forms. The function of Feature 10 could not be determined, but it is probably related to Feature 1, a slab-lined roasting pit, adjacent to the west and roughly in the same alignment.

### Feature 11

Feature 11 was a pitstructure with its central point located at approximately N108.60, E85.75. The feature was exposed in the north end of SU 8 (Figure 12.20) and the south end of SU 4 (Figure 12.15). In profile the feature shows a steep-walled basin-shaped pit 60 cm deep and approximately 3 m wide. The Feature 11 matrix consisted of a compact, brown/dark brown (10YR4/3) sandy clay. The matrix contained 10% charcoal flecks and sandstone rocks. A piece of burned tabular sandstone was noted in the matrix. Fire-reddened earth was also noted in the base of the pit. A few ceramic artifacts were recovered from the backhoe backdirt. Fire-reddened sandstone slabs up to 10 cm long were seen in situ near the center of the pit (Figure 12.15). Feature 11 was a small pitstructure likely utilized as a habitation. Feature 14 abuts the lower northeast edge of Feature 11. Feature 11 may have been excavated into Feature 14, and thus would postdate it. Feature 12 lay at the same elevation as the upper part of Feature 11, 3 m to the northeast. Beyond the backhoe excavation which revealed Feature 11 no other excavation was conducted. A radiocarbon sample (FS 119; Beta 110379) from the upper portion of the Feature 11 fill yielded a 1 sigma calibration date of AD 1040 to 1195 (conventional radiocarbon age of 910±40BP).

### Feature 12

Feature 12 was a large thermal feature located at approximately N112.5, E89.5. The feature was exposed near the south end of SU 4 (Figure 12.15). In profile the feature was 140 cm long and up to 45 cm deep. The width of the feature could not be determined. Four layers of fill were noted in the feature: cultural fill; a layer of small flat sandstone cobbles, some thermally altered; a thin charcoal lens; and a burned earth lens. The Feature 12 matrix consisted of a compact, dark sandy clay. A fragment of a worn two-hand mano and a banded grayware jar sherd were recovered from the upper portion of the fill. Feature 12 may represent a roasting pit and it may be contemporaneous with Feature 11.

### Feature 13

Feature 13 was a shallow basin-shaped feature located near the center of SU 4 at approximately N114, E90.5 (Figure 12.16). The feature matrix consisted of very dark brown (10YR2/2) to brown/dark brown (10YR4/3) sandy clay loam with gravel at a depth of at least 1.2 m. Charcoal flecks could be seen throughout the feature but the charcoal was especially dense in two locations. The primary charcoal deposit was approximately 1.8 m long and 20 cm thick, at a depth of 1.3 m. A similar dark charcoal-flecked soil lens extended for 1 to 2 m farther northeast. No artifacts were noted in the matrix but a small sandstone slab was found. A large corrugated grayware sherd was recovered at approximately the same level, 2.5 m to the southwest on the opposite side of the trench. No excavation was conducted on the feature except to remove a soil sample. The function of the feature could not be determined at this level of investigation. The lack of burned earth indicates that it probably did not represent a hearth.

### Feature 14

Feature 14 was an ash lens located in SU 4 located at approximately N110.5, E87.5. The feature matrix of Feature 14 consisted of up to 30 cm of very dark brown (10YR2/2) ash, burned

sand, and pebbles (Figure 12.15). Some of the rock was burned. Rodent disturbance had impacted the feature. Feature 14 abutted the lower northeast edge of Feature 11 and extended for 2 m to the northeast. Feature 14 was approximately 35 cm below modern grade and ranged in thickness from 8 to 30 cm. It was thickest at its contact with Feature 11. Four layers of fill were noted, consisting of a layer of cultural fill, a charcoal lens, a second layer of cultural fill, and then a layer of burned earth. A fist-sized sandstone rock was noted on the burned earth layer. No artifacts were noted in the fill matrix; however, some burned sandstone slabs and a sherd were recovered from approximately 40 cm below Feature 14. It appeared that Feature 11 had been excavated into Feature 14 and thus would postdate it. The function of Feature 14 could not be determined, but it may represent a pitstructure and adjacent smear of cultural material.

#### Feature 15

Feature 15 was an ash and charcoal pit located in SU 3 at approximately N116.25, E80.75. The feature measured 48 cm long by 20 cm thick and lay 1.35 m below modern grade (Figure 12.12). The feature matrix consisted of a yellowish brown (10YR5/4) ashy and charcoal-flecked sandy clay. Some fire-reddened earth underlay the deposit. Large chunks of burned wood were recovered from the feature. No artifacts were noted in the fill matrix. From the burned wood and fire-reddened earth, Feature 15 may have been a hearth. The stratum in which Feature 15 lay also contained dark charcoal-flecked soil. A flotation sample was collected from this stratum. From the depth of the feature, it is suggested that Feature 15 may predate many of the other features at this site; there appeared to be other possible occupation levels above it. Feature 15 may be contemporaneous with Feature 22, another deeply buried feature described below.

#### Feature 16

Feature 16 was a broad, ashy deposit near the surface in the northwest wall of SU 3 (Figure 12.13). It was located at approximately N123, E88.5. The feature measured at least 2.5 m long and 35 cm thick, and lay 10 to 15 cm below the surface. It was also visible in the opposing trench wall. Feature 16 was located beneath Stratum I and consisted of a slightly compact, dark grayish brown (10YR4/2), sandy clay with charcoal flecks and 10% gravel. Feature 16 had been excavated into Stratum II. No artifacts were noted in the matrix although a number of sherds (mostly graywares) were seen in the opposing wall at this level. Feature 16 may represent the dispersed ash from a more concentrated feature nearby.

#### Feature 17

Feature 17 was a small basin-shaped, ash and charcoal deposit located within a larger dark ashy deposit (Figure 12.14). The feature was located in the southeast wall of SU 3 in Stratum II at approximately N119.75, E85.50. The feature measured 67 cm long and 25 cm thick, and lay 20 cm below the surface. Feature 17 was located within Stratum II and consisted of a dark yellowish brown (10YR4/2) sandy clay with ash and charcoal flecks and chunks. No artifacts were recovered from the feature; however, at least four corrugated grayware sherds were recovered from Stratum II. From the shape and the quantity of ash and charcoal, it is suggested that Feature 17 may have represented a small unlined hearth.

### Feature 18

Feature 18 was an ash and charcoal deposit located within a larger dark ashy lens (Figure 12.18). The feature was located in the west wall of SU 6 at approximately N114.25, E70.75. The feature measured 60 cm long and 25 cm thick, and lay 35 cm below the surface. Feature 18 was a densely charcoal-flecked sandy clay. The soil ranged from very dark grayish brown (10YR3/2) to dark grayish brown (10YR4/2). No artifacts were present in the feature. No evidence of thermally altered soil was noted in this profile. The adjacent Feature 23 may have represented a scattering of fill from Feature 18. The function of Feature 18 could not be determined at this level of investigation. The stratigraphy below Feature 18 indicated that this was an area of high alluvial activity. It appeared that a deep cut in the lower levels had been filled by later gravelly deposits. Additionally there were layers of bedded gravel indicating alluvial transport of materials.

### Feature 19

Feature 19 was a thin ash lens located in SU 2 at approximately N131.50, E78.75 (Figure 12.11). The lens was 1.5 m long, 5 cm thick, and 90 cm below modern grade. The Feature 19 matrix consisted of a lens of very dark grayish brown (10YR3/2), loam with charcoal and burned sand comprising 50% of the matrix. No artifacts were noted in the fill. Feature 19 may have represented an activity area associated with Feature 20, a pitstructure that nearly abutted its southern end.

### Feature 20

Feature 20 was a pitstructure located in SU 2 at approximately N129, E77.25 (Figure 12.11). The feature was 2.85 m long, up to 90 cm deep, and at least 90 cm below modern grade. Two primary cultural layers were identified (Strata VIa and VIb). The upper 15 cm (Stratum VIa) consisted of a dark grayish brown (10YR4/2) clay with 10% charcoal. No artifacts were noted in this portion of the feature fill. The lower portion of Feature 20 (Stratum VIb) was up to 60 cm thick and consisted of brown (10YR5/4) loam and 20% charcoal and a burned lens near the bottom. A single plain grayware jar sherd was noted in the matrix. A flat, 45-cm-long sandstone rock separated Strata VIa and VIb. The bottom layer had numerous flecks and chunks of charcoal and a concentration of ash and burned soil along its northern side. The burned soil is located at the closest distance to Feature 22. Feature 20 was a pitstructure that has seen multiple filling episodes. The sherd in Stratum VIb indicated that the pitstructure was occupied no earlier than the Pueblo I period. However the morphology of the pitstructure was atypical of Pueblo II construction. The overlying stratigraphy indicate that this area was subject to repeated episodes of alluvial flooding and subsequent soil deposition.

### Feature 21

Feature 21 was a thin ash and charcoal-flecked lens seen in the north and east walls of SU 16 at approximately N114.85, E78.15 (Figure 12.8). The stain was 5 to 10 cm thick. The feature lay at a depth of 60 cm below modern grade. The feature matrix consisted of a compact dark brown

(10YR3/3) ashy and charcoal-flecked loam. No artifacts were recovered from this layer. Feature 21 is likely related to Stratum V seen in profile F-F' (Figure 12.12) located immediately to the east in SU 3. The function of Feature 21 could not be determined.

#### Feature 22

Feature 22 was a probable hearth located in SU 2 at approximately N130, E77 (Figure 12.11). The hearth was 48 cm long and more than 21 cm thick, and lay at a depth of approximately 2.0 m. Three distinct layers were noted in the feature fill; yellowish red (5YR4/6), fine silty loam sand which overlay ash, highly burned soil, and fire-reddened rocks. No artifacts were noted in association with the feature. Feature 22 was the deepest feature found at the site and may predate all others.

#### Feature 23

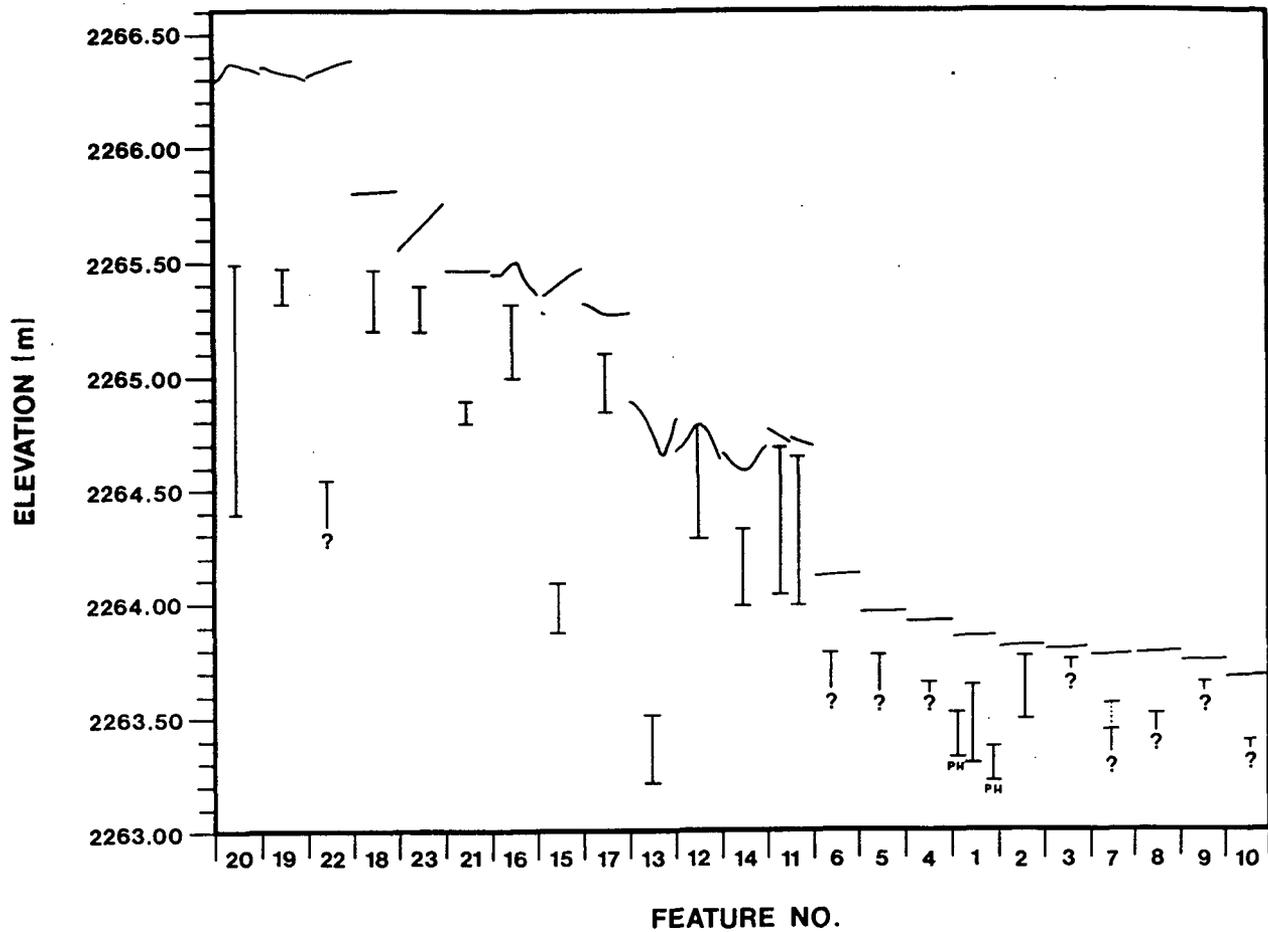
Feature 23 was a low-density ash and charcoal lens located in SU 6 with its center at approximately N112.5, E70.3 (Figure 12.18). The lens was at least 3 m long and varied from 10 to 26 cm thick. The lens appears to be slightly darker at the southern end because of more charcoal flecks within the matrix. The feature lay at a depth of 35 cm below modern grade. The Feature 23 matrix was a compact ashy and moderately densely charcoal-flecked loam. The soil ranged from dark yellowish brown (10YR3/4) to dark grayish brown (10YR4/2). No artifacts were present in the feature. Feature 23 may represent a smearing of Feature 18 which lay at the north end of this lens. Feature 23 lay above a gravelly alluvial deposit and possibly a filled arroyo.

### SUMMARY AND INTERPRETATION

Phase I Data Recovery testing of site NM-Q-22-52 resulted in the collection of 337 artifacts of which 305 were ceramics, 19 were flaked stone, six were ground stone, and seven were faunal materials. The majority were collected from surface contexts. None of the test units yielded high numbers of cultural materials.

Subsurface investigations revealed the presence of 23 features. The features represent a variety of types including pitstructures, hearths, roasting pits, storage pits, and general activity areas. Identifying the function of the features was often problematic since the nature of testing permits only a limited view of features. In some cases it is likely that what was identified as a feature may only represent a cultural occupation layer with no definable feature, or conversely, a "smear" of ash and other cultural material from a nearby, as yet undetected, feature. These less well-defined cultural manifestations were identified as features because it was felt important to catalog all possible evidence of cultural activity at site NM-Q-22-52 regardless of whether or not a function or temporal framework could be determined. The true feature population of this site remains to be seen with more intensive investigations.

Comparisons of stratigraphic positioning of features relative to the modern ground surface are interpreted to indicate at least five occupations at site NM-Q-22-52 (Figure 12.23). The apparent earliest occupation may be represented by Features 22, 15, and 13. All three of these features occurred at or near the bottom of their respective trenches. Features 22 and 15 appeared to be hearth-



- Surface elevation
- I Depth range of feature
- T Unknown lower depth
- ? Unknown lower depth
- PH Postholes adjacent to Feature 1
- T Possible upper elevations

Note: Feature 11 shows 2 elevation ranges because different parts of it were exposed in SU's 4 and 8

Figure 12.23. Site NM-Q-22-52, Comparative Feature Elevations from Highest to Lowest Ground Surface Elevation Across the Site.

type features, while Feature 13 may be a more substantial feature. None of the three features had any artifacts associated with them. It should be noted, however, that a grayware sherd was recovered from the trench wall opposite Feature 13 and 30 cm higher in elevation, and it is suggested that Feature 13 may represent a Basketmaker III occupation.

The largest cluster of features occurs in the southeastern portion of the site. The beginning elevations of Features 1 through 9 only varied by 26 cm over an approximate 50-sq-m area. Feature 10 was an anomaly being 12 cm lower; however, from its proximity to Feature 1, it may have been contemporaneous. Although the level of investigation was limited, most of the features appeared similar in function and may represent storage pits. Feature 1, a roasting pit, yielded a 1 sigma calibrated radiocarbon-date of AD 690 to 875 (conventional radiocarbon age of  $1250 \pm 60$ BP; Beta-110378) the Pueblo I period. Although numerous sherds were recovered from this area, they tended to be in Strata I and II, above the feature deposits. It is likely these artifacts were moved downslope from more recent occupations.

The next occupation is represented by Features 11 and 12. Feature 11 was a pitstructure from which a radiocarbon sample yielded a 1 sigma calibrated date of AD 1040 to 1195 (conventional radiocarbon age date of  $910 \pm 40$ BP; Beta-110379), in the late Pueblo II to early Pueblo III periods. Feature 12 may be a large roasting pit or other more substantial feature. Feature 11 appears to have been excavated into Feature 14, indicating the latter's earlier date of occupation, possibly earlier in the Pueblo II period, possibly representing a sixth occupation of this area.

The next occupation is represented by Features 16 and 17. These two features were excavated into Stratum II of their respective profiles on opposing sides of the same trench. Although Feature 17 may be identified as a probable hearth, Feature 16 was an indefinite ashy and charcoal-flecked layer. The stratum containing both features yielded a number of grayware ceramics. No definitive occupation period could be assigned; however, from the shallowness of the deposits an Early Pueblo III occupation is suggested. Possible contemporaneity of Feature 21 (located nearby in SU 16) was considered. However, an examination of the strata along the length of trench SU 3 and extrapolated into 1-by-1-m unit SU 16 indicates that Feature 21 likely predates Features 16 and 17 by an undetermined amount of time, possibly being more stratigraphically related to Features 11 and 12.

The last occupation is represented by Features 18, 19, 20, and 23. Feature 20 was a well-defined pitstructure and Feature 19 was a possible activity area adjacent to it and likely associated with it. Features 18 and 23 were stratigraphically related to each other and may have been two parts of the same feature. Elevationally all four features are similar but the stratigraphies are substantially different in the two locations. The stratigraphy below Features 18 and 23 exhibited a rather dramatic arroyo formation and subsequent filling. The arroyo cut could be seen downslope in SU 7 and 8. The stratigraphy above Features 19 and 20, however, exhibited numerous episodes of alluvial deposition. These interbedded layers may represent the alluvial flow toward the arroyo seen in SU 6. Based on this geomorphological sequence Features 19 and 20 predate Features 18 and 23, probably by a substantial amount of time. The one plain grayware sherd from Feature 20 indicates an occupation no earlier than Pueblo I.

At a minimum the radiocarbon samples yielded dates indicating two occupations at site NM-Q-22-52 during the Pueblo I and late Pueblo II to early Pueblo III periods respectively. These limited absolute dates can help seriate the other features at site NM-Q-22-52 to further provide an understanding of the occupational sequences that occurred here. As outlined in the paragraphs above at least five occupations can be identified spanning from before Pueblo I through the Early Pueblo III periods. More intensive investigations can more precisely identify the various times of occupation. This site may provide a unique view of continuous occupation of this area over a broad span of time.

The ceramic analysis (Chapter 25) indicates the occupation of this site occurred during the late Pueblo II period from AD 1000 to 1150. The bulk of identifiable sherds were graywares, mostly corrugated graywares. The whitewares included Kiatuthlanna, Red Mesa, Escavada, and Gallup black-on-white, with the Gallup type predominating. The majority of sherds represent jar forms, although numerous bowl fragments were also seen as well as a small number of ladle sherds. Two raw clay samples were also recovered.

A dark stain was noted in the shoulder of the N11 roadbed. The stain was exposed during maintenance grading and was cursorily investigated after that. Troweling did not reveal any cultural materials, and the stain appeared to be organic. The stain did not have an oily feel or smell to it suggesting roadbed dust control.

It is significant to note the presence of large tree roots in the profiles of several of the trenches. The site presently has pinyon and juniper trees growing on it; however, none of these trees is more than 2.4 m (8 ft) tall and would not sustain roots the size of those seen in the trench profiles (up to 20 cm in diameter). Additionally the depth of the roots is much greater than would be expected even for large mature trees. The bark on the roots resembled that of large pinyon or mature ponderosa trees. The depth of the roots indicates an accretion of a significant quantity of soil over time as suggested by Thompson in Chapter 24 of this report. These roots may also indicate a change in moisture and vegetation. Although ponderosa pine grows in the vicinity it is on the north side of the pass and in shaded northern exposures.

## RECOMMENDATIONS

Based on the presence of 23 intact subsurface features covering at least five occupations, the potential for significant archaeological data is high. It is therefore recommended that additional data recovery archaeological investigations be conducted at site NM-Q-22-52 to mitigate the adverse impacts of road construction. Each of the features identified during the testing should be reexposed and fully excavated to determine their cultural and temporal affiliation. In many cases this will require significant stripping of overburden. Furthermore, it will require sequenced stripping because of cultural deposits overlying other cultural deposits. Additionally the stain on the shoulder of N11 should be further examined to more confidently determine whether or not it represents a cultural deposit.

## Chapter 13

### SITE NM-Q-22-53 (LA 110316)

#### Harding Polk II

Site NM-Q-22-53 is located southeast of the N11 roadbed near the headwaters of a small, but broad, unnamed alluvial valley bordered by sheer-edged sandstone mesas. The site is situated at an elevation of 2260 m (7414 ft) but the surrounding mesas rise to over 2408 m (7900 ft). The valley drains to the southwest towards the Rio Puerco of the West 3.9 km (2.4 mi) away. Vegetation at the site is dominated by big sagebrush (*Artemisia tridentata*), with lesser quantities of fourwing saltbrush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), fringed sagebrush (*Artemisia frigida*), winterfat (*Ceratoides lanata*), Russian thistle (*Salsola kali*), and prickly pear cactus (*Opuntia* spp.). Grasses and forbs observed include Indian ricegrass (*Oryzopsis hymenoides*), blue grama grass (*Bouteloua gracilis*), mustard tansy (*Descurainia* spp.), purple aster (*Aster* spp.), desert sunflower (*Gerea canescens*), fleabane (*Erigeron* spp.), and filaree (*Erodium cicutarium*). Young pinyon (*Pinus edulis*) are present across the site, with a single mature tree located adjacent to a small rubble cluster west of the datum.

#### SURVEY DATA

Site NM-Q-22-53 was originally recorded by American Indian Cultural Consultants (AICC 1982) as two sites (N11-6 and N11-26) consisting of a small grouping of rock alignments, rock rubble, and associated artifact concentration, and a second artifact concentration approximately 45 m east of the first. Zuni Cultural Resource Enterprise (ZCRE) rerecorded these two sites in 1995 as the single site NM-Q-22-53 as part of the N11(2) road survey (Zimmerman and Abbott 1996). ZCRE's survey combined the two sites because of the relatively short distance between the two components and a now-apparent, low-density continuous artifact scatter between them. Contemporaneity of the artifacts at both locations also supports their association. ZCRE recording activities included Brunton compass mapping, in-field artifact analyses, and photography. The in-field analyses included assessment of lithic artifact reduction and material type identification, ceramic type identification, artifact counts, and surface distribution mapping of artifacts. Based on the diagnostic ceramics present the site was determined to represent a Pueblo II period ancestral Pueblo occupation.

#### NATURE AND EXTENT TESTING

From 21 April to 13 May 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent and nature of site NM-Q-22-53. A redefinition of the site boundaries and a complete surface collection of all artifacts within the right-of-way were conducted. Subsurface investigations included hand excavation of 10 test units totaling 18 sq m and backhoe excavation of five trenches totaling 104 m (Figure 13.1). Site boundaries were expanded to the northeast and southwest of the previously identified eastern end which was originally designated by AICC as N11-26. The small rubble cluster was located outside the right-of-way and was not investigated.

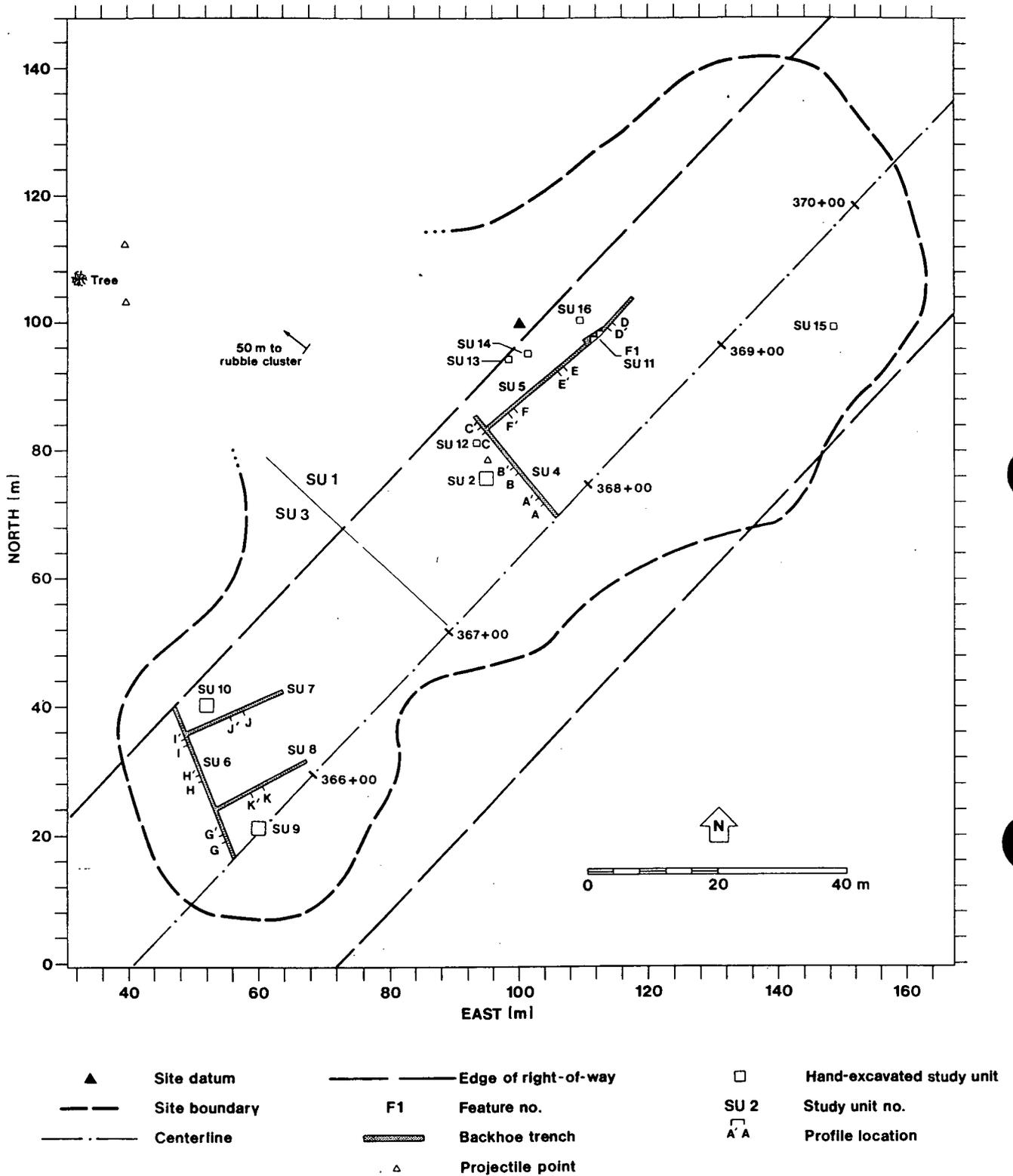


Figure 13.1. Site NM-Q-22-53, Nature and Extent Testing.

To aid in organization of the investigation of the site, the site was divided into a number of study units. Study units are arbitrary designations of space in which the investigator wants to direct special focus. They can encompass as much or as little area as deemed necessary by the investigator. That focus may be a feature, a single excavation unit, a group of excavation units, a backhoe trench, a surface collection area, or even the entire site. Consequently one study unit may be situated within another. At a minimum each excavation unit and backhoe trench has been designated with a study unit (SU) number.

Site NM-Q-22-53 was divided into two loci of investigation: SU 1 and SU 3. SU 1 comprised the eastern end of the artifact scatter identified during the survey. SU 1 mostly clustered around the site datum; however, the area it incorporated was expanded. SU 3 comprised a smaller low-density scatter, discovered during testing, located 65 m southwest of the site datum and 50 m south of the rubble scatter. The study unit was also defined because this area had a distinct change in vegetation. SU 3 incorporated an expanse where no sagebrush or other large, woody shrubs grew, in contrast to the rest of the site and across the valley.

#### Surface Collection

Surface artifacts were collected from an area encompassing 73 10-by-10-m (100 sq m) collection units (Figure 13.2). For those 10-by-10-m units that partially extended outside the right-of-way, only that portion within the right-of-way was collected and the recorded surface area reflects the actual area collected. Twenty-four units encompassed less than 100 sq m. The artifacts were then tabulated on Field Specimen (FS) catalog sheets. All artifacts from a single collection unit were assigned a single FS number; however, artifacts of the different material types (i.e., chipped stone, ceramic, ground stone) were grouped separately within the assigned FS numbers. Only 39 collection units yielded artifacts at NM-Q-22-53. Artifact types included ceramics, flaked stone (including one obsidian projectile point noted during the survey), and ground stone. A cursory examination of the ceramic assemblage and the single projectile point supports the determination of a Pueblo II ancestral Pueblo occupation. The majority and denser parts of the artifact scatter were located westward outside the right-of-way toward the rock rubble scatter. From the low density of the broad scatter within the right-of-way, alluvial transport may have moved artifacts here from the more artifact dense portions of the site.

A total of 168 sherds were recovered from the surface at site NM-Q-22-53. Included in the assemblage are plain, corrugated, and banded graywares and Gallup, Red Mesa, and Escavada black-on-white. Also noted among the graywares were a Lino Gray rim, Mancos narrow neckbanded, and polished sherds. Among the whitewares were slipped white sherds. Jar fragments dominate the assemblage.

#### Hand Excavation

Hand excavation of 10 test units encompassing 18.08 sq m was conducted in order to determine the nature and depth of cultural deposits on site NM-Q-22-53 (Table 13.1). The total of 18.08 sq m was derived from three 2-by-2-m units, five 1-by-1-m units, and two units of irregular shape at the bottom of a backhoe trench. The location of the surface artifacts was the primary factor in determining the placement of test units. All test units were excavated in arbitrary 10-cm levels and all soils were screened through 1/4-in hardware mesh. A Munsell soil chart was used to identify soil color within each level.

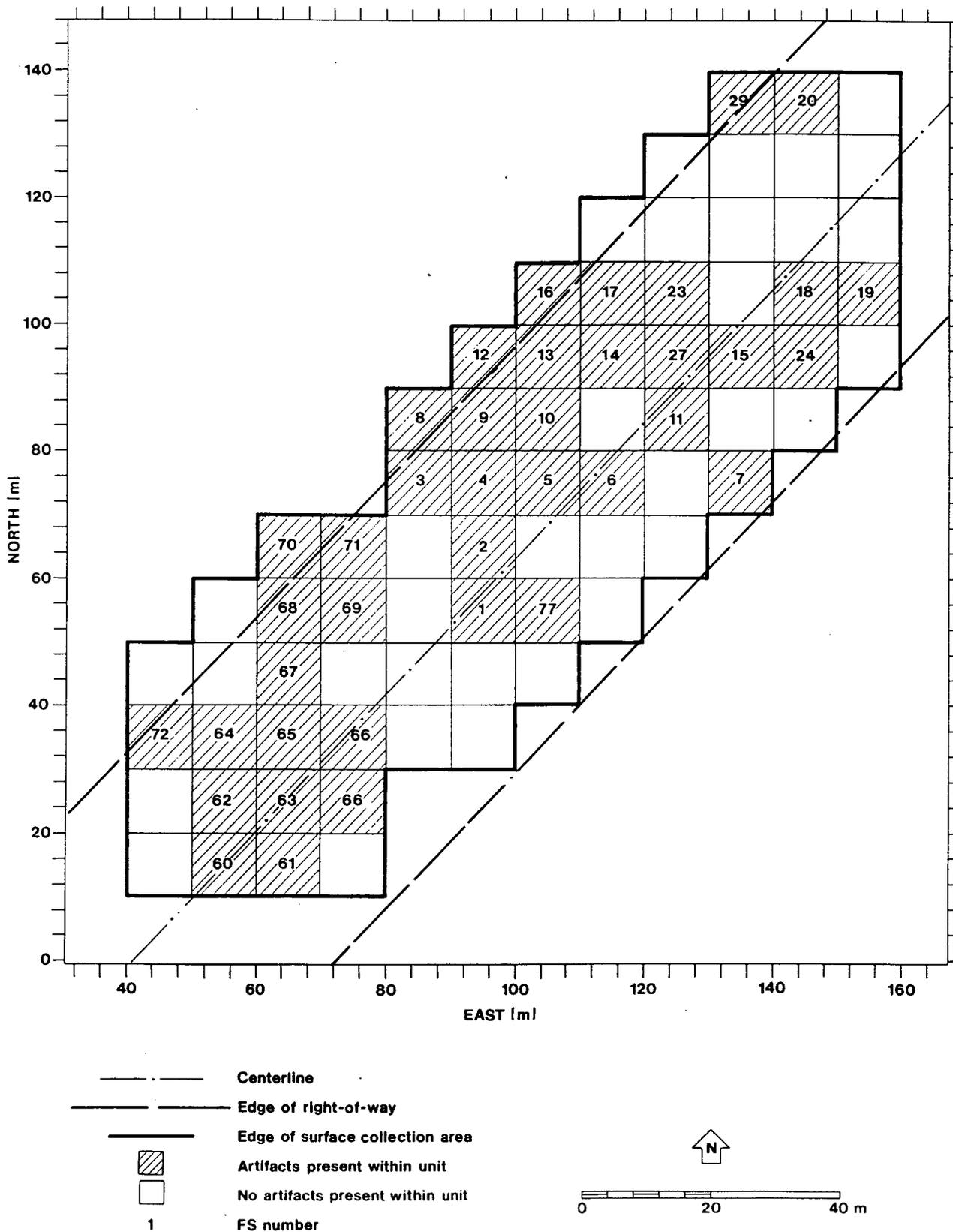


Figure 13.2. Site NM-Q-22-53, Presence or Absence of Artifacts from Gridded Surface Collection.

Table 13.1. Summary of Hand-excavated Units at Site NM-Q-22-53.

SU No.	Provenience	Dimensions (m)	Depth (cm)	Volume (cu m)	Levels with Artifacts	Features Present
2	N75, E94	2 by 2	33	1.32	1, 2, 3	None
	N76, E94	1 by 1	10	0.10	None	
9	N21, E59	2 by 2	15	0.60	1, 2	None
	N21, E59	1 by 1	10	0.10	3	
10	N40, E51	2 by 2	29	1.16	1, 2	None
11	N97, E111	0.81 sq m**	13	0.10	None	1
11	N98, E112	0.27 sq m**	27	0.07	None	1
12	N81, E93	1 by 1	44	0.44	1, 2	None
13	N94, E98	1 by 1	76	0.76	1, 2, 3	None
14	N95, E101	1 by 1	72	0.72	1, 2, 3, 4	None
15	N99, E148	1 by 1	47	0.47	1, 2, 3	None
16	N100, E109	1 by 1	48	0.48	1, 2, 3	None
Totals		18.08 sq m	42	6.32 cu m		

\*Average depth

\*\*The dimensions of these units were irregular; their areas were estimated.

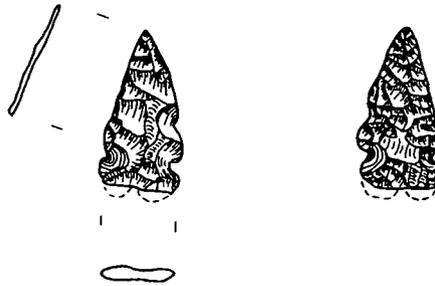
SU = Study Unit

### Study Unit 2

SU 2 was a 2-by-2-m unit located at grid coordinates N75, E94. This unit was placed in a location where a number of tabular sandstone cobbles were noted on the surface. Typically the ground surface in this alluvial valley was devoid of any lithic resources. The presence of the rocks on the surface was interpreted as a potential for architectural remains in this vicinity. In addition, this location was within 6 m of the spot where an obsidian corner-notched projectile point (Figure 13.3) was recovered (at SU 12, described below). Since the sandstone cobbles were visible over an area larger than 1 sq m, a larger unit was felt to be necessary to expose and confirm whether the surface rocks represented architectural remains and, if so, to determine the feature's orientation, extent, and depth.

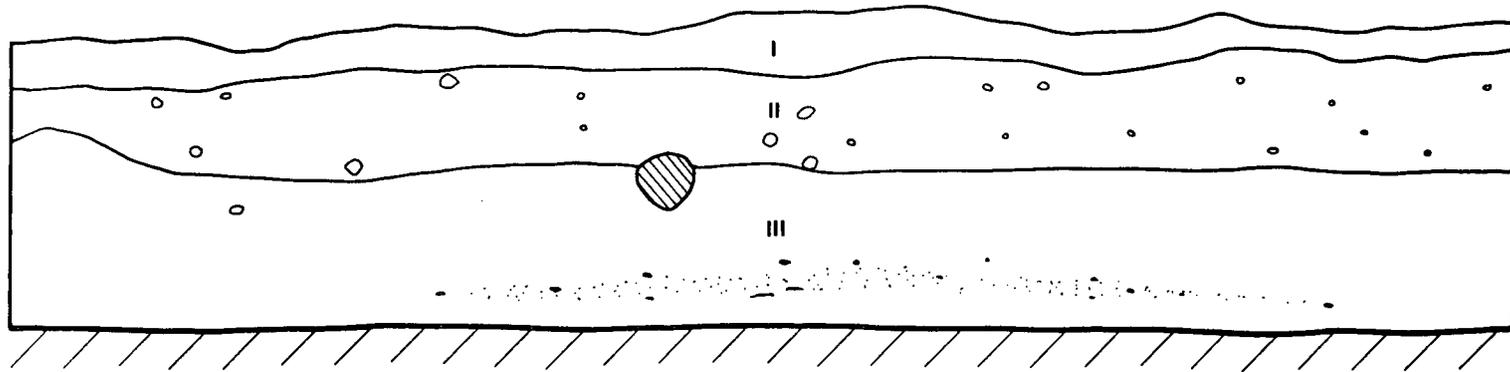
SU 2 was excavated 33 cm in three levels, then reduced to 1-by-2-m (the north half of the 2-by-2-m unit) and excavated another 10 cm (Level 4). Three soil strata were identified (Figure 13.4). Stratum I consisted of 4 to 8 cm of dark brown (10YR4/3) loose sandy clay with numerous roots in it. A single sherd was recovered from Stratum I. Stratum II consisted of 12 to 15 cm of dark brown (10YR4/3) compact sandy clay with sandstone pebbles and traces of charcoal flecking. Small- to medium-sized sandstone cobbles were noted in Levels 1 and 2 which comprised Strata I and II (Figure 13.5). Five sherds were recovered from Stratum II. Stratum III consisted of at least 25 cm of a dark yellowish brown (10YR4/4) sandy clay with charcoal flecking and small quantities of sandstone pebbles. A corrugated grayware sherd was recovered from the upper portion of this stratum.

Removal of Stratum I exposed more sandstone cobbles which formed a loose north-to-south alignment. Coupled with the slightly higher quantity of artifacts and the charcoal flecking seen in Stratum II, the cobble alignment was believed to be a degraded feature. Excavation of Stratum II, however, revealed these to be natural deposits. High-energy erosional forces likely transported these



Actual Size

Figure 13.3. Site NM-Q-22-53, Obsidian Corner-notched Projectile Point.



-  Sandstone rock
-  Sandstone pebbles
-  Charcoal flecks
-  Unexcavated

Figure 13.4. Site NM-Q-22-53, Study Unit 2, North Wall Profile.

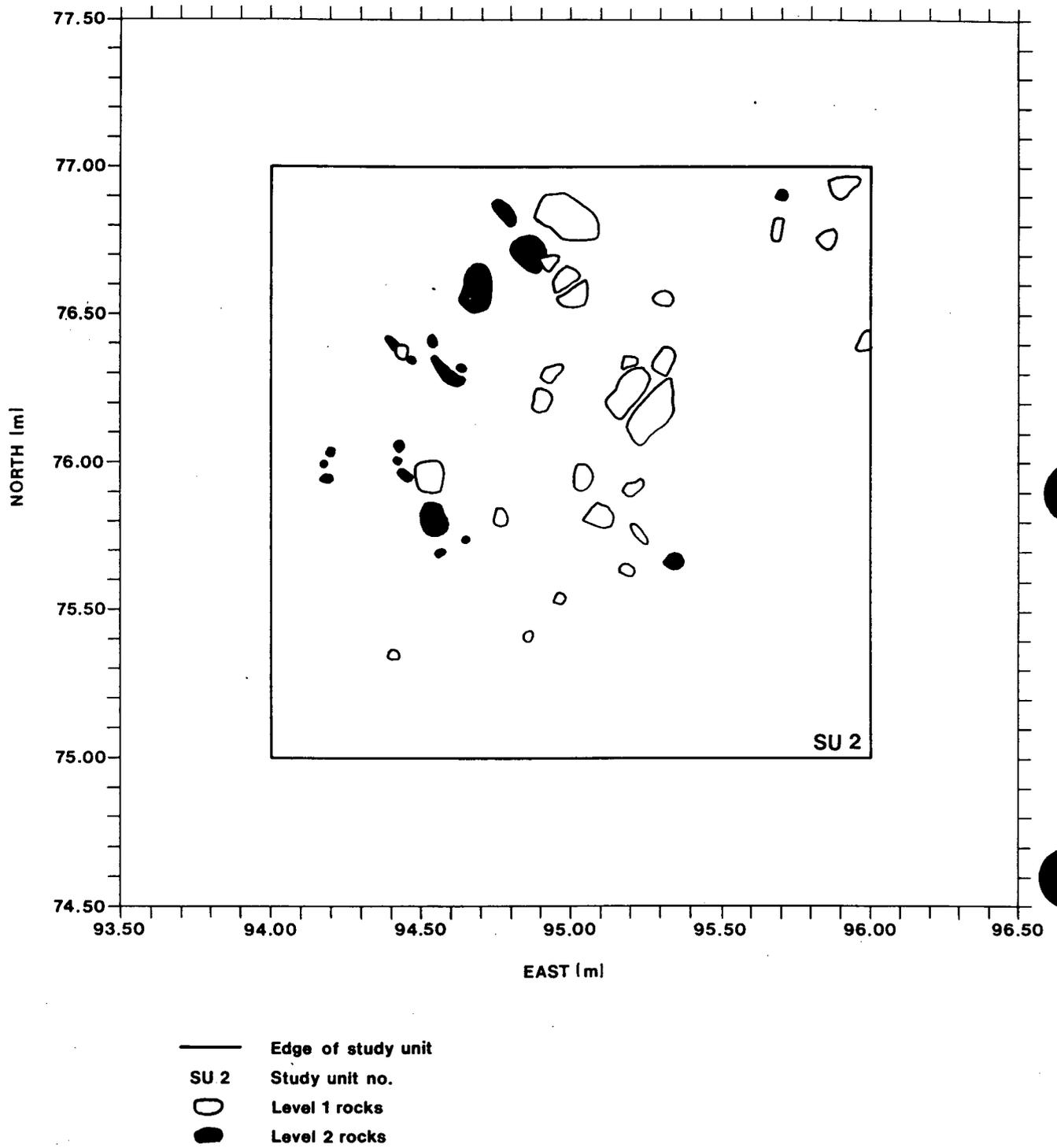


Figure 13.5. Site NM-Q-22-53, Study Unit 2, Combined Plan View of Cobble Distribution in Strata I and II.

materials from locations uphill, possibly from the rock rubble scatter and artifact scatter to the east. The single artifact at the top of the stratum and the lack of additional cobbles suggested that Stratum III was the beginning of sterile deposits.

### Study Unit 9

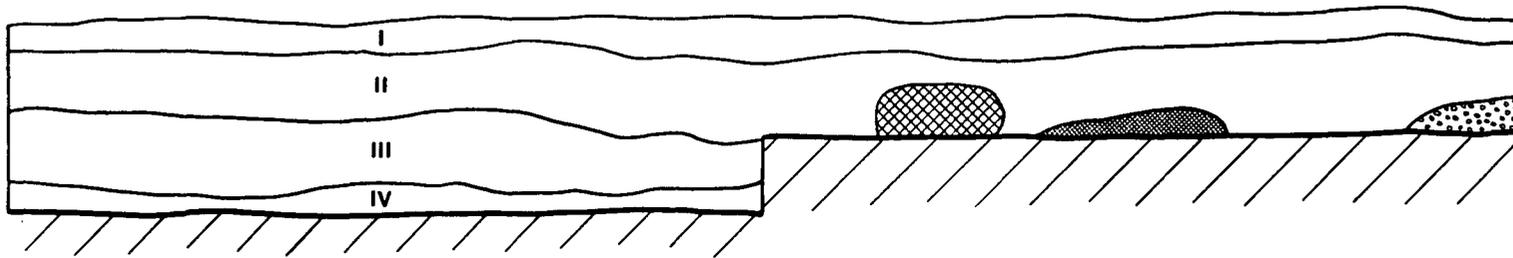
SU 9 was a 2-by-2-m unit located at grid coordinates N21,E59. This unit was placed in SU 3 where the vegetation was conspicuous by the absence of sagebrush and the predominance of grasses. In addition a low-density artifact scatter was noted in the general vicinity and specifically several ceramic artifacts were noted on the surface at this location. It was thought that the vegetation anomaly may have represented subsurface cultural deposits, an occupation surface, or some other cultural modification. The excavation of a larger unit was felt necessary because of the broad area of this vegetation anomaly and the possibility of missing any subsurface architectural elements with a smaller test unit.

SU 9 was excavated 15 cm in two levels, reduced to a 1-by-1-m unit (N21, E59), and excavated another 10 cm. Within the three levels four strata were revealed (Figure 13.6). Stratum I ranged from 4 to 6 cm thick and consisted of a dark brown (10YR4/3) loose to slightly compact, sandy clay. Some rodent disturbance was noted. Stratum II ranged from 8 to 11 cm thick and consisted of yellowish brown (10YR5/4) loam with some gravel. There was considerable rodent disturbance in the stratum. Stratum III ranged from 6 to 11 cm thick and consisted of dark grayish brown (10YR4/2) clay with some charcoal flecking. There was a small amount of rodent disturbance. Stratum IV consisted at least 4 cm of a yellowish brown (10YR5/6) loam with gravel and clay pockets. Two sherds, an indeterminate black-on-white bowl sherd and a corrugated sherd, were recovered from the first stratum. The second stratum yielded slightly more grayware sherds and a flake. The third stratum yielded two more grayware sherds from the 1-by-1-m area. Due to the low density of artifacts, the lack of cultural features, the general belief that the deposits represented alluvial redeposition, and the culturally sterile deposit below Stratum III, further excavation of this unit was discontinued.

### Study Unit 10

SU 10 was a 2-by-2-m unit located at grid coordinates N40,E51. Like SU 9, this unit was placed in SU 3, a location where the vegetation was conspicuous by the absence of sagebrush and the predominance of grasses. Additionally a low-density artifact scatter was noted in the general vicinity and specifically several ceramic artifacts were noted on the surface at this location. It was thought that the vegetation anomaly may have represented subsurface cultural deposits, an occupation surface, architecture, or some other cultural modification. The excavation of a larger unit was felt necessary because of the broad area of this vegetation anomaly and to increase the probability of encountering subsurface cultural elements.

SU 10 was excavated 29 cm in three levels and four natural soil strata were identified (Figure 13.7). Stratum I consisted of 4 to 10 cm of dark brown (10YR4/3), loose, sandy clay with numerous roots and rodent disturbance in it. Ten sherds and one flake were recovered from Stratum I. The sherds included plain and corrugated graywares and indeterminate black-on-white wares. Stratum II consisted of 2 to 6 cm of yellowish brown (10YR5/4) loam with some sandstone pebbles, roots, and rodent disturbance. Stratum III consisted of 3 to 10 cm of dark brown (10YR4/3) sandy clay.

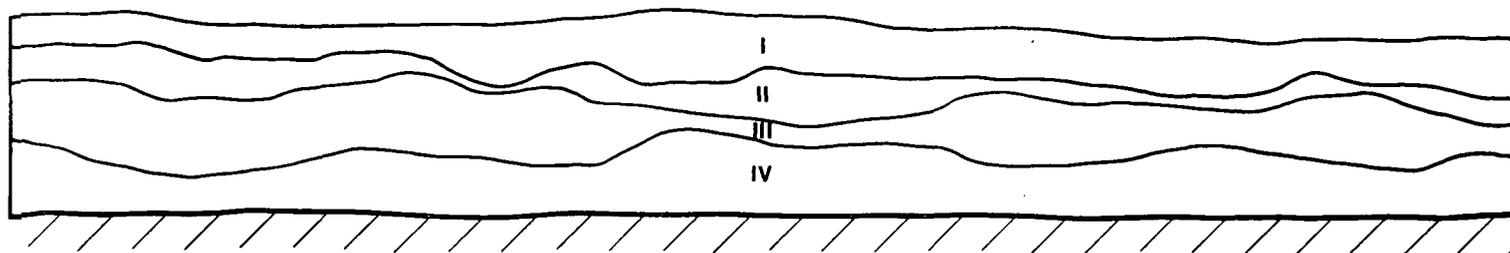


0 25 50 cm

-  Clay pocket
-  Gravel pocket
-  Rodent burrow
-  Unexcavated

200

Figure 13.6. Site NM-Q-22-53, Study Unit 9, West Wall Profile.



0 25 50 cm

/// Unexcavated

Figure 13.7. Site NM-Q-22-53, Study Unit 10, East Wall Profile.

Fifteen sherds were recovered from Level 2 which included portions of Strata II and III. The sherds included plain and corrugated graywares. Stratum IV consisted of at least 11 cm a moist, yellowish brown (10YR5/4) clay loam with sandstone gravel. No artifacts were recovered from this stratum. The sharp reduction in quantity of artifacts and the disturbed nature of the deposits in Stratum IV indicated sterile soil and excavation was thus halted. The greater (but still relatively low) number of artifacts present in Strata II and III was seen to reflect cultural activity in this area; however, it appeared to have been ephemeral in nature with no subsurface features associated with it. The vegetation anomaly is likely the result of the underlying clayey soils which are not conducive to the growth of sagebrush or other deep-rooted woody shrubs.

### Study Unit 11

SU 11 included two diagonally adjacent partial 1-by-1-m units (0.81 sq m and 0.27 sq m, respectively) located at grid coordinates N97,E111 and N98,E112. These units were defined within backhoe trench SU 5 to encompass a dark brown ashy stain manifested in the southeast wall and bottom of the trench.

Backhoe excavation had removed approximately 90 cm of overburden and three strata were exposed (see SU 5, Profile D-D', for soil descriptions). Approximately 15 cm into Stratum III a dark stain was detected and designated Feature 1. Mechanical excavation was halted at this level for more controlled and precise hand excavation to determine extent and depth of the feature. Unfortunately the toothed bucket of the backhoe caused significant disturbance to the upper portion of Feature 1. The dark ash concentration extended for 130 cm along the trench wall and varied from 4 to 7 cm in thickness (Figure 13.8). In profile, the stain appeared as three contiguous horizontal lenses. Areally the ashy stain covered most of N97, E111, however it only covered a small portion of N98, E112. No artifacts were noted in the matrix; however, a flotation sample was taken to help determine a date of occurrence and possible vegetal remains. The feature matrix was a very dark brown (10YR2/2) sandy clay. The matrix had a mottled and swirled appearance bringing into question whether it actually represented cultural activity. Rodent burrows noted in the trench profile within 60 cm and 10 cm higher in elevation than the feature further brought into question the integrity of Feature 1. Within SU 11 excavation was continued through Feature 1 for another 10 cm to expose its full vertical extent and to determine whether or not other potential cultural strata lay below it. The soil below Feature 1 was sterile.

### Study Unit 12

SU 12 was a 1-by-1-m unit located at grid coordinates N81, E93. This unit was placed where an obsidian projectile point was noted during the survey and subsequently relocated during this investigation. The projectile point was collected separately during the surface collection activities. It was felt that the point's location may have indicated the presence of buried cultural features or additional artifacts.

SU 12 was excavated 44 cm in five levels and two soil strata were identified (Figure 13.9). Stratum I consisted of 6 to 18 cm of brown (10YR5/3) sand with slight gravel deposits and minimal root disturbance. Two sherds were recovered from Stratum I of which one was a plain grayware jar sherd. Stratum II consisted of slightly compact dark yellowish brown (10YR4/4) silty clay loam with charcoal flecking and sandstone pebbles and numerous fine roots. No artifacts were recovered from

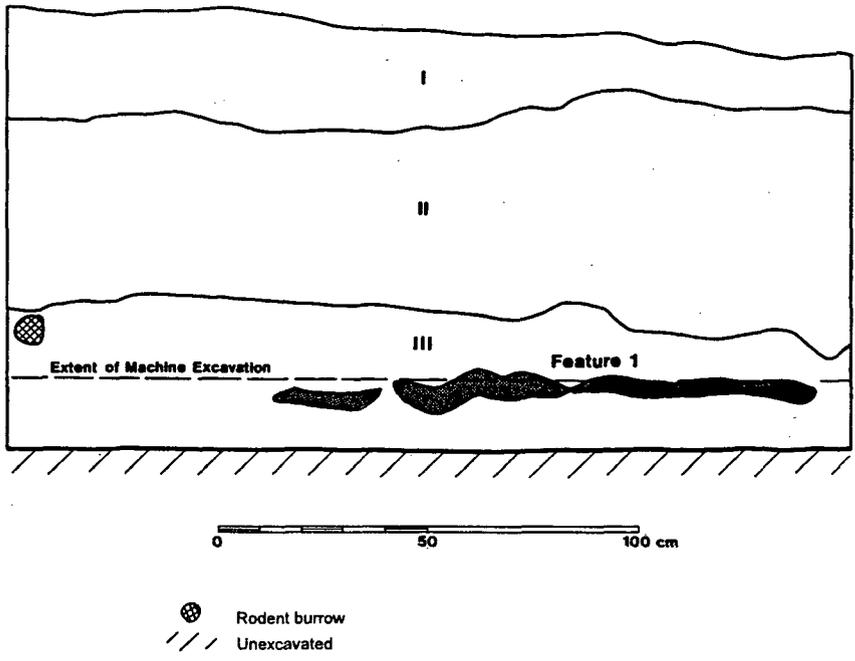


Figure 13.8. Site NM-Q-22-53, Study Unit 11, Southeast Wall Profile Showing Feature 1.

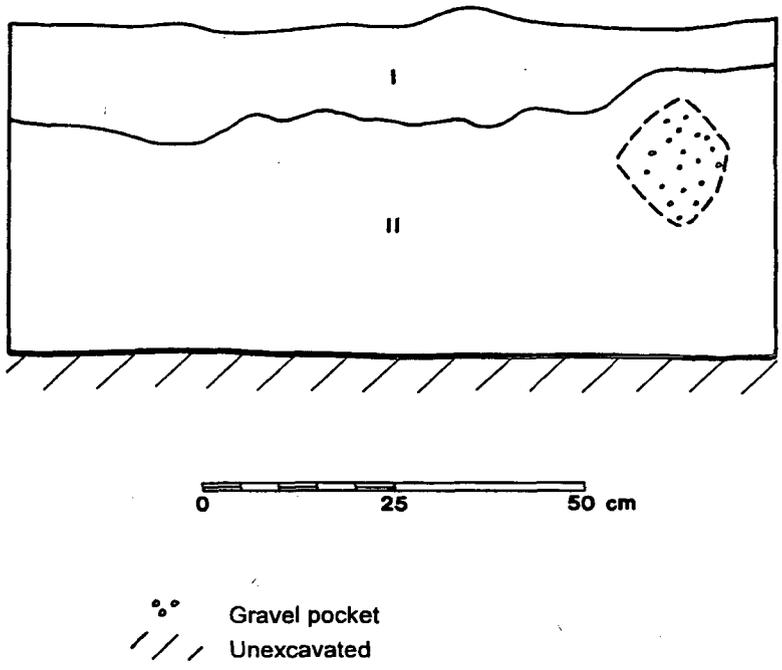


Figure 13.9. Site NM-Q-22-53, Study Unit 12, North Wall Profile.

Stratum II. Rodent disturbances were noted in both strata. The lack of artifacts in Stratum II indicated culturally sterile deposits. From the low quantity of artifacts, it is suggested that this material was probably redeposited from upslope locations as a result of erosional processes.

### Study Unit 13

SU 13 was a 1-by-1-m unit located at grid coordinates N94,E98. This unit was located immediately inside the right-of-way boundary. The unit was established at this location because immediately outside the right-of-way the surface artifact density increased considerably. It was therefore thought that subsurface cultural deposits may have continued into the right-of-way.

SU 13 was excavated 76 cm in eight levels and three soil strata were identified (Figure 13.10). Stratum I consisted of 14 to 31 cm of brown (10YR5/3) loam with minimal root disturbance but considerable rodent disturbance. Over 40 small sherds represented by a variety of plain, banded, and corrugated graywares, as well as one slipped whiteware and one indeterminate black-on-white sherd, were recovered from Stratum I. A small quantity of flakes were also recovered from Stratum I. Stratum II consisted of 21 to 40 cm of brown (10YR5/3) loam with charcoal flecking, small- to medium-sized sandstone pebbles and numerous fine roots. No artifacts were recovered from Stratum II. Stratum III consisted of at least 37 cm of dark yellowish brown (10YR4/6) loam with charcoal flecking and sandstone pebbles. No artifacts were recovered from Stratum III. Since no feature deposits were noted in SU 13, it was determined that the cultural material in Stratum I represented downslope wash from a midden, activity area, or other feature outside the right-of-way. The lack of artifacts from the two lower strata indicates sterile soil deposits. Since this was one of the first units excavated (see also SU 14) excavation continued for four levels into sterile soil to see if other buried cultural layers were present at a greater depth.

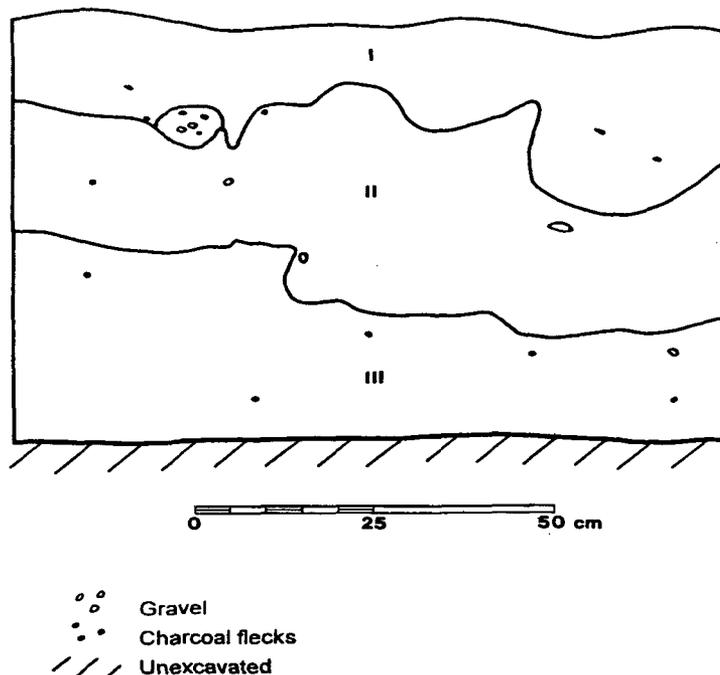


Figure 13.10. Site NM-Q-22-53, Study Unit 13, North Wall Profile.

## Study Unit 14

SU 14 was a 1-by-1-m unit located at grid coordinates N95,E101. Surface artifact density increased considerably to the west of this location, outside the right-of-way, therefore the unit was placed immediately inside the right-of-way adjacent to where the higher artifact density was noted. SU 14 was excavated 72 cm in seven levels and three soil strata were identified (Figure 13.11). Stratum I consisted of 5 to 10 cm of a brown (10YR5/3), very fine sand with some root disturbance. Fourteen small sherds consisting of plain, banded, and corrugated graywares and one Red Mesa black-on-white and one flake were recovered from Stratum I. Stratum II consisted of 25 cm of a dark yellowish brown (10YR3/4), sandy clay with charcoal flecking and small- to medium-sized sandstone pebbles and rocks. A total of 22 sherds consisting mostly of graywares were recovered from Stratum II. Stratum III consisted of a yellowish brown (10YR5/4) loam with charcoal flecking and sandstone pebbles. Numerous tabular sandstone cobbles up to 18 cm in diameter were present in the upper portion of the stratum. This layer may represent high-energy erosional movement of materials from upslope that occurred prior to the occupation of this area. Considerable rodent disturbance was noted in Strata II and III. As with SU 13 no feature deposits were noted in SU 14, and it was determined that the cultural material in Strata I and II probably represents downslope wash from a midden, activity area, or other feature outside the right-of-way. From the quantity of material, the feature or midden deposits may be located relatively nearby. The lack of artifacts from Stratum III indicates sterile soil deposits. Since this was one of the first units excavated (see also SU 13) excavation continued for four levels into sterile soil to confidently determine the last the of culture-bearing layers.

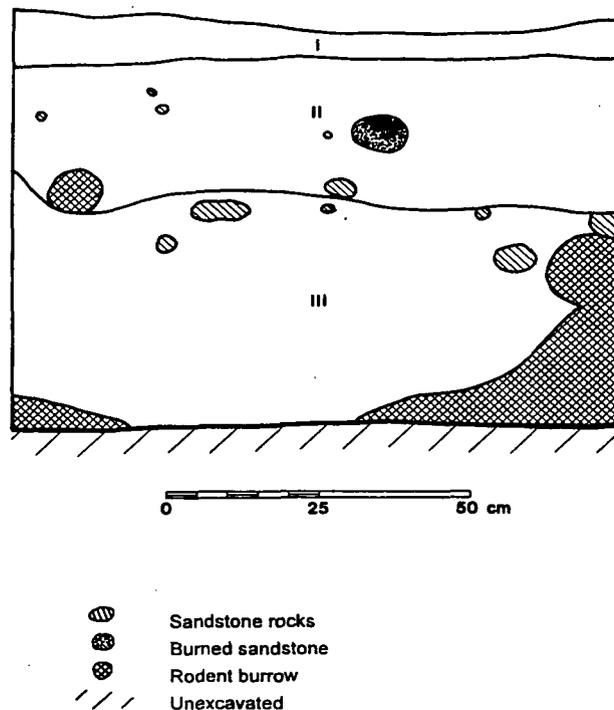


Figure 13.11. Site NM-Q-22-53, Study Unit 14, East Wall Profile.

## Study Unit 15

SU 15 was a 1-by-1-m unit located at grid coordinates N99,E148. A small quantity of ceramic artifacts were noted in this location, including a lug handle, so this area was seen as a possible locus of cultural activity. Additionally, a few small tabular sandstone cobbles were also noted in this vicinity and seemed to support the suggestion of possible cultural activity in this far eastern portion of the site.

SU 15 was excavated 47 cm in five levels and four soil strata were identified (Figure 13.12). Stratum I consisted of 2 to 4 cm of dark brown (10YR4/3) sandy clay with numerous small roots. No artifacts were recovered from Stratum I. Stratum II consisted of 14 cm of a dark brown (10YR4/3) sandy clay with some sandstone pebbles. Five plain and banded grayware jar sherds were recovered from Stratum II. Stratum III consisted of at least 36 cm of a dark yellowish brown (10YR4/4) loam with charcoal flecking, sandstone pebbles, and rodent disturbances. A single plain grayware jar sherd was recovered from the upper portion of this stratum. This pebbly layer may represent alluvial movement of materials from upslope that occurred prior to the occupation of this area. Stratum IV, at least 14 cm thick, was the same as Stratum III minus the charcoal flecking, with a lesser quantity of sandstone pebbles within the matrix. Stratum IV also appeared to be interbedded with Stratum III, thus the two strata may have had similar sources and ages. The lack of cultural deposits and the distance from the majority of surface artifact concentrations is seen as strong evidence that the artifacts recovered from this unit probably represent alluvial transport from a midden, activity area, or other feature outside the right-of-way. Strata III and IV were sterile deposits representing episodes of erosion. The single sherd in Stratum III was likely the result of bioturbation.

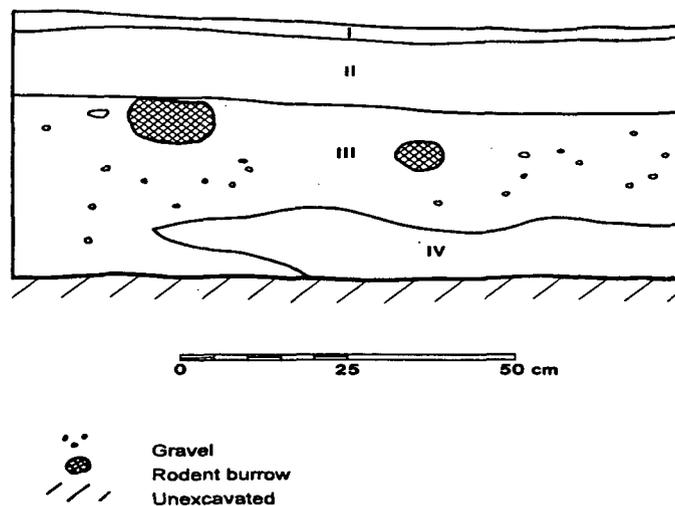


Figure 13.12. Site NM-Q-22-53, Study Unit 15, East Wall Profile.

## Study Unit 16

SU 16 was a 1-by-1-m unit located at grid coordinates N100, E109. A small quantity of ceramic artifacts were noted in this location and were thought to represent a locus of cultural activity. Additionally, a few small tabular sandstone cobbles were also noted in this vicinity.

SU 16 was excavated 48 cm in five levels and three soil strata were identified (Figure 13.13). Stratum I (Level 1) consisted of 4 to 8 cm of yellowish brown (10YR5/4) sandy loam with numerous grass and forb roots. Artifacts recovered from Stratum I included a single flake and a small piece of ground stone. Stratum II consisted of 15 to 20 cm of yellowish brown (10YR5/4) hard compact clay with light charcoal flecking. Two plain grayware jar sherds, one flake, a small piece of ground stone, and one small rodent bone fragment were recovered from Stratum II. Stratum III consisted of a loose dark yellowish brown (10YR4/4) fine sand with light charcoal flecking. No artifacts were recovered from Stratum III. The lack of cultural deposits and the distance from the majority of surface artifact concentrations are seen as strong evidence that the artifacts recovered from Strata I and II probably represent alluvial transport from some other part of the site outside the right-of-way. Stratum III was a sterile deposit representing episodes of erosion.

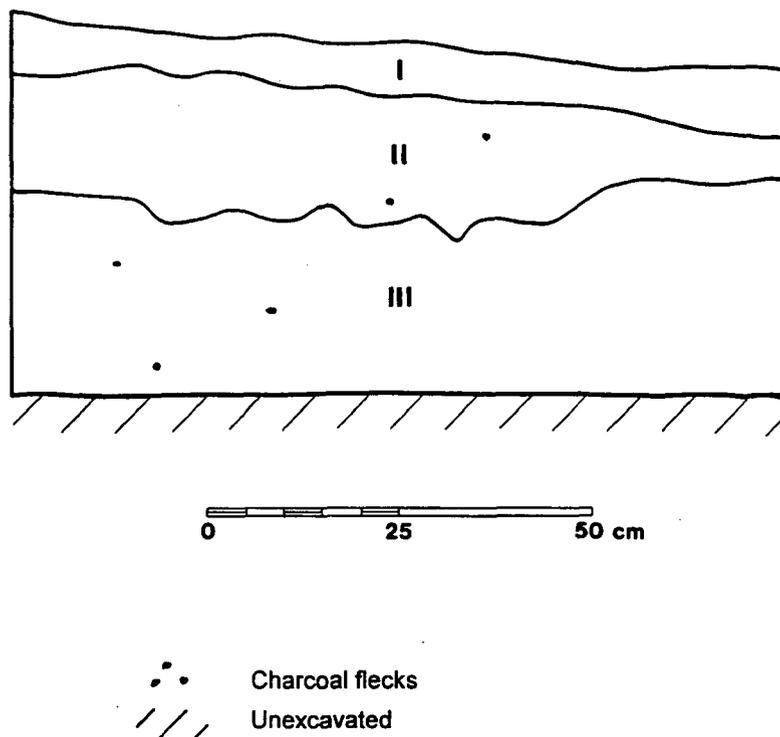


Figure 13.13. Site NM-Q-22-53, Study Unit 16, East Wall Profile.

### Backhoe Trench Excavation

The mechanical excavation of five trenches was conducted to explore for potential buried cultural deposits on site NM-Q-22-53 (Table 13.2). A backhoe with a 61-cm-wide (2-ft-wide) bucket was employed to excavate soil deposits deeper and over a broader area than could be practically completed by hand. Trench excavation was closely monitored by a ZCRE archaeologist. Excavation was halted whenever a closer inspection of the trench walls or bottom was deemed necessary by the monitor. Backhoe trenches at NM-Q-22-53 ranged in length from 15.75 to 30.25 m and varied in depth, but averaged 0.87 m. A total of 104.45 m of trenches were excavated. At least one representative soil profile was drawn for each trench; a total of 11 trench profiles were drawn at site NM-Q-22-53. The distribution of surface artifacts and the results of hand-excavated units guided the placement and length of backhoe trenches.

Table 13.2. Summary of Backhoe Trenches at Site NM-Q-22-53.

SU No.	Provenience	Dimensions (m)*	Average Depth (m)	Approx. Volume (cu m)	Features Present
4	From: N69.75, E106.00 To: N85.50, E93.25	0.7 by 20.25	1.09	15.45	None
5	From: N84.10, E95.25 To: N104.00, E117.50	0.7 by 30.25	0.96	20.33	1
6	From: N17.25, E56.00 To: N40.00, E46.75	0.7 by 22.20	0.79	12.28	None
7	From: N37.00, E49.00 To: N43.50, E63.50	0.7 by 16.00	0.79	8.85	None
8	From: N25.25, E53.75 To: N32.75, E67.25	0.7 by 15.75	0.71	7.83	None
<b>Totals</b>		0.7 by 104.45 m	0.87 m**	64.74	

\*Width of 0.7 m represents width of bucket (0.61 m) plus extra excavating room.

\*\*Average depth of all trenches

SU = Study Unit

#### Study Unit 4

SU 4 extended from grid coordinates N69.75, E106 northwestward to N85.5, E93.25. SU 4 was placed perpendicular to, and northwest of, the centerline approximately 15 m south of the site datum. Placement was influenced by a low-density scatter of surface artifacts within the right-of-way and a nearby moderate density of surface artifacts outside the right-of-way to the north and northwest. SU 4 was 20.25 m long and had an average depth of 1.09 m. Three 1-m-long profiles (A-A', B-B', and C-C') were drawn of SU 4 (Figure 13.14), one near each end and one in the middle. All were recorded from the southwest side and are representative of the entire trench. Three strata were recorded in profile A-A' and four strata were recorded in B-B' and C-C'. The strata descriptions below apply to all three profiles. Stratum I was a 7- to 18-cm layer of dark yellowish brown (10YR3/4) sandy loam with numerous roots. Stratum II was a 22- to 53-cm layer of hard compact, dark yellowish brown (10YR3/6) loam with little root disturbance. Stratum III consisted of 20 to

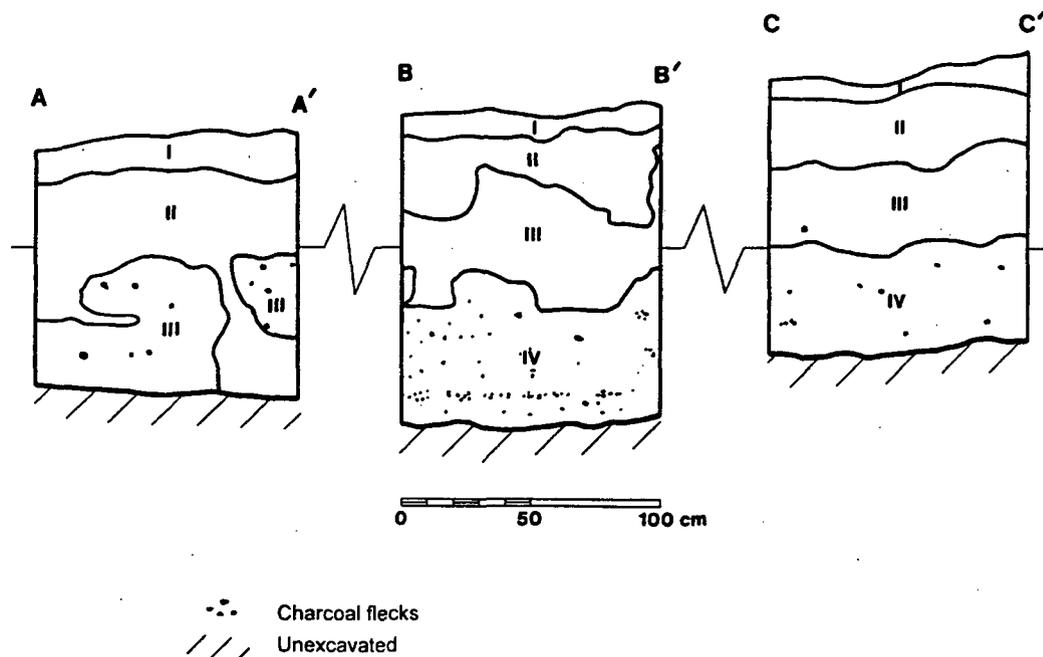


Figure 13.14. Site NM-Q-22-53, Study Unit 4, Southwest Wall Profiles A-A', B-B', and C-C'.

35 cm of a hard compact brown (10YR5/3) fine silty clay loam with charcoal flecking. Stratum IV in profiles B-B' and C-C' consisted of loose yellowish brown (10YR5/4) fine sand with charcoal flecking. No cultural materials were noted in or recovered from SU 4. No features or occupation layers were noted in SU 4.

### Study Unit 5

SU 5 extended from grid coordinates N84.10,E95.25 northeastward to N104,E117.5. SU 5 was placed parallel to the northwestern right-of-way boundary through the area of greatest artifact density within the right-of-way. Placement was further influenced by a number of hand-excavated test units placed along or near the right-of-way boundary and a desire to examine soil deposits at a depth greater than that excavated in those units. SU 5 was 30.25 m long and had an average depth of 0.96 m. Three 1-m-long profiles (D-D', E-E', and F-F') were drawn of SU 5, one near each end and one in the middle. All profiles were recorded from the southeast side and were representative of the entire trench (Figure 13.15). The three profiles are similar and three strata were recorded. Stratum I was a 10- to 25-cm layer of loose dark yellowish brown (10YR3/4) fine sand with numerous roots and rodent disturbances. Stratum II was a 30- to 60-cm layer of loose dark yellowish brown (10YR4/4) loam with little root disturbance. Stratum III consisted of at least 65 cm of yellowish brown (10YR5/4) sandy loam with charcoal flecking. No cultural materials were noted in or recovered from SU 5. However, an ash lens (Feature 1) was discovered approximately 8 m from the northeast end of the trench, between profiles D-D' and E-E' at a depth of 0.85 m. Hand excavations were conducted to test the extent and depth of the feature (see SU 11).

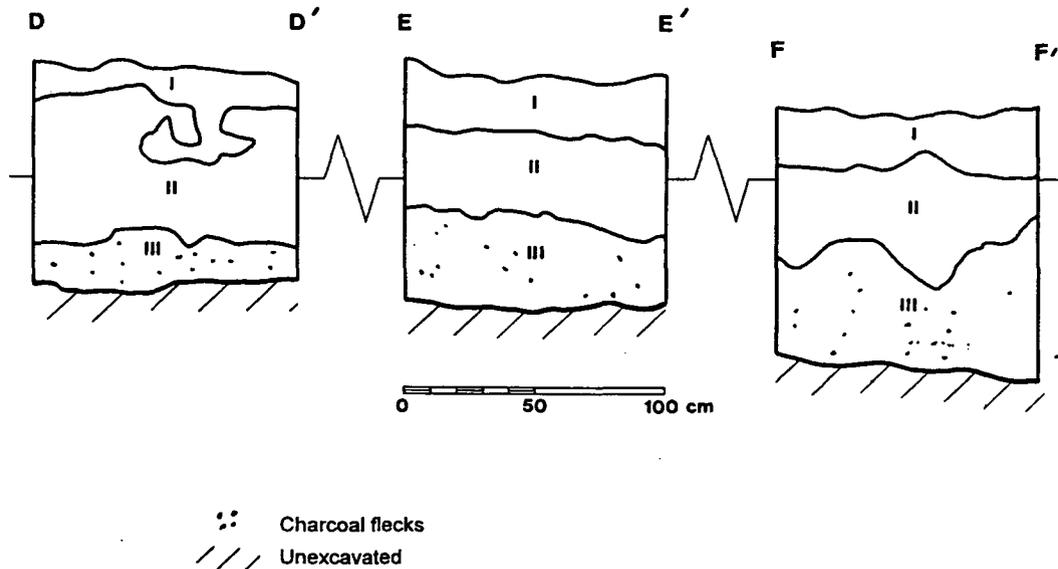


Figure 13.15. Site NM-Q-22-53, Study Unit 5, Southeast Wall Profiles D-D', E-E', and F-F'.

### Study Unit 6

SU 6 extended from grid coordinates N17.25, E56 northwestward to N40, E46.75. SU 6 was placed roughly perpendicular to the new N11 centerline. SU 6 extended 22.2 m from the centerline to the northwest right-of-way and had an average depth of 0.79 m. Placement was influenced by a low-density scatter of surface artifacts within the right-of-way defined as SU 3. Three 1-m-long profiles (G-G', H-H', and I-I') were drawn of SU 6, one near each end and one in the middle. All were recorded from the southwest wall and were representative of the entire trench (Figure 13.16). The three profiles are similar and three strata were recorded. Stratum I was a 10- to 15-cm layer of loose brown (10YR4/3) loam with roots and some gravel. Stratum II was a 40- to 50-cm layer of hard compact grayish brown (10YR5/2) clay loam. Stratum III consisted of a hard compact yellowish brown (10YR5/4) silty clay loam. No cultural materials were recovered nor were any features noted in SU 6.

### Study Unit 7

SU 7 extended from grid coordinates N37, E49 northeastward to N43.5, E63.5. SU 7 was placed perpendicular to SU 6 near the northwest right-of-way boundary. SU 7 extended 16 m and had an average depth of 0.79 m. Placement was guided by a low-density scatter of surface artifacts within the right-of-way defined as SU 3. One 2-m-long profile (J-J') was drawn of SU 7 near the middle of the trench (Figure 13.17). Three strata were recorded. Stratum I was a 10- to 15-cm layer of loose yellowish brown (10YR5/6) loam with roots and some gravel. Stratum II was a 42- to 50-cm layer of hard compact, grayish brown (10YR5/2) silty clay loam with some roots and rodent disturbance. Stratum III consisted of a hard compact brown (10YR5/3) silty clay loam. No cultural materials were recovered nor were any features noted in SU 7.

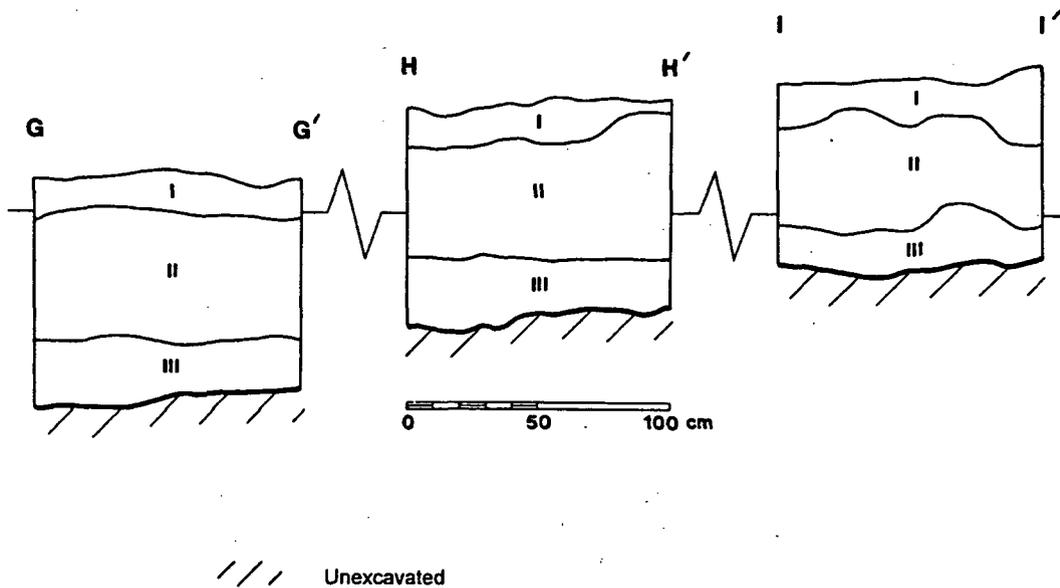


Figure 13.16. Site NM-Q-22-53, Study Unit 6, Southwest Wall Profiles G-G', H-H', and I-I'.

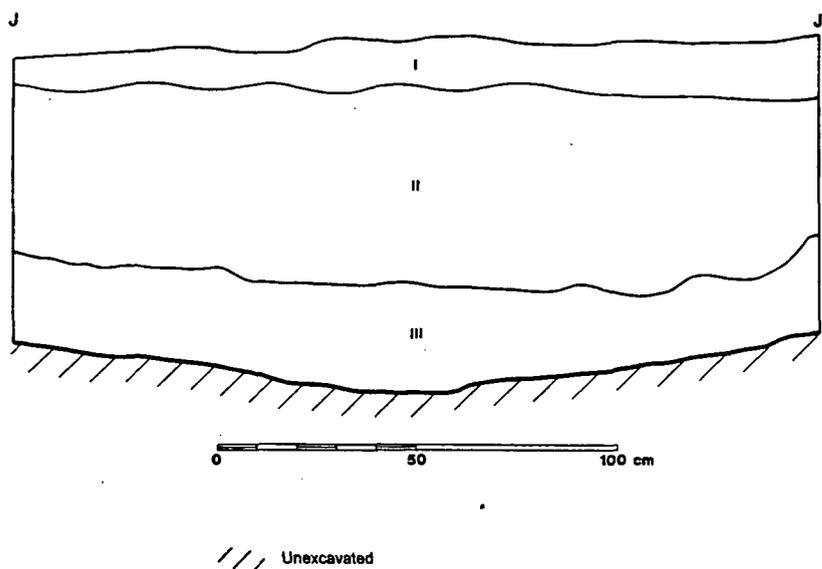


Figure 13.17. Site NM-Q-22-53, Study Unit 7, Southeast Wall Profile J-J'.

## Study Unit 8

SU 8 extended from grid coordinates N25.25, E53.75 northeastward to N32.75, E67.25. SU 8 was placed perpendicular to SU 6 near the proposed centerline. SU 8 extended 15.75 m and had an average depth of 0.71 m. Placement was guided by a low-density scatter of surface artifacts within an area devoid of sagebrush defined as SU 3. One 2-m-long profile (K-K') was drawn of SU 8, near the middle of the trench (Figure 13.18). Three strata were recorded. Stratum I was a 13- to 21-cm layer of brown (10YR5/3) loam with roots, some gravel, and rodent disturbance. Stratum II was a 22- to 33-cm layer of hard compact, grayish brown (10YR5/2) silty clay loam with some roots. Stratum III consisted of a hard compact brown (10YR5/3) fine sand. No cultural materials were recovered nor were any features noted in SU 8.

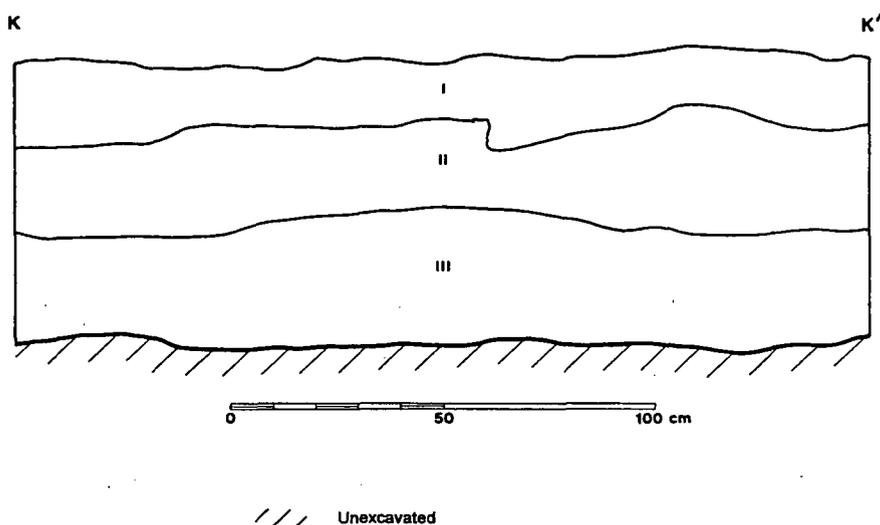


Figure 13.18. Site NM-Q-22-53, Study Unit 8, Southeast Wall Profile K-K'.

### Feature

Feature 1 was a 5 cm thick ash and charcoal lens. The lens extended for 1.3 m near the bottom of trench SU 5 at a depth of 85 cm below ground level in hand-excavated SU 11 (Figure 13.8). The feature fill consisted of a very dark brown (10YR2/2) sandy clay within Stratum III. No artifacts or other cultural manifestations were noted. This lens was much deeper than any other cultural deposit identified at this site. The surrounding matrix appeared swirled and rodent burrows were noted nearby bringing into question the integrity of deposits.

### SUMMARY AND INTERPRETATION

Phase I Data Recovery testing of site NM-Q-22-53 resulted in the collection of 377 artifacts of which 358 were ceramics, 15 were flaked stone, 3 were ground stone, and 1 was a faunal

specimen. The majority of artifacts were collected from surface contexts. None of the test excavation units yielded high numbers of cultural materials or any evidence of features, occupation surfaces, or cultural levels. The subsurface artifacts were largely recovered from the top two strata. Below Stratum II the artifacts tended to be isolated and were not associated with any other cultural materials, layers, or features.

The ceramics included various graywares and black-on-white wares (Reed and Goff 1997). The gray wares included Lino plain, Mancos narrow neckbanded, plain, polished, banded, and corrugated types. The black-on-white wares included Red Mesa, Escavada, Gallup, slipped white and other Pueblo I/II sherds and indeterminate types. The presence of these identifiable types suggests a late Pueblo II occupation. Fully 41% were unidentifiable. Of the remaining identifiable sherds, 48% were graywares which were almost exclusively jar fragments. The black-on-white wares were nearly evenly split between jar and bowl fragments, with an additional ladle sherd.

The only exception to this was the discovery of Feature 1 at the bottom of trench SU 5. The cultural affinity of this feature is questionable due to the lack of associated artifacts and its much greater depth in comparison to the levels in which most other artifacts were recovered. It is doubtful that any significant cultural activity or occupation occurred within this portion of the site. The rock rubble and denser artifact scatter west of the right-of-way likely represent the focus of Pueblo II period activity in this vicinity (some artifacts are shown in Figure 13.19). The cultural material observed and collected within the right-of-way is likely the result of downslope wash from the more intensively utilized portion of site NM-Q-22-53.

#### RECOMMENDATIONS

Due to the lack of any evidence of any subsurface cultural features or integrity, the data potential for the portion of the site within the right-of-way has been determined to be exhausted and no further work is recommended. Considering the proximity of the rock rubble scatter to N11(2) it is recommended that monitoring of construction activities in the vicinity of site NM-Q-22-53 be conducted in the event that undetected subsurface features or occupation layers are present.

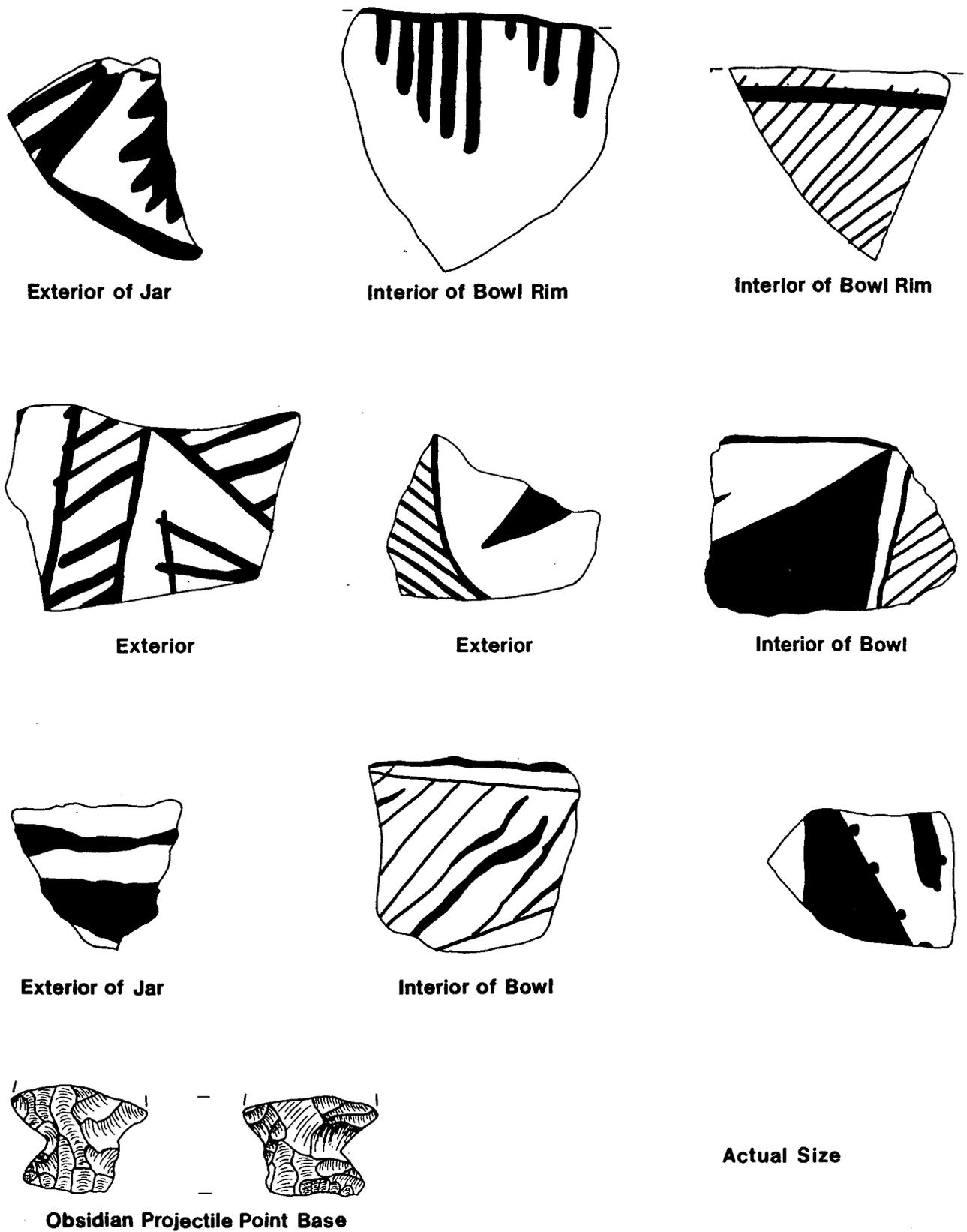


Figure 13.19. Site NM-Q-22-53, Selected Ceramic and Lithic Artifacts from the Rubble Scatter Area.

## Chapter 14

### SITE NM-Q-22-54 (LA 110317)

#### Harding Polk II

Site NM-Q-22-54 is located at the head of a small, but broad, unnamed alluvial valley bordered by sheer-edged sandstone mesas. The site is situated at an elevation of 2273 m (7457 ft) but the surrounding mesas rise to over 2408 m (7900 ft). The valley drains to the southwest towards the Rio Puerco of the West 4.4 km (2.8 mi) away. One hundred fifty meters to the northeast a declivity between the mesas at the northeastern end of the valley forms a pass that drops steeply into the San Juan basin. Both the present and proposed routes of N11 utilize this natural pass. The site is situated on a small, low knoll. While the surface is generally sandy there are exposures of broken hard sandstone substrata around the knoll. The broken sandstone is particularly noticeable on the western and southwestern face of the knoll, as well as another exposure 15 m to the southeast. A level, sandy bench extends northeast of the knoll covering an area approximately 25 sq m. A low, sandy ridge extends southwestward from the rubble mound.

Vegetation at the site is dominated by big sagebrush (*Artemisia tridentata*), with lesser quantities of fourwing saltbrush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), fringed sagebrush (*Artemisia frigida*), and winterfat (*Ceratoides lanata*). Various grasses and forbs were seen including blue grama grass (*Bouteloua gracilis*), slender wheatgrass (*Agropyron trachycaulum*), galleta grass (*Hilaria jamesii*), western wallflower (*Erysimum capitatum*), desert sunflower (*Gerea canescens*), globemallow (*Sphareralcea* spp.), purple aster (*Aster* spp.), Indian paintbrush (*Castilleja* spp.), pineleaf penstemon (*Penstemon* spp.), and fleabane (*Erigeron* spp.), and prickly pear (*Opuntia* spp.) and hedgehog (*Echinocereus* spp.) cacti. Young pinyon trees (*Pinus edulis*) have proliferated across the lower elevations of the site area.

#### SURVEY DATA

Site NM-Q-22-54 was originally recorded by American Indian Cultural Consultants (AICC 1982) as N11-07. Site NM-Q-22-54 was then rerecorded by Zuni Cultural Resource Enterprise (ZCRE) in 1995 as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping, in-field artifact analyses, and photography. The in-field analyses included identification of ceramic types, lithic material types, and stages of lithic artifact reduction. In addition, artifact counts and mapping of surface artifact distribution were conducted. The site was identified as a rubble mound with a dense lithic and ceramic artifact scatter. The mound, measuring approximately 10 by 14 m, was thought to represent a roomblock of as many as 10 to 15 rooms. Estimates of artifact density numbered in the thousands. Two features were identified: Feature 1 was a 1-by-1-m area of exposed collapsed wall courses at the top of the rubble mound; Feature 2 was a circular area of burned sandstone. The densest portion of the artifact scatter covered an area approximately 36 by 18 m including and extending northeast from the rubble mound and lying entirely outside the proposed right-of-way. Identified ceramics included Gallup, Reserve, Puerco, and Red Mesa black-on-whites, indented corrugated grayware, and an unidentified black-on-redware. These ceramics indicated an occupation from AD 1050 to 1150, during the Pueblo II and III periods. The site appeared wholly intact with no major impacts.

## NATURE AND EXTENT TESTING

From 6 June to 23 July 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent and nature of site NM-Q-22-54. Test excavations, complete surface collection of all artifacts, and a redefinition of site boundaries within the right-of-way were conducted. An initial cursory survey of the site revealed only a broad, low-density artifact scatter inside the right-of-way. The testing program was limited to the proposed right-of-way, which skirted the foot of the low knoll with the rubble mound and the southwest-extending low sandy ridge. It was thought that the area at the foot of the knoll would contain the greatest probability for intact subsurface cultural deposits, most likely in the form of a midden. Other outlying activity areas or features were postulated within the right-of-way. Subsurface investigations included hand excavation of 7 test units totaling 24 sq m and backhoe excavation of 10 trenches totaling 264.9 m. Site boundaries were expanded to the west and southwest of the previously identified western end of site NM-Q-22-54 (Figure 14.1).

To aid in organization of the investigation, the site was divided into a number of study units. Study units are arbitrary designations of space in which the investigator wants to direct special focus. They can encompass as much or as little area as deemed necessary by the investigator. That focus may be a feature, a single excavation unit, a group of excavation units, a backhoe trench, a surface collection area, or even the entire site. Consequently one study unit may be situated within another. At a minimum each excavation unit and backhoe trench has been designated with a study unit (SU) number.

### Surface Collection

Artifacts were collected from an area along approximately 150 m of the N11(2) right-of-way. Since the artifact density within the right-of-way appeared relatively low, it was decided to point-plot each artifact. A visual search of the right-of-way along the low sandy ridge and near the rubble mound was conducted and each artifact pin-flagged. The location of each artifact was shot in by transit, and artifacts were then collected and recorded on Field Specimen (FS) catalog sheets. Therefore most artifacts in the right-of-way were assigned unique FS numbers. In several instances, however, small clusters of artifacts were collected together when they lay within 1 m of each other. Seventy-one artifacts were collected from 52 point locations. The artifact assemblage was dominated by ceramics (n=67) with a small quantity of flaked stone (n=4). Grayware ceramic types predominated and included plain, corrugated, and banded graywares, with a few polished sherds. Whitewares included Red Mesa and Gallup black-on-whites, Escavada/Gallup black-on-white, slipped white, and indeterminate black-on-white. The vast majority of sherds represent jar forms. Within the right-of-way there did not appear to be any significant clustering of artifacts. However, except for four examples all the surface artifacts were recovered southeast of the centerline.

### Hand Excavation

Hand excavation of seven test units encompassing 24 sq m was conducted in order to determine the extent, depth, and density of cultural deposits within the proposed N11 right-of-way at site NM-Q-22-54. The total of 24 sq m was derived from four 2-by-2-m units, one 4-by-0.5-m unit, one 4-by-1-m unit, and one 1-by-2-m unit (Table 14.1). The location of the surface artifacts,

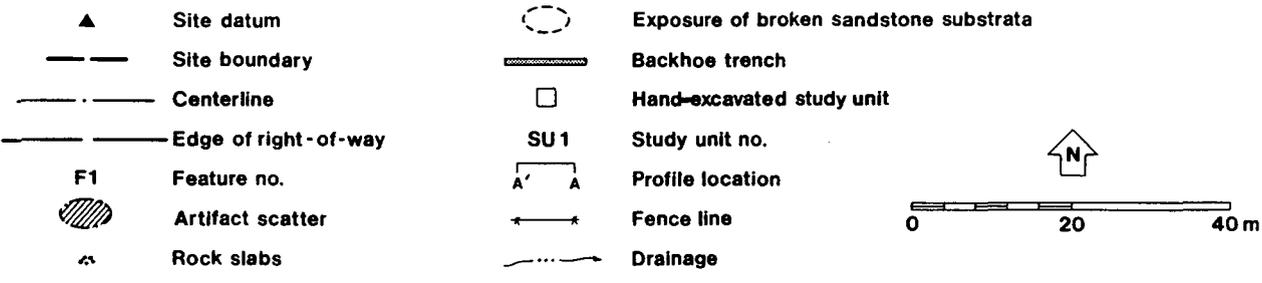
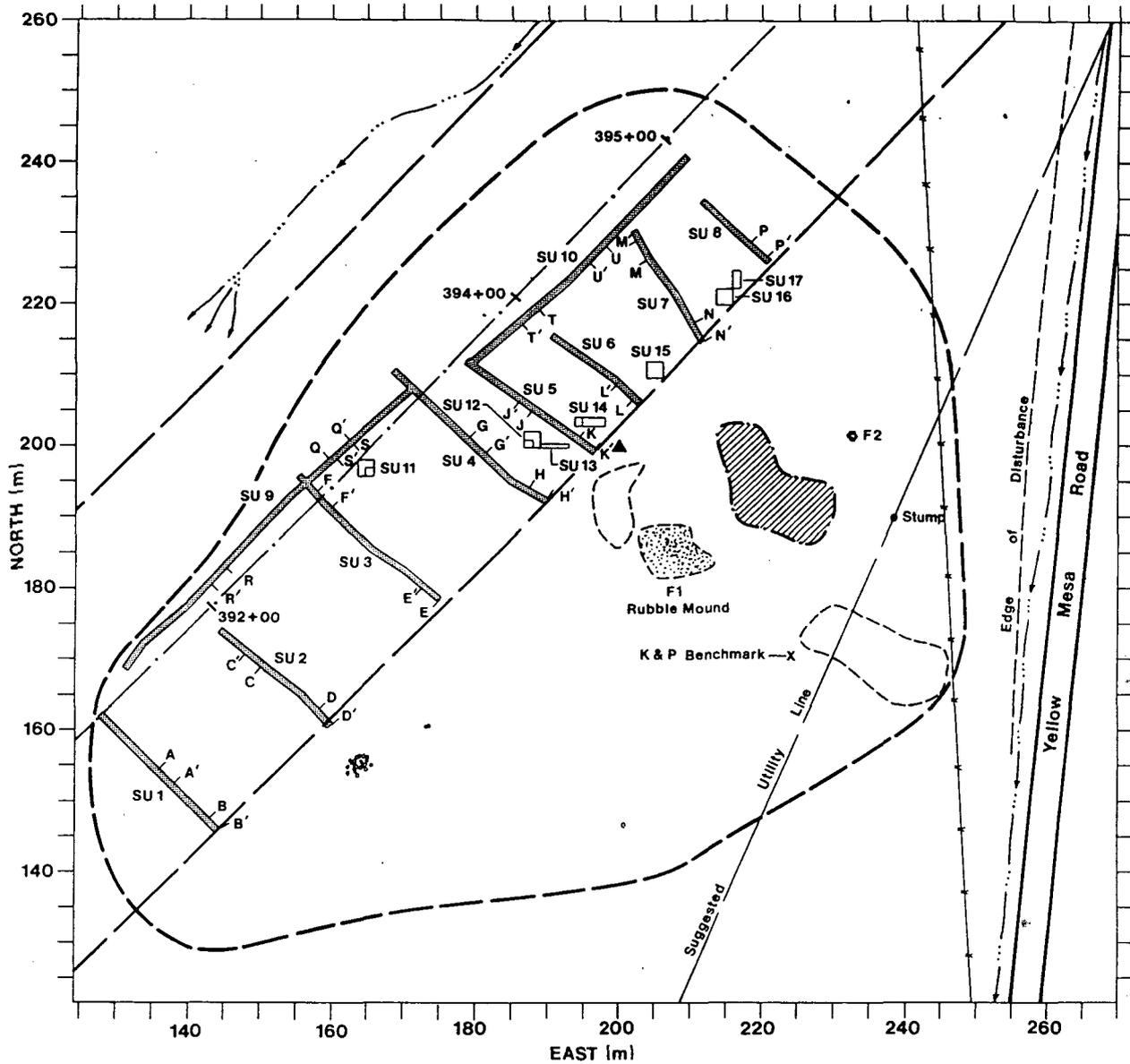


Figure 14.1. Site NM-Q-22-54, Nature and Extent Testing.

Table 14.1. Summary of Hand-excavated Units at Site NM-Q-22-54.

SU No.	Provenience	Dimensions (m)	Depth (cm)	Volume (cu m)	Levels with Artifacts	Features Present
11	N196, E164	2.00 by 2.00	15	0.60	None	None
	N196, E165	1.00 by 1.00	110	1.10	3, 4, 5, 6, 8, 9, 10, 11	
12	N200, E187	2.00 by 2.00	42	1.68	1, 2, 3, 4	None
	N200, E187	1.00 by 1.00	62	0.62	5, 6, 9, 10	
13	N200, E189	4.00 by 0.50	48*	0.96	2, 3, 4	None
14	N203, E194	4.00 by 1.00	47*	1.88	1, 2, 3, 4, 5	None
	N203, E194	1.00 by 1.00	30	0.30		
15	N210, E204	2.00 by 2.00	35*	1.40	1, 2, 3, 4	None
16	N220, E214	2.00 by 2.00	29	1.16	1, 2	None
17	N222, E216	1.00 by 2.00	45*	0.90	2, 3, 4	None
Totals		24.00 sq m	66*	10.60		

\*Average depth  
 SU = Study Unit

both within and adjacent to the right-of-way, as well as proximity to the rubble mound guided the placement of test units. All test units were excavated in arbitrary 10-cm levels and all soils were screened through 1/4-in hardware mesh. Soil descriptions were made using Munsell soil charts to identify soil color.

### Study Unit 11

SU 11 was a 2-by-2-m unit located at grid coordinates N196, E164. This unit was placed in a location where several ceramic sherds and several medium-sized sandstone slabs were noted on the surface. Additionally the terrain in this location formed a small, low sandy bench providing a potentially more level surface on which to build. It was thought that the combination of these factors may have represented the presence of subsurface cultural deposits, possibly architectural in nature.

SU 11 was excavated 15 cm in two levels, reduced to a 1-by-1-m unit (N196, E165) and excavated another 110 cm. Five soil strata were revealed (Figure 14.2). Stratum I consisted of 2 to 7 cm of brown (10YR5/3) sandy clay with numerous grass and forb roots. To level the unit, only the northern one-third of the unit was excavated. No artifacts were recovered from Stratum I. Two sandstone slabs approximately 10 cm across were removed from the surface. Stratum II consisted of 24 to 29 cm of mottled yellowish brown (10YR5/4) and dark grayish brown (10YR4/2) loam with charcoal flecking throughout. Artifacts recovered from the lower part of Stratum II include one piece of ground sandstone (6 by 8 cm), one relatively large corrugated jar sherd, and one chert flake; three unmodified sandstone slabs (10 cm in diameter) were also found. Stratum III consisted of up to 65 cm of brown (10YR5/3) loam with charcoal flecking and rodent disturbance. The charcoal flecking was less than in Stratum II. A petrified wood hammerstone/core was recovered from Stratum III. A tabular sandstone rock that appeared thermally altered was also noted in this stratum. Stratum IV

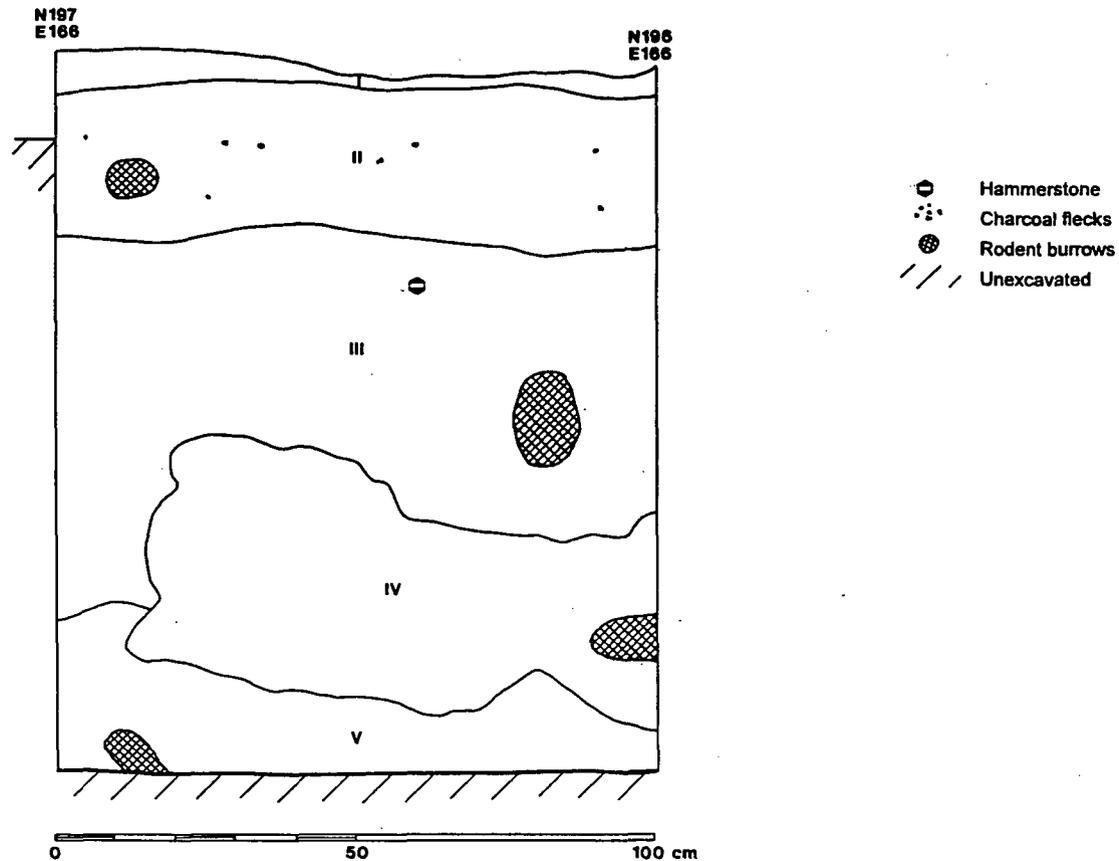


Figure 14.2. Site NM-Q-22-54, Study Unit 11, N196, E165, East Wall Profile.

consisted of up to 40 cm of yellowish brown (10YR5/4) loam with a small quantity of charcoal flecking and rodent disturbance. Stratum IV yielded numerous small mammal bones; however, they represented a rodent which probably died in its burrow. Stratum V consisted of grayish brown (10YR4/2) clay with minor rodent disturbance. No features or occupation surfaces were revealed in this unit. The small quantity of artifacts and charcoal likely represents natural erosional movement during and after the occupation of this site particularly since this unit was located 36 m from the rubble mound. Excavation in other units and trenches indicated that the “charcoal” flecks observed in this unit were probably fragments of a naturally occurring carbonaceous shale deposit as seen in the backhoe trenches, particularly those close to the rubble mound.

#### Study Unit 12

SU 12 was a 2-by-2-m unit located at grid coordinates N200, E187. This unit was placed in a location where the soil had a darker hue with possible ashy deposits from a feature or other cultural

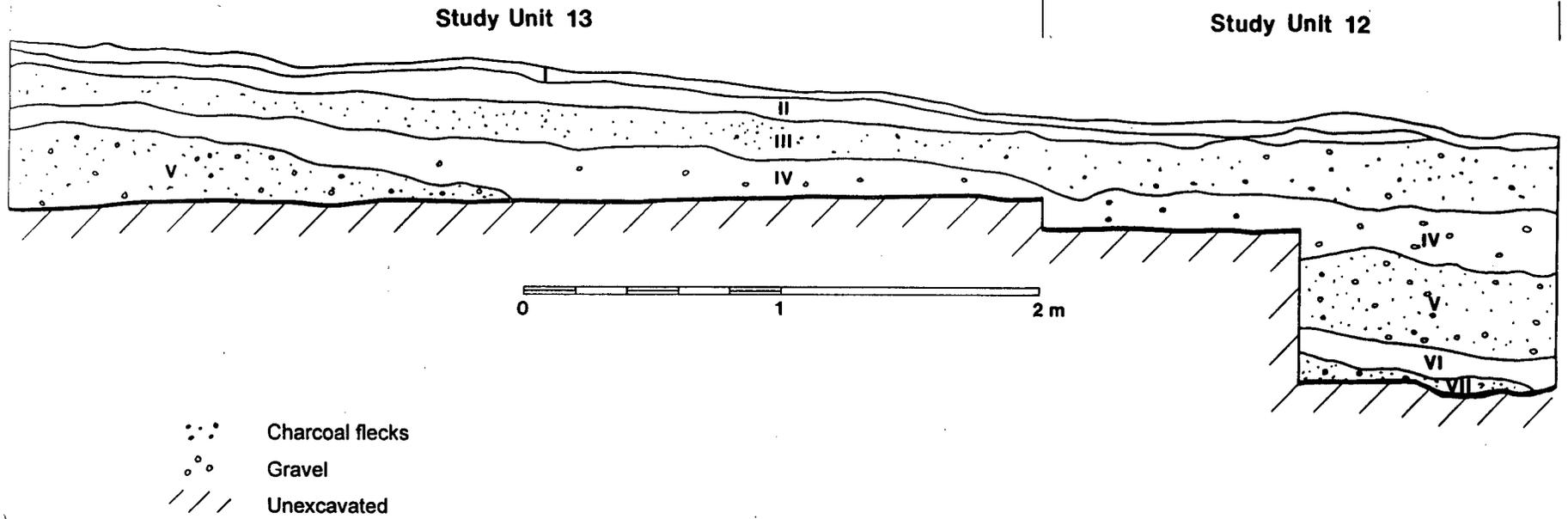
manifestation. This unit was also located near the base of the knoll and one of the broken sandstone exposures. Typically midden deposits would be located downslope and a short distance away from the main occupation area (albeit usually to the south or southeast). There seemed to be a high potential for cultural deposits in this area. It was felt a larger unit had a higher probability of encountering whatever features may have been located here.

SU 12 was excavated 42 cm in four levels, reduced to a 1-by-1-m unit (N200, E187), and excavated another 62 cm (Levels 5 to 10). Seven soil strata were identified (Figure 14.3). Stratum I consisted of 3 to 8 cm of pale brown (10YR6/3) fine sand with some pebbles and roots. A couple of lithic and ceramic artifacts were recovered. Stratum II consisted of up to 10 cm of brown (10YR5/3), fine sand with some charcoal flecking and pebbles. No artifacts were recovered from this stratum. Stratum III consisted of approximately 20 cm of grayish brown (10YR5/2) loam with charcoal flecks, gravel, and clay. The stratum yielded four sherds and three flakes. Stratum IV was the same as Stratum II and consisted of up to 24 cm of brown (10YR5/3) loam with small amounts of charcoal and gravel. Stratum IV yielded nine sherds and two flakes. Stratum V was similar to Stratum III and consisted of up to 35 cm of grayish brown (10YR5/2), fine sand with charcoal flecks and small amounts of gravel and clay. No artifacts were recovered from Stratum V. Stratum VI was the same as Strata II and IV and consisted of up to 12 cm of brown (10YR5/3) loam with small amounts of charcoal and gravel. No artifacts were recovered from Stratum VI. Stratum VII consisted of at least 12 cm of gray (10YR6/1) clay with small gravel deposits. No artifacts were recovered from Stratum VII. Artifacts were recovered from Strata I, III, and IV, however, no features or occupation surfaces were noted from these strata. The identified ceramics were all graywares. No artifacts were recovered from Strata V to VII indicating sterile noncultural deposits. From the similarity of Strata II, IV, and VI and Strata III and V, repeated erosional events are suggested. Only Strata I, III, and IV showed prehistoric occupation by the presence of artifacts. Stratum IV may represent the period of occupation and Stratum III may represent the subsequent burial after abandonment by soil carrying artifacts from upslope.

### Study Unit 13

SU 13 was a 4-by-0.5-m unit oriented east-to-west and located at grid coordinates N200, E189. This unit was placed extending eastward from SU 12. It was thought that midden deposits may have lain closer to the base of the knoll. It was felt that this trench-like unit would have a higher probability of encountering midden deposits if they extended this far from the rubble mound.

SU 13 was excavated a maximum of 58 cm in four levels. Since the unit was located on a slope, the lower western end was only excavated 32 cm. Five soil strata were identified (Figure 14.3) providing an extended view of the same strata seen in SU 12. Stratum I consisted of approximately 5 cm of pale brown (10YR6/3) fine sand with some pebbles and roots. Stratum II consisted of up to 13 cm of brown (10YR5/3), fine sand with some charcoal flecking and pebbles. Stratum III consisted of approximately 15 cm of slightly compact, grayish brown (10YR5/2) loam with charcoal flecks, gravel, and clay. Stratum IV was the same as Stratum II and consisted of up to 18 cm of brown (10YR5/3), slightly compact, loam with small amounts of charcoal and gravel. Stratum V was the same as Stratum III and consisted of at least 35 cm of grayish brown (10YR5/2), fine sand with charcoal flecks and small amounts of gravel and clay. No artifacts were recovered from Stratum V. The strata roughly followed the same slope as the surface; therefore the strata ran



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Figure 14.3. Site NM-Q-22-54, Study Units 12 and 13, South Wall Profile.

diagonally through the excavation levels. For this reason it was difficult to distinguish from which strata artifacts were recovered. Only four ceramic sherds were recovered from the unit and most of them from the western end of the unit most likely from Stratum IV. The sherds are one each of plain, corrugated, and banded grayware jar sherds, and a Gallup black-on-white bowl sherd. The marked reduction in the quantity of artifacts from this unit, when coupled with the results of SU 12 excavation, indicates that there are no features or culturally influenced layers in this area.

#### Study Unit 14

SU 14 was a 4-by-1-m unit oriented east-to-west and located at grid coordinates N203, E194. Similar to SU 12 and 13 this unit was placed in close proximity to the rubble mound to test the area believed most likely to contain potential midden deposits spilling down the slope.

SU 14 was excavated a maximum vertical depth of 77 cm in six levels and six soil strata were identified (Figure 14.4). As with SU 13, SU 14 was excavated along a moderate slope down to the west so beginning elevations differed by as much as 47 cm from the east end of the trench to the west end. Therefore, although Level 1 was over 30 cm thick it covered less than half the length of the trench. After three levels of excavation the unit was reduced to a 1-by-1-m unit (N203, E194). SU 14 displayed a similar stratigraphic profile to the combined profile of SU 12 and 13 located 3 m southwest of this unit. Stratum I consisted of up to 7 cm of grayish brown (10YR5/2) sandy clay with numerous roots. Stratum II consisted of up to 7 cm of dark gray (10YR4/1), clay with charcoal flecking. Approximately one dozen pieces of tabular sandstone averaging 10 cm in diameter and less than 5 cm thick were exposed in the central part of the unit. Some burned roots and thermally altered sandstone were also noted in this stratum. Stratum III consisted of up to 17 cm of brown (10YR5/3) sandy clay and sandstone pebbles. Stratum IV consisted of up to 16 cm of grayish brown (10YR5/2) compact clay with some roots and sandstone pebbles. Stratum V was the same as Stratum III except more compact. It consisted of up to 21 cm of brown (10YR5/3) sandy clay with small amounts of sandstone gravel. A small quantity of ceramics and flaked stone were recovered from Stratum V. Stratum VI consisted of brown (10YR6/2), clay with sandstone gravel. No artifacts were recovered from Stratum VI. The upper strata of this unit exhibited sloping deposits conforming with the angle of the slope resulting from downslope erosion. The lower strata conformed more with horizontal layering of sedimentary deposits. A moderate quantity of artifacts (n=29) were recovered from Strata I through V. The majority of artifacts consisted of ceramic sherds; however, two small cores and two mammal teeth were recovered. The majority of identified sherds were indeterminate black-on-white wares with almost exclusively jar forms. Corrugated graywares were also present. Unfortunately since each level crossed two or more strata, proveniencing the artifacts to a specific stratum was problematical except to say that artifacts were present in Strata I to V. General conclusions indicate that Strata I and II represented relatively recent downslope colluvium, Strata III and IV represented downslope erosion after site abandonment, Stratum V may have been contemporaneous with the site's occupation, and Stratum VI was sterile and predated the occupation of the site. Undoubtedly the close proximity of the mound to this unit is responsible for the higher artifact quantities.

#### Study Unit 15

SU 15 was a 2-by-2-m unit located at grid coordinates N210, E204. This unit was placed adjacent to the southeast edge of the right-of-way in an area where there was a low-density clustering

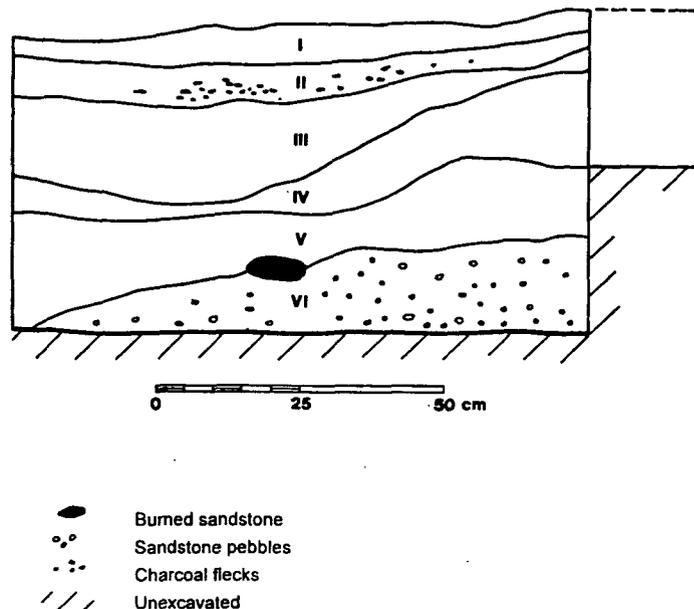
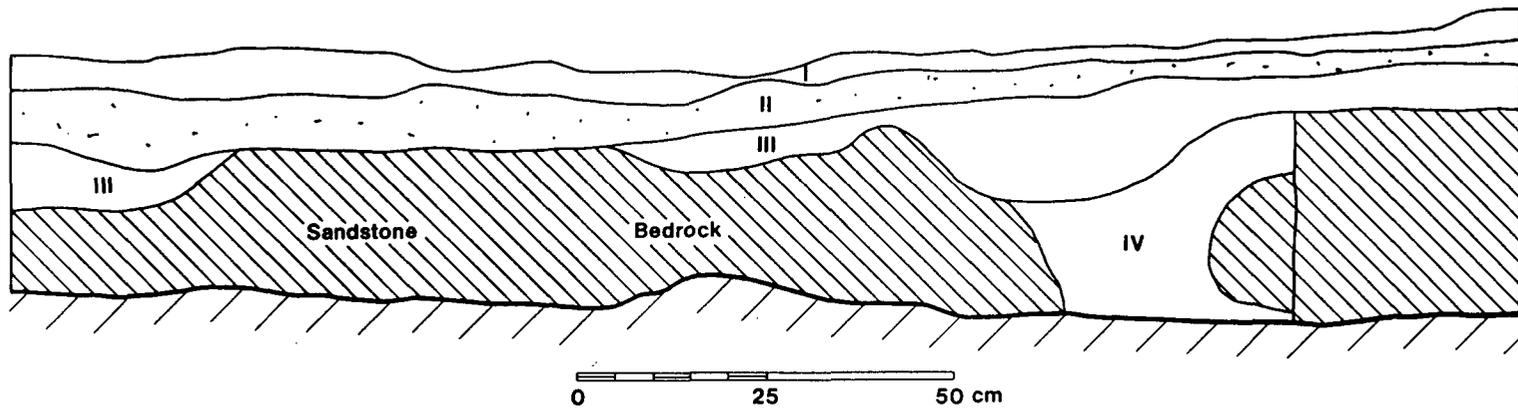


Figure 14.4. Site NM-Q-22-54, Study Unit 14, N203, E194, South Wall Profile.

of artifacts. This unit also lay closest to the dense artifact scatter noted on the sandy bench northeast of the rubble mound outside the right-of-way.

SU 15 was excavated an average of 35 cm in four levels and four soil strata were identified (Figure 14.5). Stratum I consisted of up to 7 cm of pale brown (10YR6/3) fine sand with numerous roots and gravel deposits. Stratum II consisted of up to 10 cm of brown (10YR4/3) fine sand with roots, charcoal flecking, and some gravel deposits. Fractured calcinated sandstone bedrock was exposed in the northeast corner of the unit. Stratum III consisted of up to 12 cm of brown to dark brown (10YR4/3), fine sand with small amounts of sandstone gravel. Exposures of friable calcinated sandstone bedrock and sandstone cobbles were noted throughout most of the unit, particularly the eastern half. Stratum IV occurred in pockets between exposures of bedrock and consisted of light brownish gray (10YR6/2) sandy clay. This unit yielded 37 artifacts consisting of 20 ceramic sherds, 15 flaked stone, 1 hammerstone, and 1 piece of ground stone. One petrified wood core was among the flaked stone. The ceramics included banded and corrugated graywares and Gallup and Pueblo I/II black-on-whites. All identified sherds were jar forms. The artifacts had been redeposited onto the bedrock and overlying strata through natural erosion. The quantity of artifacts may indicate the presence of a nearby feature lying outside the right-of-way. It is unlikely that the bedrock was exposed at the time of the site's occupation or any other time, since it was covered with calcium carbonate deposits typical of buried rock in the Southwest. Although this rock would provide a good architectural building material, it did not appear to have been utilized as such since none of this type of stone was noted on the rubble mound.



-  Calcinated sandstone bedrock
-  Charcoal flecks
-  Unexcavated

224

Figure 14.5. Site NM-Q-22-54, Study Unit 15, East Wall Profile.



### Study Unit 16

SU 16 was a 2-by-2-m unit located at grid coordinates N220, E214. As with SU 15 this unit was placed adjacent to the southeast edge of the right-of-way in an area where there was a low-density clustering of artifacts reflecting the outer fringes of the dense artifact scatter outside the right-of-way.

SU 16 was excavated 29 cm in three levels and three soil strata were identified (Figure 14.6). Stratum I consisted of up to 13 cm of grayish brown (10YR5/2) sandy clay with numerous roots. Stratum II consisted of up to 25 cm of yellowish brown (10YR5/4) sandy clay with roots and rodent disturbance. Stratum III consisted of brown to dark brown (10YR5/3) sandy clay with small amounts of sandstone gravel. A total of 12 artifacts were recovered from Strata I and II. They consist of eight ceramic sherds, three flakes, and six fragments of one ground stone artifact. Five of the sherds were from one corrugated vessel. One of the sherds was a plain grayware. The ground stone exhibited burning and all appeared to be from the same item. The presence of these artifacts reflected natural erosional movement redepositing artifacts downslope from their original deposition. However, they may indicate a nearby feature outside the right-of-way.

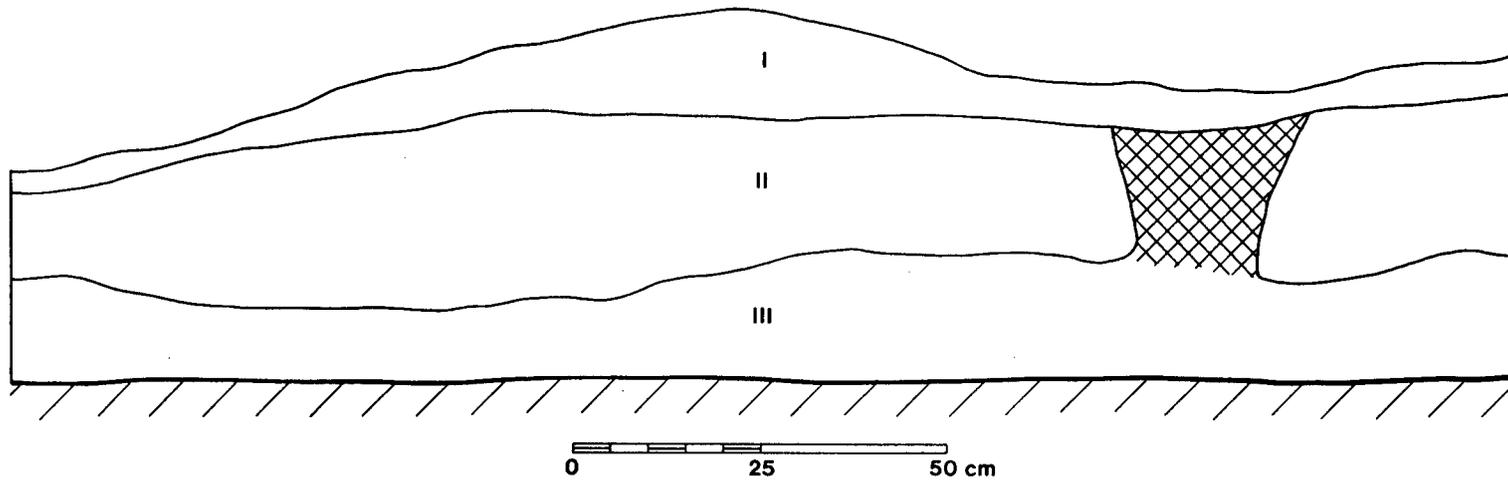
### Study Unit 17

SU 17 was a 1-by-2-m unit oriented north-to-south and located at grid coordinates N222, E216. The unit lay diagonally adjacent to the northeast corner of SU 16. Similar to SU 16, this unit was intended to test an area where a low-density clustering of sherds was noted on the surface. Additionally the quantity and variety of artifacts from SU 16 was seen as evidence that cultural deposits may have been present nearby.

SU 17 was excavated an average of 45 cm in five levels and two soil strata were identified (Figure 14.7). Stratum I consisted of 6 to 10 cm of yellowish brown (10YR5/4) fine sand with numerous roots. Stratum II consisted of dark yellowish brown (10YR4/4) fine sand with roots and slight gravel deposits. A total of eight artifacts were recovered consisting of two ceramic sherds and six flakes. The ceramics were one plain grayware and one indeterminate black-on-white. The flakes were four chert flakes, one obsidian microflake, and one quartzite flake. Most of the artifacts were recovered from Stratum I and the upper portion of Stratum II. The rotted remains of a possible wooden post were noted at the bottom of the unit. It could not be determined whether the post was contemporaneous with the occupation of the site or a later intrusion. Although a fence line bordered the site to the east, no evidence of a fence line was noted in this immediate area. The artifacts in this unit likely represent erosional displacement from the original deposition upslope to the east or southeast.

### Backhoe Trench Excavation

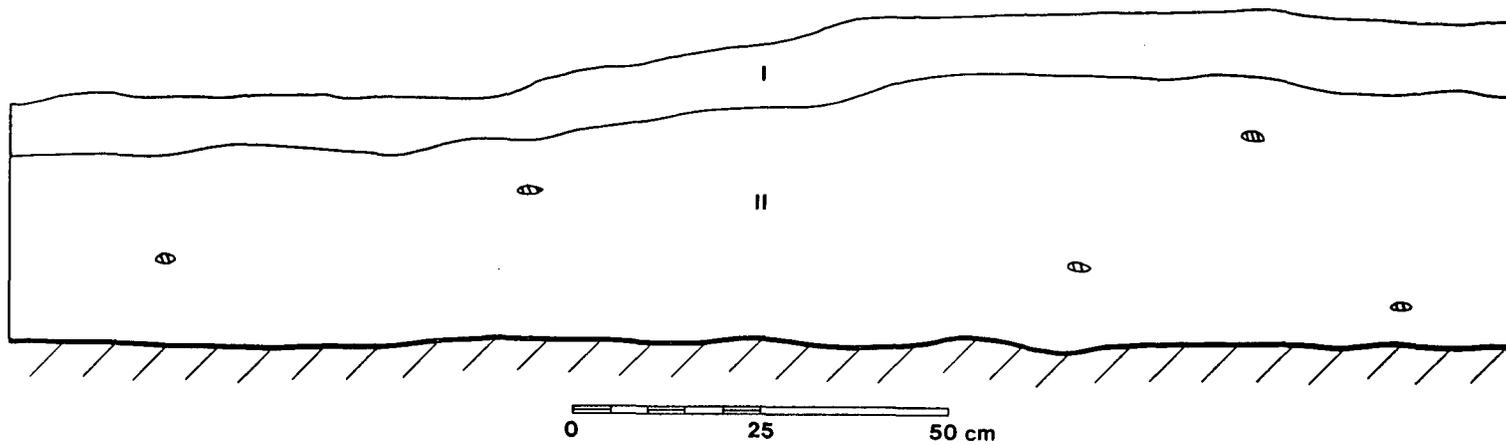
The mechanical excavation of 10 trenches was conducted to explore for potential buried cultural deposits on site NM-Q-22-54 (Table 14.2). A backhoe with a 61-cm-wide (2-ft-wide) bucket was employed to excavate soil deposits deeper and over a broader area and shorter time than could be practically completed by hand. Trench excavation was closely monitored by a ZCRE archaeologist. Excavation was halted whenever a closer inspection of the trench walls or bottom was



-  Rodent burrow
-  Unexcavated

Figure 14.6. Site NM-Q-22-54, Study Unit 16, East Wall Profile.





 Sandstone  
 Unexcavated

Figure 14.7. Site NM-Q-22-54, Study Unit 17, West Wall Profile.

Table 14.2. Summary of Backhoe Trenches at Site NM-Q-22-54.

SU No.	Provenience	Dimensions (m)*	Average Depth (m)	Approx. Volume (cu m)	Features Present
1	From: N145.50, E144.50 To: N162.00, E128.50	0.7 by 23.0	1.85	29.79	None
2	From: N159.75, E160.50 To: N173.75, E144.50	0.7 by 21.3	1.33	19.83	None
3	From: N176.50, E175.00 To: N195.50, E155.50	0.7 by 25.9	1.30	23.57	None
4	From: N192.00, E189.75 To: N210.50, E168.50	0.7 by 28.2	1.47	29.02	None
5	From: N198.75, E196.25 To: N211.75, E178.50	0.7 by 21.8	1.58	24.11	None
6	From: N206.00, E202.50 To: N215.25, E190.25	0.7 by 15.3	1.37	14.67	None
7	From: N214.25, E211.50 To: N230.50, E201.75	0.7 by 18.7	1.38	18.06	None
8	From: N225.75, E220.75 To: N234.25, E211.25	0.7 by 12.7	1.39	12.36	None
9	From: N168.50, E130.50 To: N206.25, E170.75	0.7 by 56.7	1.85	73.43	None
10	From: N212.50, E179.50 To: N241.00, E209.50	0.7 by 41.3	1.74	50.30	None
<b>Totals</b>		<b>0.7 by 264.9 m</b>	<b>1.53 m**</b>	<b>295.14</b>	

\*Width of 0.7 m represents width of bucket (0.61 m) plus extra excavating room.

\*\*Average depth of all trenches

deemed necessary by the monitor. Backhoe trenches at site NM-Q-22-54 ranged in length from 12.7 to 56.7 m and ranged in depth from 1.3 to 1.85 m, averaging 1.53 m. A total of 264.9 m of trenches were excavated. At least one representative soil profile was drawn for each trench; a total of 19 trench profiles were drawn at site NM-Q-22-54. The distribution of surface artifacts and the results of test excavation units generally guided the placement and length of backhoe trenches. It was observed at site NM-Q-22-54 that adjacent trenches, and sometimes adjacent profiles, often differed markedly from their neighbors, making interpretation difficult.

### Study Unit 1

SU 1 extended from grid coordinates N145.5, E144.5 northwestward to N162, E128.5. SU 1 lay perpendicular to the centerline, approximately 77 m southwest of the site datum. Placement was influenced by the farthest southwest scatter of surface artifacts at the site, albeit a low-density scatter. There was also a shallow longitudinal northeast-southwest running swale parallel to the low sandy ridge that was thought to possibly represent some cultural feature. The trench was placed between the centerline and the southeast right-of-way boundary. SU 1 was 23 m long and had an average depth of 1.85 m. Two 3-m-long profiles (A-A' and B-B') were drawn of the northeast side of SU 1 (Figures 14.8 and 14.9, respectively), one at the southeast end and one near the middle.

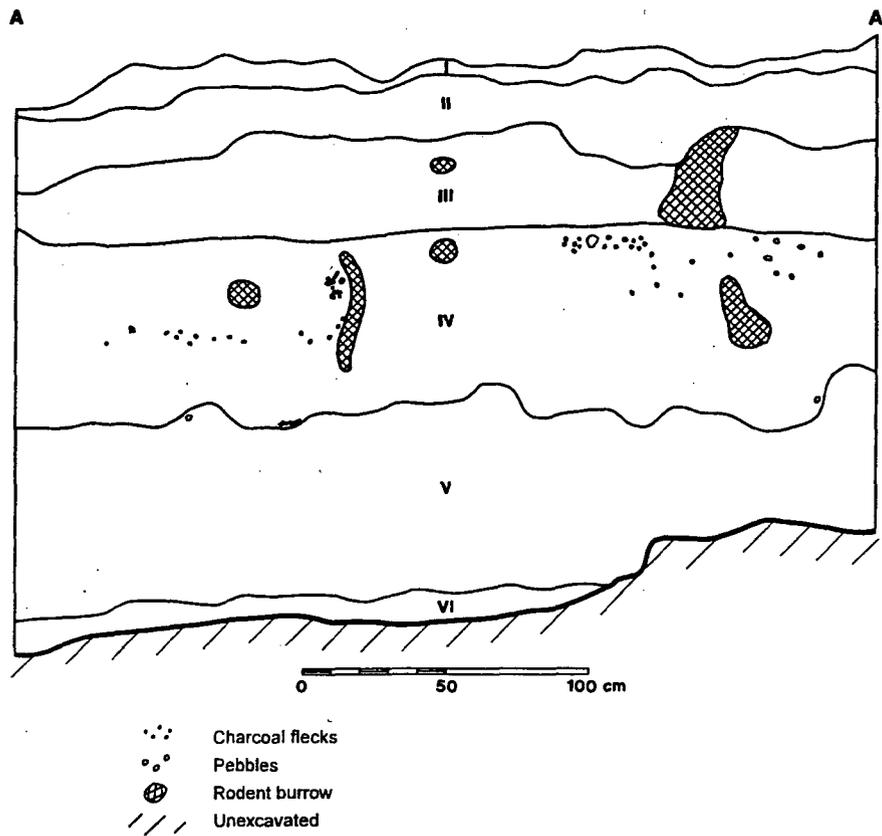


Figure 14.8. Site NM-Q-22-54, Study Unit 1, Northeast Wall Profile A-A'.

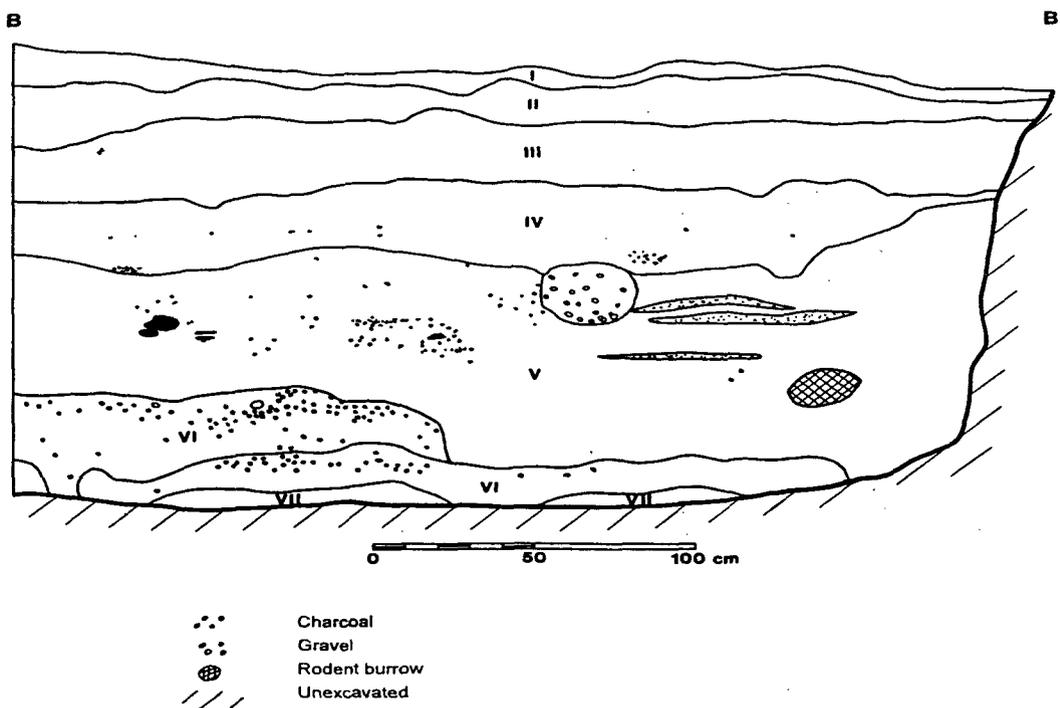


Figure 14.9. Site NM-Q-22-54, Study Unit 1, Northeast Wall Profile B-B'.

Profile A-A' shows six strata. Stratum I consisted of 3 to 15 cm of loose brown (10YR5/3), sandy clay with roots. Stratum II consisted of 14 to 35 cm of compact brown (10YR5/3) sandy clay with a lesser quantity of roots. Stratum III consisted of 21 to 36 cm of slightly compact yellowish brown (10YR5/4) loam with some gravel inclusions and rodent disturbance. Stratum IV consisted of approximately 60 cm of compact grayish brown (10YR5/2) sandy clay with pockets of loam, bedded gravel deposits, and a thin lens of charcoal flecking in the middle of this stratum. Rodent burrows were noted throughout this stratum. Stratum V consisted of approximately 65 cm of loose brown (10YR5/3) loam with lenses of clay, some gravel, and light charcoal flecking. Stratum VI was a white (10YR8/1) limestone bedrock. Profile B-B' shows seven strata. Stratum I consisted of 3 to 17 cm of loose pale brown (10YR6/3) sandy clay with roots. Stratum II consisted of 7 to 26 cm of grayish brown (10YR5/2) sandy clay with a slightly lesser quantity of roots. This stratum initially was believed to be a cultural layer; however, it appeared to be naturally dark. Stratum III consisted of 22 to 36 cm of a brown (10YR5/3) sandy clay with roots and a small amount of charcoal flecking. There was some interbedding of loam. Stratum IV consisted of 22 to 37 cm of compact brown (10YR5/3) sandy clay with charcoal flecking and interbedding of loam. Stratum V consisted of up to 83 cm of yellowish brown (10YR5/4) loam with lenses of clay, pockets of gravel, and light charcoal flecking. Rodent burrows were noted throughout this stratum. This stratum appeared to correspond with Stratum IV in profile A-A' since both contained considerable charcoal flecking, clay lenses, and rodent burrows. Stratum VI consisted of up to 42 cm of yellowish brown (10YR5/4) loam with lenses of clay, pockets of gravel, and light charcoal flecking. Stratum VII was white (10YR8/1) limestone bedrock. No artifacts or features were noted in the trench walls of SU 1.

## Study Unit 2

SU 2 extended from grid coordinates N159.75, E160.50 northwestward to N173.75, E144.50. SU 2 lay perpendicular to the centerline, approximately 55 m southwest of the site datum. Placement was influenced by the same shallow longitudinal swale noted above. A few ceramic artifacts were noted near the centerline at the northwest end of this trench. SU 2 was 21.3 m long and had an average depth of 1.33 m. Two 3-m-long profiles (C-C' and D-D') were drawn of SU 2, one at the southeast end and one towards the northwest end. Profile C-C' was recorded on the southwest side and Profile D-D' was recorded on the northeast side (Figures 14.10 and 14.11, respectively). Profile C-C' shows five strata. Stratum I consisted of up to 10 cm of pale brown (10YR6/3) sandy clay with roots. Stratum II consisted of up to 33 cm of yellowish brown (10YR5/4) fine sand with roots and small quantities of charcoal flecking and pebbles. Stratum III consisted of approximately 40 cm of hard compact brown (10YR5/3) sandy clay with small deposits of gravel and carbonaceous shale flecking. Stratum IV consisted of 38 to 66 cm of loose pale brown (10YR6/3) medium sandy clay interbedded with a gravel lens and considerable carbonaceous shale flecking. Stratum V was fractured sandstone bedrock with heavy caliche buildup. Profile D-D' shows five strata. Stratum I consisted of up to 6 cm of pale brown (10YR6/3) sandy clay with roots. Stratum II consisted of up to 28 cm of yellowish brown (10YR5/4) sandy clay with a slightly lesser quantity of roots. Stratum III consisted of up to 40 cm of brown (10YR5/3) sandy clay with roots and carbonaceous shale flecking. There was some interbedding of gravels near the base of this stratum. Stratum IV consisted of approximately 70 cm of compact pale brown (10YR6/3) sandy clay with thin lenses of carbonaceous shale flecking. Minor rodent burrowing was noted. Stratum V consisted of fractured sandstone bedrock with heavy caliche buildup. No artifacts or features were noted in the trench walls of SU 2.

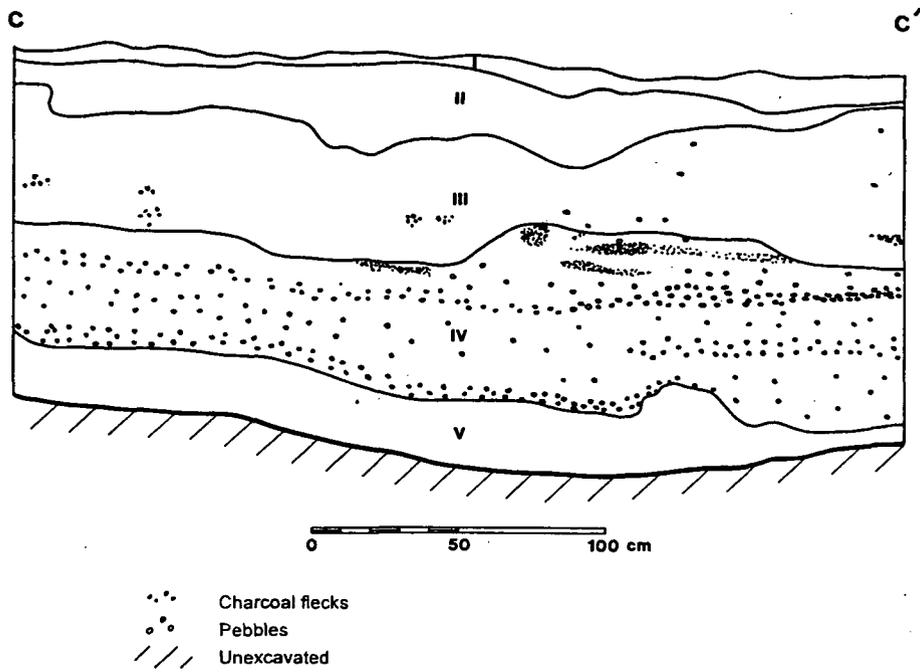


Figure 14.10. Site NM-Q-22-54, Study Unit 2, Southwest Wall Profile C-C'.

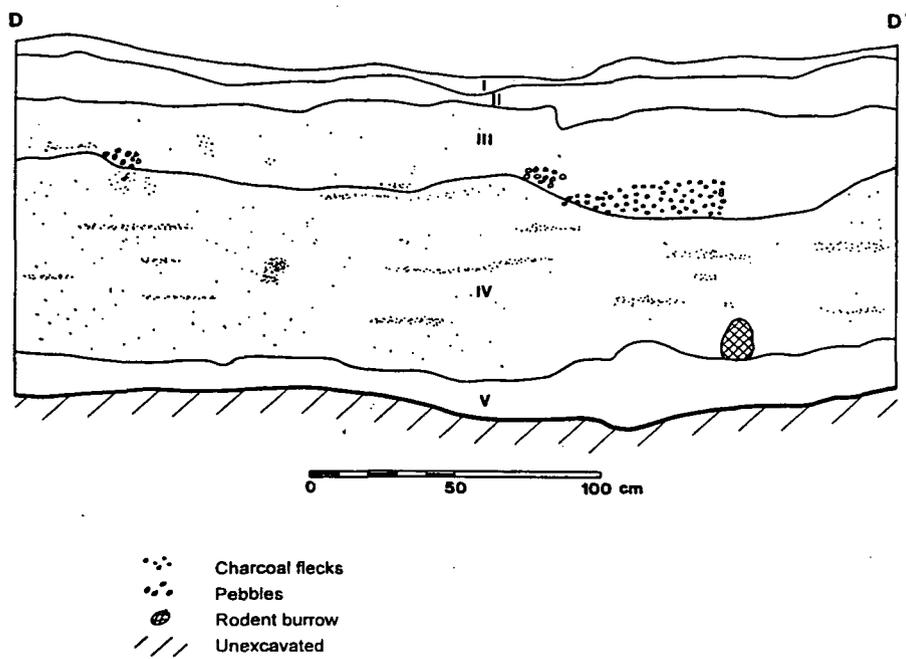


Figure 14.11. Site NM-Q-22-54, Study Unit 2, Northeast Wall Profile D-D'.

### Study Unit 3

SU 3 extended from grid coordinates N176.5, E175 northwestward to N195.5, E155.5. SU 3 lay perpendicular to the centerline, approximately 32 m southwest of the site datum. SU 3 extended 25.9 m from the southeast right-of-way boundary, across the centerline, to SU 9. The trench had an average depth of 1.3 m. Placement was influenced by a low-density scatter of surface artifacts at the edge of the right-of-way, the proximity of SU 11 (N196,E164) and the low sandy bench noted above. Two 3-m-long profiles (E-E' and F-F') were drawn of SU 3, one at the southeast end and one toward the northwest end. Profile E-E' recorded the southwest side and Profile F-F' recorded the northeast side of the trench (Figures 14.12 and 14.13, respectively). The two profiles exhibited markedly different profiles. Profile E-E' was relatively simple showing four strata dominated by a thick layer of dark brown, clay with charcoal flecking and a small deposit of coalshale lying atop the limestone bedrock. Profile F-F' exhibited eight strata which showed interbedded layers of clay- and sand-dominated soils. Bedrock was not reached. Profile E-E' is described below. Stratum I consisted of less than 5 cm of pale brown (10YR6/3) sandy clay with numerous roots. Stratum II consisted of 5 to 27 cm of brown (10YR5/3) sandy clay with a slightly lesser quantity of roots. Stratum III consisted of up to 105 cm of very compact dark brown (10YR4/3) sandy clay with few roots, some gravel, and a small amount of charcoal flecking. Lying immediately atop Stratum IV at the bottom of Stratum III was a 50-cm-long pocket of dense charcoal and ash (coalshale?). Stratum IV consisted of white (10YR8/1) limestone bedrock. Stratum IV was only visible for 1.4 m at the end of the trench. Profile F-F' shows eight strata. Stratum I consisted of 6 to 16 cm of brown (10YR5/3) sandy clay with roots. Stratum II consisted of 28 to 48 cm of yellowish brown (10YR5/4) loam with roots and minor rodent disturbance. A piece of tabular sandstone was noted in this stratum. Stratum III consisted of up to 8 cm of mixed grayish brown (10YR5/2) and yellowish brown (10YR5/4), sandy clay with few roots. Stratum IV consisted of 10 to 26 cm of brown (10YR5/3) loam with few roots. Some rodent burrowing was noted between this stratum and Stratum V. Stratum V consisted of 10 to 23 cm of compact grayish brown (10YR5/2) sandy clay. Stratum VI consisted of 10 to 25 cm of brown (10YR5/3) sandy clay with light charcoal flecking. Stratum VII consisted of at least 100 cm of grayish brown (10YR5/2) clay. Stratum VIII was interbedded into Stratum VII and consisted of 10 cm of compact yellowish brown (10YR5/4) and grayish brown (10YR5/2) sandy clay with an approximately 40% gravel inclusion. No artifacts or features were noted in the trench walls of SU 3.

### Study Unit 4

SU 4 extended from grid coordinates N192, E189.75 northwestward to N210.5, E168.5. SU 4 extended 28.2 m and had an average depth of 1.47 m. Placement was guided by the proximity of the rubble mound and by SU 12 and 13, hand-excavated units in which a moderate quantity of artifacts were recovered. Two profiles (G-G' and H-H') were drawn of SU 4, the former (3 m long) in the middle of the trench and the latter (2 m long) at the southeast end (Figures 14.14 and 14.15, respectively). Both are views of the northeast side of the trench and both show four strata. Profile G-G' is described below. Stratum I consisted of up to 12 cm of yellowish brown (10YR5/4) fine sand with roots and gravel. Stratum II consisted of 17 to 43 cm of dark yellowish brown (10YR4/4) fine sand with minor root and rodent disturbance. A single corrugated grayware jar sherd was recovered from the bottom of this level. Stratum III consisted of 47 to 112 cm of yellowish brown (10YR5/8), very fine sand with lenses of coarser sand throughout the stratum. Numerous rodent

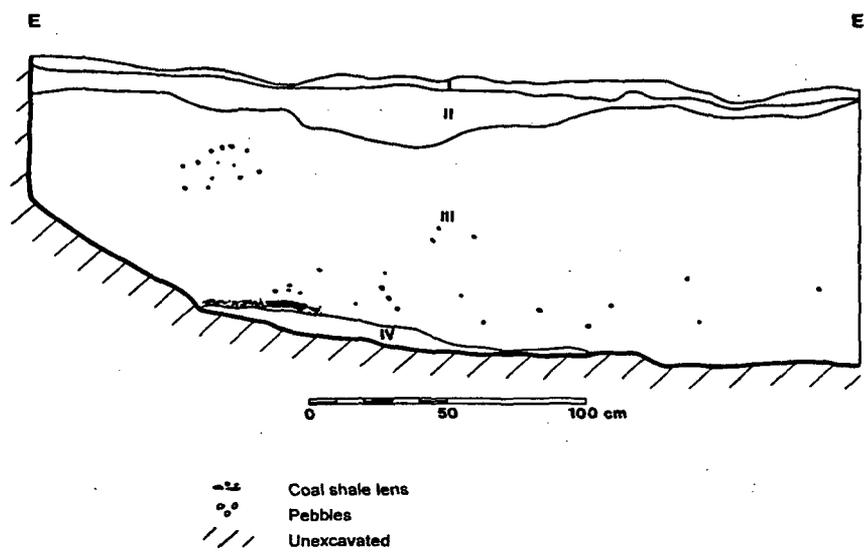


Figure 14.12. Site NM-Q-22-54, Study Unit 3, Southwest Wall Profile E-E'.

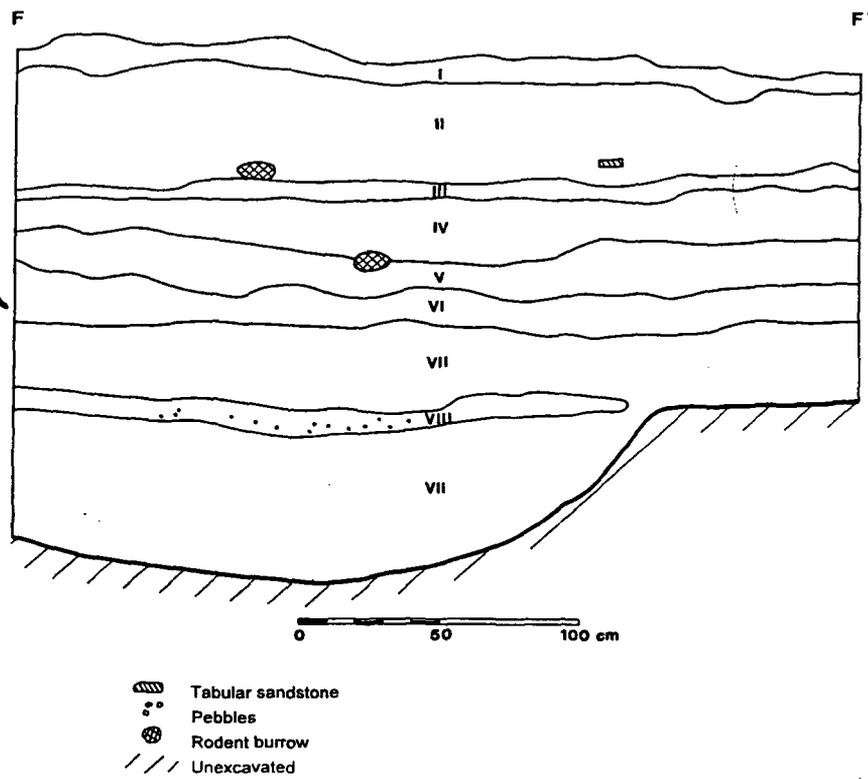


Figure 14.13. Site NM-Q-22-54, Study Unit 3, Northeast Wall Profile F-F'.

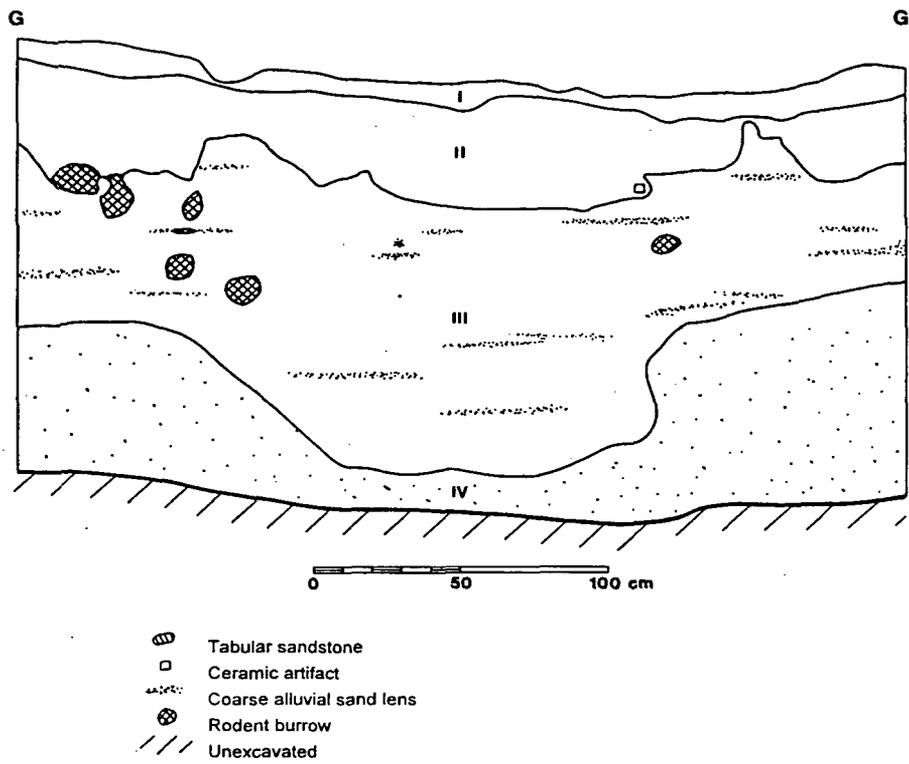


Figure 14.14. Site NM-Q-22-54, Study Unit 4, Northeast Wall Profile G-G'.

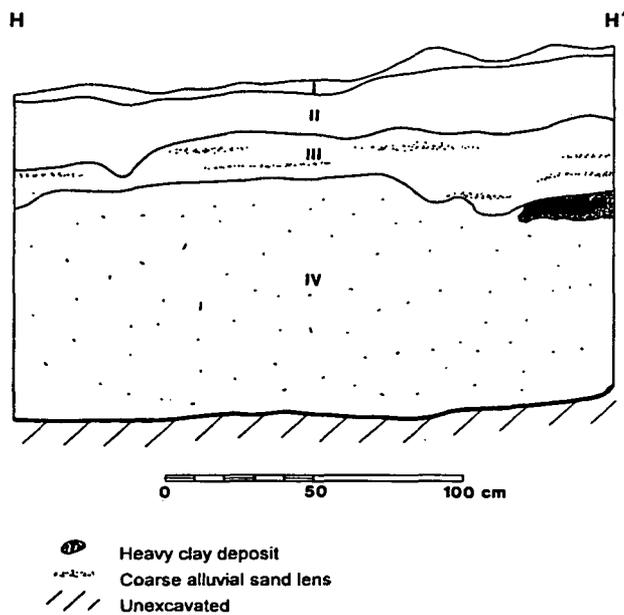


Figure 14.15. Site NM-Q-22-54, Study Unit 4, Northeast Wall Profile H-H'.

burrows were also noted throughout the stratum. Stratum III appeared to cut deeply (50+ cm) into Stratum IV in the center of the profile. Stratum IV consisted of at least 80 cm of gray (10YR5/1) fine silty clay. No inclusions were noted. Profile H-H' is described below. Stratum I, consisted of up to 7 cm of yellowish brown (10YR5/4) fine sand with roots. Stratum II consisted of 14 to 26 cm of dark yellowish brown (10YR4/4) fine sand with minor root disturbance. Stratum III consisted of 10 to 32 cm of dark yellowish brown (10YR4/4), very fine sand with lenses of coarser sand throughout the stratum. At the southeast end of the profile a very dark gray (10YR3/1), 12-cm-thick pocket of clay was sandwiched between Strata III and IV. Stratum IV consisted of at least 90 cm of very compact dark gray (10YR4/1) silty clay. No inclusions were noted. A single corrugated grayware jar sherd was recovered from the bottom of Stratum II; however no features were noted in the trench walls of SU 4.

### Study Unit 5

SU 5 extended from grid coordinates N198.75, E196.25 northwestward to N211.75, E178.50. SU 5 was 21.8 m long and had an average depth of 1.58 m. Placement was guided by the close proximity of the rubble mound and by SU 12, 13, and 14, hand-excavated units in which a moderate quantity of artifacts were recovered. Two profiles (J-J' and K-K') were drawn of Trench 5, the former (2 m long) near the middle of the trench and the latter (3 m long) at the southeast end (Figures 14.16 and 14.17). Profile J-J' views the southwest side of the trench and five strata were recorded. Stratum I consisted of up to 16 cm of pale brown (10YR6/3) sandy clay with roots. Stratum II consisted of 12 to 22 cm of yellowish brown (10YR5/4) loam with some roots. Stratum III consisted of 30 to 40 cm of grayish brown (10YR5/2) sandy clay with few roots. Stratum IV consisted of 35 to 53 cm of yellowish brown (10YR5/4) loam with few roots. Stratum V consisted of up to 57 cm of grayish brown (10YR5/2) sandy clay. Profile K-K' views the northeast side of the trench and three strata were recorded. Stratum I consisted of no more than 5 cm of pale brown (10YR6/3) sandy clay with roots. Stratum II consisted of up to 128 cm of grayish brown (10YR5/2) sandy clay with some roots. A number of pieces of tabular sandstone were noted in the middle of this stratum. Approximately 10 cm of carbonaceous shale was noted sandwiched between Strata II and III 3 m from the end of the trench. Stratum III consisted of up to 60 cm of dark grayish brown (10YR4/2) sandy clay with few roots. Stratum IV overlay a large dense pocket of coalshale at the southeast end of the trench. No artifacts or features were noted in the trench walls of SU 5.

### Study Unit 6

SU 6 extended from grid coordinates N206, E202.5 northwestward to N215.25, E190.25. SU 6 was 15.3 m long and had an average depth of 1.37 m. Placement was guided by the relatively close proximity of the rubble mound and by SU 14 and 15, hand-excavated units which yielded a moderate quantity of artifacts. One 3-m-long profile (L-L') was drawn of SU 6, near the southeast end of the trench (Figure 14.18). Profile L-L' views the southwest side of the trench and three strata were recorded. Stratum I consisted of up to 10 cm layer of pale brown (10YR6/3) fine sand with roots and a small quantity of gravel. Stratum II consisted of up to 40 cm of yellowish brown (10YR5/4) sandy clay with some roots. The soil in this stratum was mixed in with a dense interbedding of tabular fine-grained sandstone cobbles. Stratum III consisted of up to 125 cm of sandy clay that varies in color from yellowish brown (10YR5/6) to gray (10YR5/1) to light gray or gray (10YR6/1). No artifacts or features were noted in the trench walls of SU 6.

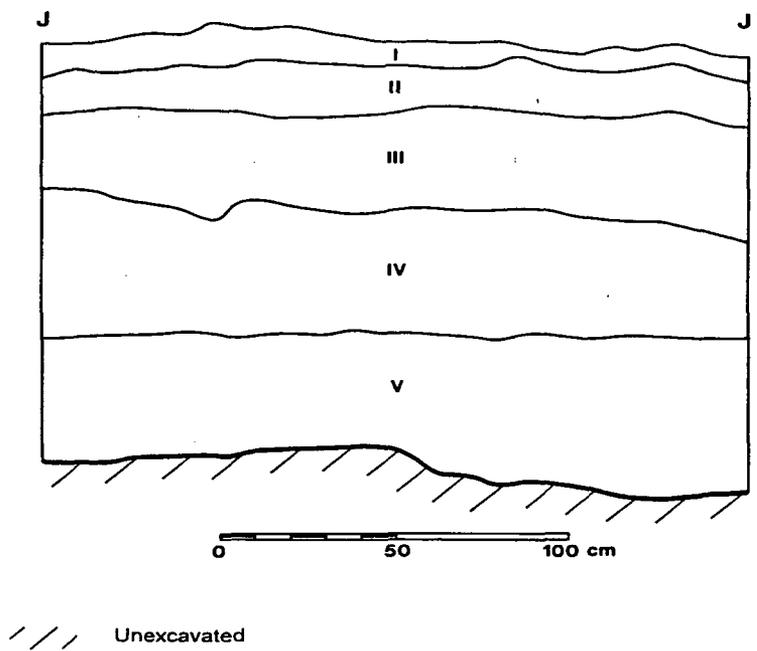


Figure 14.16. Site NM-Q-22-54, Study Unit 5, Southwest Wall Profile J-J'.

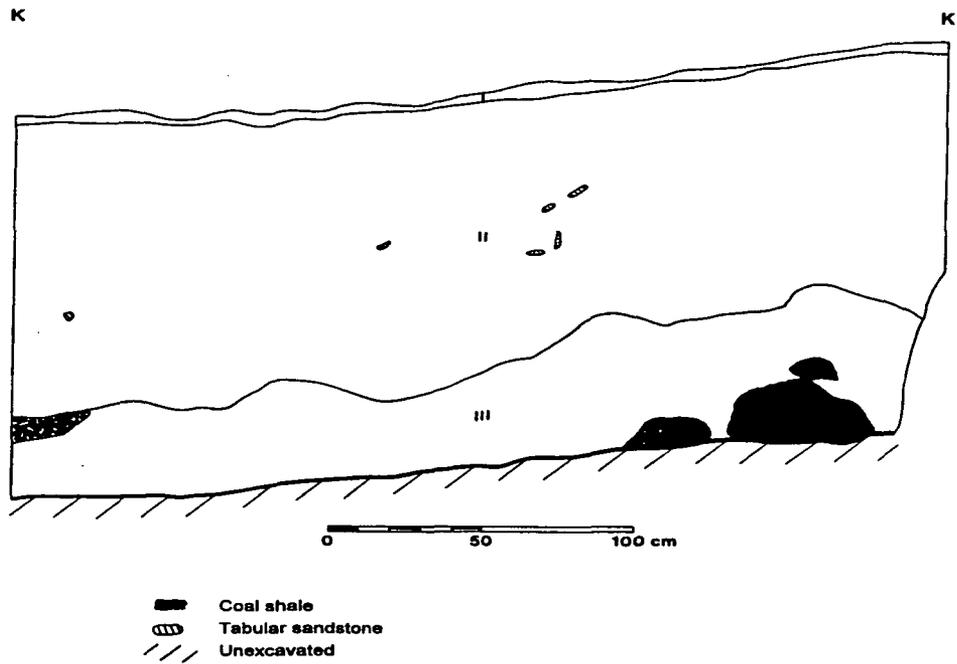


Figure 14.17. Site NM-Q-22-54, Study Unit 5, Northeast Wall Profile K-K'.

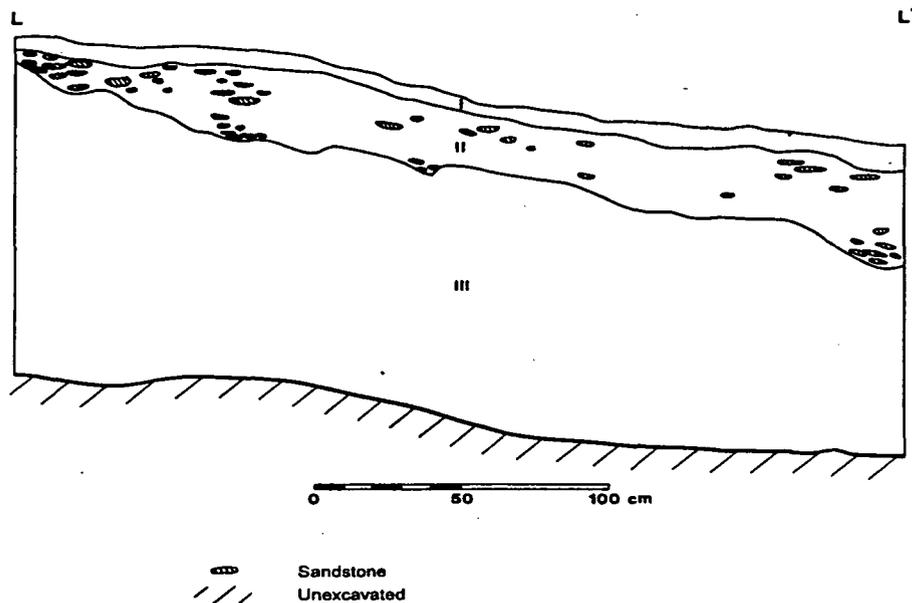


Figure 14.18. Site NM-Q-22-54, Study Unit 6, Southwest Wall Profile L-L'.

### Study Unit 7

SU 7 extended from grid coordinates N214.25, E211.5 northwestward to N230.5, E201.75. SU 7 was 18.7 m long and had an average depth of 1.38 m. The trench was placed between SU 15 and SU 16 and 17 with their low-density artifact scatters, to test the area between them. Two 3-m-long profiles (M-M' and N-N') were drawn of SU 7, the former near the northwest end of the trench, the latter at the southeast end (Figures 14.19 and 14.20). Profile M-M' is a view of the southwest side of the trench and is described below. Stratum I consisted of up to 11 cm of brown (10YR5/3) sandy clay with numerous roots. Stratum II consisted of 3 to 27 cm of yellowish brown (10YR5/4) loam with sandy clay inclusions and roots. Stratum III consisted of 20 to 45 cm of yellowish brown (10YR5/4) loam with brown sandy clay inclusions. The stratum also included minor root intrusions and charcoal flecking. Several rodent burrows were noted in the stratum. Stratum IV consisted of 17 to 28 cm of grayish brown (10YR5/2) sandy clay with minor charcoal flecking. Several rodent burrows were noted in the stratum. Stratum V consisted of approximately 20 cm of yellowish brown (10YR5/4) loam with brown sandy clay inclusions. Faint charcoal flecking was noted in the stratum. Stratum VI consisted of at least 95 cm of very compact brown (10YR5/3) sandy clay with small sandstone pebbles and caliche. Profile N-N' is a view of the northeast side of the trench showing five strata. Stratum I consisted of up to 13 cm of loose brown (10YR5/3) sandy clay with roots. Stratum II consisted of 3 to 18 cm of brown to dark brown (10YR4/3) sandy clay with roots. Stratum III consisted of 14 to 26 cm of yellowish brown (10YR5/4) loam with few roots. Stratum IV consisted of 21 to 33 cm of compact brown (10YR5/3) clay with a small quantity of gravel along the bottom of the stratum. One noncultural quartzite cobble was noted in the matrix. Stratum V consisted of at least 17 cm of compact light yellowish brown (10YR6/4) sandy clay. Stratum V was interrupted by exposures of fine-grained sandstone bedrock. No artifacts or features were noted in the trench walls of SU 7.

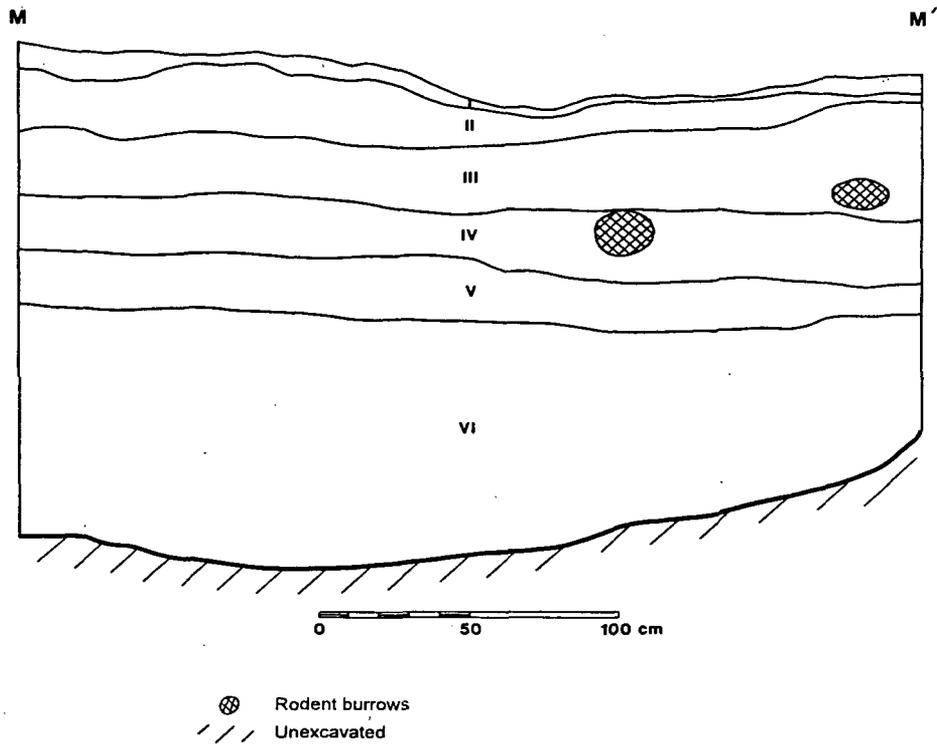


Figure 14.19. Site NM-Q-22-54, Study Unit 7, Southwest Wall Profile M-M'.

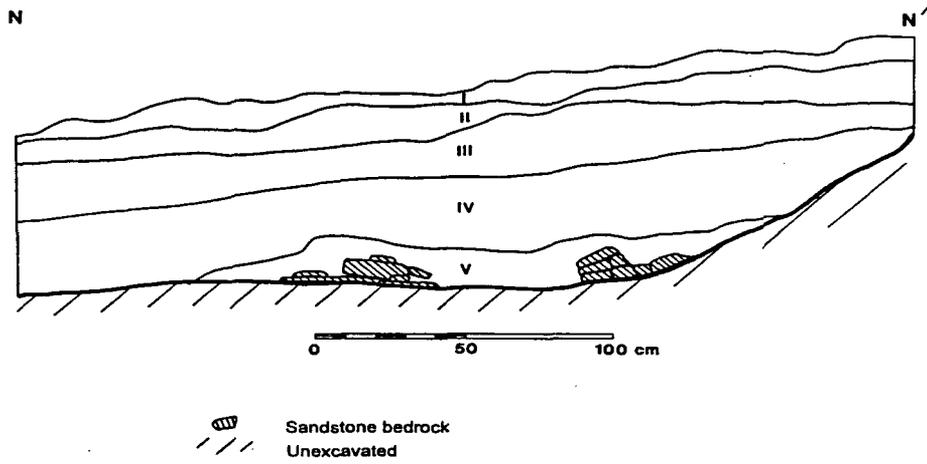


Figure 14.20. Site NM-Q-22-54, Study Unit 7, Northeast Wall Profile N-N'.

## Study Unit 8

SU 8 extended from grid coordinates N225.75, E220.75 northwestward to N234.25, E211.25. SU 8 extended 12.7 m and had an average depth of 1.39 m. This trench was placed at this location to be the farthest northeast excavation and was adjacent to SU 17, a hand-excavated unit and its associated low-density artifact scatter. One 3-m-long profile (P-P') was drawn of SU 8, at the southeast end of the trench (Figure 14.21). Profile P-P' views the northeast side of the trench and six strata were recorded. Stratum I consisted of up to 12 cm of pale brown (10YR6/3) fine sand with few roots. Stratum II consisted of 8 to 27 cm of dark yellowish brown (10YR4/6) fine sand with some roots. Stratum III consisted of 31 to 45 cm of dark yellowish brown (10YR4/4) fine sand with a small quantity of gravel in the matrix. Stratum IV consisted of 23 to 59 cm of yellowish brown (10YR5/4) clay with caliche and gravel inclusions. Stratum V consisted of 4 to 21 cm of hard compact very dark gray (10YR4/4) clayey coalshale. Stratum VI consisted of a light gray (10YR7/1) fine-grained sandstone bedrock. No artifacts or features were noted in the trench walls of SU 8.

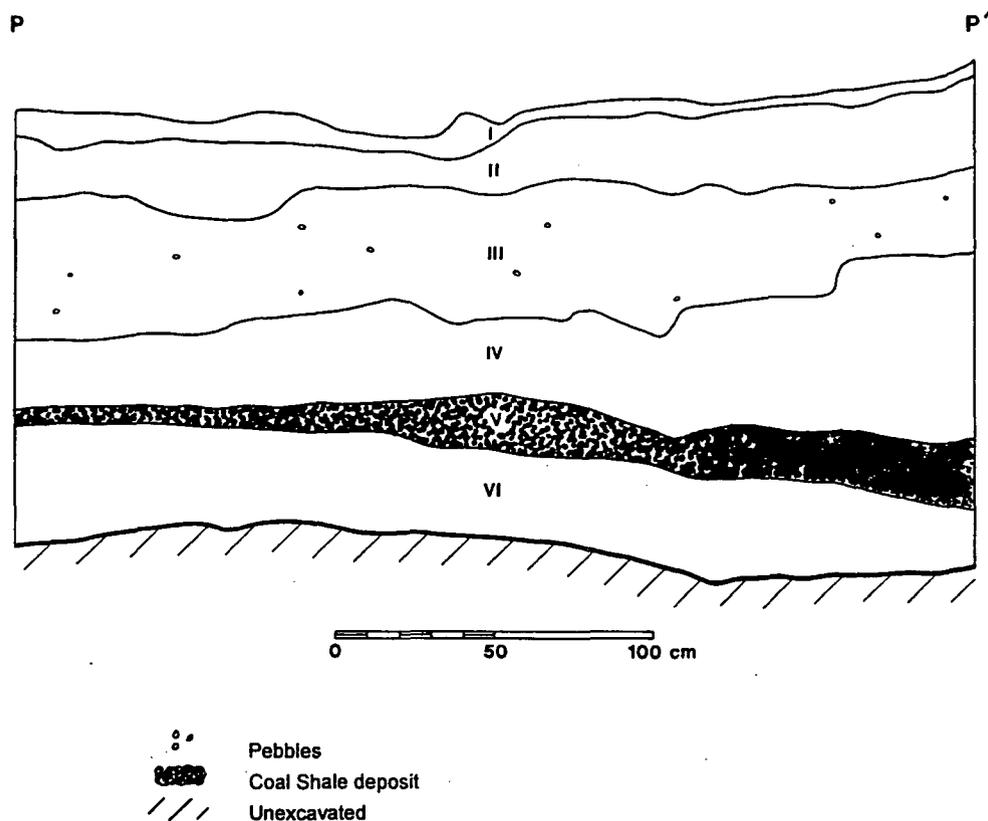


Figure 14.21. Site NM-Q-22-54, Study Unit 8, Northeast Wall Profile P-P'

## Study Unit 9

SU 9 extended from grid coordinates N168.5, E130.5 northeastward to N206.25, E170.75. SU 9 was 56.7 m long and had an average depth of 1.85 m. This trench was placed along the centerline between trenches SU 1 and 4. Besides testing the area along the centerline, it provided an extended view of the stratigraphy at site NM-Q-22-54. Three profiles were drawn of SU 9 (Figures 14.22, 14.23, and 14.24). Profile R-R' was near the middle of the trench, and Profiles Q-Q' and S-S' were on opposing walls towards the northeast end of SU 9. Profile R-R' was a 3-m-long view of the southeast wall and shows seven strata. Stratum I consisted of up to 6 cm of pale brown (10YR6/3) fine sand with moderate root disturbance. Stratum II consisted of 3 to 14 cm of brown (10YR5/3) fine sand with some roots. Stratum III consisted of 20 to 31 cm of yellowish brown (10YR5/4) fine sand with a small quantity of gravel in the matrix. Stratum IV consisted of 60 to 85 cm of grayish brown (10YR5/2) clay with light charcoal flecking and gravel inclusions. Stratum V consisted of 28 to 75 cm of yellowish brown (10YR5/4) sandy clay with a small amount of charcoal flecking. Almost half the matrix was composed of interbedded gravel deposits. Stratum VI consisted of up to 35 cm of a black (10YR2/1) flaky coalshale deposit wedged between Strata V and VII. Stratum VII consisted of at least 30 cm of gray (10YR5/1) clayey coalshale with a small amount of charcoal flecking.

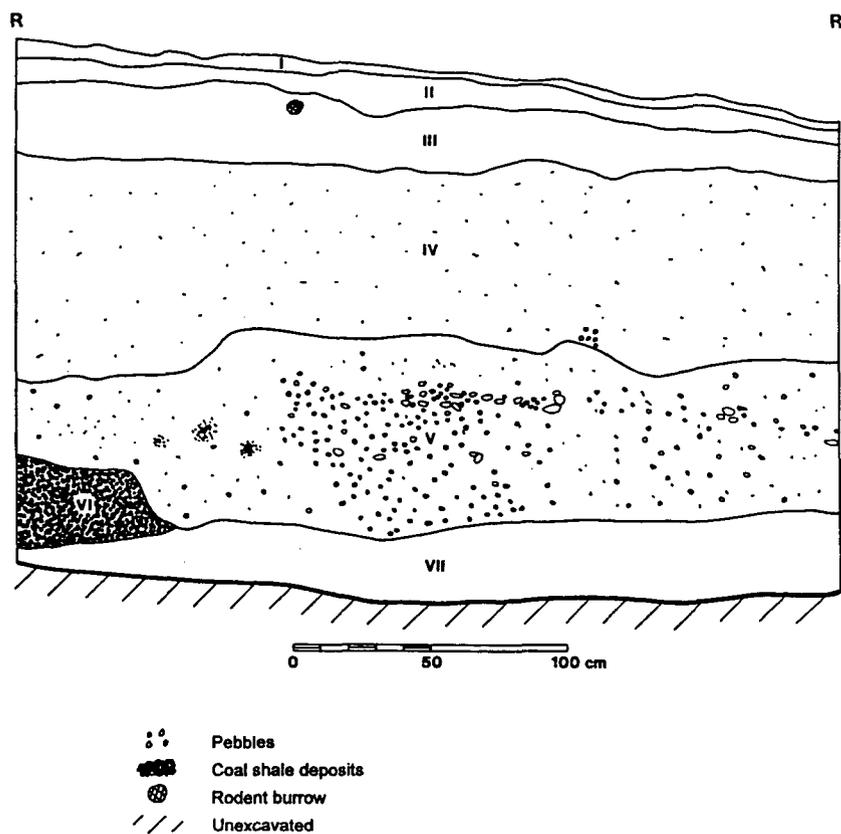


Figure 14.22. Site NM-Q-22-54, Study Unit 9, Southeast Wall Profile R-R'.

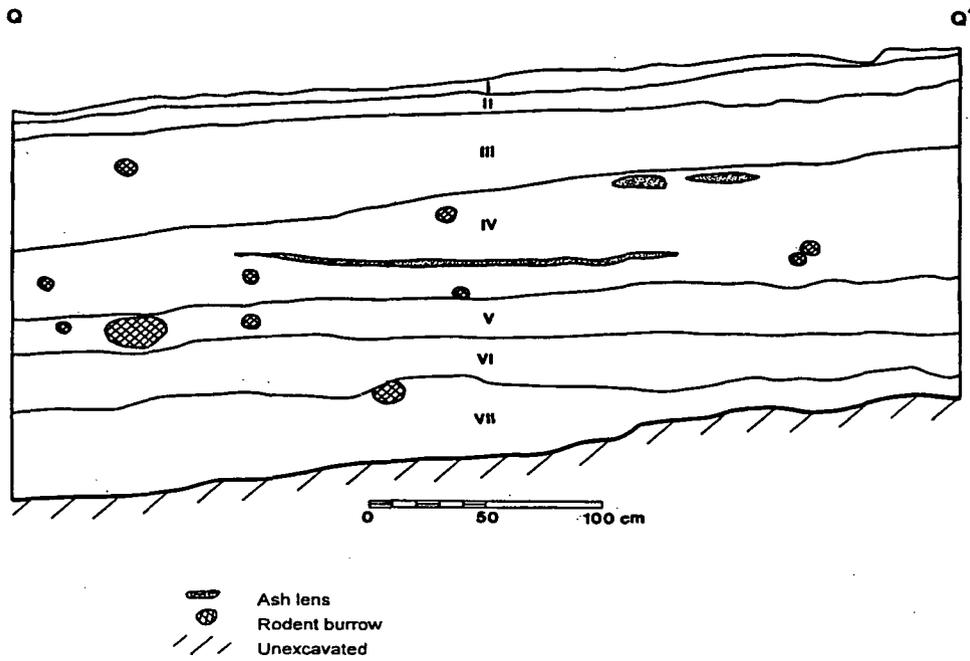


Figure 14.23. Site NM-Q-22-54, Study Unit 9, Northwest Wall Profile Q-Q'.

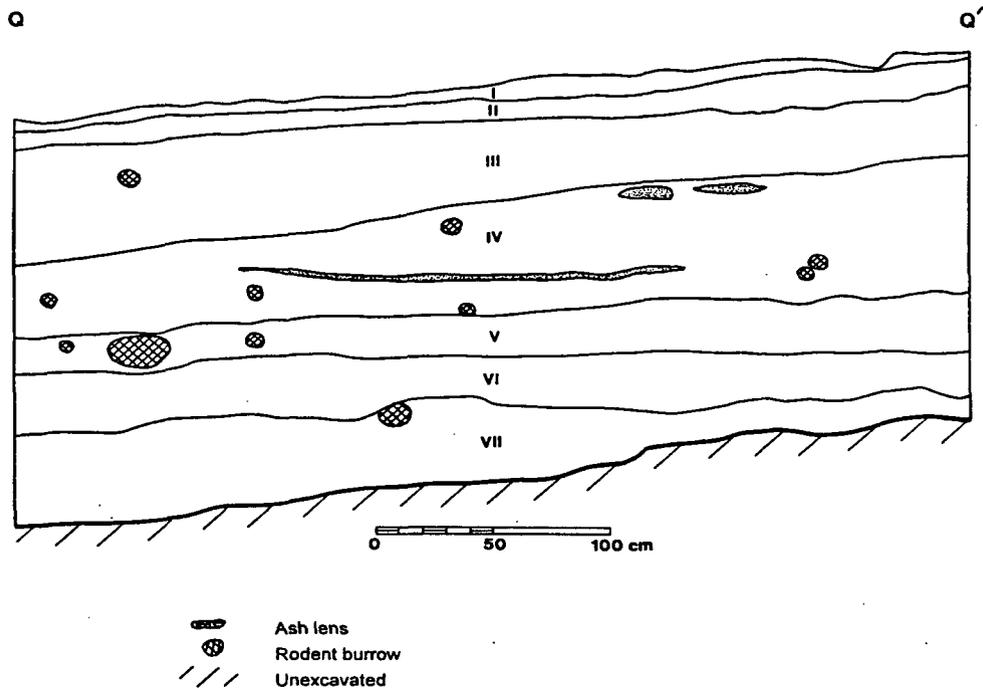


Figure 14.24. Site NM-Q-22-54, Study Unit 9, Southeast Wall Profile S-S'.

Profile Q-Q' is a 4-m-long view of the northwest wall and shows seven strata. Stratum I consisted of up to 10 cm of brown (10YR5/3) sandy clay with moderate root disturbance. Stratum II consisted of 6 to 19 cm of slightly brown (10YR5/3) sand with roots. Stratum III consisted of 29 to 55 cm of slightly yellowish brown (10YR6/4) loam with few roots and some rodent disturbance. Stratum IV consisted of 35 to 65 cm of yellowish brown (10YR5/4) loam with few roots, light charcoal flecking, and heavy rodent burrowing. Within Stratum IV was a 1.85-m-long ash lens and two smaller adjacent ash lenses. No artifacts were noted in association with the ash lenses. Stratum V consisted of 17 to 27 cm of grayish brown (10YR5/2) sandy clay with pockets of loam and heavy rodent burrowing. Stratum VI consisted of 19 to 30 cm of yellowish brown (10YR5/4) fine silt with deposits of sandy clay with traces of caliche. Stratum VII consisted of at least 45 cm of brown (10YR5/3) fine sandy clay with deposits of sandy clay with traces of caliche.

The 4-m-long Profile S-S' exhibits an almost identical view to Profile Q-Q'. As with Profile Q-Q' an ash lens was visible in Stratum IV. This 23-cm-long lens lay at the same stratigraphic and elevational level as the 1.85-m lens seen in Profile Q-Q' and likely represents another segment of the same deposit. No cultural materials were noted in the matrix or in association with the ash lens. It could not be determined if these lenses represented cultural or natural events.

#### Study Unit 10

SU 10 extended from grid coordinates N212.5, E179.5 northeastward to N241, E209.5. SU 10 was 41.3 m long and had an average depth of 1.74 m. This trench was placed along the centerline between SU 5 and 8. Besides testing the area along the centerline, it provided an extended view of the stratigraphy at site NM-Q-22-54. Two profiles were drawn of SU 10 (Figures 14.25 and 14.26, respectively). Profile T-T' was located toward the southwest end of the trench and Profile U-U' in the middle of the trench. Profile T-T' is a 3-m-long view of the southeast wall and shows five strata. Stratum I consisted of up to 10 cm of brown (10YR5/3) fine sand with moderate root disturbance. Stratum II consisted of 20 to 70 cm of yellowish brown (10YR5/4) fine sand with some roots. There were also small quantities of gravel and carbonaceous shale flecks. Stratum III consisted of 22 to 85 cm of dark yellowish brown (10YR4/6) fine sand with a small quantity of gravel and carbonaceous shale flecks in the matrix. Stratum IV consisted of 32 to 50 cm of brown to dark brown (10YR4/3) clay with fine sand. Light caliche and gravel inclusions are present. Stratum V consisted of at least 35 cm of brown to dark brown (10YR4/3) clay with a small amount gravel in the matrix.

Profile U-U' is a 3-m-long view of the southwest wall and shows five strata. Stratum I consisted of up to 8 cm of brown (10YR5/3) fine sand with moderate root disturbance and a small quantity of pebbles. Stratum II consisted of 17 to 30 cm of yellowish brown (10YR5/4) fine sand with roots and a small quantity of pebbles. Stratum III consisted of 65 to 80 cm of light yellowish brown (10YR6/4) fine sand with few roots and a small quantity of pebbles. Two corrugated grayware jar sherds were recovered from the central portion of this stratum. Stratum IV consisted of 22 to 52 cm of brown to dark brown (10YR4/3) fine sand with few roots and pebbles. Stratum V consisted of up to 70 cm of very dark grayish brown (10YR3/2) clay with a small quantity of gravel and moderate amount of caliche deposits. No features were noted in the trench walls of SU 10.

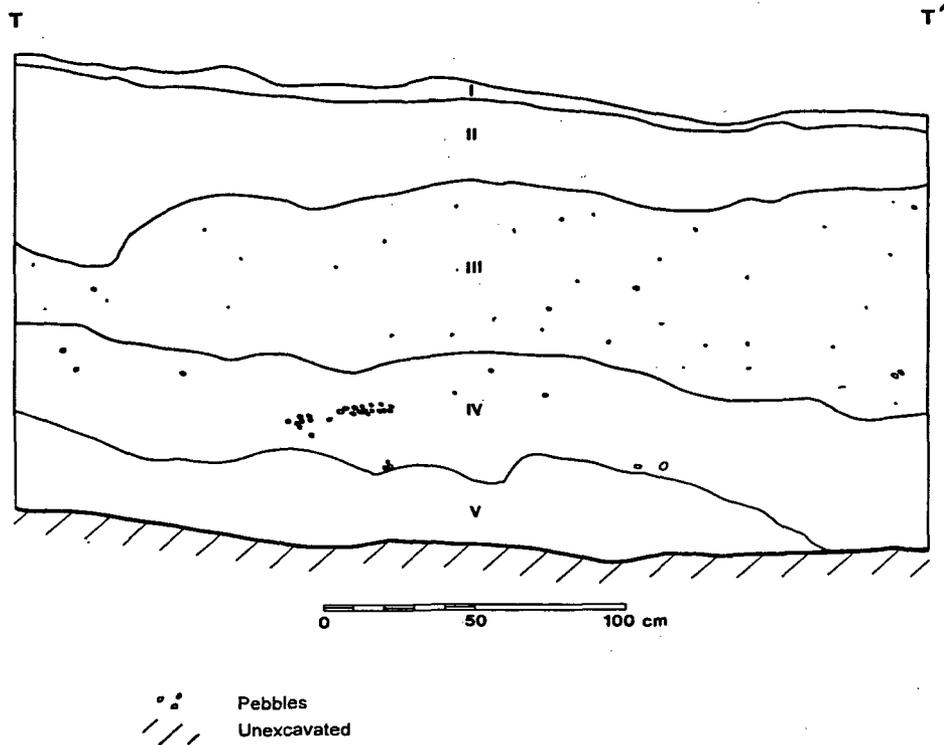


Figure 14.25. Site NM-Q-22-54, Study Unit 10, Southeast Wall Profile T-T'.

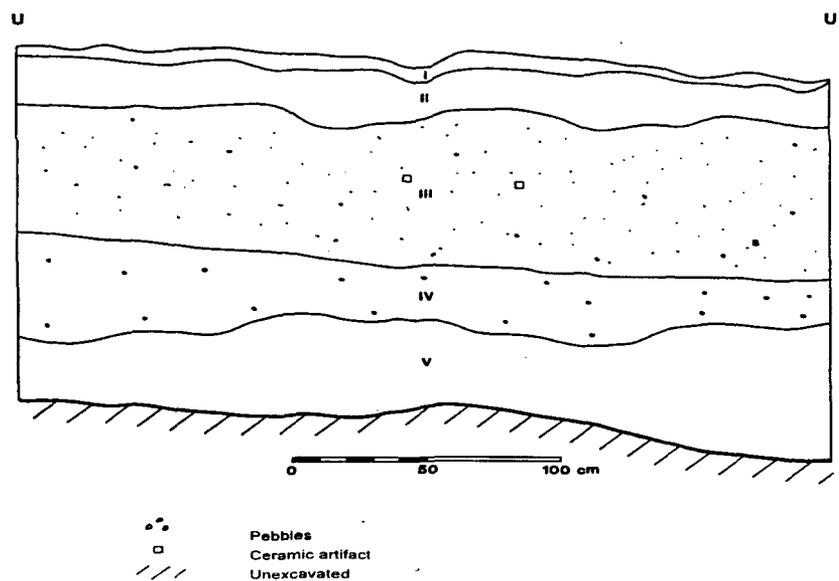


Figure 14.26. Site NM-Q-22-54, Study Unit 10, Southeast Wall Profile U-U'.

## SUMMARY AND INTERPRETATION

Phase I Data Recovery testing of site NM-Q-22-54 resulted in the collection of 241 artifacts of which 157 were ceramics, 42 were flaked stone, 3 were ground stone, and 39 were faunal materials. Seventy-one artifacts were collected from surface contexts and 170 were collected from subsurface contexts. None of the hand-excavated units revealed any evidence of features, occupation surfaces, or cultural levels. As was expected, the highest quantities of artifacts were recovered from units closest to the rubble mound and its associated artifact scatter to the northeast (both outside the right-of-way). However, even the quantities seen here do not reflect what would be expected from a midden. This may be because the general disposal pattern was oriented to the south or southeast which would place the midden outside the right-of-way. The artifacts were largely recovered from the top two strata. Below Stratum II the artifacts tended to be isolated. This superficial deposition likely represents erosional movement of material from higher elevations outside the right-of-way where a denser distribution of artifacts can be seen. Data from the ceramic assemblage indicate a late Pueblo II period (AD 1000 to 1150) occupation at NM-Q-22-54.

The trenches revealed a variety of soil types. In general, the stratigraphy consisted of a fine-grained sandstone bedrock with multiple layers of clays or sandy clays above that and covered by loose aeolian sands. In general the bedrock was quite deep (1.5 m); however, toward the northeastern end of the right-of-way it was close to the surface. In a number of places, particularly near the rubble mound, pockets of a flaky and/or clayey coalshale type material (carbonaceous shale?) were exposed. Layers of this can be seen in the surrounding mesas where geologic strata are exposed, particularly on the north side of the pass. Erosion of this material is likely responsible for the "charcoal" flecking noted in many of the upper soil strata, rather than dispersal of culturally produced charcoal. The soil strata, quite numerous in some locations, appeared to be mostly alluvial in nature. This is inferred from the layering and interbedding of sands, silts, clays, or various mixtures thereof, as well as bedded layers of gravel. All the gravel was rounded, evidence of erosional tumbling. Evidence of alluvial erosional cutting and subsequent filling could be seen in some of the more southwestern trenches. Some of the erosional episodes may represent quite high-energy movement of materials.

Cultural manifestations in the trenches were rare. Only three artifact locations and several thin ash lenses were recorded. Two adjacent corrugated sherds were recovered from Stratum III of SU 10, 40 m north of the rubble mound, near the northeast end of the site. One corrugated sherd was recovered from Stratum II of SU 4, 15 m west of the rubble mound. The ash lenses were revealed at two different levels in Stratum IV of SU 9, 30 m west of the rubble mound at the western extent of the site. These ash lenses were unlike the coalshale material seen elsewhere around the site and likely do represent burning episodes. Unfortunately no artifacts were noted in direct association with the ash lenses and it could not be determined if they represented cultural or natural phenomena.

Ceramic analysis (Chapter 25) indicates that site NM-Q-22-54 was probably occupied between AD 1000 to 1150, a mid- to late Pueblo II occupation. A total of 157 sherds were recovered from this site. Grayware ceramics dominated the assemblage identified at the site (n=78) and included plain, corrugated, and banded sherds as well as one polished sherd. Whitewares (n=25)

included Red Mesa- and Gallup-style black-on-white sherds, Escavada/Gallup black-on-white sherds, a slipped white sherd, as well as other Pueblo I/II-style black-on-white sherds. Jar forms accounted for 95% of the ceramic assemblage.

Lithic artifact analysis (Chapter 26) recorded 42 flaked stone and 3 ground stone artifacts from site NM-Q-22-54. Of the 42 flaked items fully half represent cores. From the presence of such a high percentage of cores along with two hammerstones a certain amount of lithic reduction activities at this site is suggested. The low quantity of ground stone may reflect a limited amount of food or vegetal processing. However, these assumptions are skewed by the fact that the investigation was conducted within the right-of-way and not on the core of the site (i.e., the rubble mound and associated artifact scatter).

### RECOMMENDATIONS

In general the cultural materials and manifestations seen inside the proposed right-of-way likely represent postoccupational erosional movement. The exception is the ash lenses in SU 9, as shown in Profiles Q-Q' and S-S'. The thin ash deposits and paucity of associated artifacts is reminiscent of Late Archaic pitstructure-type occupations and, from the depth of the ash, this may represent an occupation which precedes the late Pueblo II occupation of the rubble mound. For this reason limited data recovery investigations should be conducted in this area of the site to confirm or deny whether these represent cultural activities.

Additionally, because this site was considered one of the most significant sites on the survey and because of the rubble mound's close proximity to the right-of-way, several restrictions are recommended for the construction work in this area. First, the construction zone should be narrowed on the southeast side as it passes this site, in the event that undiscovered subsurface features exist within the proposed right-of-way. Second, the site should be fenced off to prevent any inadvertent vehicular incursions onto the site. Third, an archaeologist should be present to monitor construction activities that involve the removal of soil deposits to watch for accidental exposure of buried subsurface cultural deposits or features and to halt further construction impacts until archaeological mitigative action can be conducted.

## Chapter 15

### SITE NM-Q-23-55 (LA 110318)

Harding Polk II and Ardale R. Delena

Site NM-Q-23-55 is a small ancestral Pueblo lithic and ceramic artifact scatter situated on a small, narrow, relatively flat bench on a steep rocky slope at the head of large box canyon. A small ephemeral drainage defines the southern and southeastern boundaries of the site. It is this southeastern portion of the site that lies within the right-of-way. The site sits at an elevation of 2255 m (7400 ft). N11 curves around the southern uphill side of the site before passing through a gap between mesas forming a natural pass. The box canyon is bordered by sheer sandstone cliffs rising to more than 2316 m (7600 ft). The soil is mostly sand with some eroding gravel deposits. Vegetation at the site is dominated by a pinyon (*Pinus edulis*), juniper (*Juniperus scopulorum*), Gambel's oak (*Quercus gambelii*) woodland. Underbrush consists of big sagebrush (*Artemisia tridentata*), Apache plume (*Fallugia paradoxa*), broom snakeweed (*Gutierrezia sarothrae*), fringed sagebrush (*Artemisia frigida*), rabbitbrush (*Chrysothamnus* spp.), narrowleaf yucca (*Yucca* spp.), prickly pear cactus (*Opuntia* spp.), and various grasses and forbs.

#### SURVEY DATA

The site was recorded by Zuni Cultural Resource Enterprise (ZCRE) in 1995 as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping, in-field artifact analyses, and photography. The in-field analyses included lithic artifact reduction and material identification, ceramic identification, artifact counts, and gross surface distribution mapping of artifacts. ZCRE recorded the site as a lithic and ceramic artifact scatter. Ceramics identified at the site included plain whitewares and Kiatuthlanna and Red Mesa black-on-whites. Based on the ceramics the site was determined to represent a Pueblo II period ancestral Pueblo occupation (AD 900 to 1150). Lithic artifacts included a gray chert, corner-notched biface. All the flaked stone appeared to represent primary cobble reduction, with one exception: a quartzite bifacial thinning flake. No architecture or other features were noted.

#### NATURE AND EXTENT TESTING

On 23 October 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent and content of site NM-Q-23-55. A redefinition of the site boundaries and a complete surface collection of all artifacts within the right-of-way were conducted. Subsurface investigations included hand excavation of one 1-by-1-m test unit. No backhoe trenches were excavated at this site. Site boundaries were marginally expanded southward (Figure 15.1).

#### Surface Collection

An area along approximately 20 m of the proposed road right-of-way was visually searched for surface artifacts. When located each artifact was pin-flagged. Only two Cibola Gray Ware jar sherds were collected at site NM-Q-23-55. They were located in the small ephemeral drainage. The corner-notched biface was not relocated.

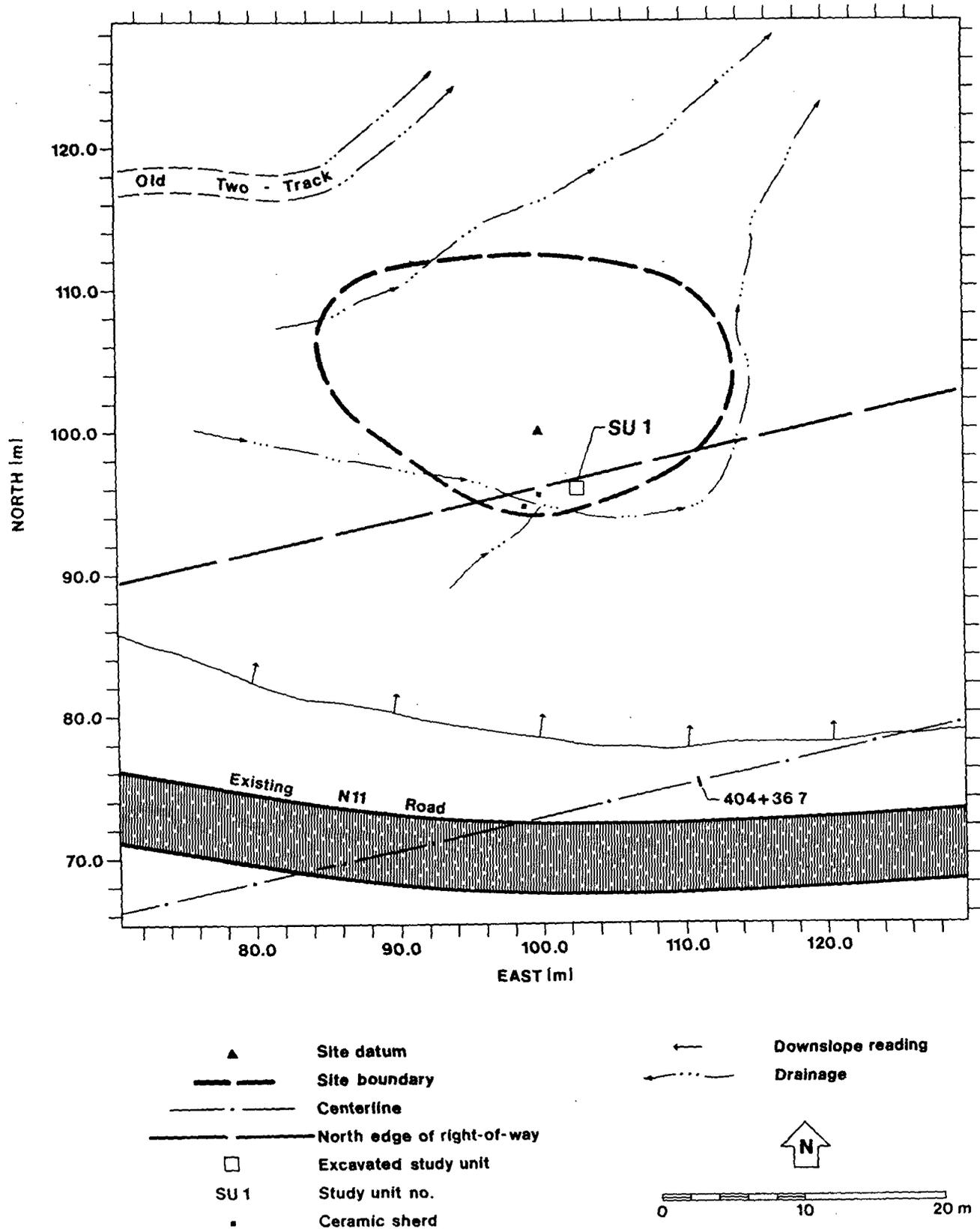


Figure 15.1. Site NM-Q-22-55, Nature and Extent Testing.

## Hand Excavation

Hand excavation of one 1-by-1-m test unit was conducted in order to determine the nature and depth of cultural deposits on site NM-Q-23-55. The test unit was excavated in arbitrary 10-cm levels and all soils were screened through 1/4-in hardware mesh. Soil descriptions were made using Munsell soil charts to identify soil color.

Study Unit (SU) 1 was a 1-by-1-m unit located at grid coordinates N95.48, E102.14. The unit was placed on the north edge of a small drainage that defines the southern boundary of the site. This unit was placed on the only remaining stable ground near where two ceramic sherds were collected from the surface. From the two sherds and the relatively level ground, there seemed to be a possibility of subsurface cultural deposits.

SU 1 was excavated 30 cm in three levels and three soil strata were identified (Figure 15.2). Stratum I consisted of 6 to 8 cm of brown (10YR5/3), sandy loam with some gravel, sandstone, and rocks throughout. Some root disturbance was also noted. Stratum II consisted of 8 to 10 cm of dark yellowish brown (10YR4/4), sandy loam with some gravel, sandstone, and rocks throughout and some slight root disturbance. Stratum III consisted of 10 to 12 cm of dark gray (10YR4/1), sandy loam with some traces of caliche. There were also inclusions of platy gray clay, coalshale, and sandstone gravel. Some root disturbance was also noted. No artifacts were recovered and no features nor occupation surfaces were revealed in this unit.

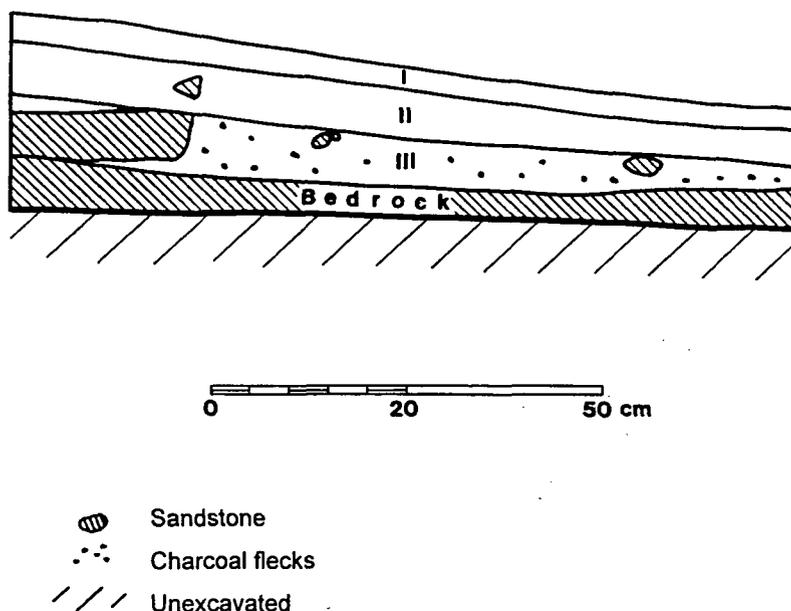


Figure 15.2. Site NM-Q-22-55, Study Unit 1, North Wall Profile.

## SUMMARY AND INTERPRETATION

Phase I Data Recovery testing of site NM-Q-23-55 resulted in the collection of two Cibola Gray Ware jar sherds from surface contexts. Hand excavation of one test unit revealed no evidence of features, occupation surfaces, or cultural levels. The two sherds collected from this small portion of the site within the right-of-way likely represent erosional movement of materials. Given the steep adjacent slopes, there are probably no intact stratigraphic deposits present at this site. The small ephemeral drainage may represent an eroded relic of an old dirt roadbed. The artifact assemblage observed at this site is probably the result of downslope erosion from original deposition farther up the slope.

## RECOMMENDATIONS

The portion of site NM-Q-23-55 within the right-of-way does not contain significant cultural elements. No further archaeological investigations are recommended.

## Chapter 16

### SITE NM-Q-23-56 (LA 110319)

Harding Polk II and Steve Lonjose

Site NM-Q-23-56 is a small ancestral Pueblo lithic and ceramic artifact scatter with subsurface features. The site is situated on a steep rocky slope and continues into the adjacent drainage. N11 likely bisects the site. The site is located in a deep narrow canyon at an elevation of 2164 m (7100 ft) and is bordered by sheer sandstone cliffs rising to more than 2316 m (7600 ft). This area is drained to the north by a tributary of Indian Creek. At the head of the canyon is a pass (Mariana Pass) traversed by N11 which enters an unnamed valley draining south to the Rio Puerco of the West approximately 4.7 km (2.9 mi) to the southwest. Vegetation at the site is dominated by a pinyon (*Pinus edulis*) and juniper (*Juniperus scopulorum*) woodland. Underbrush consists of big sagebrush (*Artemisia tridentata*), Apache plume (*Fallugia paradoxa*), broom snakeweed (*Gutierrezia sarothrae*), fringed sagebrush (*Artemisia frigida*), rabbitbrush (*Chrysothamnus* spp.), narrowleaf yucca (*Yucca* spp.), prickly pear cactus (*Opuntia* spp.), and various grasses and forbs.

### SURVEY DATA

The site was originally recorded by American Indian Cultural Consultants (AICC 1982) as N11-09. The site was then rerecorded by Zuni Cultural Resource Enterprise (ZCRE) in 1995 as part of the N11(2) road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping, in-field artifact analyses, and photography. The in-field analyses included assessment of lithic artifact reduction and material identification, ceramic identification, artifact counts, and gross surface distribution mapping of artifacts. ZCRE recorded the site as a lithic and ceramic artifact scatter of approximately 100 artifacts. Ceramics identified at the site included indented corrugated graywares, Gallup, Escavada, and Reserve black-on-white wares. Based on the ceramics the site was determined to represent a late Pueblo II period occupation (AD 1050 to 1150). Subsurface deposits were visible in the arroyo wall but no features or architecture were noted. Due to the location of the site on a 45° slope the site has likely suffered considerable downslope erosion. Secondly, extensive arroyo cutting at the base of the slope has potentially cut into the subsurface deposits and washed artifacts farther away from the site. Furthermore, construction of and subsequent maintenance activities of N11 have potentially obliterated portions of the site.

### NATURE AND EXTENT TESTING

From 14 to 26 May and 5 August 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent and content of site NM-Q-23-56. A redefinition of the site boundaries and a complete surface collection of all artifacts within the right-of-way were conducted. Subsurface investigations included hand excavation of four test units totaling 4 sq m. No backhoe trenches were excavated at this site. Site topography and arroyo cutting provided deep views of the site stratigraphy in several locations. The opportunity was taken to record profiles from four

locations at the site. Site boundaries were marginally expanded to the north and east. The testing program was limited to the proposed right-of-way; however, additional surface examination was conducted on the east side of the present N11 roadbed (Figure 16.1).

To aid in organization of the investigation of the site, the site is divided into a number of study units. Study units (SU) are arbitrary designations of space in which the investigator wants to direct special focus. They can encompass as much or as little area as deemed necessary by the investigator. That focus may be a feature, a single excavation unit, a group of excavation units, a backhoe trench, a surface collection area, or even the entire site. Consequently one study unit may be situated within another. At a minimum each excavation unit and backhoe trench has been designated with a study unit number.

### Surface Collection

Artifacts were collected from an area along approximately 100 m of the N11(2) right-of-way. A visual search of the site was conducted and each artifact pin-flagged. For surface collection a 10-by-10-m grid was superimposed over the site and all artifacts collected within each 100-sq-m surface collection unit were given one FS number. A total of 195 artifacts were collected from 33 surface collection units (SU 1 through 33). The surface artifact assemblage was dominated by ceramics (n=183) with a small quantity of flaked stone (n=10) and ground stone (n=2). The ceramics included plain, corrugated, banded, and polished graywares and Red Mesa, Escavada, and Gallup black-on-white wares. Also collected were Mancos erect rim corrugated, and slipped whiteware. Two pieces of unfired clay were also collected.

### Hand Excavation

Hand excavation of four test units (SU 34 to 37) encompassing 4 sq m was conducted in order to determine the nature and depth of cultural deposits on site NM-Q-23-56. All test units were excavated in arbitrary 10-cm levels and all soils were screened through 1/4-in hardware mesh. Soil samples were collected for pollen and flotation analysis. Soil descriptions were made using Munsell soil charts to identify soil color.

### Study Unit 34

SU 34 was a 1-by-1-m unit located at grid coordinates N89, E103. The unit was situated on a slight hillslope 5 m west of a northward-flowing deep drainage. The unit was placed in a light charcoal and ash scatter within a larger moderate-density artifact scatter. The placement of this unit in the artifact scatter and stain were based on the perceived potential for subsurface artifacts, features, and other cultural deposits.

SU 34 was excavated 81 cm in nine levels and five soil strata were revealed (Figure 16.2). Stratum I consisted of 2 to 13 cm of yellowish brown (10YR5/4) fine sand with roots and some sandstone gravel deposits (25%). One corrugated grayware jar sherd was recovered from the stratum. Stratum II consisted of up to 11 cm of yellowish brown (10YR5/6) sandy clay loam with roots and sandstone gravel deposits (50%). One flake was recovered from this stratum. Stratum III consisted of up to 18 cm of dark yellowish brown (10YR4/4), sandy loam with roots and sandstone

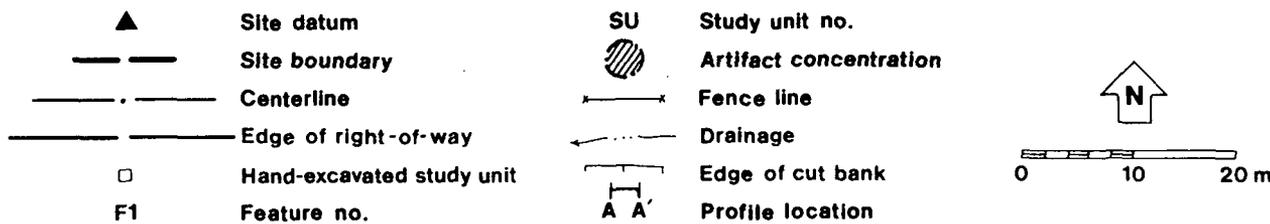
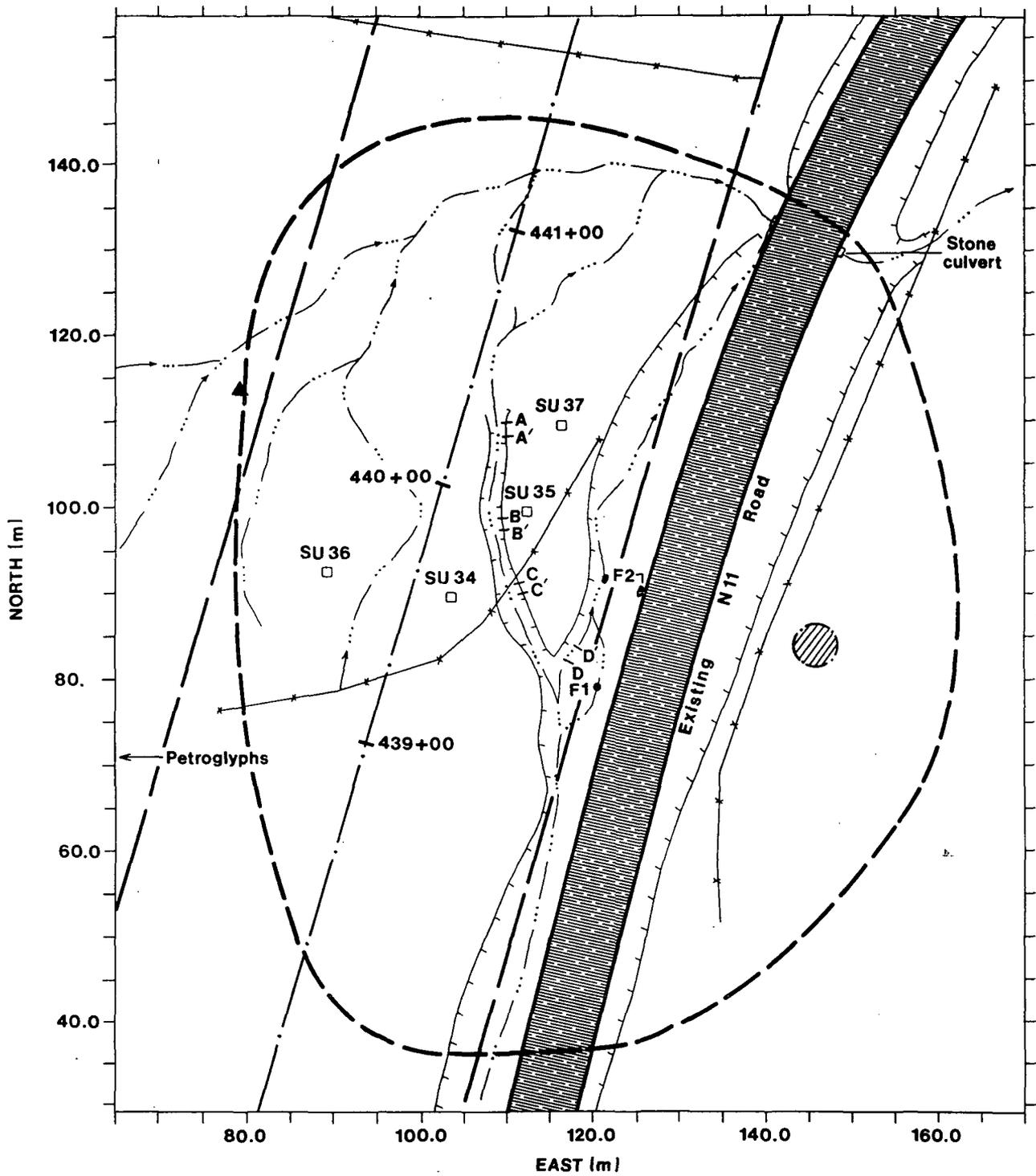


Figure 16.1. Site NM-Q-23-56, Nature and Extent Testing.

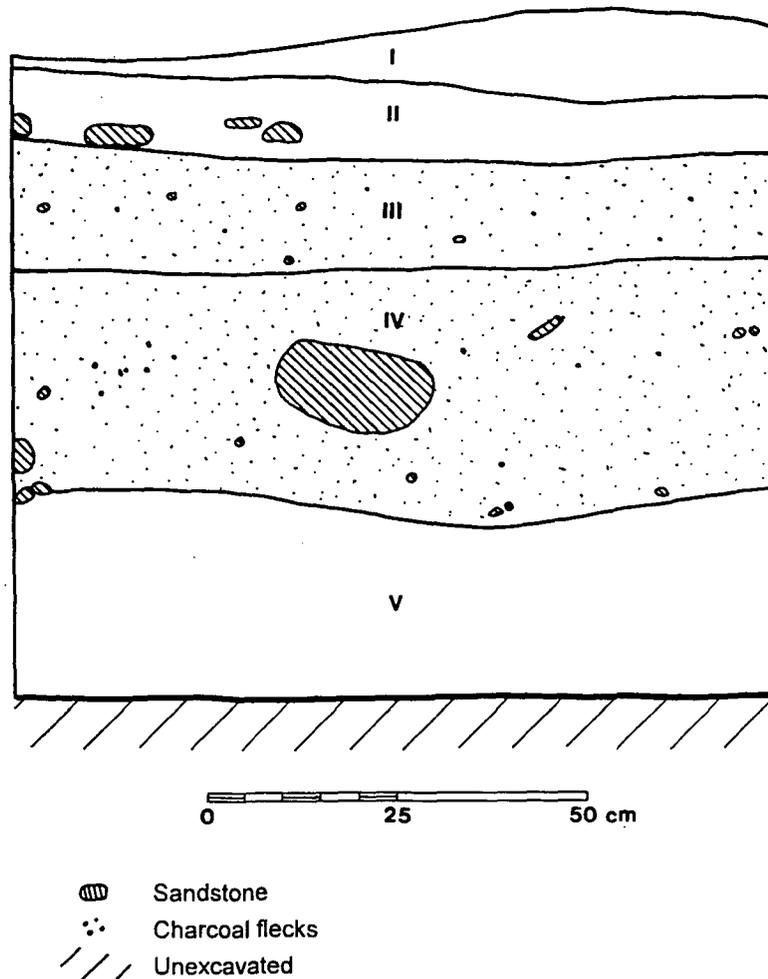


Figure 16.2. Site NM-Q-23-56, Study Unit 34, South Wall Profile.

gravel deposits (50%) along with slight traces of charcoal. This stratum yielded three grayware jar sherds and one flake. Stratum IV consisted of up to 36 cm of yellowish brown (10YR5/6), sandy loam with few roots, heavy sandstone gravel deposits (50%), and slight traces of charcoal. The artifacts consisted of 17 grayware and black-on-white ceramic sherds, less than 10 flakes, one piece of ground stone, and a small mammal bone. Stratum V consisted of up to 28 cm of brownish yellow (10YR6/6), sandy loam with a few roots, sandstone gravel deposits (50%), and slight traces of calcium carbonate (caliche). No artifacts were recovered from this stratum nor was there any evidence of any cultural deposits.

### Study Unit 35

SU 35 was a 1-by-1-m unit located at grid coordinates N99, E112. This unit was situated on a slope between two deep drainages. The unit was placed within a moderate-density artifact scatter with a potential for subsurface cultural deposits.

SU 35 was excavated 90 cm in nine levels and five soil strata were revealed (Figure 16.3). Stratum I consisted of 5 to 9 cm of dark yellowish brown (10YR4/4) sand with some roots and sandstone gravel deposits (25%). The artifacts recovered from this stratum consisted of grayware and black-on-white jar sherds and a piece of ground stone. Stratum II consisted of up to 14 cm of yellowish brown (10YR5/6) sand with some roots, heavy gravel deposits (75%), and some slight charcoal flecking. Corrugated grayware and black-on-white jar sherds were recovered from this stratum. Stratum III consisted of up to 12 cm of yellowish brown (10YR5/4) sandy loam with some roots, gravel deposits (40%), and some slight charcoal flecking. Slipped whiteware and Red Mesa bowl sherds were recovered from this stratum as well as a piece of ground stone. Stratum IV consisted of up to 15 cm of yellowish brown (10YR 5/4) sandy loam and some roots with heavy gravel deposits (over 75%). Plain and corrugated grayware jar sherds were recovered from this stratum. Stratum V consisted of up to 62 cm of light olive brown (2YR5/4) sandy loam with tree root disturbance, heavy sandstone gravel deposits (over 75%), and slight traces of calcium carbonate (caliche). Stratum VI is a pocket of yellowish brown (10YR5/4) sandy clay loam was also noted mid-level in the Stratum V matrix. Stratum VII was a gray clay lens was noted further down in Stratum V. No cultural materials were recovered from this stratum. No features nor cultural deposits were defined within the entire study unit.

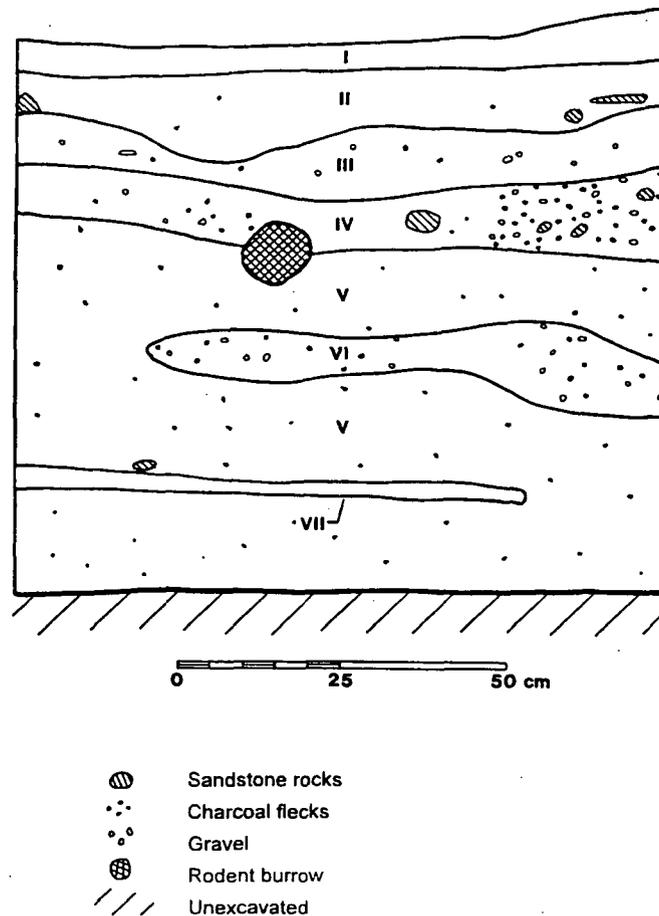


Figure 16.3. Site NM-Q-23-56, Study Unit 35, West Wall Profile.

Study Unit 36

SU 36 was a 1-by-1-m unit located at grid coordinates N92, E89. This unit was situated on a hillslope between two drainages. The unit was placed within a low-density artifact scatter to determine whether any subsurface cultural deposits were present.

SU 36 was excavated 75 cm in seven levels and two soil strata were revealed (Figure 16.4). Stratum I consisted of 47 to 60 cm of light olive brown (2.5YR5/4), sandy clay loam with a few roots and heavy sandstone gravel deposits (50%). No artifacts or cultural materials were present in this stratum. Stratum II consisted of up to 16 cm of yellowish brown (10YR5/4), sandy clay loam with very few roots and some sandstone gravel deposits (less than 10%). No artifacts or cultural materials were present in this stratum.

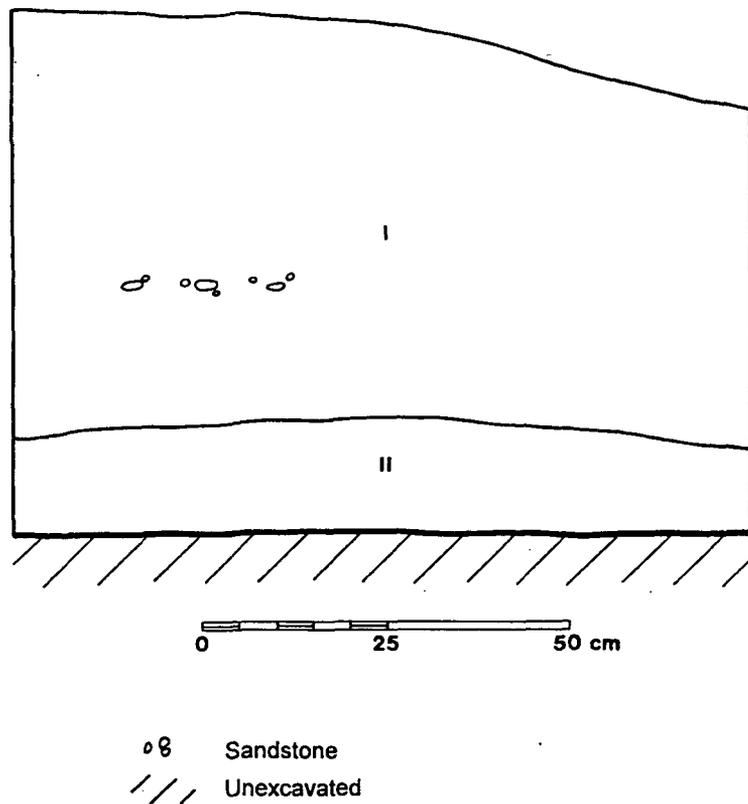


Figure 16.4. Site NM-Q-23-56, Study Unit 36, West Wall Profile.

Study Unit 37

SU 37 was a 1-by-1-m unit located at grid coordinates N109, E116. This unit was situated at the base of a slope between two deep drainages. The unit was placed in a light-density artifact scatter to determine whether any subsurface cultural deposits were present.

SU 37 was excavated 91 cm in nine levels and four soil strata were revealed.(Figure 16.5). Stratum I consisted of 3 to 6 cm of yellowish brown (10YR5/4) sandy loam with very few roots and sandstone gravel (25%). No artifacts or other cultural deposits were present in this stratum. Stratum II consisted of up to 60 cm of brown (10YR5/3) to olive brown (2.5Y4/4), fine sandy loam with very few roots and sandstone gravel (less than 10%). Distributed throughout Stratum II were lenses of dark grayish brown (10YR4/2), clay. No artifacts or other cultural deposits were present in this stratum. Stratum III consisted of up to 19 cm of yellowish brown (10YR5/4) sandy loam with very few roots and some sandstone gravel (less than 10%). No artifacts or cultural deposits were present in this stratum. Stratum IV consisted of up to 16 cm of light olive brown (2.5YR5/4) fine sandy loam with very few roots and gravel (less than 10%). There were no artifacts or cultural deposits in this stratum.

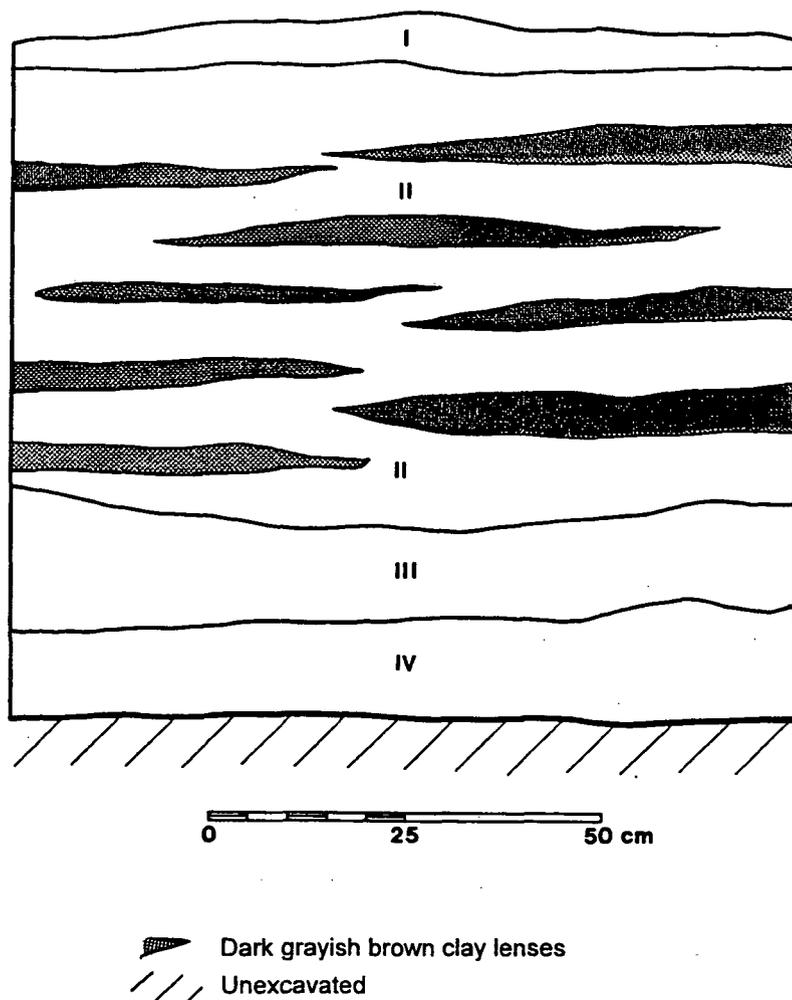


Figure 16.5. Site NM-Q-23-56, Study Unit 37, South Wall Profile.

## Profiles

Backhoe trenches were not excavated at site NM-Q-23-56 because of the steep and rocky terrain. However, a deep arroyo cut through the center of the site (designated Main Drainage 1) and provided an extensive view of the stratigraphic layering of this area. Three profiles (Profiles A-A', B-B', and C-C') were recorded from the east wall of the northward-flowing arroyo to document the stratigraphy of this portion of the site. A fourth profile (D-D') was drawn of the east side of a branch drainage flowing toward the stone culvert.

### Profile A-A'

Profile A-A' was 1 m long and located at grid coordinates N110, E109.3. The depth of the drainage was approximately 1.17 m and four soil strata were recorded (Figure 16.6). Stratum I consisted of 3 to 8 cm of yellowish brown (10YR5/4) sandy loam with some roots. No artifacts or other cultural deposits were noted in this stratum. Stratum II consisted of up to 55 cm of yellowish

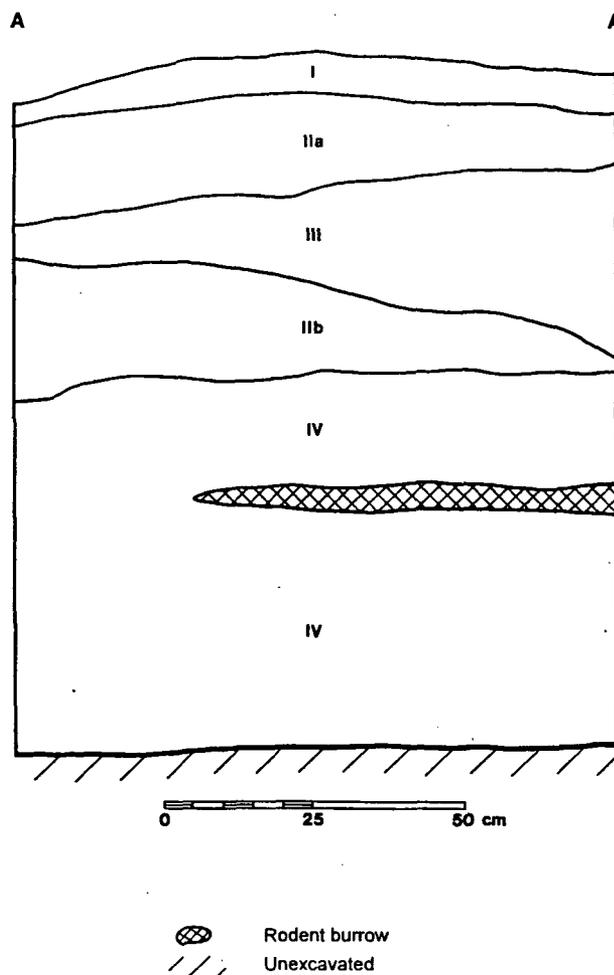


Figure 16.6. Site NM-Q-23-56, Profile A-A' of East Wall of Arroyo in Main Drainage.

brown (10YR5/4), sandy loam with very few roots and some gravel (less than 10%). Stratum II was divided into IIa and IIb because it was interbedded with Stratum III. No artifacts or cultural deposits were noted within this stratum. Stratum III consisted of 6 to 30 cm of brown (10YR5/3), fine sandy loam with very few roots and no gravel. No artifacts or cultural deposits were noted within this stratum. Stratum IV consisted of up to 63 cm of light olive brown (2.5Y5/4) fine sandy loam with very few roots. Deposits of calcium carbonate (caliche) were present throughout the stratum (50%). Some rodent disturbance was also noted in this stratum.

Profile B-B'

Profile B-B' was 1 m long and located at grid coordinates N98.5, E110.7. The drainage was approximately 80 cm deep and four soil strata were recorded (Figure 16.7). Stratum I consisted of 4 cm of yellowish brown (10YR5/4) sandy loam with some roots and gravel (25%). Stratum II consisted of 45 to 63 cm of brown (10YR5/3) sandy loam with roots and a higher gravel content (50%). Stratum III consisted of 10 to 18 cm of light olive brown (2.5Y5/3) sandy loam with very few roots and some gravel (10%). Stratum IV consisted of 7 to 11 cm of light olive brown (2.5Y5/4) sandy loam with very few roots and no gravel. The entire drainage profile did not reveal any artifacts or cultural deposits.

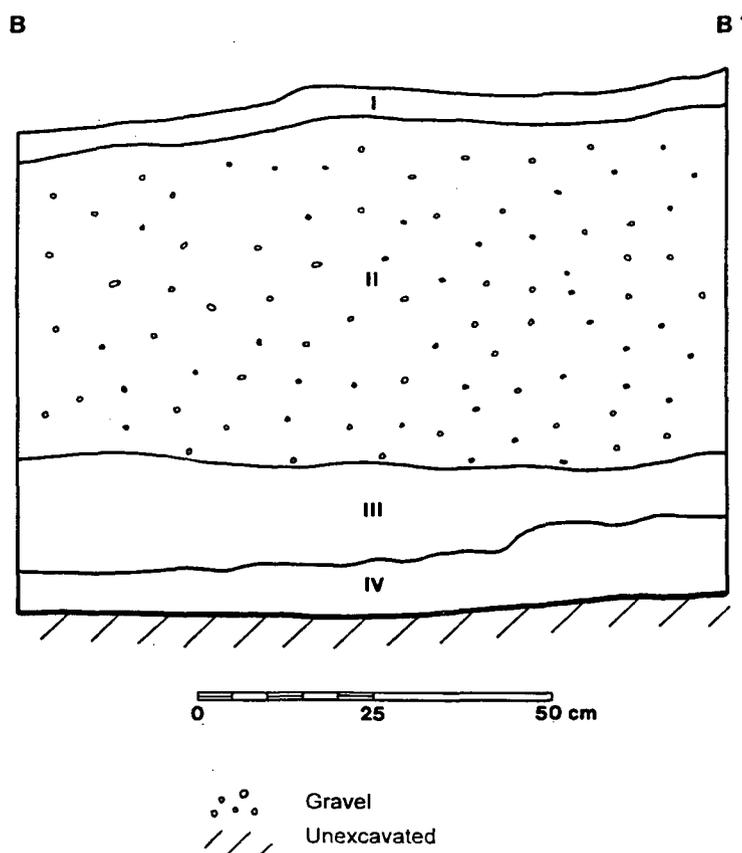


Figure 16.7. Site NM-Q-23-56, Profile B-B' of East Wall of Arroyo in Main Drainage.

Profile C-C'

Profile C-C' was 1 m long and located at grid coordinates N90,E113.1 at the south end of the drainage. The drainage was approximately 1.2 m deep and three soil strata were recorded (Figure 16.8). Stratum I consisted of 4 to 5 cm of yellowish brown (10YR5/4) sandy loam with dense gravel (50%) and some roots. Stratum II consisted of 60 to 70 cm of brown (10YR5/3), sandy loam with roots and a high gravel content (75%) throughout. Stratum III consisted of 47 to 61 cm of light olive brown (2.5Y5/4), sandy loam with a high gravel content (over 75%) and very few roots. The entire drainage profile did not reveal any artifacts or cultural deposits.

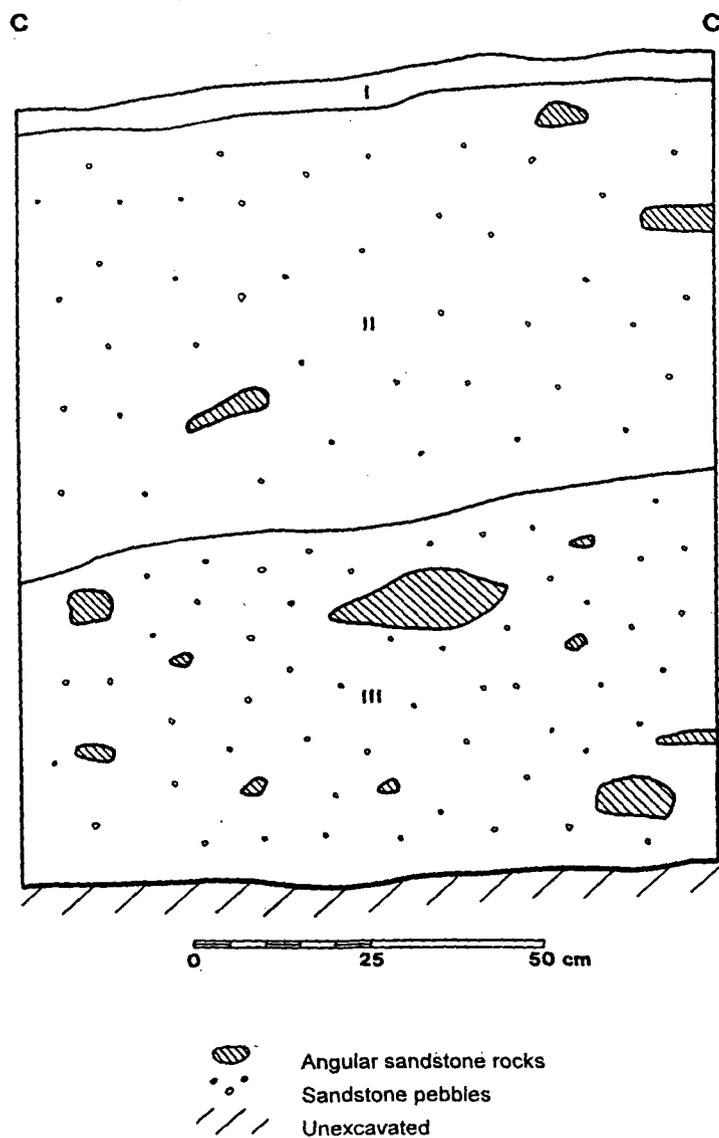


Figure 16.8. Site NM-Q-23-56, Profile C-C' of East Wall of Arroyo in Main Drainage.

### Profile D-D'

Profile D-D' was a 1 m long profile. The profile was located at grid coordinates N82.82, E117.67 and was located 2.7 m inside the eastern right-of-way boundary near the existing N11 road cut. Maximum depth was 108 cm, and three strata were identified in the profile (Figure 16.9). Stratum I consisted of 5 to 22 cm of dark yellowish brown (10YR4/4) sandy loam with very few root disturbances. No cultural material was present in Stratum I. A clear wavy boundary separated Strata I and II. Stratum II consisted of 10 to 22 cm of a yellowish brown (10YR5/4) sandy loam with caliche, a 10% inclusion of coal fragments, and very few root disturbances. No cultural material was present in Stratum II. Stratum II was cut off by Stratum I. A diffuse irregular boundary separated Strata II and III. Stratum III consisted of at least 82 cm of a hard compact very pale yellow (10YR7/4) sandy loam, with a 50% inclusion of caliche and a 10% inclusion of natural sandstone gravels. No cultural material or features were present in the profile.

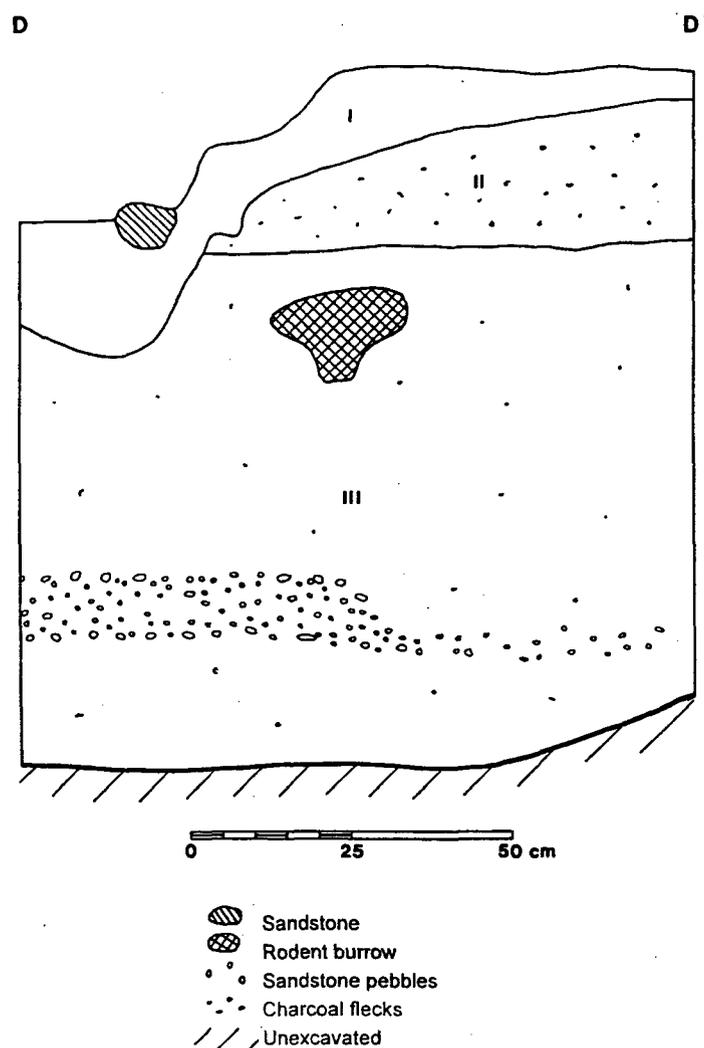


Figure 16.9. Site NM-Q-23-56, Profile D-D' of East Wall of Arroyo in Branch Drainage.

## Features

### Feature 1

The center of Feature 1 was located at N78.97, E121.61. The feature consisted of an ashy charcoal-flecked earthen pit. The feature was discovered in the east wall of the west drainage ditch for the existing N11 after severe flooding from heavy summer rains. The lens was approximately 10 cm thick and approximately 1 m long. A single chert flake was noted in the matrix. The function of Feature 1 could not be determined without further investigation. The feature lay approximately 2 m outside the right-of-way.

### Feature 2

The center of Feature 2 was located at N91.28, E126.18. The feature was exposed along the west side of the existing N11 roadbed by machine grading to maintain the roadbed. The feature was an indeterminate thermal feature measuring approximately 36 by 110 cm with the long axis oriented north-to-south (Figure 16.10). The depth of the feature is unknown. The feature matrix consisted of ashy, charcoal-flecked, fire-reddened earth. One plain grayware sherd was noted in the matrix but was not collected. The feature lay 3.5 m outside the eastern right-of-way boundary.

## SUMMARY AND INTERPRETATION

Phase I Data Recovery testing of site NM-Q-23-56 resulted in the collection of 244 artifacts of which 221 were ceramics, 16 were flaked stone, 16 were ground stone, and 1 was a faunal specimen. A total of 195 artifacts were collected from surface contexts, and 59 artifacts were collected from subsurface contexts in two units. Grayware ceramics comprised 65% of the ceramics and included plain, polished, corrugated, and banded graywares (Chapter 25). Two sherds of Mancos erect corrugated rim were also collected. The whiteware ceramics comprise 24% of the ceramics and include Red Mesa, Gallup, and Escavada black-on-white as well as three sherds of slipped whiteware. Two sherds of a black-on-red ware were also collected. The flaked stone consisted of five cores, eight flakes, and three hammerstones. A variety of materials were present including chert, petrified wood, and quartzite. More than one-third of the flaked stone consisted of quartzite. One biscuit mano was among the ground stone artifacts. No evidence of features, occupation surfaces, or cultural levels was seen in any of the units or arroyo cut banks. Most of the surface material appeared to be washing down the steep slope comprising the southern portion of the site.

Two thermal features were discovered as a result of heavy summer rains cutting deep into a drainage ditch and maintenance grading. The two features were located along the west side of the N11 roadbed just outside the east edge of the right-of-way. Feature 2 had been truncated by maintenance grading of N11 and both features were in danger of continued erosion. Both features likely retain potentially significant data.

During the course of this investigation a small artifact concentration was noted on the east side of the existing N11 roadbed. The majority of artifacts were ceramic sherds. The dominant

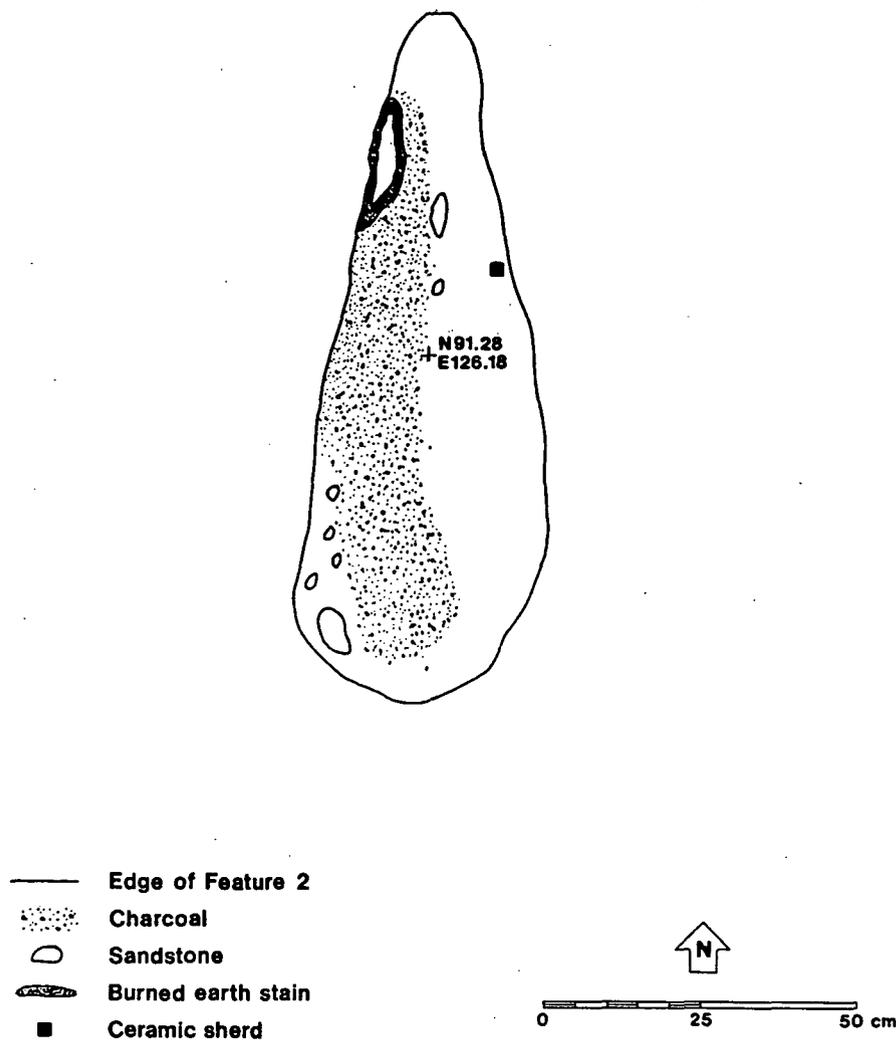


Figure 16.10. Site NM-Q-23-56, Plan View of Feature 2 on Shoulder of N11.

ceramic type was Gallup Black-on-white, contemporaneous with the material on the west side of the road. In light of the two features located on the west side of N11, it may be safe to assume that other elements of the site may have been located in the road between these two elements. Unfortunately the original construction and periodic maintenance have likely destroyed, or at least severely truncated, those portions of the site that were located in the roadbed.

Additional reconnoitering around this site during testing revealed the presence of several petroglyphs. The petroglyphs were located southwest of the main portion of the site and outside the right-of-way. The petroglyphs were on two large boulders at the top of a very steep slope. The petroglyphs appeared to contain ancestral Pueblo and Navajo elements.

A historic feature was also discovered as a result of the heavy rain-induced erosion. This feature consisted of a sandstone culvert running under the existing N11 roadbed. Its western end was located at approximately N133, E141 at the northern extreme of this site. Although only a cursory examination was conducted, it appeared very similar in construction to the culvert at site NM-Q-22-51 (Chapter 11). That feature was determined to date probably to the 1930s and possibly was constructed as a CCC project. From the similarity of construction, the two are likely contemporaneous.

Site NM-Q-23-56 represents an ancestral Pueblo habitation site dating to the late Pueblo II period. From the quantity of artifacts, a fairly substantial occupation possibly over considerable time is suggested. The presence of numerous sherds, ground stone, and flaked stone is believed to indicate that a variety of activities occurred here, including, but not limited to, food resource procurement and processing and lithic reduction. The broad distribution of artifacts is reflective of the high-energy erosional environment of the site, although the investigation also suggests that the original occupation may have covered a fairly substantial area, particularly on the more level northern portion of the site. Although no architecture was identified, it may have been present at one time, but since destroyed by road construction, maintenance, or erosion. The site area also contains small Navajo and historic elements (petroglyphs and a sandstone culvert) outside the right-of-way.

#### RECOMMENDATIONS

Site NM-Q-23-56 was tested and determined to contain limited significant cultural remains. The testing program at this site was directed toward the site as it was known from surface contexts identified during the survey portion of the N11(2) investigations. That portion of the site was determined to contain no intact cultural occupation surfaces or features and the data potential has been exhausted. Features 1 and 2, which were discovered by chance after all other testing was completed, were determined to still contain intact cultural deposits and likely contain significant data potential. Furthermore, the presence of these two features reflects the possibility of other subsurface cultural deposits in this portion of the site. Therefore, it is recommended that data recovery investigations be conducted at site NM-Q-23-56 but limited to the portion of the site where Features 1 and 2 are located and nearby surrounding terrain. The historic culvert and the ancestral Puebloan and Navajo petroglyphs lie outside the proposed right-of-way and no further investigations are recommended for them.

## Chapter 17

### SITE NM-Q-23-57 (LA 110320)

#### Harding Polk II and Ardale R. Delena

Site NM-Q-23-57 is an extensive historic Navajo site situated on a rocky bench and adjacent drainage at an elevation of 2152 m (7060 ft). The site is located in a deep narrow canyon bordered by sheer sandstone cliffs rising to more than 2316 m (7600 ft). N11 winds steeply up the south end of the canyon to a pass bridging the San Juan basin to the drainage of the Rio Puerco of the West. Vegetation at the site is dominated by a pinyon (*Pinus edulus*) and juniper (*Juniperus scopulorum*) forest. Underbrush consists of big sagebrush (*Artemisia tridentata*), Apache plume (*Fallugia Paradoxa*), broom snakeweed (*Futierreia saothrae*), fringed sagebrush (*Artemisia frigida*), rabbitbrush (*Chrysothamnus* spp.), narrow leaf yucca (*Yucca* spp.), prickly pear cactus (*Opuntia* spp.), and various grasses and forbs including blue grama grass (*Bouteloua gracilis*), slender wheatgrass (*Agropyron trachycaulum*), Indian rice grass (*Oryzopsis hymenoides*), Wright's birdbeak (*Cordylanthus wrightii*), tansy mustard (*Descurainia* spp.), Mormon tea (*Ephedra trifurca*), desert four o'clock (*Mirabilis multiflora*), yellow bee plant (*Cleome lutea*), and purple aster (*Aster* spp.).

#### SURVEY DATA

The site was originally recorded by AICC (1982) as two sites, N11-11 and N11-12. They were then rerecorded as a single site (NM-Q-23-57) by Zuni Cultural Resource Enterprise (ZCRE) in 1995 as part of the N11 road survey (Zimmerman and Abbott 1996). ZCRE recording activities included Brunton compass mapping, in-field artifact analyses, and photography. The in-field analyses included identification of historic ceramics, cans, and other metal items; artifact counts; and surface distribution mapping of artifacts. The site was identified as a historic Navajo compound with nine features and a low-density artifact scatter. The features included a stone hogan, a stone rectangular structure, an ash/trash midden deposit, an unidentified stone circle, a small stone corral or structure, a historic metal and ceramic trash deposit, a stone corral, a slab-lined hearth and a historic trash dump. From in-field analyses of artifacts, an occupation prior to 1880, was suggested. Ethnographic interviews, in contrast, indicated the complex was occupied approximately from 1910 to 1945. A single sherd of prehistoric whiteware ceramic indicates a transient presence of Pueblo II ancestral Pueblo peoples.

#### NATURE AND EXTENT TESTING

From 22 July to 13 August 1997 personnel from ZCRE conducted Phase I Data Recovery testing to determine the extent and content of site NM-Q-23-57. A redefinition of the site boundaries and a complete surface collection of all artifacts within the right-of-way were conducted. Subsurface investigations included hand excavation of seven test units totaling 17 sq m. No backhoe trenches were excavated at this site. Site boundaries were marginally expanded to the west and south at the southern end of the site. The testing program was limited to the proposed right-of-way; however, architectural elements outside the right-of-way were recorded in more detail (Figure 17.1a and b).

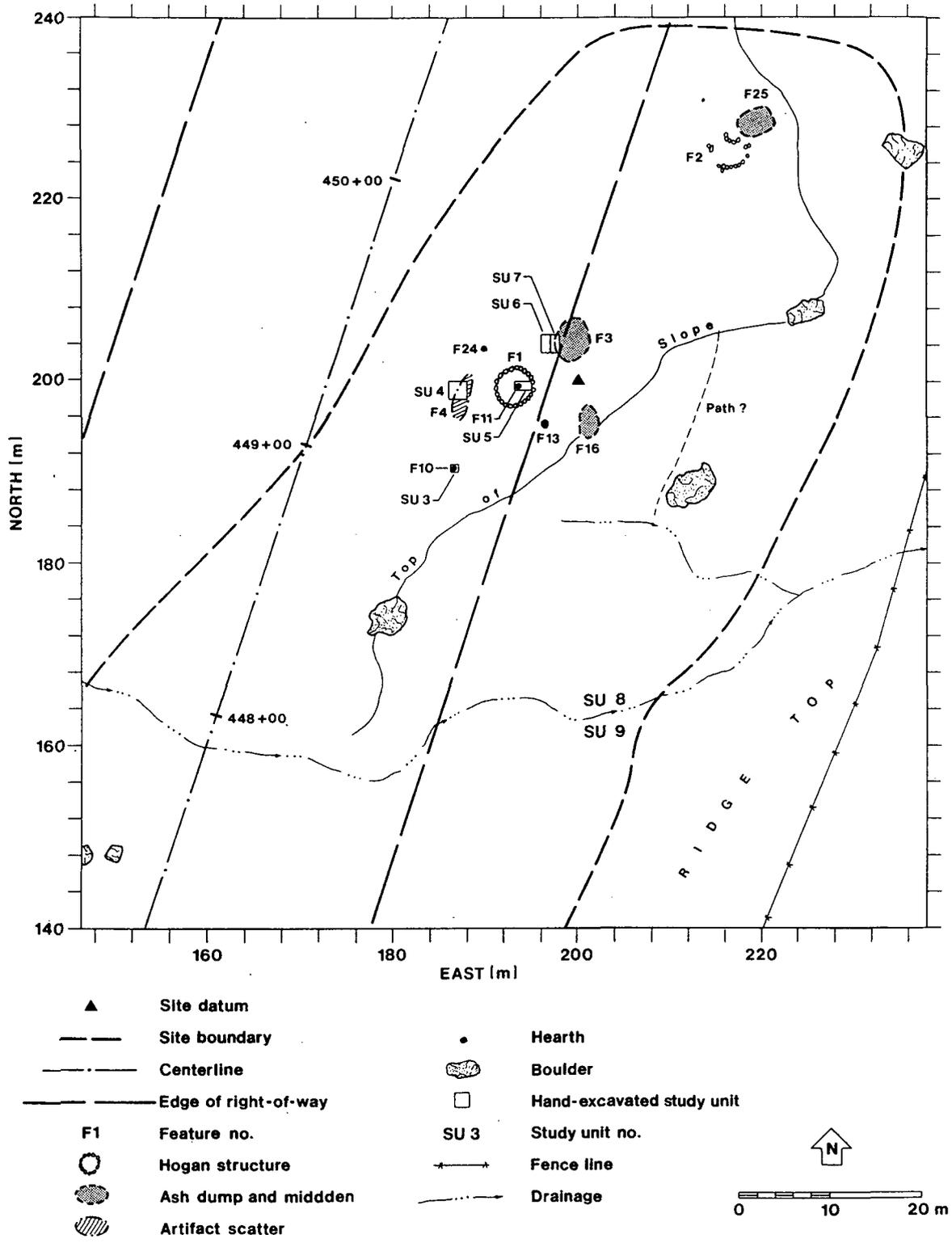


Figure 17.1a. Site NM-Q-23-57, Nature and Extent Testing, Northern Portion.

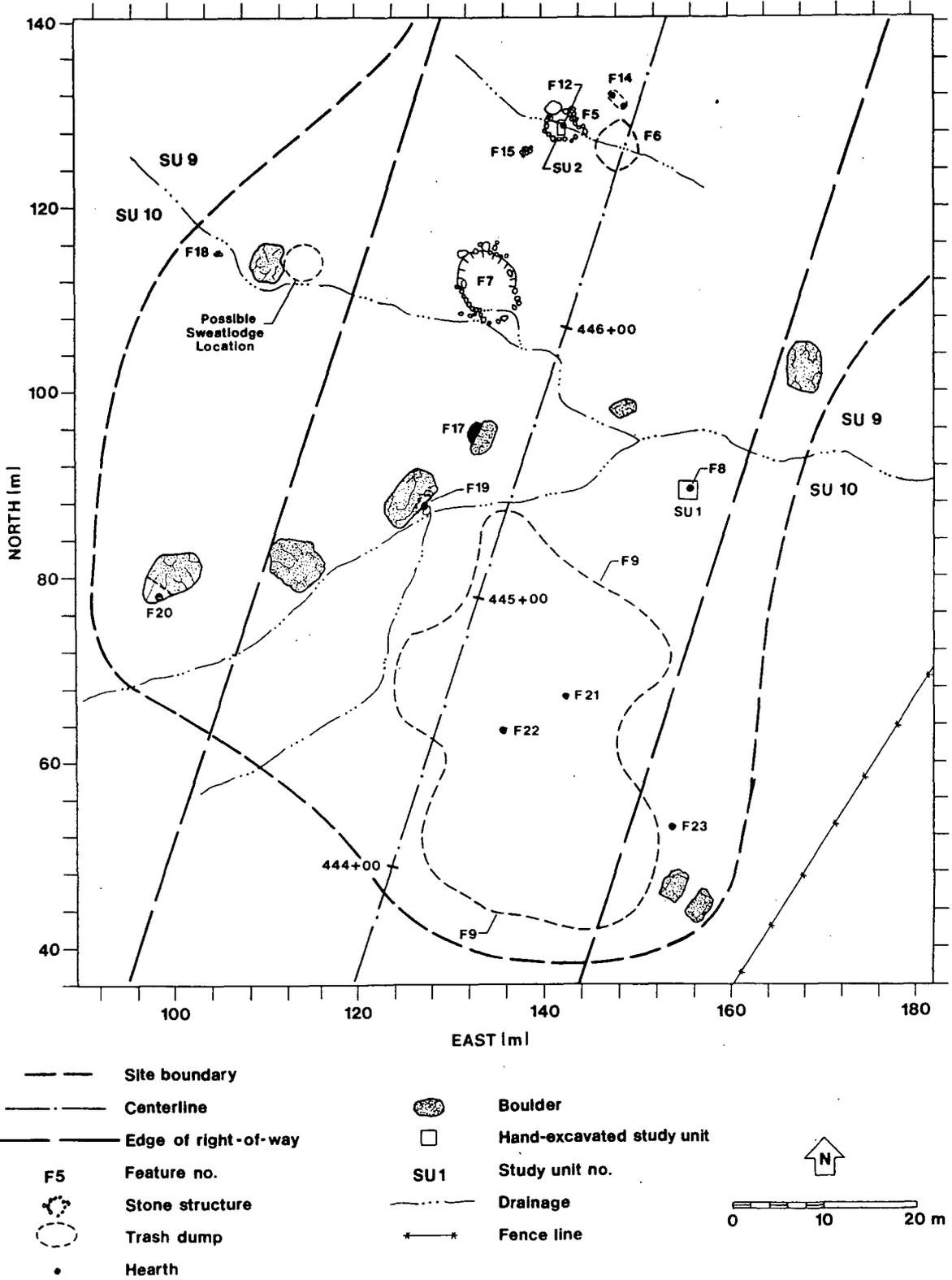


Figure 17.1b. Site NM-Q-23-57, Nature and Extent Testing, Southern Portion.

## Surface Collection

Artifacts were collected from an area along approximately 200 m of the proposed road right-of-way. The site was divided into three areas roughly corresponding to activity or occupation areas. The three areas were separated by drainages and each was assigned a study unit number (8 to 10 from north to south) to help compartmentalize the surface collected artifacts to specific areas. Since the artifact density within the right-of-way appeared relatively low, it was decided to point-plot each artifact. A visual search of the site was conducted and each artifact pin-flagged. The location of each artifact was then shot in by transit and those within the right-of-way were collected and recorded on Field Specimen (FS) catalog sheets. Usually each collected artifact was assigned a single FS number; however, in some instances several artifacts were collected together when they clustered within 1 m of each other. Twenty point locations yielded at least one artifact. An exception to point-plotting was conducted at the southern end of the site in SU 10, the area of Feature 9 where numerous artifacts were noted on the surface over a broad area. To expedite surface collection in the Feature 9 area, a 5-by-5-m grid was laid out, and all artifacts collected within each 25 sq m grid unit were given one FS number. Artifacts were collected from 35 25-sq-m collection units within SU 10.

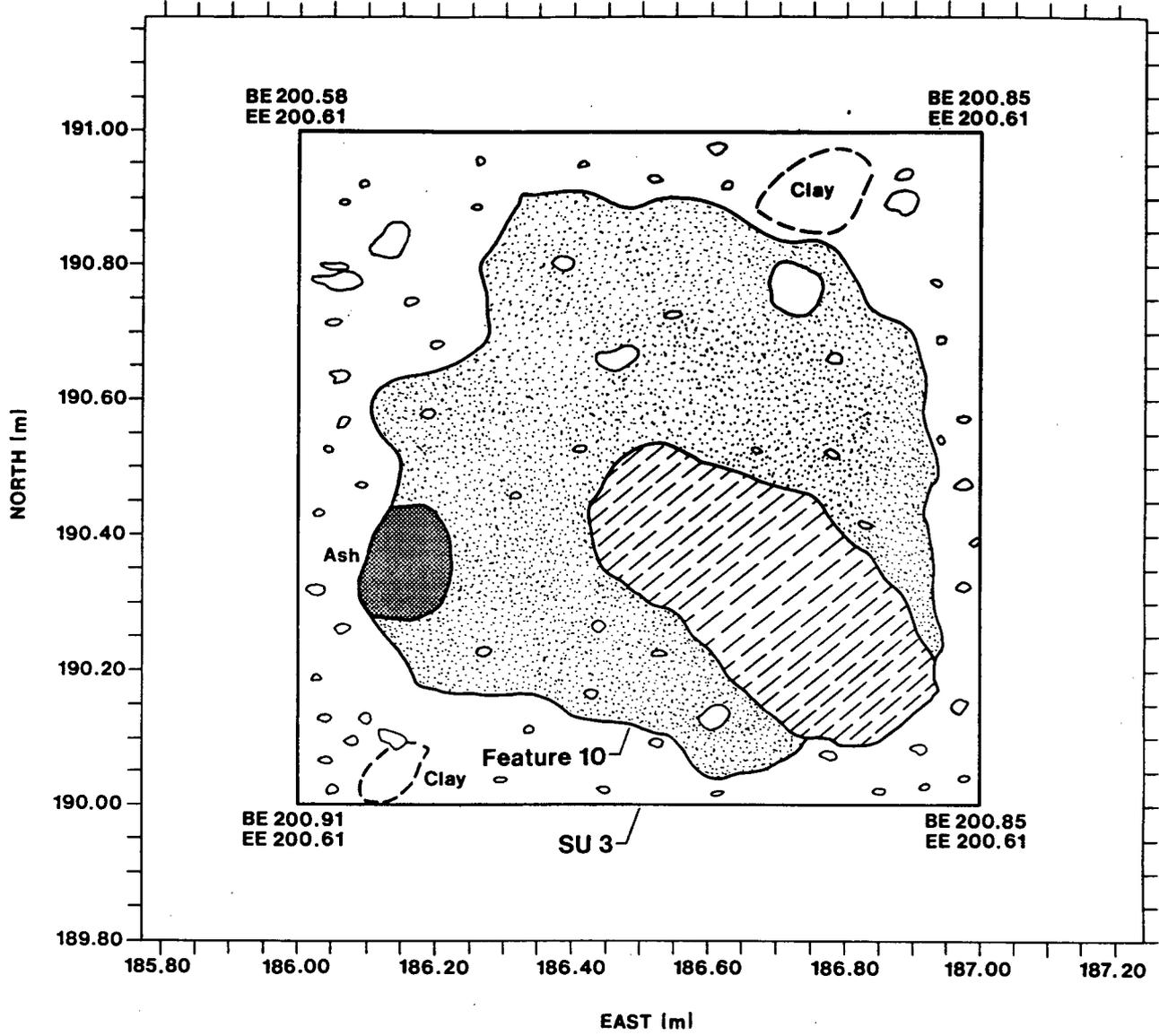
While the vast majority of surface artifacts were historic in nature, a small quantity of prehistoric materials were also noted or collected including 12 ceramics, 3 flaked stone, and 2 pieces of ground stone. It should be noted, however, that not all of these items represent prehistoric utilization. Specifically, the ground stone was located in close proximity to the stone hogan (Feature 1) and was probably used historically by the inhabitants of the hogan. The prehistoric ceramic sherds do not appear modified or worn, thus indicating no secondary use by either the historic or prehistoric people. The sherds probably represent an ephemeral presence of ancestral Puebloan peoples. Isolated prehistoric sherds at this site are not surprising considering the close proximity of an ancestral Puebloan site (NM-Q-23-56) located less than 200 m to the south (Chapter 16).

## Hand Excavation

Hand excavation of seven test units encompassing 17 sq m (SU 1 to 7) was conducted in order to determine the nature and depth of cultural deposits on site NM-Q-23-57. The total of 17 sq m was derived from one 1-by-1-m unit, four 1-by-2-m units, and two 2-by-2-m units (Table 17.1). The location of the surface artifacts and the location of features guided the placement of test units. Initially excavation in all test units began in arbitrary 10-cm levels, but in some cases was changed to stratigraphic levels when cultural deposits were clearly defined. All soils were screened through 1/4-in hardware mesh. A Munsell soil chart was used to identify soil color within each level.

### Study Unit 1

SU 1 was a 2-by-2-m unit located at grid coordinates N87.85, E154.60. The unit was placed over Feature 8 (a slab-lined hearth described below). The main channel of a drainage ran past the northern edge of the study unit but a smaller channel ran along the northern edge of the feature. The unit was placed here to better define Feature 8, to recover any associated artifacts, and to determine the adverse impacts of the drainage on Feature 8.



- Edge of study unit
- SU 3 Study unit no.
- Burned soil
- Sandstone rock
- ▨ Bedrock
- BE Beginning elevation
- EE Ending elevation



Figure 17.4. Site NM-Q-23-57, Study Unit 3, Plan View Showing Feature 10.

a thermal feature (Feature 11) in the western half of the study unit located in the center of the hogan (Figure 17.5). Artifacts collected from this stratum include clear bottle glass fragments and burned bone (probably sheep) which lay immediately atop the hearth fill. The glass fragments likely mend to form a small medicine bottle. Excavation of the unit was initially reduced to the western 1-by-1-m to concentrate on Feature 11 but then was soon reduced to a 0.5-by-1-m unit (southern half) to bisect the hearth to determine the depth of deposits and to provide a cross-sectional profile (Figure 17.6). Stratum II consisted of up to 8 cm of dark yellowish brown (10YR4/6) loam with some root disturbance throughout. Stratum II comprised the feature fill. No artifacts were collected from this stratum. Soil samples were recovered from the bisected hearth. Stratum III consisted of a red (2.5YR4/6) burned loam with burned sandstone rocks and bedrock. Stratum III comprised the burned earth layer beneath the hearth. No artifacts were recovered.

### Study Unit 6

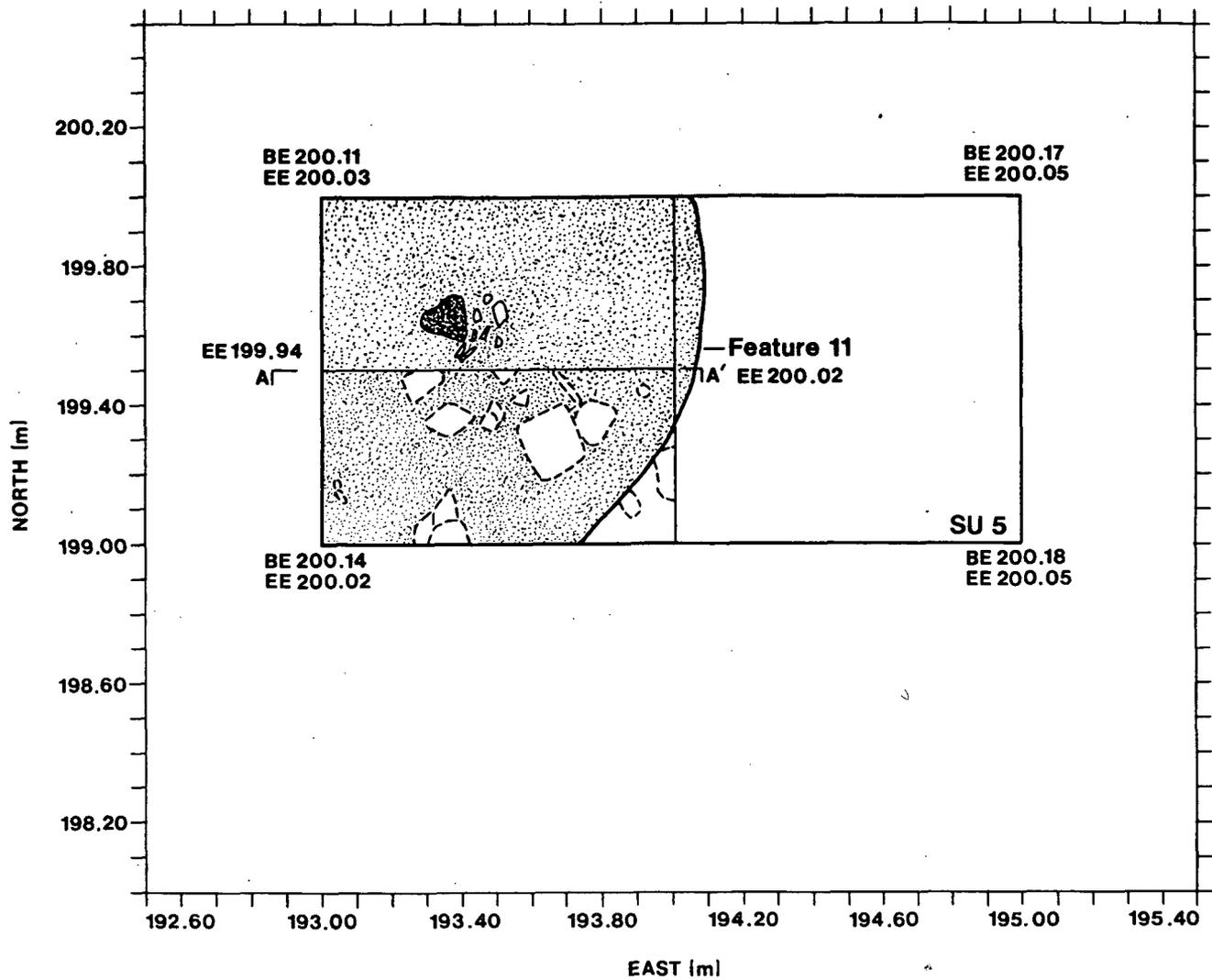
SU 6 was a 1-by-2-m unit oriented north-to-south and located at grid coordinates N203, E196. The unit was placed along the west edge of Feature 3, an area of darker soil and charcoal. Feature 3 was a probable ash/trash dump. Excavation was done to better determine the extent, depth, and nature of deposits, and to collect a sample of artifacts from the matrix. The unit was approximately 4 m northeast of Feature 1.

SU 6 was excavated 20 cm in two levels and two soil strata were revealed. Stratum I consisted of 12 to 16 cm of pale brown (10YR6/3) fine sand with some charcoal flecking, gravel deposits, and root disturbance. Artifacts recovered from Stratum I included one burned bone. Stratum II consisted of 4 to 8 cm of light yellowish brown (10YR6/4) fine sand with charcoal flecking and some clay and gravel deposits down to bedrock. Some light root disturbance was noted. No artifacts were recovered from Stratum II. From the shallowness of this feature along with recovery of all artifacts from Stratum I, the feature appeared surficial in nature. From the close proximity of Feature 3 to Feature 1, Feature 3 was probably the ash dump for the hogan and thus they were contemporaneous.

### Study Unit 7

SU 7 was a 1-by-2-m unit oriented north-to-south and located at grid coordinates N203, E197. The unit was placed adjacent to and east of SU 6 in the southwest part of Feature 3, an area of dark ashy soil, charcoal flecks and chunks, and historic trash. Excavation was conducted to further define the extent of Feature 3 and to define the depth of the subsurface cultural deposits.

SU 7 was excavated 20 cm in two levels and one soil stratum was revealed. Stratum I consisted of 20 cm of brown (10YR5/3) fine sand with charcoal and gravel deposits with some root disturbance. Artifacts collected from this stratum included several pieces of clear glass (two of which are conjoinable fragments from the same bottle) and an unidentified piece of metal. This unit was excavated to sterile soil and sandstone bedrock. The cultural deposits of this unit as well as the rest of Feature 3 appear to be no more than 3 to 5 cm in depth. As noted with SU 6, Feature 3 appeared to be the ash dump for Feature 1 and was surficial in nature.



- Edge of study unit
- SU 5 Study unit no.
- [Stippled Box] Hearth fill
- [Dark Spot] Burned sandstone [Level 2]
- [Irregular Shape] Bottle fragments [Level 2]
- [Circle] Sandstone rocks [Level 3]
- BE Beginning elevation
- EE Ending elevation
- A-A' Profile [See Figure 17.6]

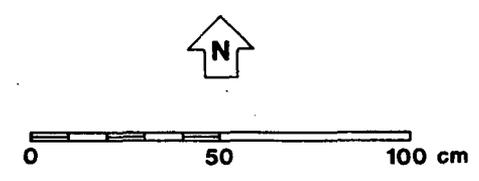


Figure 17.5. Site NM-Q-23-57, Study Unit 5, Plan View Showing Feature 11.

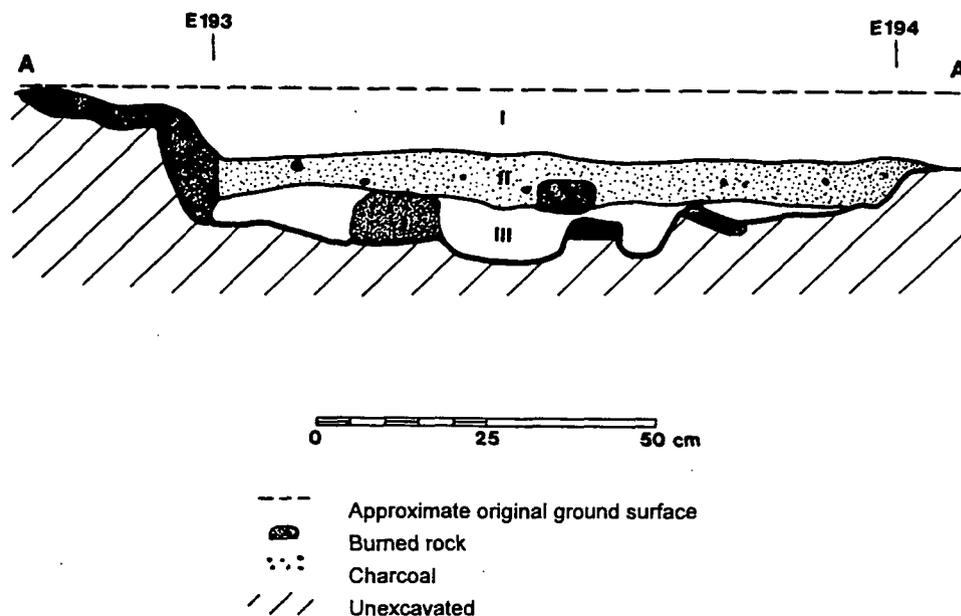


Figure 17.6. Site NM-Q-23-57, Study Unit 5, South-facing Profile Showing Feature 11.

### Features

#### Feature 1

Feature 1 was a circular stone hogan located on a bench above the present N11 roadbed (Figure 17.7). The grid coordinates at the center of the hogan were N199.5, E193.2. It was located immediately inside the eastern boundary of the right-of-way. Features 10 and 24 (exterior hearths), Features 3, 13, and 16 (ash dumps), and Feature 4 (a small low-density artifact scatter) were all located within 9 m of the hogan and were likely associated with it. The hogan measured approximately 4.5 m in diameter and was constructed of blocky sandstone cobbles and boulders. It appeared that there was little or no modification of the cobbles for construction. The stonework was not coursed. The walls were intact to a height of 1 m or less with the western part of the hogan more collapsed. Although no evidence survived, mud mortar was probably utilized to bond the stonework and fill the interstices between the sandstone cobbles. Small angular sandstone chunks may have also been utilized to chink the larger gaps between the cobbles and boulders. Mud plaster may have been used to finish the interior walls. Juniper branches noted inside the hogan likely represent portions of the collapsed roof. The branches were probably stacked in a corbel fashion to form the roof. Ash, charcoal, and small cobbles of burned sandstone were noted in the center of the feature. A small quantity of artifacts including two tin cans, baling wire, and amethyst-colored glass were recovered from inside the hogan. The glass included a cork-stoppered-type medicine bottle neck. A 1-by-2-m unit (SU 5) was excavated in the central and eastern portions of the hogan. Excavation revealed a central hearth (Feature 11). Burned bone and most of a small clear glass

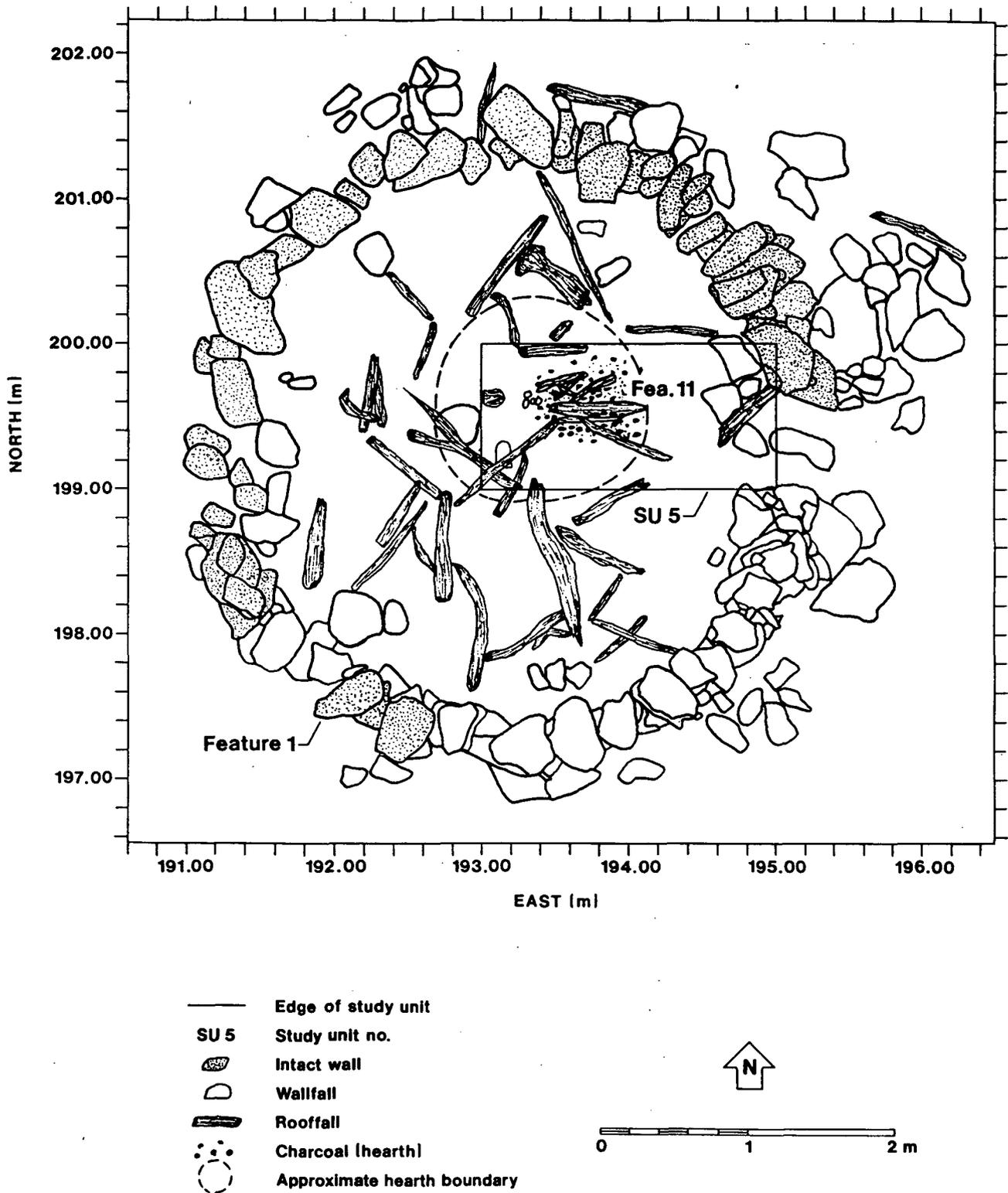


Figure 17.7. Site NM-Q-23-57, Plan View of Feature 1 Showing Study Unit 5 and Feature 11.

medicinal bottle in fragments were recovered from the vicinity of the hearth. Two pieces of ground sandstone were recovered immediately outside the hogan, and likely represented historic rather than prehistoric usage. An occupation in the first quarter of the twentieth century is suggested based on the artifacts.

### Feature 2

Feature 2 was a stone hogan situated on a bench above the present N11 roadbed (Figure 17.8). The center of the hogan lay at grid coordinates N225, E215.8. The hogan was located approximately 9 m outside of the right-of-way. Definition of the walls of the hogan was difficult; however, a circular shape is suggested. (The surveyors [Zimmerman and Abbott 1996] had concluded that this structure was rectangular). The hogan was approximately 3.5 m in diameter and was constructed of unmodified blocky sandstone cobbles, boulders, and bedrock. The southern part of the hogan retained three courses, but most of the walls were collapsed. The southwest portion utilized an exposure of sandstone bedrock. The east part of the hogan had only one course remaining, and the north and the west parts had no walls at all. A juniper stump was growing into the south wall. A relative lack of wallfall may have resulted from robbing of materials, possibly for Feature 1, 30 m to the southwest. These walls probably had small stone chinking along with a mud mortar and a mud plaster, although none of it survives today. There was some juniper branch roof fall located within the feature along with two sanitary seal-type tin cans and two pieces of baling wire. There were also three burned sandstone cobbles, one located within and two located just outside the east part of the hogan. The burned rock may have come from a central hearth as is common in Navajo hogans. Feature 25, an ash/trash dump, lay adjacent to the northeast. Since this feature was located outside of the right-of-way no excavations were conducted within the hogan and no artifacts were collected.

### Feature 3

Feature 3 was an oval-shaped broad, low-density ash dump. The center of this feature was located at grid coordinates N204.5, E199.6, and Feature 3 measured 3.5 by 5 m oriented north-to-south. The dump likely represented the hearth cleanings from the adjacent hogan (Feature 1). It lay approximately 4 m northeast of Feature 1 and straddled the right-of-way boundary. Numerous fragments of charcoal were visible within the dump. Charcoal flecks were seen some distance out from the ash dump including downslope to the east. These scattered charcoal flecks likely blew or eroded out of the feature. Artifacts observed on the surface included fragments of burned bone, clear and amethyst-colored bottle glass, wire, and two .22-caliber bullet cartridges. SU 6 and 7 were placed in the western part of the feature within the right-of-way.

### Feature 4

Feature 4 was an oval-shaped low-density artifact scatter. The center of this feature was located at grid coordinates N198.5, E187.6, and Feature 4 measured 1.5 by 5 m. Feature 4 lay approximately 2 m west of Feature 1. A 2-by-2-m unit (SU 4) at grid coordinates N198, E186 was placed in the northern part of the feature to determine its nature and depth.

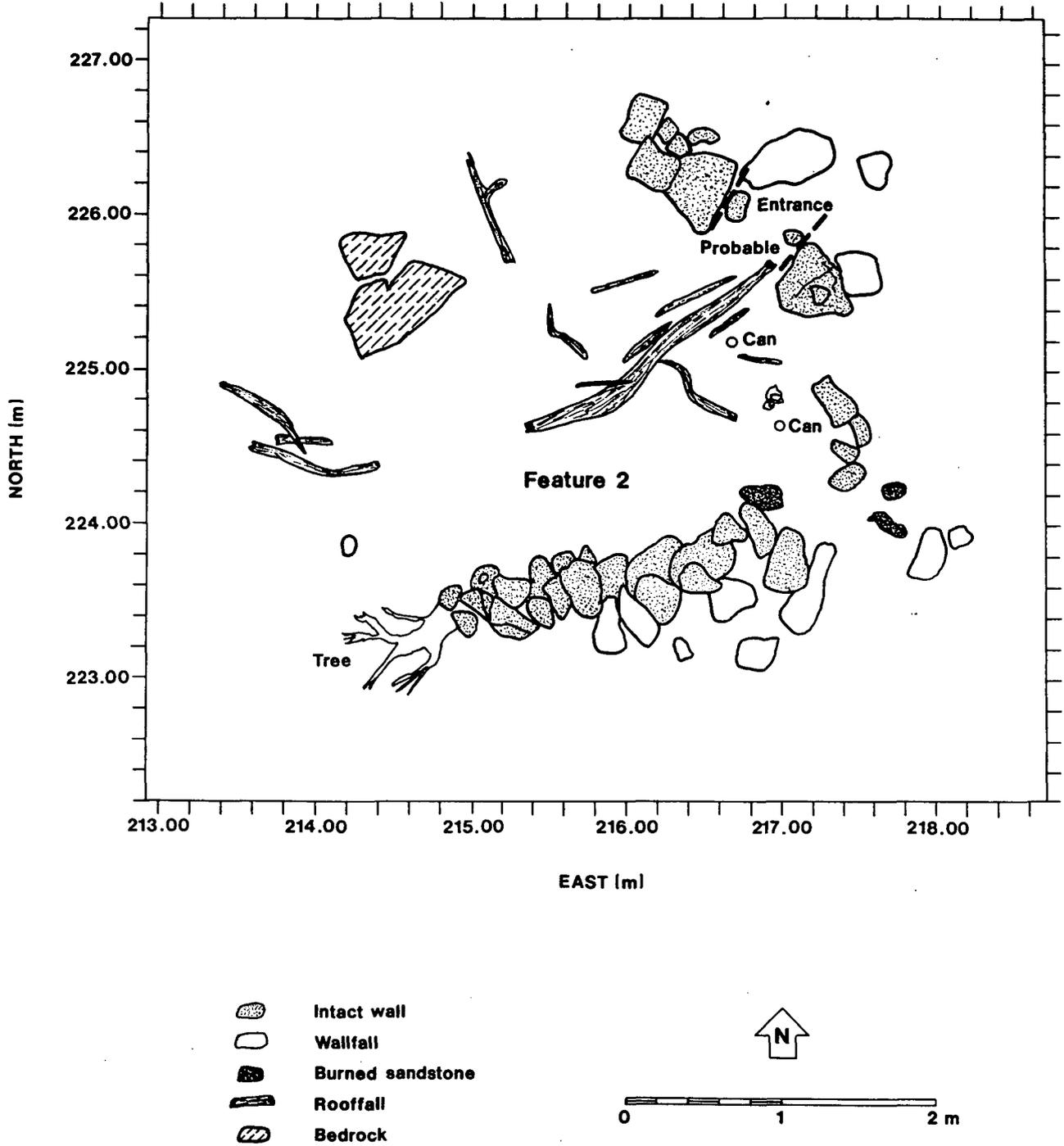


Figure 17.8. Site NM-Q-23-57, Plan View of Feature 2.

The artifacts within the feature included a substantial portion of a historic whiteware bowl which appeared to be a pot break, a metal pants fly button, and several fragments of 7/16-in thick milled wood with 6d box end nails. The ceramics and button were clustered at the south end over a 1.5-by-2-m area, and the wood and nails were at the north end of the feature. The wood likely represented the remains of a packing crate. Since these artifacts were directly behind Feature 1, they may have represented an activity area associated with its occupation.

#### Feature 5

Feature 5 was a circular stone hogan located on a boulder-strewn, south-facing slope (Figure 17.3). The center of the feature was at grid coordinates N128, E142.6. The hogan took advantage of a small hollow formed by an ephemeral drainage. It measured approximately 3.75 m in diameter and was constructed of unmodified blocky sandstone cobbles, boulders, and bedrock. The variable sizes of the stones precluded formal courses. The height of the walls varied from three stones high in the northwest part of the hogan to one in the eastern part. A mud mortar and plaster with small stone chinking may have been used; however, none of it survived. No evidence of the roof survived. A small ephemeral drainage ran through the center of the hogan from west to east causing some erosion. SU 2, a 1-by-2-m unit, was excavated within the hogan. Feature 12, a hearth, was exposed in the center of the feature. Feature 6 (an ash/trash dump), Feature 14 (an exterior hearth), and Feature 15 (a rock pile) lay within 4 m of the hogan and were likely associated. No artifacts were observed in the hogan; however, artifacts lying nearby, such as sanitary seal-type tin cans, clear glass, and whiteware ceramics, indicate a historic occupation. It is suggested that the hogan was occupied during the second quarter of the twentieth century. Ethnographic interviews during the survey portion of the N11 investigation noted that Feature 5 was a ram pen. This may represent a secondary usage of the feature, or it may be a confusion with Feature 7, which appeared to be such a structure.

#### Feature 6

Feature 6 was an oval-shaped historic trash scatter. The center of this feature was located at grid coordinates N126.4, E148.3 and Feature 6 measured 3.7 by 4.5 m. It was located 2 m southeast of Feature 5. Artifacts within the scatter consisted of some clear glass, historic ironstone and whiteware ceramics, and sanitary seal-type tin cans. Six burned sandstone cobbles were among the trash scatter; however, no ash, charcoal, or burned areas were observed within the feature. A small ephemeral drainage ran through the center of the feature. No excavations were conducted at the feature, but the artifacts were collected. Feature 6 was most likely created as a result of the occupation of Feature 5.

#### Feature 7

Feature 7 was a circular stone and earthen feature that had its center located at grid coordinates N111, E134.50 (Figure 17.9). The feature was 7 by 8.5 m and was located approximately 14 m southwest of Feature 5. The north half of the feature was dug into the slope and the south half was ringed by unmodified sandstone cobbles and boulders. A few unmodified blocky sandstone cobbles have been used to form a wall around the northern portion of the feature where some slumping has occurred. A small ephemeral drainage flowed among the boulders along the southern edge of the feature. A possible thermal feature was located in the southeastern portion of

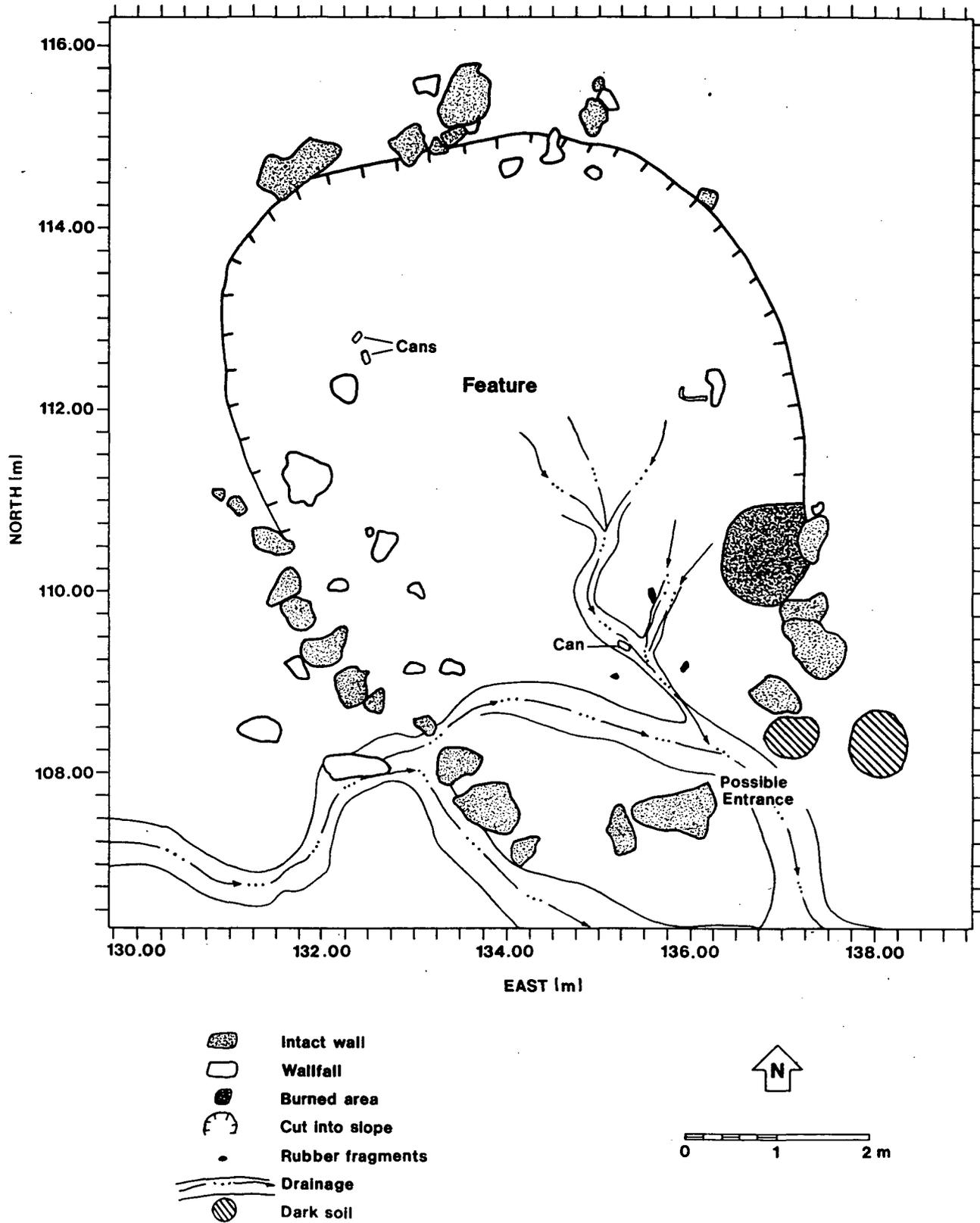


Figure 17.9. Site NM-Q-23-57, Plan View of Feature 7.

Feature 7 beside a possible entrance. Two patches of dark soil were located outside the possible entrance, but were likely natural soil deposits. No hand-excavated units were excavated in this feature. Artifacts associated with the feature consist of several tin beer cans (opened with a "church key" opener), pieces of a rubber boot, and a metal pot handle. The cans were recovered immediately outside the feature to the west and north, while the rubber and metal pot handle were located in the southeast portion of the feature. The rubber and metal pot handle may have been contemporaneous with the occupation of Feature 5. The beer cans more likely date later and may represent target-shooting activities. The feature was a possible sheep corral or lambing pen. The possible thermal feature may have been an area where fires were built to keep lambs warm during cold weather.

#### Feature 8

Feature 8 was a circular slab-lined hearth that was located along a lesser meander of a small seasonal drainage in the southern portion of the site (Figure 17.2). The center of the feature was located at grid coordinates N89.20, E155.72 and measured 70 by 80 cm. The hearth was contained by upright sandstone slabs. The northern portion of the feature may have suffered from erosion by a small drainage that cut across it, but most remained intact. SU 1 was placed over Feature 8 and excavation was conducted to expose the full extent of the feature. The feature matrix was very dark grey (10YR3/1) loam with charcoal deposits and some pebbles. Due to a lack of artifacts it was difficult to determine the age of the hearth; however, it may be related to Feature 9 which covered a broad area to the southwest of Feature 8.

#### Feature 9

Feature 9 was a broad, irregular-shaped historic trash scatter situated on a low rise south of small intermittent drainage basin. The center of the feature was located at grid coordinates N64, E138.5. It measured approximately 50 by 30 m oriented north-to-south. The southeastern portion of the feature extended out beyond the eastern right-of-way boundary. Artifacts from Feature 9 were surface collected by overlaying a 5-by-5-m grid system across this portion of the site. The majority of the trash scatter consisted of tin cans (most of which appear to be food cans) and lesser quantities of other metal, glass, and bone, both burned and unburned. Several .22-caliber bullet cartridges were also collected. A turquoise-colored glass bead formed in the shape of a fish or arrowhead was noted along with a small flat piece of brass in a wide rock cleft at the southeast extremity of the feature outside the right-of-way. Two possible hearths (Features 21 and 22) were located in the center of Feature 9. A number of old ax-cut trees were noted in the southern portion of the feature. Some of the trees had only a couple of branches, two had only a trunk remaining, and one was only a stump. A small quantity of prehistoric ceramics were noted in the southwestern portion of the feature. Ethnographic interviews during the survey portion of the investigation indicated that a ramada and corral were located on the flat area near Feature 6, probably meaning this area. A Navajo crewmember suggested this area may be the location of a Second Night ceremony of the Squaw Dance.

#### Feature 10

Feature 10 was a circular exterior hearth situated 8.5 m southwest of Feature 1. The center of the feature was located at grid coordinates N190.43, E186.41. It measured 80 cm in diameter and

was 3 to 4 cm thick atop shallowly buried sandstone bedrock. The hearth did not appear to be outlined with rock; however, it exhibited a well-defined ash deposit and a good quantity of fire-reddened sandstone rock. SU 3 was placed over it, and the excavation completely removed the feature (Figure 17.4). No artifacts were recovered from the feature.

#### Feature 11

Feature 11 was a circular hearth centrally located within a hogan (Feature 1; Figure 17.7). The center of the feature was located at grid coordinates N199.5, E193.5. The feature measured 1 m in diameter and was 4 to 15 cm thick (Figures 17.5 and 17.6). The hearth appeared to be contained within a loose and incomplete circle of rocks which were generally fire-reddened. The earthen floor was also fire-reddened particularly on the north side of the hearth. Bits of charcoal were present throughout the matrix and were also spread to the east. Artifacts recovered from the feature included burned bone, probably sheep, and the fragmented remains of a small medicine bottle which were recovered under and adjacent to one of the fire-reddened rocks. A possible wooden fire poker was located southeast of the hearth.

#### Feature 12

Feature 12 was a circular hearth centrally located within a hogan (Feature 5; Figure 17.3). The center of the feature was located at grid coordinates N128.2, E142.6. Feature 12 measured 60 cm in diameter. The feature was partially excavated in SU 2. Only the west half of the feature was fully exposed during the excavation. The hearth had been moderately disturbed by an ephemeral drainage that ran west to east through the center of the hogan. An ashy stain extended 40 cm west of the main hearth. No artifacts were recovered from the hearth; however, the two halves of a shoe-polish tin were recovered 40 cm south of the hearth. A flotation sample was collected from the hearth.

#### Feature 13

Feature 13 was an irregular-shaped exterior hearth associated with a hogan (Feature 1). The feature was located just outside the east right-of-way boundary, with the center located at grid coordinates N195.88, E196.28. The hearth measured 1 by 1.1 m. The hearth lay 3 m south-southeast of the entrance to the hogan. The hearth consisted of a patch of ash and charcoal roughly ringed by sandstone rocks from 10 to 40 cm long, some of which exhibited fire-reddening. The hearth appeared to be relatively undisturbed except for minor sheet erosion and plant growth. No artifacts or burned bone were associated with the hearth to allow inference of function. The hearth was likely contemporaneous with the nearby hogan. Since the feature lay outside the right-of-way, no subsurface investigation was conducted.

#### Feature 14

Feature 14 was a subrectangular thermal feature located 4 m north of Features 5 and 6. The center of the feature was at grid coordinates N130.80, E148.40. The feature measured 0.6 by 3 m and was comprised of two halves that were separated by 1 m of bedrock and natural ground surface. The west half was comprised of burned sandstone cobbles that were randomly placed with no

charcoal or ash in or around the rocks. The east half was slightly downslope from the west half and consisted of burned sandstone cobbles, ash, and some charcoal (50 by 50 cm). No artifacts were noted in association with the hearth. Proximity might mean that Feature 14 was contemporaneous with Features 5 and 6. No subsurface investigation was conducted.

#### Feature 15

Feature 15 was an oval-shaped rock pile located 4 m southwest of Feature 5. The center of the feature was located at grid coordinates N125.54, E138.38. The rock pile measured 1 by 1.6 m. The feature was comprised of 15 blocky sandstone cobbles, averaging about 30 cm in diameter, arranged around one piece of blocky sandstone which measured 30 by 70 cm. There were no charcoal or burned rocks in or around the feature. No artifacts were located within the feature. No subsurface investigation was conducted.

#### Feature 16

Feature 16 was an irregular-shaped ash and charcoal stain located 6 m east-southeast of a hogan (Feature 1). The center of the feature was located at grid coordinates N195.6, E201, outside the eastern right-of-way boundary. The feature measured 3 by 3.75 m. The feature consisted of an ash, charcoal, and garbage disposal area that had a very low density of cultural material. No subsurface investigation was conducted since the feature was located outside the right-of-way. Artifacts observed in the feature included charcoal, burned bone, an enamelware pot handle, a burned gray chert flake, fire-reddened sandstone, and the top to a purple glass medicine bottle. Based on the artifacts observed and the close proximity, this feature was likely contemporaneous with Feature 1. Fragments of a medium-sized fluted whiteware bowl were noted near the base of the slope below this feature and may be related to this feature and the hogan.

#### Feature 17

Feature 17 was an indeterminate ash/charcoal stain located 10 m south of Feature 7. The center of the feature was located at grid coordinates N95.14, E133. The feature measured 2.25 by 4 m. The feature lay adjacent to the west side of a large low boulder. The feature had been moderately disturbed by small drainages. A single artifact was noted: a piece of clear glass. Several other artifacts were noted within 8 m to the west including a harmonica reed, a tin can, and a piece of clear glass. This feature may have been related to Feature 9, a larger trash scatter. No subsurface investigation was conducted. The feature was possibly a hearth.

#### Feature 18

Feature 18 was a linear rock feature located 15 m outside the west right-of-way. The center of the feature is located at grid coordinates N114.64, E105.39. The feature measured 40 by 80 cm. The feature was comprised of two adjacent sandstone cobbles (35 by 40 cm and 20 by 20 cm, respectively) lying on natural sandstone bedrock. No artifacts were noted in association with the rocks. No subsurface investigation was conducted. The function of the feature is unknown.

### Feature 19

Feature 19 was a hearth located under one edge of a large sandstone boulder on the edge of a small drainage near the northwest end of Feature 9. The center of the feature was located at grid coordinates N87.45, E127.30. The hearth measured 50 by 50 cm. It appeared that the boulder was used as a shelter to shield the hearth from wind. The northeast-flowing drainage has eroded the southeastern portion of the hearth. A large rock spall has fallen off the boulder (probably fairly recently) onto the hearth and now lies in front of the hearth somewhat shielding it from the drainage. No artifacts were directly associated with the hearth; however, a number of artifacts were collected from the opposite side of the boulder. The artifacts include clear glass, a .22-caliber bullet cartridge, an enamelware pan handle, a wire nail, and a piece of baling wire. This feature may be related to Feature 9, a larger trash scatter. No subsurface investigations were conducted of the feature.

### Feature 20

Feature 20 was a hearth located under one end of a large boulder. The center of the feature was located at grid coordinates N77.80, E99.05, 10 m outside the western right-of-way boundary. The feature measured 70 by 91 cm. The boulder was used as a shelter with approximately 1 m of space under the overhang. The hearth consisted of a circular arrangement of sandstone cobbles. The cobbles exhibited fire-reddening. Charcoal and ash was visible within the rock circle. A small quantity of artifacts were located from about 1 m to at least 10 m southwest of the hearth. These included a can, a possible syrup bottle, bone, and milled lumber with several small embedded finishing nails. Feature 20 may be related to Feature 9, a larger trash scatter. No subsurface investigations were conducted of the feature since it lay outside the right-of-way.

### Feature 21

Feature 21 was a small ash and charcoal stain located within Feature 9. The center of the feature was located at grid coordinates N67.09, E142.41. The hearth was roughly circular and measured 30 by 34 cm. The feature was comprised of ash, charcoal, and burned sandstone that had been heavily disturbed by erosion. Only a small quantity of burned bone was noted within the feature matrix. No subsurface investigation was conducted to determine the extent and depth of the feature.

### Feature 22

Feature 22 was a small ash and charcoal stain located within the boundaries of Feature 9, 7 m southwest of Feature 21. The center of the feature was located at grid coordinates N63.53, E135.67. Feature 22 was circular and measured 80 cm in diameter. The feature was comprised of ash, charcoal, and one small piece of burned wood. There was a small ephemeral drainage which ran through the whole feature, washing the ash and charcoal downslope. No artifacts were noted within the feature. No subsurface investigation was conducted to determine the extent and depth of the feature.

### Feature 23

Feature 23 was an ash and charcoal stain located at the southeastern periphery of Feature 9. The center of the feature was located at grid coordinates N53.10, E153.85, approximately 4 m outside the eastern right-of-way boundary. The hearth was ovoid and measured 1 by 1.6 m. The feature was comprised of burned sand, ash, charcoal, and burned sandstone. There was a small ephemeral drainage which ran through the feature eroding ash and charcoal downslope. No artifacts were observed in or associated with the feature. The hearth was likely associated with Feature 9, a larger historic trash scatter. Because the feature lay outside the right-of-way, no subsurface investigation was conducted to determine the extent and depth of the feature. This hearth was within 5 m of two boulders where a turquoise-colored glass bead was noted.

### Feature 24

Feature 24 was a small unlined exterior hearth located 2.5 m northwest of Feature 1, a stone hogan. The center of the feature was located at grid coordinates N203.50, E189.84. The hearth was roughly circular and measured 50 cm in diameter. The feature consisted of a surface manifestation of ashy soil, numerous bits of wood, charcoal, and a couple of fire-reddened sandstone rocks. No artifacts were noted in association with the hearth. A fragment of a slip-on can lid was noted 2.5 m northwest of the hearth. The hearth was likely associated with the occupation of the hogan.

### Feature 25

Feature 25 was an ash/trash dump located immediately northeast of Feature 2, the remains of a stone hogan. The center of the feature is located at grid coordinates N228.57, E219.20. The feature was ovoid, measured 3 by 4 m, and consisted of an ashy gravelly matrix. The feature appeared to be a surficial deposit. The artifact assemblage consisted mostly of small fragments of burned bone, but it also included two petrified wood flakes, one petrified wood uniface scraper, several pieces of baling wire, and an electroplated silver teaspoon. A fossilized shark tooth was noted approximately 5.5 m north of the midden, and a .22-caliber bullet cartridge was noted 10 m east at the edge of a sandstone boulder outcrop. A slip-on can lid was also noted 7 m northeast of the midden. It could not be determined if the tooth, the bullet cartridge, and the can were associated with the hogan. Some of the artifacts have been moved eastward and downslope due to erosion. The dump was most likely associated with the hogan and probably dates to the late nineteenth century.

## SUMMARY AND INTERPRETATION

Phase I Data Recovery testing of site NM-Q-23-57 resulted in the collection of 354 artifacts of which 170 were metal, 33 were glass, 12 were other historic items, 12 were prehistoric ceramics, 3 were flaked stone, 2 were ground stone, and 122 were faunal materials. The majority were collected from surface contexts. None of the hand-excavated units yielded high numbers of artifacts.

Site NM-Q-23-57 represents at least three consecutive Navajo occupations and a Pueblo II limited activity occupation. The Navajo occupations date from the late nineteenth to mid-twentieth century and contain 25 features reflecting a variety of Navajo cultural activities. A fourth component reflects a more modern temporary presence for livestock operations. The site can be associated with

contemporary Navajo families presently living in the area and still contains intact structural elements and important information about Navajo lifeways over a one-half century continuum. That continuum encompasses a transitional period from near self-sufficiency to entering a barter- or cash-based consumer economy.

The feature complex centering around the northernmost hogan, Feature 2, appeared to be the earliest Navajo occupation of this site, probably dating to the late nineteenth century. This hogan was in the most deteriorated condition and the artifacts reflected little utilization of manufactured goods. The limited artifacts associated with this hogan included various stone tools as well as a metal spoon.

The feature complex centering around the best-preserved hogan, Feature 1, was the next oldest, probably dating to the first quarter of the twentieth century, possibly after World War I. There appeared to be an increased dependence on manufactured goods. The various features associated with it include a number of glass, ceramic, metal, and wood artifacts. This complex of features was the most extensive and may be indicative of a longer period of occupation.

The complex centering around the southernmost hogan, Feature 5, was the most recent occupation, probably dating to prior to World War II. This group of features reflected a higher dependence on manufactured goods. Artifacts associated with this hogan included a number of tin cans, glass bottles, ceramics, and other relatively modern items. Additionally, a broad, very low-density scatter of artifacts of similar type was noted to the east and northeast of the hogan. Unfortunately it could not be determined if these were specifically related to this hogan or general trash disposal, in particular associated with Feature 9 to the south.

The Feature 9 activity area represented the most recent use of site NM-Q-23-57 with artifacts dating to after World War II. This constituted the largest portion of the site's artifact assemblage. This assemblage showed the largest reliance on manufactured goods specifically as seen in the form of canned goods. From the density and broad distribution of the artifact scatter and the number of isolated hearths, a probable repeated use of this area over a number of years is suggested. Nevertheless, no evidence was observed for the ramada or corral as reported in the ethnographic interviews from the survey portion of the N11 investigations.

Ethnographic interviews during the survey portion of the N11 investigation indicated that possibly several sweatlodges may be located in this area. Although no features definitively indicated a sweatlodge, two locations are considered possible. Feature 17 may represent a sweatlodge based on ash and charcoal and possibly some partially buried juniper branches used for the structure. A second location was identified with the help of a Navajo crewmember. The crewmember indicated a location up one of the drainages to the west of the right-of-way near Feature 18. He suggested this spot based on its removed location, level ground, and availability of resources.

Various isolated artifacts indicate transient visitation of the site even more recently. Conversely, a small quantity of ancestral Pueblo pottery also indicates limited activity during the early Pueblo II period. These isolated artifacts may be related to site NM-Q-23-56, an ancestral Pueblo site located less than 200 m to the south.

## RECOMMENDATIONS

The site is considered significant and archaeological data recovery excavations are recommended. All the identified features within the right-of-way should be excavated. However, to help minimize the amount of additional archaeological investigation, it is suggested that Feature 1 and its associated features be avoided if possible. If it is feasible from an engineering standpoint, the construction corridor should be narrowed and fenced off to prevent any inadvertent vehicular incursions since this feature complex lies close to the edge of the right-of-way. Otherwise full excavation of the hogan complex should be conducted. Additionally, due to their close proximity to the right-of-way, Features 2 and 25 should also be fenced off to prevent any inadvertent vehicular incursions onto that part of the site. Lastly, an archaeologist should be present to monitor construction activities that involve the removal of soil deposits as they presently exist in this area to watch for accidental exposure of buried subsurface cultural deposits or features and to halt further adverse construction impacts until additional archaeological mitigative action can be conducted.