MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

ARCHAEOLOGICAL TESTING RESULTS FOR SEVEN SITES AND A RESEARCH DESIGN AND DATA RECOVERY PLAN FOR FIVE SITES LOCATED ALONG PROPOSED NM 599, NORTHWEST SANTA FE RELIEF ROUTE, SANTA FE COUNTY, NEW MEXICO

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ADMINISTRATIVE SUMMARY

In October and November of 1996, the Office of Archaeological Studies (OAS), Museum of New Mexico, conducted archaeological testing of seven sites for the New Mexico State Highway and Transportation Department (NMSHTD). The sites were located within the proposed right-of-way of the Northwest Santa Fe Relief Route (NMP No. WIPP 599-1[3]) in Santa Fe County, New Mexico. All sites were on privately owned land and testing proceeded after landowner permission was obtained.

LA 108902, LA 108903, and LA 111364 were located in areas not included in the original project corridor (Post 1995, 1996a). LA 113946, LA 113949, LA 113954, and LA 114071 were located by an independent archaeological contractor conducting an inventory of a private subdivision (Anschuetz and Viklund 1996). The survey was subsequent to the original inventory and testing project completed by the Office of Archaeological Studies (Maxwell 1988; Wolfman et al. 1989).

Archaeological testing of the seven sites, LA 108902, LA 108903, LA 111364, LA 113946, LA 113949, LA 113954, and LA 114071, focused on determining the nature, depth, extent, and data potential of the cultural deposits. Archaeological testing results were used to determine if a site had the potential to yield important information on prehistoric occupation of the piedmont hills north and west of Santa Fe and the Santa Fe area in general.

LA 108902 is a multicomponent artifact scatter with Pueblo period sherds and an Archaic-patterned chipped stone concentration. The chipped stone artifact count from the subsurface excavation suggests that surface stripping may yield as many as 500 artifacts. Additional investigation within the cluster may yield chronological information, site structure patterns, and technological data. LA 108902 has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage, and further data recovery is recommended.

LA 108903 is a multicomponent artifact scatter with Pueblo period sherds, two low-frequency chipped stone clusters, and the deflated remains of a thermal feature. Test excavation revealed no potential for substantial subsurface cultural deposits. The feature is heavily deflated and the fill has been mixed. LA 108903 does not have the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage.

LA 111364 is a multicomponent Pueblo period raw material procurement and resource gathering site. Sites with late Developmental to early Historic period Pueblo components are rare in the piedmont hills (Post 1996b). The presence of subsurface chipped stone associated with late Classic period pottery make LA 111364 a potentially important contributor to the understanding of changing Pueblo foraging practices. LA 111364 has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

LA 113946 yielded no temporally diagnostic artifacts, but the core reduction cluster and the buried, intact thermal feature represent two occupation episodes. The core reduction cluster has substantial subsurface artifacts and the buried thermal feature, a 20- to 25-cm-thick intact deposit, may yield datable charcoal and evidence of plant or animal processing and consumption. This portion of LA 113946 has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is

recommended.

LA 113949 yielded no temporally diagnostic artifacts, though a low-frequency artifact cluster was recorded and a badly deflated thermal feature was investigated. Test excavation revealed no subsurface deposits and the deflated condition of the feature limits its data potential. The portion of LA 113949 within the right-of-way does not have the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage.

LA 113954 is a multicomponent Coalition to early Classic period site with an intact thermal feature and a core reduction cluster associated with a dispersed artifact scatter. Outside the right-of-way is a series of five charcoal stains exposed in an erosion channel and dispersed sherds and lithic artifacts. The thermal feature should yield datable charcoal samples, and the intact internal morphology may provide functional information. The chipped stone cluster yielded subsurface artifacts indicating higher artifact density than was evident on the surface. The portion of LA 113954 within the right-of-way has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

LA 114071 is primarily a temporally nondiagnostic artifact scatter containing a thermal feature associated with a core reduction concentration. Spatial association between the core reduction cluster and a small, intact thermal feature is unique for Santa Fe Relief Route West sites. It appears that the feature and core reduction areas are related, and it is possible that the thermal feature was used to heat-treat Madera chert cores. The portion of LA 114071 within the right-of-way has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

LA 108902, LA 111364, LA 113946, LA 113954, and LA 114071 should be considered to have data potential and require a data recovery plan. The data recovery plan for these sites is provided in this report. LA 108903 and LA 113949 have no further data potential and no additional archaeological investigation should be required.

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INTRODUCTION

In October and November of 1996, the Office of Archaeological Studies (OAS), Museum of New Mexico, conducted archaeological testing of seven sites for the New Mexico State Highway and Transportation Department (NMP No. WIPP 599-1[3]). The sites were located within the proposed right-of-way of the Northwest Santa Fe Relief Route in Santa Fe County, New Mexico. All sites were on privately owned land and testing proceeded after landowner permission was obtained.

Legal descriptions for the sites have been provided in previous reports and are in the New Mexico Cultural Resources Information System (NMCRIS) files maintained by the Archeological Records Management Section (ARMS) of the New Mexico Historic Preservation Division in Santa Fe. A site location map is provided in Appendix 1. The project vicinity map provides the location of the County Road 70 extension, the Camino La Tierra interchange, and limits of the College Hills Subdivision within the relief route corridor (Fig. 1).

LA 108902, LA 108903, and LA 111364 were located in areas not originally included in the project corridor (Post 1995, 1996a). LA 113946, LA 113949, LA 113954, and LA 114071 were located by an independent archaeological contractor conducting an inventory of a private subdivision (Anschuetz and Viklund 1996). The survey was completed subsequent to the original inventory and testing project completed by the Office of Archaeological Studies (Maxwell 1988; Wolfman et al. 1989.). LA 108902 and LA 108903 are within the County Road 70 extension corridor. LA 111364 is within the Camino La Tierra interchange corridor, and LA 113946, LA 113949, LA 113954, and LA 114071 are within the relief route corridor as it crosses the College Hills Subdivision.

Archaeological testing of the seven sites focused on determining the nature, depth, extent, and data potential of the cultural deposits. Archaeological testing results were used to determine if a site had the potential to yield important information on prehistoric occupation of the piedmont hills north and west of Santa Fe and the Santa Fe area in general.

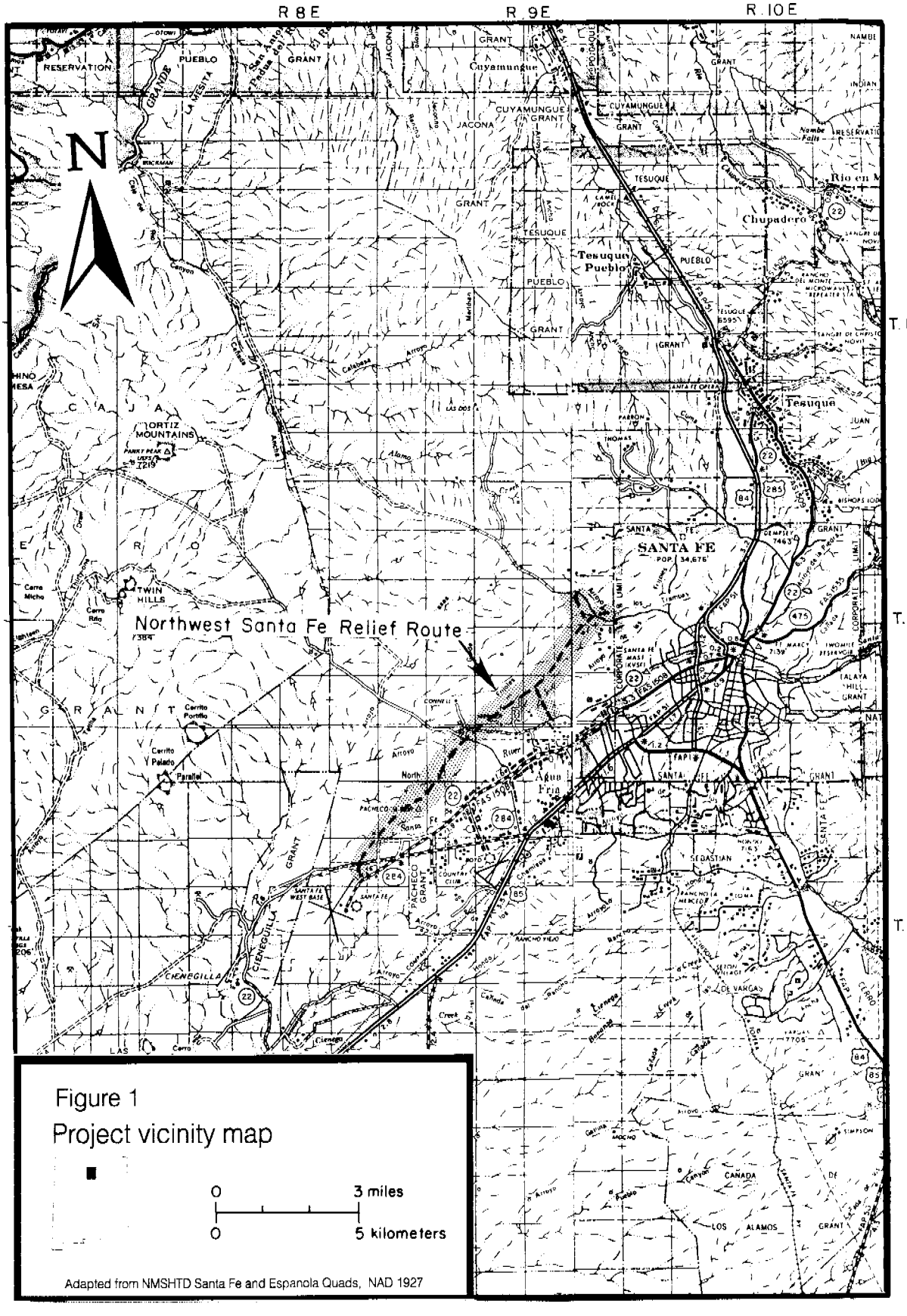

Figure 1
Project vicinity map

Adapted from NMSHTD Santa Fe and Espanola Quads, NAD 1927

CONTEMPORARY ENVIRONMENT

The contemporary environment of the Santa Fe Basin has been thoroughly reviewed in a study by Kelley (1980) as part of the Arroyo Hondo Archaeological Project. The reader is referred to this monograph for the wealth of detail it contains. Maxwell (1988) and Scheick (1991) concisely summarize the contemporary environment for the northwest Santa Fe area.

The project area is within a structural subdivision of the Southern Rocky Mountain physiographic zone (Folks 1975:110). The basin is bounded on the west by the Jemez Mountains and to the east by the Sangre de Cristo Mountains. An alluvial plain, dissected by many arroyos, stretches westward from the foothills at the base of the Sangre de Cristos. This alluvial plain forms the piñon-juniper piedmont within which the investigated sites are located. The piedmont includes the Santa Fe-Tesuque Divide, which decreases in elevation to the west-southwest, and includes the County Road 70 area near its westernmost edge. The piedmont ends at an extensive drainage trough that extends northwest to the Cerros del Rio, west to the edge of La Bajada, and southwest to the Cerrillos Hills and La Cienega. Within the general project area elevations range from 1,910 m to 2,252 m.

Local topography alternates among nearly level piedmont table land, rolling gravel terraces, and steep, rocky slopes. The major drainage is the Santa Fe River, with three major tributaries, the Arroyo Gallinas, Arroyo de las Trampas, and Arroyo de los Frijoles, draining much of the project area. The arroyo floodplains were farmed during historic times (Spivey 1996) and may have been farmed during the Pueblo period, although no evidence of fields or field structures has been identified (Post 1996b). These major tributary arroyos are separated by low, broad ridges that are heavily incised by primary and secondary arroyos. These smaller tributary arroyos have grassy areas at their headwaters that provided protected settings for foraging and processing camps; a site location pattern that is repeatedly evident in the Las Campanas area (Post 1996b; Lang 1996).

Lithic raw material suitable for core reduction and tool manufacture occurs in the terrace and pediment deposits exposed along the Arroyo de los Frijoles, Arroyo de las Trampas, Arroyo Gallinas, and their major upland tributary arroyos. These gravel deposits are of Santa Fe and Ancha formation origin dating to the middle to late Tertiary. They contain a wide range of igneous and metamorphic rock. Mixed with these gravel deposits are the alluvial deposits from the Sangre de Cristo Mountains that contain redeposited nodules of chert and chalcedony from the bedded Pennsylvanian age Madera limestone formation (Lang 1993). These combined deposits provided a wide range of chert, chalcedony, silicified wood, quartzite, igneous, and metamorphic materials. There is differential distribution of suitable lithic raw materials throughout the piedmont hills with particularly thick deposits noted along the Arroyo de los Frijoles (Lang 1996). These local raw materials make up 95 percent of the chipped stone recovered by the OAS excavations at Las Campanas (Post 1996b) and from the majority of the sites along the Santa Fe Relief Route (Wolfman et al. 1989).

Project area soils are typical of the dissected piedmont plains (Folks 1975:3-4). Three of the major soil associations of the piedmont plains occur within the project area: Pojoaque Panky rolling, Pojoaque Rough Broken Land, and Panky Fine Sandy Loam.

Pojoaque Panky rolling is the predominant soil association. It covers the ridge tops and slopes separating the Arroyo de los Frijoles and Arroyo Calabasas drainages. It is interspersed with patches of Pojoaque Rough Broken Land. It consists of 60 percent Pojoaque sandy clay loam on slopes of 5 to 25 percent and 35 percent Panky Loam on slopes of 0 to 9 percent (Folks 1975:43). Bluewing, Cerrillos, and Agua Fria soils make up the remaining 5 percent. Pojoaque soil has moderate permeability, an effective rooting depth of 60 inches, and a water-holding capacity of 8 to 9.5 inches. The Panky soil will be described separately.

Pojoaque Rough Broken Land soils occur south of the Arroyo de los Frijoles on the ridges that divide that major drainages. The Pojoaque soils make up 50 percent of the association and are well-drained on upland terraces with a 8-inch-thick surface layer of reddish brown sandy clay loam. The substratum is 32 inches of a light reddish brown gravelly sandy clay loam with mild calcareous content (Folks 1975:43). The Rough Broken Land soils are on steep slopes, have shallow depth, and consist of sandy to sandy loam with greatest depth as colluvium at the base of rock slopes.

Panky Fine Sandy Loam occurs on level to gently sloping surfaces. Patches of this association occur at the base of the broad ridge tops along the secondary and tertiary tributaries of the gentle slopes of the transition between the piedmont and grassy juniper plains at the southwest end of the project area. It has a shallow cap of fine sandy loam that lacks plasticity. Loam content increases to 6 inches below the surface. From 6 to 32 inches, the soil increases in clay content and becomes increasingly calcareous. It has slow permeability with slow to medium run-off and a rooting depth of 1 m. Available water holding capacity is 4 to 10 inches (Folks 1975:39-40).

Most of the archaeological deposits encountered during this testing project and the previous Santa Fe Relief Route project (Wolfman et al. 1989) occur within the modern or A horizons of the predominant soil associations. The common and abundant occurrence of prehistoric and historic deposits on similar soil horizon surfaces suggest many of the land forms in the project area have not undergone radical geomorphological change in the last 2,000 to 3,000 years. However, from the Las Campanas project there were deeply buried late Archaic period deposits at LA 84758 and LA 84787 indicating that microenvironments within the project area have experienced substantial alluvial deposition (Post 1996b). However, even in these areas the cultural deposits were marked by surface remains that were roughly contemporaneous with the subsurface cultural deposits. The presence of surface cultural deposits in combination with deeply buried deposits suggests that A Horizons and associated deflated surfaces have been reworked over the last 3,000 years. Periodic episodes of soil deflation on the slopes and ridge top margins have served to expose the archaeological deposits and have mitigated against soil deposition and the formation of stratified cultural deposits. In fact, the tendency for large areas of gravel and cobble deposits to be exposed undoubtedly influenced prehistoric lithic raw material procurement strategies.

Two main plant communities as described by Kelley (1980) are common within the Northwest Santa Fe Relief Route project area: piñon-juniper woodlands and the rabbitbrush community. Other important plant communities include the grassland community that extends to the edge of La Bajada and the riparian environment of the Santa Fe River. Together these plant communities would have provided a diverse array of floral resources for prehistoric populations.

Within the project area, the piñon-juniper woodland is the dominant plant community covering an estimated 80 percent of the land. Piñon-juniper woodlands had 135 of the 271 plant

species observed within the Arroyo Hondo Pueblo catchment (Kelley 1980:60). Of these, 63 species are edible or have medicinal qualities. However, with the exception of piñon, most of the species are not abundant or are most productive in disturbed soils. Economic plant species besides piñon found in the piñon-juniper woodland and in archaeological context include yucca, prickly pear and pin cushion cacti, *Chenopodium* sp., *Amaranthus* sp., and Indian ricegrass. Wetterstrom (1986) suggests that intensive gathering of these species might off-set years of moderately poor agricultural production. However, consecutive years of poor moisture would affect the productivity of wild plants and cultigens alike, rendering their buffering potential unpredictable. Total available economic plant species of the piñon-juniper woodland project high wild resource productivity, but conditions that favor grasses and shrubs might off-set piñon-juniper productivity.

The rabbitbrush community of the arroyo channels and terrace slopes may have provided abundance and variability in plant species when piñon-juniper yield was decreased or less predictable. Affected by run-off, flooding, and erosion, arroyo channels and terraces are more disturbed and support the grasses, shrubs, and succulents that favor disturbed conditions. The arroyo channels or terraces also may have been dry farmed, which would have created disturbed soils zones when left uncultivated. Plant species of the rabbitbrush community include prickly pear, yucca, *Chenopodium* sp., *Amaranthus* sp., and Indian ricegrass.

The open, shortgrass plains occur at 1,525 to 2,050 m (5,000 to 6,700 ft). This area has the longest growing season, but receives the lowest mean annual precipitation (Kelley 1980:112). Under optimal conditions, this community would be highly productive with abundant edible grasses and shrubs. Especially important is the ability of certain grass species to respond to intermittent rainfall by producing seeds when suitable conditions exist. Therefore, a dry season with a few intensive rain showers might trigger seed propagation (Wetterstrom 1986). This could have been critical in years when crop production failed and wild plants were the difference between survival and starvation. Indian ricegrass was common at Arroyo Hondo Pueblo suggesting that it was commonly used as a supplement.

The fauna of the piedmont have been described in Wetterstrom (1986), Lang and Harris (1984), and Kelley (1980). Mammals most abundant on the piedmont would have been cottontail and black-tailed jackrabbit, a variety of squirrels, rats, mice, and gophers, prairie dogs, coyote, and mule deer. Pronghorn would have roamed the shortgrass plains. Distribution and abundance of these species would have depended on available forage and prey species. It is likely that in good years a full range of small, medium, and large mammals would have been available. However, during the Pueblo period, Lang and Harris (1984) suggest that Arroyo Hondo residents became more reliant on small mammals and long-distance hunting trips for large game.

The Santa Fe area has a semiarid climate. Most of the local precipitation occurs as intense summer thunderstorms that produce severe runoff and reduce usable moisture. The area receives an average of 229 to 254 mm of precipitation per year and a mean snowfall of 356 mm (Kelley 1980:112). The growing season ranges from 130 to 220 days and averages 170 days. The last spring frost usually occurs in the first week of May and the first fall frost occurs around the middle of October. The mean yearly temperature is 10.5 degrees C.

CULTURE HISTORY

Paleoindian Period

A striking characteristic of Santa Fe culture history is the paucity of evidence for occupation during the Paleoindian period (9500 B.C. to 6000 B.C.). The two reported occurrences are isolated late Paleoindian Cody complex artifacts from the Galisteo Basin near San Cristobal (Lang 1977) and the Galisteo Reservoir (Honea 1971).

In New Mexico, the most extensive and spectacular evidence for Paleoindian subsistence are remains from killing and butchering large mammals (Stuart and Gauthier 1981). Evidence for hunting smaller mammals and plant gathering is rare and largely inferential (Judge 1973). Kill and butcher sites have the highest archaeological visibility, and therefore are reported most often.

The lack of reported Paleoindian remains may be a visibility problem instead of a lack of occupation. Paleoindian remains from hunting and gathering activities may be masked by later Archaic and Anasazi components. Geomorphological factors also may contribute to low Paleoindian period visibility. Surfaces or strata containing the earliest remains may be deeply buried and exposures that contain Paleoindian remains may be difficult to identify or may be missed using traditional pedestrian survey methods (Cordell 1978:6).

The discovery of a Clovis period site in the Jemez Mountains suggests that Paleoindians used montane environments, where large game was available (Acklen et al. 1990). The two identified Cody complex components may be evidence for a changing adaptation that was focused more on hunting smaller mammals and plant gathering than in previous periods. Use of the Middle Rio Grande Valley for hunting and gathering forays may have resulted in site or component distributions that were not masked by later occupations or by deep, natural soil deposition.

Archaic Period

The Archaic period in the Santa Fe area has been defined according to the Desert Culture Oshara and Cochise traditions (Cordell 1979; Biella and Chapman 1977; Lang 1977). These traditions span 5500 B.C. to A.D. 400 and are primarily distinguished by morphologically and temporally distinct projectile points, and to some extent, stone tool assemblages and site structure (Irwin-Williams 1973, 1979). Archaic period sites identified in the Santa Fe area date from the Bajada phase (4800 to 3200 B.C.) to the En Medio or Basketmaker II period (800 B.C. to A.D. 400). Recent archaeological investigations throughout the Santa Fe area have revealed some aspects of the settlement and subsistence patterns of Archaic period populations.

The early and middle Archaic periods (5500 to 1800 B.C.) are represented by low frequency and widely dispersed sites and isolated occurrences (Doleman 1996; Futch and Kayser 1996; Lang 1992). Evidence from this period often consists of temporally diagnostic projectile points or tools that are mixed with deposits from later occupations. Many of these sites are located along the Santa Fe River and its primary tributaries, which would have been preferred campsite locations. Early and middle Archaic period materials found on these sites are presumed to be

primary deposits and not the result of later recycling or scavenging. Temporal information for this period is mainly derived from obsidian hydration dating of chipped stone artifacts from surface or near surface contexts. The accuracy of these dates is debatable. Other chipped stone materials associated with the obsidian are weathered, suggesting that they are older than the other spatially associated materials.

The late Archaic periods (Armijo, En Medio and Basketmaker II, 1800 B.C. to A.D. 400) are characterized by an increasing number of sites through time that were occupied longer and located in a broad range of environmental settings. Small Armijo phase camp sites have been identified north of the Santa Fe River (Post 1993:8-10). Late Armijo phase pit structures and base camps have been excavated in the low piedmont area separating the Arroyo Calabasas from the Santa Fe River near the airport in Santa Fe (Schmader 1994; Post n.d.a). Radiocarbon mid-point dates ranging from 1740 to 940 B.C. were obtained from hearths and structural elements from three sites. As late Archaic populations remained longer in the Santa Fe area, the sites had more formal facilities and distinctive discard patterns. Small logistical sites increase in number, but are widely dispersed suggesting expansive foraging ranges.

En Medio and Basketmaker II period sites are the most numerous and widely distributed. Base camps with structures, limited base camps, special activity sites, and isolated occurrences are found in riverine, piedmont, foothill, and montane environments (Lang 1993; Scheick 1991; Schmader 1994; Viklund 1988; Post 1993). The greater site frequency and diversity indicate population increase, longer occupations, and shorter spans between occupational hiatuses. Based on Lang's (1977:328-329) climatic reconstruction, the periods from 50 B.C. to A.D. 200 and from A.D. 250 to 400 may have been the best for a hunting and gathering adaptation. These periods had above average precipitation or were similar to modern precipitation patterns combined with warmer than modern temperatures during the early period and equal to or cooler than modern temperatures during the later period. Warmer temperatures combined with above average precipitation would have supported a more abundant and perhaps diverse plant community as well as larger herds of large game mammals. It is possible that year-round habitation could have been supported in the eastern Galisteo Basin and the Santa Fe drainage basin during these periods.

Pueblo Period

Developmental Period (A.D. 600-1200)

The Developmental period (Wendorf and Reed 1955) is divided into early (A.D. 600 to 900), middle (A.D. 900-1000), and late (A.D. 1000 to 1200) subperiods. This temporal framework roughly corresponds to the Pecos Classification system developed by Kidder (1924).

Early Developmental period sites are uncommon in the Northern Rio Grande (Wendorf and Reed 1955:138). Archaeological survey at Cochiti Reservoir found only 12 sites that could be assigned to this period (Biella and Chapman 1977:203). McNutt (1969:70) located no early Developmental period components north of La Bajada and White Rock Canyon. In the eastern Galisteo Basin only five components may date to this period (Lang 1977; Scheick and Viklund 1989). The lack of evidence for sedentism suggests that there was a long-term pattern of hunting and gathering in the Northern Rio Grande. This continued focus on hunting and gathering may be in part attributed to the rich resource diversity of the Northern Rio Grande Valley, forestalling

an early reliance on small-scale farming (Cordell 1979:2).

During the middle Developmental period (A.D. 900 to 1000), site frequency increased in the Northern Rio Grande area. Excavations in the Santa Fe and Tesuque river valleys revealed pithouses associated with contiguous surface rooms, and perhaps a kiva (Honea 1971; McNutt 1969:58). The pottery was mineral painted in the Red Mesa style, and neckbanded utility wares occurred. The appearance of these sites does not necessarily suggest that population increased. Instead, the settlement and subsistence pattern had shifted from one of mobility, which left ephemeral archaeological remains, to a more sedentary lifestyle, which left more structural remains and artifact accumulations. The general pattern was still one of low population density.

During the late Developmental period (A.D. 1000 to 1200), the first population increase occurred in the Santa Fe area, as inferred from increased site numbers and size (Wendorf and Reed 1955:140-141). Larger village size suggests year-round residential occupation. The predominant pottery was Kwahe'e Black-on-white, originally identified by Mera (1935) as a local Rio Grande variant of Chaco-style pottery. Occurrence of this pottery style coincided with the growth of the Chaco system in the San Juan Basin in northwestern New Mexico. Site size in the Northern Rio Grande area ranges from 1 to 100 rooms. Known sites in the project area include LA 114 (Arroyo Negro), LA 15969 (Wiseman 1978), and a minor component at Pindi Pueblo (LA 1) (Stubbs and Stallings 1953). The Pindi Pueblo component shows that some large Coalition period sites had their origins in this period (Stubbs and Stallings 1953:14-15).

Arroyo Negro (LA 114) was originally recorded by Mera in the 1920s. It has seven small (less than 10 rooms) to medium (11-25) room blocks constructed of adobe with cobble foundations. In 1934, W. S. Stallings collected 95 tree-ring samples from pothunted rooms and four kivas (Smiley et al. 1953:27-29). The tree-ring dates indicate an occupation span between A.D. 1050 and 1150, with less reliable A.D. 950 to 1000 dates for Kiva C. Two construction episodes occurred between the A.D. 1050s and A.D. 1130 to 1145 (Smiley et al. 1953:29). Identified pottery types at LA 114 included Kwahe'e Black-on-white, Santa Fe Black-on-white, Socorro Black-on-white, and Wingate Black-on-red.

LA 15969 was identified by Wiseman (1978:8) on top of the gravel terrace overlooking the north prehistoric floodplain of the Santa Fe River. The site included a U-shaped 14-room structure with a kiva. It is estimated to have been occupied between A.D. 1100 and 1150, making it contemporaneous with the later occupation of LA 114.

The late Developmental component at Pindi Pueblo (LA 1) had two jacal structural remnants, a pithouse, and sparse refuse (Stubbs and Stallings 1953:9). The refuse was in the central portion of the site on a knoll. Identified pottery types included Red Mesa Black-on-white, Kwahe'e Black-on-white, and Puerco and Wingate Black-on-red (Stubbs and Stallings 1953:14). Stubbs and Stallings (1953:15) observed that the pre-Pindi material was very sparse and the deposit ranged from 2 to 50 cm deep. These deposits were underneath the later Coalition period occupation.

Coalition Period (A.D. 1200-1325)

The Coalition period is marked by three major changes in the archaeological record in the Northern Rio Grande: (1) a significant increase in the size and numbers of sites, suggesting an increase in population and an extension of the early village-level organization noted in the late

Developmental period; (2) pithouses as domiciles were replaced by contiguous arrangements of adobe and masonry surface rooms; and (3) a change in pottery-making technology from mineral to organic-based painted pottery. These changes were sufficiently important to warrant a new period in the Northern Rio Grande cultural sequence that was divided into two phases: Pindi (A.D. 1220-1300) and Galisteo (A.D. 1300-1325) (Wendorf and Reed 1955). The decorated pottery was divided into Santa Fe Black-on-white and all its local variants (Stubbs and Stallings 1953) for the Pindi phase, and Galisteo Black-on-white (Mera 1935) for the later phase. Most of the large sites were established during the Pindi phase. The largest sites continued to grow during the Galisteo phase, anticipating the large villages of the Classic period. Site sizes ranged from 2 to 200 rooms; 15 to 30 rooms was the most frequent size (Stuart and Gauthier 1981:51). Site frequencies in all areas of the Northern Rio Grande increased enormously at this time (Biella and Chapman 1977:203; Orcutt 1991; McNutt 1969; Lang 1977).

In the Santa Fe River Valley, large villages on the prehistoric floodplain near the river channel were established during the early Coalition period. The only reported excavations are at Pindi Pueblo (LA 1) (Stubbs and Stallings 1953) and the Agua Fria Schoolhouse site (LA 2) (Lang and Scheick 1989). LA 1, LA 2, LA 109, LA 117, LA 118, and LA 119 have Santa Fe and Galisteo Black-on-white pottery, and at least a small amount of glaze-paint pottery, suggesting that all six sites are roughly contemporaneous. These villages formed a large continuous community that was 3.2 km (2 miles) long. Sites in the Santa Fe River Valley recorded by Carter and Reiter (1933), but not by Mera, include CR (Carter-Reiter) 178, 180, 182, 183, and 185. These sites may have Coalition and early Classic period components, since LA 1 (Pindi Pueblo) and LA 2 (Agua Fria Schoolhouse) were recorded by Carter and Reiter as historic sites.

Site data for the late Coalition period show a thriving community along the Santa Fe River. Farming along the Santa Fe River, the presence of fresh-water springs, and access to diverse environments for subsistence items and raw material all contributed to successful settlement. OAS investigations at Las Campanas identified 20 components (Post 1996b) and the Northwest Santa Fe Relief Route inventory and testing (Maxwell 1988; Wolfman et al. 1989) yielded 16 components from the Coalition or early Classic period that remained from short duration or daily use of the piedmont hills. Thermal features were mainly shallow, oval-shaped pits with cobble linings or fire-cracked rock moderately abundant to absent. Two sites from the Las Campanas project, LA 86159 and LA 84793, yielded pottery-firing pit kilns associated with Santa Fe Black-on-white pottery (Lakatos 1996). Other sites exhibited chipped stone reduction patterns, which reflect material procurement and testing, and exhibited all stages of core reduction, supporting daily foraging activities. Local raw material made up 95 percent of the chipped stone debris. Sites were formed by single, high-intensity episodes or from many brief visits that left a dispersed artifact scatter.

Classic Period (A.D. 1325-1600)

Wendorf and Reed (1955) mark the beginning of this period (A.D. 1325-1600) by the appearance of Glaze A and locally manufactured red-slipped pottery (see also Mera 1935; Warren 1979). Characterized by Wendorf and Reed as a "time of general cultural florescence," regional populations reached their maximum size, and large communities with multiple plaza and room block complexes were established. Although the reasons for the appearance and proliferation of the glaze wares are debatable, many researchers, including Eggan (1950), Hewett (1953), Mera (1935, 1940), Reed (1949), Stubbs and Stallings (1953), and Wendorf and Reed (1955), believe that the similarity of the new pottery to White Mountain Redware is evidence for large-scale

immigration into the area from the San Juan Basin and Zuni region. Steen (1977) argues, however, that the changes seen during this period resulted from rapid indigenous population growth. Steen believes that the population growth was enabled by favorable climatic conditions, which allowed Rio Grande populations to practice dry farming in previously unusable areas. Steen also suggests that there was "free and open" trade between the Northern Rio Grande region and other areas, accounting for the observed changes in Classic period material culture.

It is therefore unclear how much of the population increase during this period resulted from immigration or from intrinsic growth. Besides populations migrating from the west, it has also been suggested that some population growth was due to the arrival of people from the Jornada branch of the Mogollon to the south, and perhaps from northern Mexico (Schaafsma and Schaafsma 1974).

Large villages of this period found in the Santa Fe vicinity include the Aqua Fria Schoolhouse site (LA 2), Arroyo Hondo (LA 12), Cieneguilla (LA 16), LA 118, and LA 119. When Glaze B pottery appeared (ca. A.D. 1425), however, only Cieneguilla was still occupied by a large population. Dickson (1979) believes that abandonment of the large villages was due to the drought conditions, revealed by tree-ring studies (Fritts 1965; Rose et al. 1981), and subsequent agricultural failure.

In the Santa Fe River Valley, LA 1 and LA 2 are the best known Classic period sites. LA 1 was occupied between A.D. 1325 and 1350, which is the early part of the period (Stubbs and Stallings 1953:155). This may have been a time of population movement and village reorganization. Pindi Pueblo experienced a short interlude of decreased occupation before A.D. 1325, but by A.D. 1330 there was new building and renewed use of older parts of the pueblo (Stubbs and Stallings 1953:14). A similar pattern was suggested for LA 12 (Arroyo Hondo Pueblo) (Lang and Scheick 1989:196). A change in kiva function may be indicated by a change in frequency (four to two) within villages and a change in their location from subterranean to surface placement. Perhaps as kiva function became more specialized, the number decreased. Plazas were more conspicuous at this time suggesting a more centralized social organization that may have required larger community areas for social or ceremonial functions. It is known that the large villages of the Galisteo Basin, the Rio Grande, and Rio Chama showed the same trends in the construction of fewer kivas and use of larger, more centrally located community space, as early Classic period Pindi Pueblo. The full florescence of the Classic period was not realized at Pindi Pueblo because it was abandoned in A.D. 1350, just as the larger villages were being established.

The limited excavation data for LA 2 suggests an occupation that lasted until A.D. 1420, which corresponds to Arroyo Hondo Pueblo and La Cieneguilla. Little is known about the early Classic period at LA 2. The abundance of Glaze A pottery suggests that the residents were engaged in regular social or economic interaction with the more southern Classic period villages (Lang and Scheick 1989). Lang and Scheick (1989:195) surmise that LA 2 was the largest village in the Santa Fe River Valley until A.D. 1420. If the village did house between 1,000 and 2,000 people as suggested by Lang and Scheick (1989:196), then the smaller surrounding villages (LA 117, LA 118, and LA 119) may have been abandoned by A.D. 1350 with the local population coalescing at LA 2. An untested hypothesis suggests that this coalescence may have been brought on by a change in social organization, and not environmental conditions. The resources of the Santa Fe River could have been successfully exploited by many little villages. Success notwithstanding, sometime after A.D. 1350, everyone may have moved into one large village. If economic resources were equally available to all, then there must have been other social or

religious factors that contributed heavily to population aggregation (Cordell 1978:58).

Sites from this period were rare in the Las Campanas assemblage (Post 1996b) and only three components were identified by the Northwest Santa Fe Relief Route inventory and testing (Maxwell 1988; Wolfman et al. 1989). The Las Campanas site data suggest a shift to a more logistically organized foraging or collecting pattern after A.D. 1425. Utility and decorated jar sherds, which are rare in the Las Campanas ceramic assemblage before A.D. 1425, are abundant on later sites suggesting caching, storage, and low-intensity domestic activities. The ceramic patterns suggest that these occupations lasted longer and involved activities necessary to support a group for overnight visits.

After A.D. 1420, Santa Fe River Valley, east of Agua Fria, was mostly abandoned. The large settlement at La Cieneguilla increased in size and was still occupied by Native Americans until the Pueblo Revolt in A.D 1680. The settlement pattern that prevailed throughout the Rio Grande, Rio Chama, and Galisteo Basin was a decrease in small villages or large farmsteads. The remaining large villages dramatically increased in size (Stuart and Gauthier 1981). Presumably, these large villages had extensive subsistence catchment basins and extensive networks of social and economic interaction. The pattern of few or no Native American sites dating between A.D. 1420 and 1680 is graphically reflected in the survey results from large parcels near the Santa Fe River Valley (Hannaford 1986; Maxwell 1988; Wiseman 1978; Gossett and Gossett 1989; Lang 1980).

The Historic Period (A.D. 1540 to 1940)

The Historic period in the Santa Fe area spans more than 400 years of interaction among Native American, Spanish, and Anglo-American cultures. A detailed summary of historical events and trends for the Middle Rio Grande and the Santa Fe area is beyond the scope of this report. Interested readers are referred to the many sources that detail the events and patterns of the historical period (Jenkins and Schroeder 1974; Lamar 1966; Larson 1968; Bannon 1979; Noble 1989; Pratt and Snow 1988; Kessell 1979; Twitchell 1925; Athearn 1989).

Except for the period of Spanish exploration, the Historic period is divided into time spans that reflect changes in political control in New Mexico. The Spanish exploration period includes the period between Coronado's *entrada* into New Mexico in 1540, and in 1598 when Don Juan de Oñate arrived at San Juan de Caballeros along the Rio Grande at modern San Juan Pueblo. The early Spanish Colonial period spans 1599 to 1680, which includes the founding of Santa Fe (1609-1610) and the beginning of the Pueblo Revolt. The return to Native American self-determination spanned 1680 to 1696. Beginning in 1696 and ending in 1698, Don Diego de Vargas recaptured New Mexico and returned political and economic control to Spain. The later Spanish Colonial period spanned A.D. 1698 to 1821, the year of Mexican independence from Spain. It was a time of settlement growth and expansion in New Mexico. The Mexican period lasted from A.D. 1821 to 1848. This period was a short interlude with minor changes in New Mexico social and political life, except for the initiation of trade with the United States and the official opening of the Santa Fe Trail. The Territorial period began in 1848, with the end of the Mexican-American War and the signing of the Treaty of Guadalupe Hidalgo. The Territorial period continued the expansion of the Anglo-American social, economic, and political system into the American Southwest that had begun with the opening of the Santa Fe Trail. The Territorial period ended with statehood in 1912. From statehood to World War II (A.D. 1912 to 1945), New Mexico continued to become

more integrated into the national political, economic, and social system. There was increased education and economic opportunity outside New Mexico and a steady flow of Anglo-Americans into New Mexico. These factors combined to crystallize the tricultural traditions that are a recognized part of New Mexico's past and present.

GENERAL TESTING METHODS

Each site was relocated using the survey description and locational maps. One to two hours were spent flagging the surface artifacts and features to obtain an accurate representation of the artifact distribution and the site limits. Artifact concentrations and features were expected to provide the best information on the depth, nature, and age of the cultural deposits.

A baseline was established for a 1-by-1-m grid system to provide the horizontal controls for the testing units. A 2-by-2-m excavation unit was established in each artifact concentration or at the edge of each surface feature. The excavation unit was surface stripped in 1-by-1-m units by removing the loose top soil and grass to a maximum depth of 10 cm. The soil was screened through ¼-inch steel mesh. Artifact counts were recorded and the unit that yielded the highest artifact count was selected for additional excavation. For units placed at surface features, additional excavation was undertaken in the unit that exposed the feature stain or outline.

Additional excavation of a 1-by-1-m unit within an artifact concentration proceeded until the depth of the cultural deposit was determined. This depth ranged from 10 to 30 cm below the surface strip depending on the setting and soil type. An auger test placed in the bottom of the 1-by-1-m unit reached bedrock or an impenetrable stratum 30 to 60 cm below the surface strip. Recording of the excavation unit included provenience information, nature of the cultural deposit, artifact types and counts from the surface strip and other excavated levels, a description of the soil type, and a stratigraphic drawing of the trench, if multiple soil strata were encountered.

Portions of features were excavated to expose the profile of the feature fill and content. All of the feature area within the selected 1-by-1-m unit was excavated, unless it would have constituted excavation of more than one-half of the feature. If too much of the feature would be exposed by excavating the exposed stain, then a 25-by-25-cm test pit was excavated within the stain to expose the profile and internal feature structure. Feature analysis included collecting a flotation sample for ethnobotanical analysis and radiocarbon dating, drawing a plan and profile map, describing the feature fill, and taking scaled photographs.

After the test excavations were complete, the site was transit-mapped showing the site limits, artifact concentrations, excavation areas, important topographic features, and available right-of-way markers. All surface artifacts were recorded using standard OAS attribute lists. The chipped stone attributes included material type and texture, artifact type and function, dorsal cortex percentage, dorsal scar counts, artifact dimensions, and flake condition and platform type. Pottery was recorded by type and vessel form and portion.

The excavations were backfilled when recording was complete. Sufficient stakes were left at the site to reconstruct the baseline and excavation unit locations, if data recovery was determined to be necessary.

TESTING RESULTS

Archaeological testing was completed for seven sites at three general locations along the relief route. The sites and the testing results are described. The testing results will be used to assess the data potential for each site within the context of current research on prehistoric occupation and use of the piedmont hills north of the Santa Fe River.

LA 108902 Site Description and Testing Results

LA 108902 is described in Post (1995:12-14) as located at NMSHTD center line station 21+00 along the County Road 70 extension. The majority of the artifacts were present in the west half of the right-of-way.

At an elevation of 2,043 m (6,700 ft), LA 108902 is on a long, broad, gentle northwest to southeast sloping ridge that separates the Arroyo de las Trampas from the Santa Fe River. The Arroyo de las Trampas is 670 m to the north and the Santa Fe River is 1 km to the south. The ridge top has deep alluvial soils capped by a dense and abundant gravel and cobble deposit. This deposit is exposed on the slopes and in eroded and deflated swales and erosion channels. The ground cover is predominantly grama grass and rabbitbrush with prickly pear and cholla cactus. Piñon-juniper is sparsely present.

LA 108902 is in good condition with the cultural deposit 51 to 75 percent intact. Erosion has been retarded by the gentle slope. Surface gravel and cobbles are evidence of some top soil deflation. The clustered prehistoric artifacts may result from one main occupation, with livestock grazing contributing to the limited dispersion.

Survey recording identified a multicomponent artifact concentration within a 29 m north-south by 19 m east-west, 551-sq-m area. Artifacts consist of 38 pieces of chipped stone debris, one utility pottery jar body, and three aqua glass bottle or tumbler fragments. The chipped stone distribution forms an oval pattern with the majority of the artifacts clustered in a central 15-by-15-m area. The glass fragments occur along the south site limit and the utility potsherd is along the southeast site periphery (Fig. 2).

Testing Results

Reexamination of the site and transit-mapping enlarged the site limits to 33 m north-south by 31 m east-west, covering 1,023 sq m (Fig. 2). A total of 83 chipped stone artifacts and two Coalition period sherds were flagged and recorded or recovered from the surface or surface strip within excavation units. Except for the sherds, no temporally diagnostic artifacts were encountered.

Two 2-by-2 m units, 109N/100E and 123N/98E, were located centrally or on the periphery of the chipped stone artifact cluster. Excavation Unit 109N/100E had 20 artifacts recovered from surface and surface strip. No artifacts were recovered from below the 5-cm-deep surface strip level. Excavation Unit 123N/98E had four surface artifacts, but only one was recovered from the surface strip and no artifacts were recovered from deeper strata.

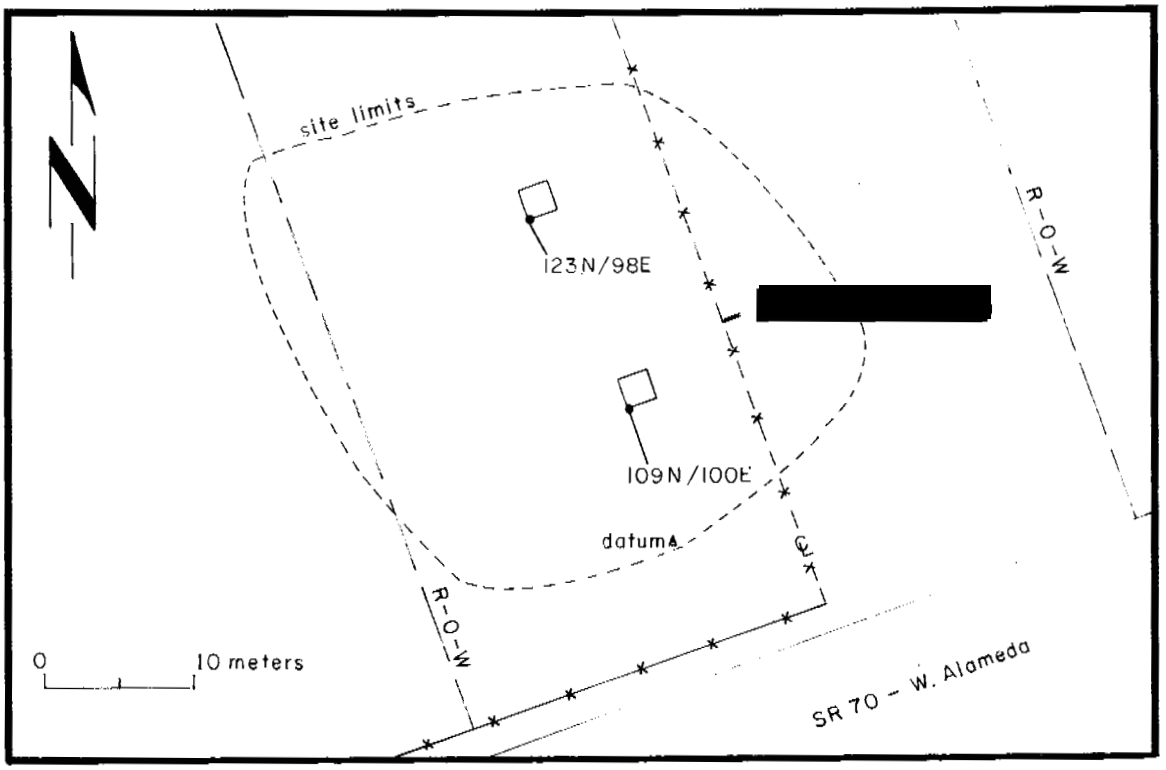

Figure 2. LA 108902, site map.

Both units were excavated to 20 cm and auger-tested to 33 to 70 cm below the surface strip, exposing three stratigraphic levels. Stratum 1 consisted of a 20-cm-thick, strong brown (7.5YR 4/6, dry) sandy clay loam that was homogeneous, moderately plastic when moistened, and contained 5 to 10 percent pea gravel and occasional cobbles. This layer is consistent with Pojoaque-Panky association, rolling A1 horizon (Folks 1975:43). Stratum 2 was a 40-cm-thick layer of calcareous, reddish brown (7.5YR 4/4, dry) clay loam, moderately plastic to sticky when wet, and increasingly more calcareous with depth. At 60 cm below the modern ground surface a pinkish white, sandy clay loam that is strongly calcareous with 40 to 60 percent disseminated calcium carbonate was encountered. This layer is similar to the Panky Fine Sandy Loam Cca horizon (Folks 1975:40).

Chipped Stone Artifacts. Eighty-three chipped stone artifacts were recorded in the field or in the lab. Artifacts studied in the lab were recovered from surface and surface strip levels within the two excavation units. The artifact and material type distributions for field and lab recorded assemblages are presented in Tables 1 and 2.

The main material types, chert (including Madera chert), obsidian, basalt, and quartzite, occurred in roughly similar proportions in the field and laboratory-recorded assemblages. Basalt, which commonly occurs in the lag gravel along the Rio Grande, was the main material type (Warren 1977). Quartzite, chert, and chalcedony are common in the pediment gravel along the Arroyo de los Frijoles and Arroyo Calabasas to the north of the site. Obsidian would have been obtained from the Jemez Mountains. When compared with other Northwest Santa Fe Relief Route assemblages, the LA 108902 material type distribution is unique. Typically, chert and quartzite were the predominant material types, with the exception of LA 61282, which had obsidian as the

main material type (Wolfman et al. 1989:122-128).

Artifact types were dominated by core flakes with fewer occurrences of biface flakes and angular debris. Field recording identified higher numbers of biface flakes and laboratory analysis identified more angular debris. Basically, excavation unit locations missed the higher concentration of biface flakes and focused on core reduction. Inventory recording suggested that a higher percentage of biface flakes was present. However, detailed field recording showed that the initial assessment erred in favor of biface flakes and decreased the contribution of core reduction debris. This led to the assumption that LA 108902 was geared to hunting and might be of Archaic age. Generally, the Northwest Santa Fe Relief Route assemblages comprised mainly core reduction debris with occasional manufacturing flakes (Wolfman et al. 1989:122-128). The LA 108902 assemblage does have more biface flakes than the majority of the Northwest Santa Fe Relief Route sites, suggesting temporal or function differences.

The material and artifact types reflect core and biface reduction of local and nonlocal materials. Chert and basalt occurred as core reduction; less than 20 percent of the assemblage was biface flakes. Obsidian was more equally distributed between core and biface flakes suggesting some differential use of nonlocal material. The emphasis on core reduction for basalt suggests that locally obtained cobbles or nodules were used, though it is rare in the local gravel deposits. The mixed reduction strategies combined with use of a nonlocal material suggests a brief occupation logistical foraging camp or base camp occupation. This is a typical Archaic period pattern for Las Campanas area sites (Post 1996b).

Table 1. LA 108902, Field and Laboratory Analysis by Artifact Type

Count Row Pct	Angular Debris	Core Flake	Biface Flake	Resharpening Flake	Row Total
Field	5 8.5	42 71.2	12 20.3		59 71.1
Laboratory	4 16.7	17 70.8	2 8.3	1 4.2	24 28.9
Column Total	9 10.8	58 69.9	13 15.7	1 1.2	83

Table 2. LA 108902, Field and Laboratory Analysis by Material Type

Count Row Pct	Chert	Madera Chert	Chalcedony	Obsidian	Basalt	Quartzite	Row Total
Field	8 13.6	8 13.6	1 1.7	8 13.6	29 49.2	5 8.5	59 71.1
Laboratory	8 33.3			4 16.7	10 41.7	2 8.3	24 28.9
Column Total	16 19.3	8 9.6	1 1.2	12 14.5	39 47.0	7 8.4	83 100.0

Pottery. Two decorated sherds were located during the testing phase. The utility ware sherd found during the inventory was not relocated. One sherd was a Pindi Black-on-white bowl body fragment. Pindi Black-on-white was a common pottery type made between A.D. 1325 and 1350 (Stubbs and Stallings 1953; Habicht-Mauche 1993). The second sherd was a Santa Fe Black-on-white bowl body fragment. Santa Fe Black-on-white, made between A.D. 1200 and 1425, was the most common decorated pottery type found on Northwest Santa Fe Relief Route sites (Wolfman et al. 1989) and on Las Campanas area sites (Post 1996b). The presence of Santa Fe and Pindi Black-on-white pottery reflects proximity to the Santa Fe River Coalition to early Classic period sites of Pindi Pueblo (LA 1) and Agua Fria Schoolhouse site (LA 2). These pottery types suggest that LA 108902 was partly occupied at the height of prehistoric settlement along the Santa Fe River.

Summary

Test excavation and artifact recording of LA 108902 emulated the patterns observed during the inventory. Artifact distribution is mainly restricted to the surface or upper 5 cm of modern soil. Artifact density for the excavated sample does seem to be higher than the surface density. An average of three artifacts per square meter was recovered by excavation. This average artifact density can be projected across the site with an estimated maximum artifact yield of 3,000 artifacts. While this estimate may seem too high for artifact yield, it is probable that surface stripping within a 400 sq m area of the site might easily yield up to 1,200 artifacts. A 1,200 artifact assemblage for a Coalition to early Classic period limited activity or foraging site would be highly unusual and would suggest multiple occupations. The same yield from an Archaic period base camp would not be unusual based on the Las Campanas excavation results (Post 1996b). While LA 108902 does not have great depth, it does have potential for comparison with assemblages from the Northwest Santa Fe Relief Route and the Las Campanas area.

LA 108903 Site Description and Testing Results

LA 108903 is described in Post (1995:14-16) as located at NMSHTD center line station [redacted] along the County Road 70 extension. The majority of the artifacts were present in the western half of the right-of-way.

At an elevation of 2,043 m (6,700 ft), LA 108902 is on the lower slope of a long, broad, gentle northwest-southeast sloping ridge that separates the Arroyo de las Trampas from the Santa Fe River. The Arroyo de las Trampas is 480 m to the north and the Santa Fe River is 1.2 km to the south. The ridge slope has deep alluvial soils capped by a dense and abundant gravel and cobble deposit. The deposit and cultural material area exposed on the slopes and in eroded and deflated swales and erosion channels. The ground cover is predominantly grama grass and rabbitbrush with prickly pear and cholla cactus. Piñon and juniper are sparsely present.

LA 108902 is deflated. The cultural deposit is 51 to 75 percent intact. Along the east site limit, the slope is gentle to nonexistent. The grama grass cover is thick and the soil is stabilized. Artifacts tend to be more tightly clustered in the stabilized areas. To the west and downslope, the soils are moderately to severely deflated with the sandy top soil containing moderate to dense gravel and cobble deposits. It appears that the prehistoric A horizon has been eroded and replaced with a mix of lower A1 and B2 horizons. The gravel and cobble exposures contain numerous

small tabular nodules and cobbles of chert and quartzite of flintknapping quality. Based on the chipped stone assemblage, these potential raw materials were exposed during the prehistoric occupation. The swale erodes into a shallow drainage that flows southwest into a primary tributary of the Arroyo del las Trampas. Based on the eroded and deflated nature of the soil, shallow to nonexistent cultural deposits were expected. The majority of the cultural material occurs in a distribution pattern that has been dispersed and elongated east-west.

Survey recording identified a multicomponent artifact concentration within a 105 m north-south by 28 m east-west, 2,940 sq m area. Fewer than 100 chipped stone artifacts of local material, consisting mostly of core reduction debris, were observed in four, low-frequency concentrations. Additionally, a deflated cobble-lined thermal feature was exposed in a deflated area at the edge of a recent drainage channel. Historic period artifacts were observed in the northern portion of the site, but were not further examined during testing. The historic artifacts post-date 1930.

Testing Results

Reexamination of the site and transit-mapping decreased the site limits to 55 m north-south by 45 m east-west, covering 2,465 sq m (Fig. 3). A total of 73 chipped stone artifacts and one utility ware rim sherd were flagged and recorded or recovered from the surface or surface strip within excavation units. Except for the sherds, no temporally diagnostic artifacts were encountered.

Two 2-by-2-m units, 84N/103E and 48N/104E, were located centrally or on the periphery of two chipped stone artifact clusters. A third excavation unit, 75N/99E, was placed at the edge of Feature 1, a deflated thermal feature. Four artifacts were recovered from surface and surface strip of Excavation Unit 84N/103E. No artifacts were recovered from below the 5-cm-deep surface strip level. Excavation Unit 48N/104E had six artifacts, of which four were recovered through surface stripping. Only one artifact was recovered from 75N/99E in spatial, but unknown temporal association with Feature 1. One 1-by-1-m unit within each excavation unit was excavated to 10 cm below the surface strip, and an auger test was used to determine soil depth. No cultural materials were recovered from lower levels and the pinkish white Panky C2cam soil was encountered at 50 cm below the surface strip in 48N/105E and 85N/104E.

Two 1-by-1-m units, 48N/105E and 85N/104E, were excavated to 10 cm and auger tested 60 cm below the surface strip, exposing two stratigraphic levels. Stratum 1 consisted of a 40- to 50-cm-thick, brown (10YR 6/4, moist) sandy clay loam that was homogeneous, moderately plastic when moistened, and contained 5 to 10 percent pea gravel and occasional cobbles. This layer is consistent with the Pojoaque-Panky association, rolling A1 horizon (Folks 1975:43). Stratum 2 is a fine sandy loam that is strongly calcareous with 40 to 60 percent disseminated calcium carbonate. This layer is similar to the Panky Fine Sandy Loam C2cam horizon (Folks 1975:40).

Excavation Unit 76N/99E revealed a mixed deposit of Panky-Pojoaque A1 and C2cam soils below the modern deflated A1 horizon. The mixing of the two soils reflects severe deflation and downslope deposition of the A1 horizon from the eastern portion of the site. The 40- to 50-cm-thick A1 horizon is missing and apparently has been removed by recent or periodic erosion sequences, exposing the lower hearth fill and cobble lining of Feature 1.

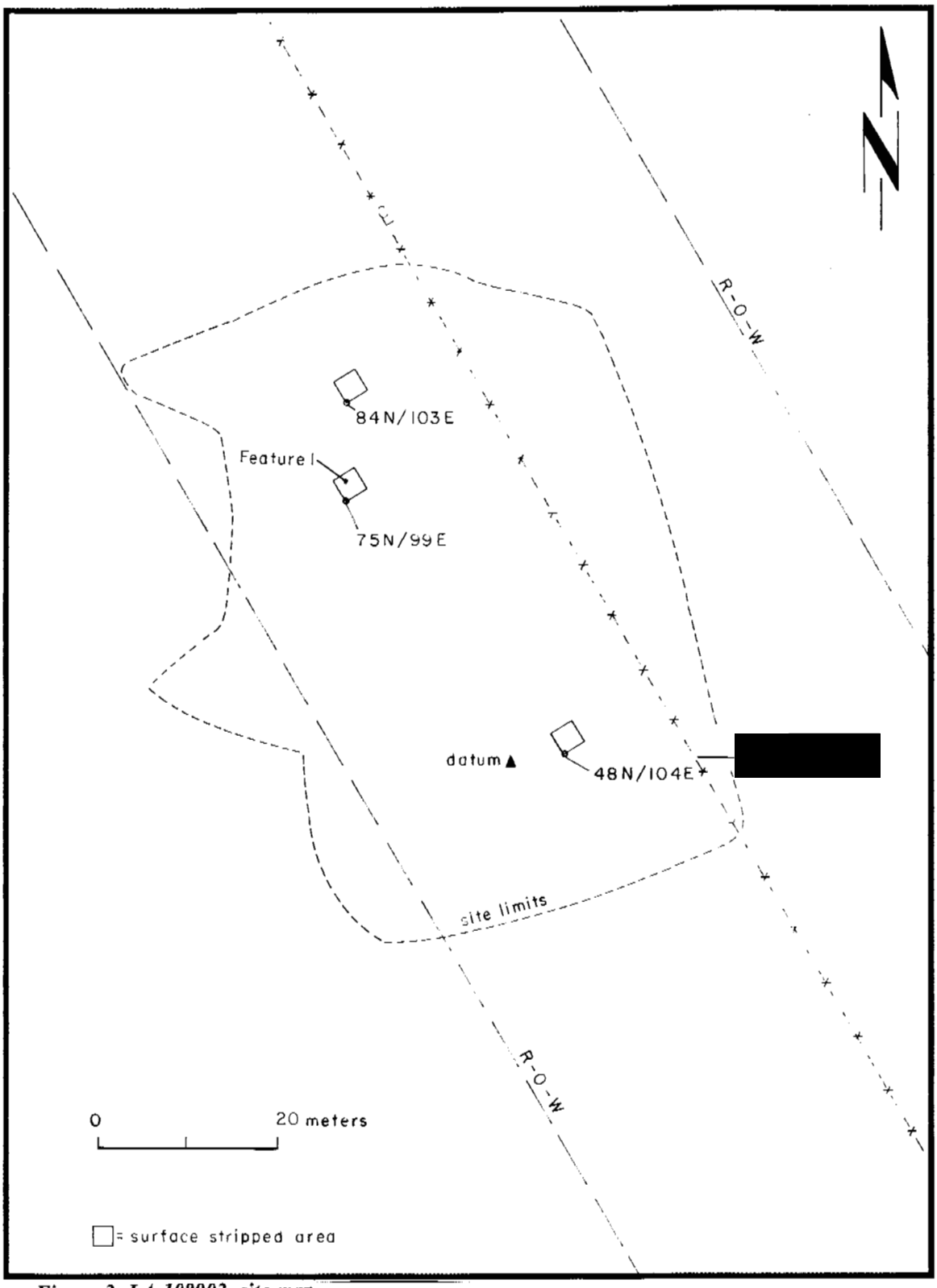

Figure 3. LA 108903, site map.

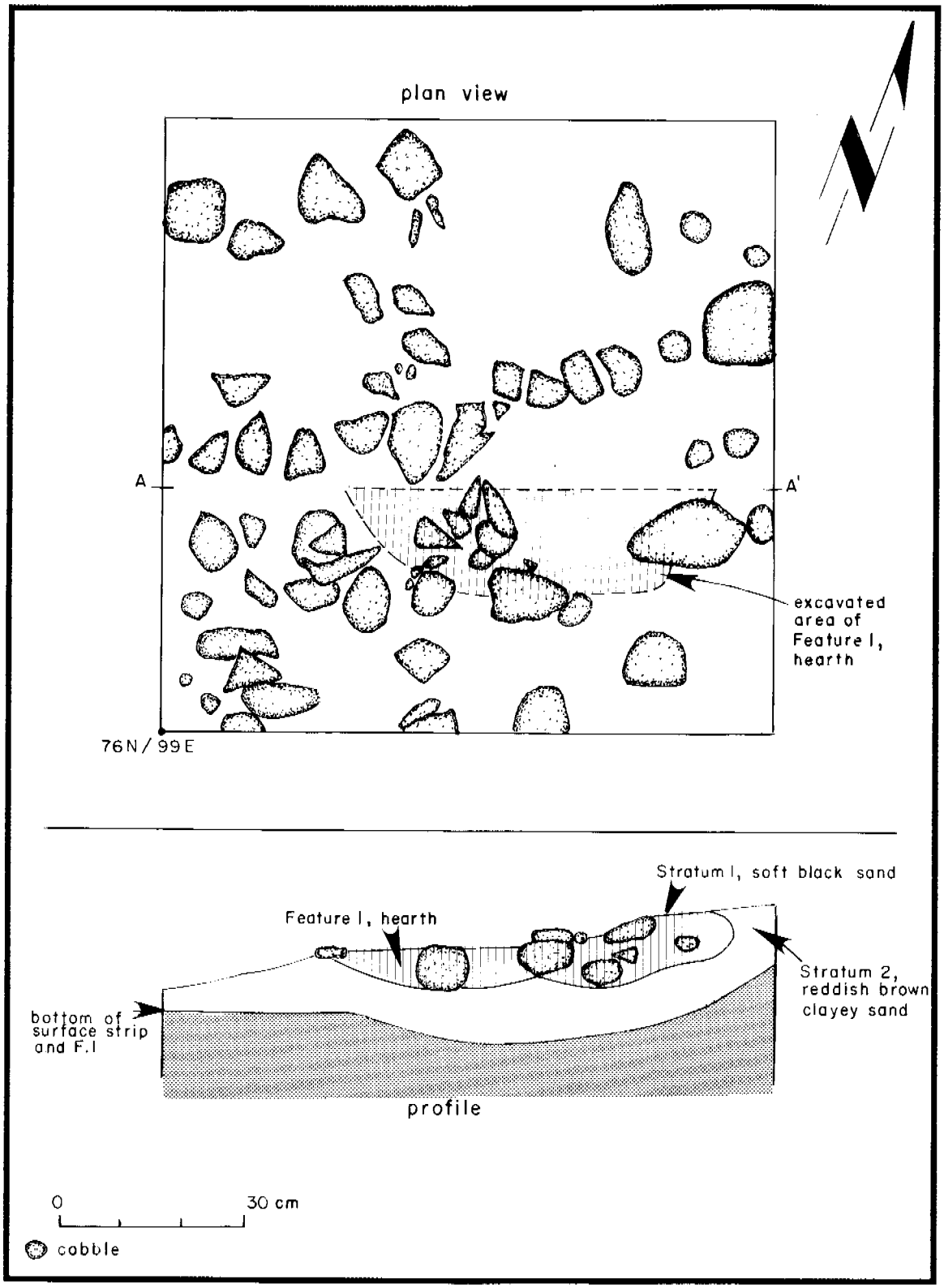

Figure 4. LA 108903, Feature 1, plan and profile.

Feature 1. Feature 1 was cross-sectioned with the southern half excavated to expose the feature profile (Fig. 4). From excavation, Feature 1 dimensions were estimated between 85 and 150 cm long by 65 cm wide by 5 to 12 cm deep. It was oval shaped with moderately sloped walls and a basin-shaped bottom. Cobbles are lying at the bottom of the darkest (10YR 3/1, very dark gray) soil. The cobbles are blackened and fire-cracked. Approximately 25 gray, white, pink, and black quartzite cobbles were represented by whole and fractured specimens. Maximum cobble dimensions ranged from 5 to 12 cm with most cobbles small to medium in size. A 2.25 liter flotation sample was collected and examined, and no economic plant species were present (Toll 1997). Feature 1 is an oval-shaped thermal feature typical of those found in the Las Campanas area (Post 1996b) and along the Northwest Santa Fe Relief Route (Wolfman et al. 1989).

Chipped Stone Artifacts. A total of 73 chipped stone artifacts were field recorded or recovered by excavation. Artifact and material type frequencies are provided in Table 3. Chert and Madera chert are the main raw material types; lesser amounts of quartzite and chalcedony occur. Madera chert is the red to pink to chalcedonic white, fine- to coarse-grained material, which is redeposited from the Pennsylvanian age Madera formation that occurs in the lower Sangre de Cristo foothills (Lang 1993). This chert was common on Northwest Santa Fe Relief Route (Wolfman et al. 1989) and Las Campanas sites (Post 1996b). It has mixed with the terrace gravel found along the Arroyo de los Frijoles and Arroyo Calabasas.

Raw material procurement and core reduction were the main activities evidenced by the chipped stone assemblage. Core flakes predominate, but nine cores and one tested cobble were also recorded. The high percentage of cores is unusual and suggests that a pocket of raw material was exposed on or near the site. Raw materials were tested and cores reduced for transport or core flakes produced for transport. Low-frequency material procurement sites were common along the Northwest Santa Fe Relief Route and as small sites along the Arroyo de los Frijoles.

Summary

LA 108903 is a small artifact scatter associated with a deflated thermal feature. Test excavation and recording decreased the site limits by 50 percent. Artifact recording and test excavation provided information on 73 pieces of chipped stone. Test excavation revealed that the cultural deposit was shallow and subject to mixing from erosion and deflation. Feature 1 is a deflated, cobble-lined thermal feature. It lacked identifiable ethnobotanical remains and artifacts. No artifacts could be associated with feature use. Chipped stone analysis suggests that material procurement and early to middle stage core reduction were the primary activities. Exposed gravel display suitable knapping material. Similar deposits were apparently available to the prehistoric people that traveled between the Santa Fe River and the piedmont hills and arroyos to the north. Dating of LA 108903 was not possible. The single utility ware sherd could date from A.D. 1000 to 1300. The relatively scattered distribution of the artifacts and the isolated feature suggest that LA 108903 was created by multiple, short-lived occupations. Excavation revealed no subsurface cultural deposits and limited nonsurficial artifacts. It is unlikely that LA 108903 would yield more detailed information than has been collected by test excavation.

Table 3. LA 108903, Artifact Type by Material Type

Count Row Pct Col Pct	Chert	Madera Chert	Chalcedony	Quartzite	Row Total
Angular debris	3 37.5 12.5	3 37.5 8.6	1 12.5 33.3	1 12.5 9.1	8 11.0
Core flake	18 32.7 75.0	26 47.3 74.3	2 3.6 66.7	9 16.4 81.8	55 75.3
Tested cobble		1 100.0 2.9			1 1.4
Unidirect. core	2 50.0 8.3	2 50.0 5.7			4 5.5
Bidirect. core	1 100.0 4.2				1 1.4
Multidirect. core		3 75.0 8.6		1 25.0 9.1	4 5.5
Column Total	24 32.9	35 47.9	3 4.1	11 15.1	73 100.0

LA 111364 Site Description and Testing Results

LA 111364 is on a gentle to moderately steep, southwest-facing slope that is cut by numerous minor drainages, two of which bound the site on the east and west. The site extends from the ridge slope to the bank of a primary tributary of Arroyo de los Frijoles. The site is at the headwaters of the arroyo, where numerous modern channels have cut into the deep alluvium and combine to form a broad and braided channel. The ridge top has deep Pojoaque-Rough Broken Land complex soils (Folks 1975:43) capped by a dense and abundant Ancha formation gravel and cobble deposit that is exposed on the slopes. The arroyo channel is cut into Bluewing gravelly sandy loam (Folks 1975:16). The ground cover is predominantly grama grass and rabbitbrush with prickly pear, cholla cactus, and narrowleaf yucca. Piñon-juniper is sparse to moderately abundant.

The site is in eroded condition. The top soil on the ridge slope is deflated with cobbles and gravel forming a pavement where many of the chipped stone artifacts were found. The lower slope along the margins of the arroyo channel is deflated and eroded with diffuse soil stains evident. The sherds occur on this lower slope in association with the soil stains.

Initially, LA 111364 was described as a low density and frequency artifact scatter associated with a diffuse soil stain of an undetermined nature (Post 1996a). Kwahe'e Black-on-white sherds were associated with the stain, and very dispersed chipped stone occurred on the lower slope at the edge of the arroyo. Chipped stone debris of local material was scattered across the middle and upper ridge slope where the gravel and cobble cover was densest. The site is primarily within the right-of-way limits at Centerline Station 61+00 along the access ramp to Camino la Tierra.

Reevaluation of LA 111364 revealed that it is larger and displays more time depth than was originally suggested by the survey data. Site dimensions increased to 54 m east-west by 47 m north-south covering 2,538 sq m (Fig. 5). Artifact frequency and density also increased from the 30 pieces of chipped stone and 7 sherds to 100 chipped stone artifacts and 24 sherds, including Kwahe'e and Santa Fe Black-on-white, Biscuit A, Biscuit B, Sankawi Black-on-cream, and smeared indented corrugated pottery, which were field recorded or recovered by excavation.

Also, LA 111364 was found to closely border LA 61308, which was examined during the initial testing phase for the Northwest Santa Fe Relief Route project (Wolfman 1989:69-71). LA 61308 yielded a dispersed chipped stone scatter with Biscuit B and Sankawi Black-on-cream pottery, but the cultural deposit displayed no depth. LA 111364 and LA 61308 represent a late Classic foraging locus at the head of the primary tributary arroyo that separates them.

Testing Results

Testing of LA 111364 focused on determining the nature of the dark soil stain and assessing the potential for subsurface cultural deposits or artifacts. Four 2-by-2-m excavation areas were established. Two units (72N/107E and 80N/108E) were located within the limits of the soil stain and Kwahe'e Black-on-white cluster. One unit (92N/107E) was located at a chipped stone concentration on the middle ridge slope, and a fourth unit (94N/126E) was located on the upper slope in a chipped stone and Biscuit ware pottery cluster. Each unit was surface stripped in 1-by-1-m grids and the 1-by-1-m unit with the highest artifact count was excavated deeper.

Excavation Units 72N/107E and 80N/108E revealed two main strata. Unit 72N/107E yielded no artifacts from the surface strip or deeper, and 80N/108E yielded three sherds and two chipped stone artifacts from the surface strip, and one lithic artifact from 5 cm below the surface strip. One fleck of charcoal was observed in 80N/108E, otherwise there was no evidence of a feature or deflated cultural deposit. Excavations stopped at 30 cm below the surface strip and augering went 60 cm below the surface strip.

Excavation Units 92N/107E and 94N/126E examined the artifact distribution on the ridge slope. Both revealed a shallow cultural level with higher artifact counts recovered from the surface strip than were evident on the surface. Excavation Unit 92N/107E had six surface lithic artifacts and nine surface strip artifacts. Excavation Unit 94N/126E had three sherds and one lithic artifact on the surface and seven sherds and eight lithic artifacts recovered from the surface strip. Both units were excavated 30 cm below the surface strip and augered 50 cm below the surface strip with no deeper cultural material encountered.

Two soil strata were exposed in the lower slope excavation units. Stratum 1 was a 14-cm-thick layer of dark brown (10YR 4/3, moist), moderately consolidated sandy loam with concentrated organic material and 20 to 30 percent gravel. Stratum 2 was a 12-cm-thick dark

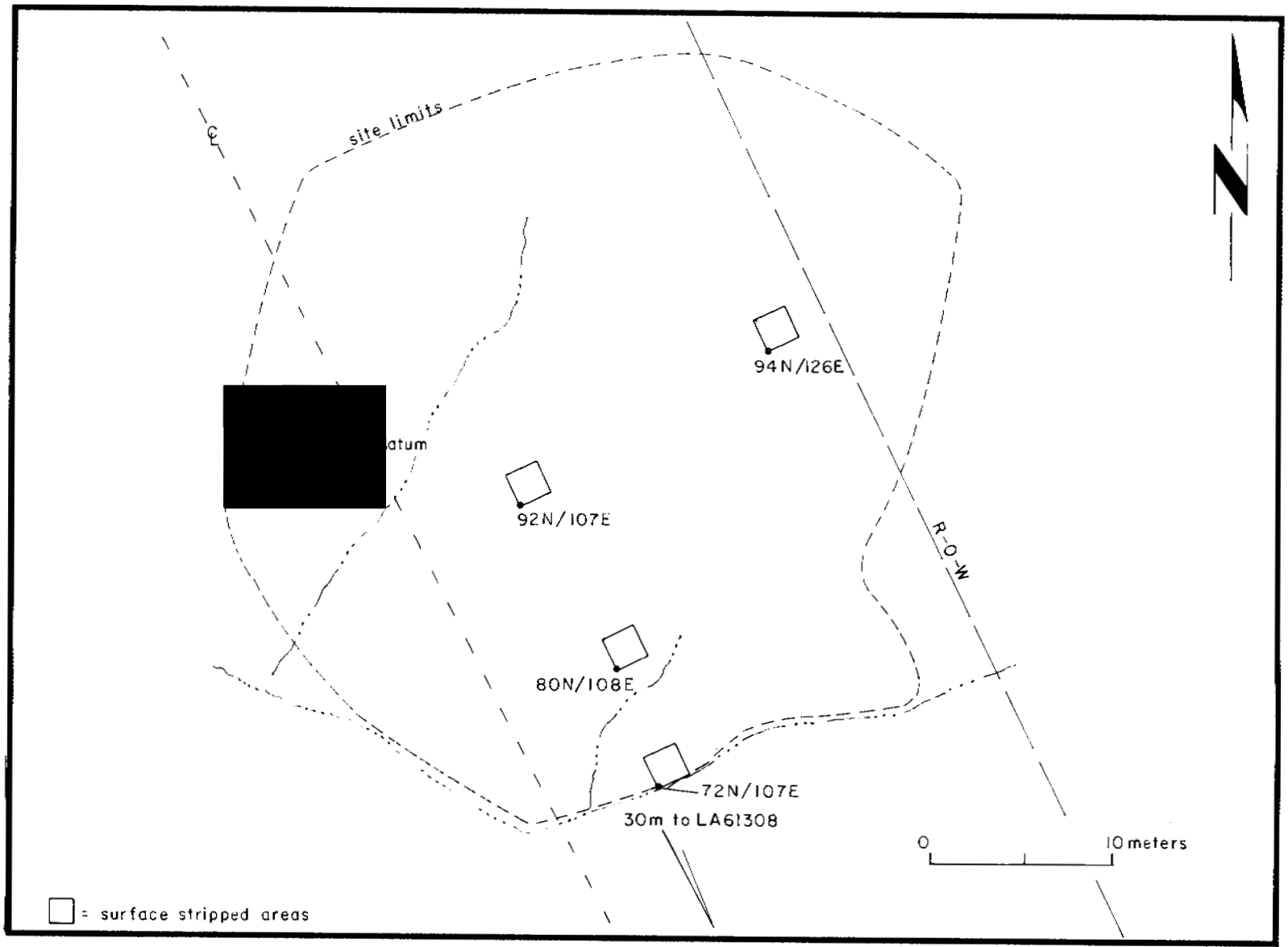

Figure 5. LA 111364, site map.

brown (7.5YR 4/4, moist) loosely consolidated sandy loam that increased in gravel content and calcium carbonate with depth. These strata are consistent with the upper layers of the Pojoaque-Panky rolling association (Folks 1975:43).

The middle and upper slope excavation units exhibited a 40- to 50-cm-thick layer of brown to dark brown (7.5YR 4-5/4, moist), moderately consolidated sandy clay loam with 10 to 30 percent gravel and cobbles and increasing calcium carbonate with depth. This is consistent with the upper layers of the Pojoaque-Rough Broken Land complex soils (Folks 1975:43).

Pottery. Eleven sherds were recovered by excavation. From the sherd concentration and soil stain, excavation recovered an ash-tempered Santa Fe Black-on-white jar sherd (72N/107E), a coarse feldspar-tempered utility jar sherd, and a crystal pumice-tempered undifferentiated white ware (80N/108E). These sherds combine with the Kwahe'e Black-on-white to indicate that the lower slope area is multicomponent, reflecting numerous site visits rather than a single component fieldhouse or foraging site.

Five Biscuit B bowl body sherds, two Sankawi Black-on-cream bowl body sherds, and a mica and quartz paste utility ware were recovered from 94N/126E. These sherds date to the late Classic or early historic periods (A.D. 1450 to 1650) and were brought from the Pajarito Plateau. The nearest village that might have used this area for foraging during the late Classic or historic periods is Cieneguilla Pueblo, about 15 km to the west. Biscuit ware pottery at Cieneguilla Pueblo would suggest trade with the Pajarito Plateau villages.

Thirteen sherds were field recorded and their locations piece-plotted. Identified types include Kwahe'e Black-on-white (n = 3), Santa Fe Black-on-white (n = 2), Biscuit B (n = 4), Sankawi Black-on-cream (n = 1), undifferentiated white ware (n = 1), and smeared indented corrugated (n = 2). These sherds reflect a temporal span from A.D. 1000 to 1650.

Chipped Stone Artifacts. One hundred chipped stone artifacts were field recorded or recovered by excavation. Tables 4 and 5 show the distribution of artifact types and material types for field recorded and laboratory analyzed artifacts. Artifact types are similar for field and lab analyzed assemblages. Field-recorded artifacts were more diverse and included a biface flake, tested cobble, and an early stage biface. Material types were all locally available, except for the obsidian artifact recorded in the field. Chert and quartzite predominate, reflecting their abundance in the pediment gravel occurring along the Arroyo de los Frijoles and its primary tributary arroyos.

Table 6 shows the artifact types by material types for field and lab recorded artifacts combined. Core flakes predominate for all material types and are 85 percent of the assemblage. Chert and quartzite cores are evidence of on-site core reduction, and the quartzite tested cobble reflects raw material procurement. The early stage biface suggests that middle and late stage reduction occurred, but on a small scale. It is likely that core reduction was primarily geared to production of expedient tools for plant gathering and initial processing.

Summary

Reevaluation and test excavation of LA 111364 revealed a larger site with greater time depth than was originally described. The soil stain and concentration of late Developmental period sherds proved not to be an isolated fieldhouse or foraging location. Instead, the pottery indicates occupations occurring sporadically between A.D. 1000 and 1650. This long occupation span

Table 4. LA 111364, Field and Lab Analysis by Artifact Type

Count Row Pct	Angular Debris	Core Flake	Biface Flake	Tested Cobble	Multidirect. Core	Early Stage Biface	Row Total
Field	8 11.3	59 83.1	1 1.4	1 1.4	1 1.4	1 1.4	71 71.0
Lab	2 6.9	26 89.7			1 3.4		29 29.0
Column Total	10 10.0	85 85.0	1 1.0	1 1.0	2 2.0	1 1.0	100 100.0

Table 5. LA 111364, Field and Lab Analysis by Material Type

Count Row Pct	Chert	Madera Chert	Chalcedony	Obsidian	Quartzite	Row Total
Field	14 19.7	28 39.4	2 2.8	1 1.4	26 36.6	71 71.0
Lab	13 44.8	4 13.8			12 41.4	29 29.0
Column Total	27 27.0	32 32.0	2 2.0	1 1.0	38 38.0	100 100.0

Table 6. LA 111364, Artifact Type by Material Type

Count Row Pct Column Pct	Chert	Madera Chert	Chalcedony	Obsidian	Quartzite	Row Total
Angular debris	2 20.0 7.4	5 50.0 15.6			3 30.0 7.9	10 10.0
Core flake	25 29.4 92.6	24 28.2 75.0	2 2.4 100.0	1 1.2 100.0	33 38.8 86.8	85 85.0
Biface flake		1 100.0 3.1				1 1.0
Tested cobble					1 100.0 2.6	1 1.0
Multidirect. core		1 50.0 3.1			1 50.0 2.6	2 2.0
Early stage biface		1 100.0 3.1				1 1.0
Column Total	27 27.0	32 32.0	2 2.0	1 1.0	38 38.0	100 100.0

resulted in a spatially expansive artifact scatter reflecting all stages of expedient stone tool production and limited evidence of formal tool production. Local raw materials were available on the ridge slopes during all periods. Excavation revealed shallow depth for cultural materials, but that subsurface artifacts outnumbered surface artifacts in the middle and upper slope excavation units. LA 111364 can potentially provide information on long-distance late Developmental and late Classic period foraging strategies. Additional excavation should reveal assemblages that can be compared with similar aged sites from previous excavations along the Northwest Santa Fe Relief Route and the Las Campanas area.

LA 113946 Site Description and Testing Results

LA 113946 is located between [redacted] and is almost completely within the right-of-way. It is on the south-southeast-facing slopes of a broad ridge that bounds the Arroyo Gallinas drainage system on the north. The ridge slope has deep Pojoaque-Rough Broken Land complex soils (Folks 1975:43) capped by a dense and abundant Ancha formation gravel and cobble deposit that is exposed on the slopes. The ground cover is predominantly grama grass and rabbitbrush with prickly pear, cholla cactus, and narrowleaf yucca. Piñon-juniper is sparse to moderately abundant.

The site is deflated with two shallow drainages cutting through its central portion. The southern arroyo shown in Figure 6 has formed outside of a former channel that has filled at its head and no longer drains the site. It appears that this is an active geomorphological environment as Feature 1 has been exposed by recent erosion and the artifact concentration in 103N/100E spreads downslope.

The artifact scatter that defines the LA 113946 site limit is 48 m northeast-southwest by 36 m northwest-southeast and covers an estimated 1,728 sq m (Fig. 6). The majority of the cultural materials and Feature 1 are concentrated in a 17-by-10-m area. This portion of the site contains a high density core reduction area that may have 100 to 200 surface artifacts within a 3-by-3-m area. The remaining site area is covered by a very dispersed artifact scatter consisting of chipped stone.

Testing Results

Testing of LA 113946 focused on determining the condition of the exposed thermal feature (Feature 1) and assessing the data potential of the high-density chipped stone concentration. A 2-by-2-m unit placed in the artifact concentration (103N/100E), and another that abutted the exposed thermal feature (92N/105E), were surface stripped. A 1-by-1-m unit within 103N/100E was excavated to 30 cm below the surface strip. Unit 92N/106E was partly excavated exposing the Feature 1 profile and a distinct charcoal-stained soil outline.

Excavation of 103N/101E yielded 137 chipped stone artifacts. Five lithic artifacts were recovered 10 cm below the surface strip. The soil was a 40-cm-thick, dark brown (7.5YR 3/4, moist) sandy clay loam with 10 to 20 percent pea gravel and low calcium carbonate content. The sandy clay loam is consistent with the Pojoaque-Rough Broken Land complex soils (Folks 1975:43). This layer was above the friable sandstone bedrock that is visible in the 1-m-deep arroyo cuts that occur in the surrounding area.

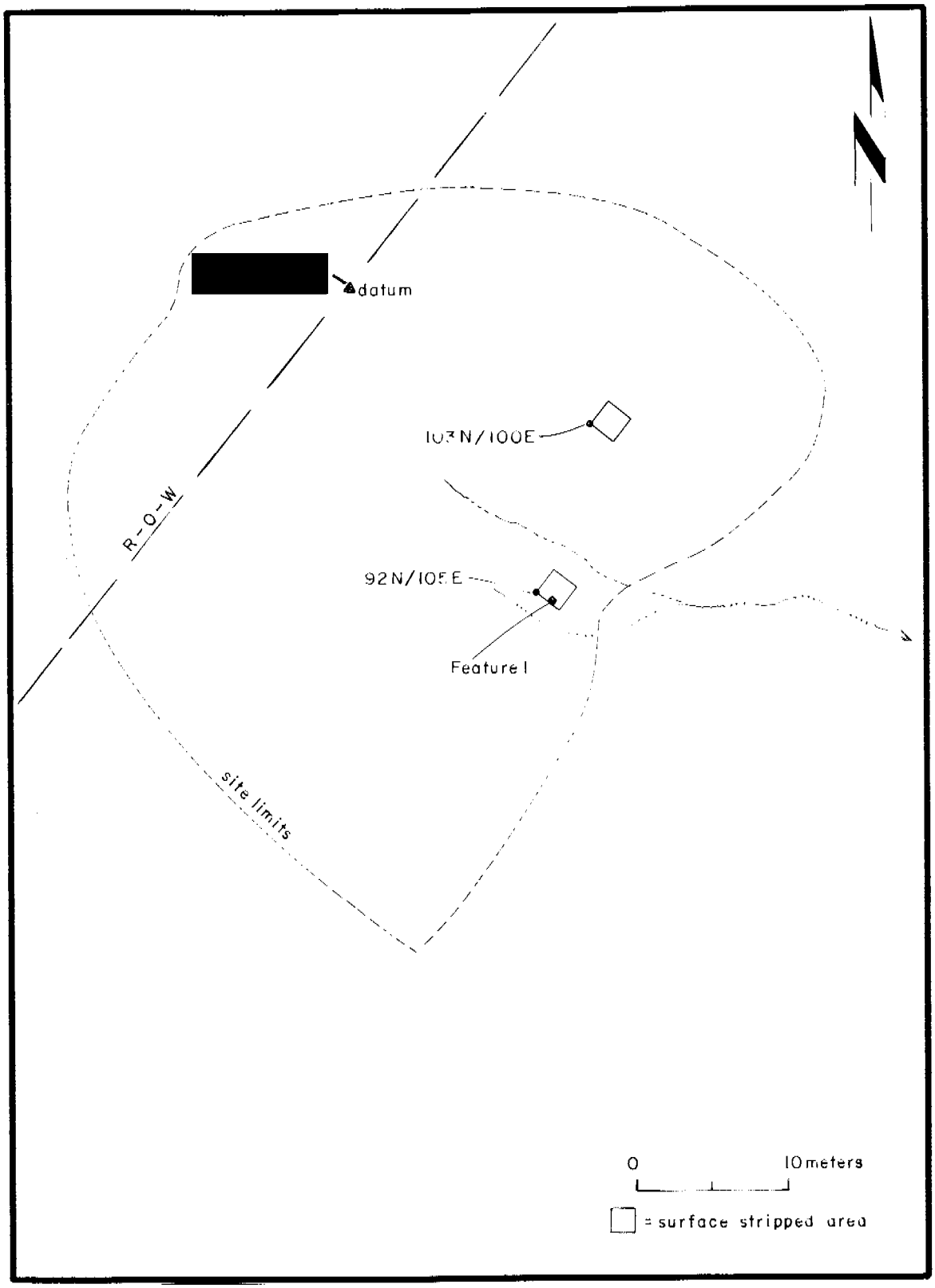

Figure 6. LA 113946, site map.

Feature 1. Excavation of 92N/106E exposed the partial outline of a thermal feature. The 25-by-25-cm test pit excavated into the feature revealed a 25 cm depth and the potential for intact feature fill. The fill is darkly stained (black, 7.5YR 2/0, moist) with few visible charcoal fragments and a few internal cobbles that may have lined the feature. Dimensions and actual outline could not be determined, but it appeared to be oval and perhaps as much as 1.2 m long. No artifacts were recovered from the feature. A 16.4 liter flotation sample yielded one charred juniper seed and .17 g of juniper and piñon charcoal (Toll 1997). Association with the chipped stone concentration could not be clarified. A single obsidian core flake was associated, suggesting that the feature was not associated with the Madera chert chipped stone concentration.

Chipped Stone Artifacts. Tables 7 and 8 show the artifact and material type distributions for the general site scatter and the chipped stone concentration. The general site scatter artifacts were field recorded and the chipped stone concentration sample was recovered by excavation.

The site scatter assemblage is dominated by core flakes of Madera chert and quartzite. On-site core reduction is evidenced by the five cores that were recorded. The unidirectional core reflects material testing and early stage reduction. Multidirectional cores reflect reduction geared to producing expedient flake tools. The general site scatter is typical of sites found along the Arroyo de los Frijoles in the Las Campanas area and along the Santa Relief Route.

The lithic artifact concentration yielded 137 pieces of chipped stone debris. The lithic artifacts were almost all Madera chert; core flakes and angular debris predominate. The core reduction debris undoubtedly represents more than one core, but variation in color and texture could not be used to discern individual cores. Texture and color differences on a single piece often represented the whole spectrum. It is likely that the heterogeneity in material texture contributed to the large amount of debris that remained from the core reduction. Most artifacts are irregular in shape with uneven edge thickness and cross section. The importance of this concentration is its potential for comparison with dispersed artifact scatters that reflect multiple, short-duration visits. An assemblage of single episode core reduction debris provides insight into assemblages where the majority of the material was removed or where flakes were used and discarded in a relatively unpatterned manner.

Table 7. LA 113946, Site Scatter, Artifact Type by Material Type

Count Row Pct	Chert	Madera Chert	Obsidian	Quartzite	Row Total
Angular debris		3 75.0		1 25.0	4 15.4
Core flake		10 58.8	1 5.9	6 35.3	17 65.4
Unidirect. core		1 100.0			1 3.8
Bidirect. core	1 100.0				1 3.8
Multidirect. core		2 66.7		1 33.3	3 11.5
Column Total	1 3.8	16 61.5	1 3.8	8 30.8	26 100.0

Table 8. LA 113946, Excavation Unit 103N/100E, Artifact Type by Material Type

Count Row Pct	Madera Chert	Quartzite	Row Total
Angular debris	45 97.8	1 2.2	46 33.6
Core flake	86 95.6	4 4.4	90 65.7
Multidirect. core	1 100.0		1 .7
Column Total	132 96.4	5 3.6	137 100.0

Summary

LA 113946 is a multicomponent artifact scatter with a dense lithic artifact concentration and a deep, well-preserved thermal feature. Excavation revealed that considerable subsurface artifacts exist within the core reduction debris concentration. Intensive investigation in this area should provide an excellent comparative assemblage for the Northwest Santa Fe Relief Route, College Hills, and Las Campanas area sites. Limited excavation of Feature 1 revealed intact feature fill and strong evidence of intact feature morphology. Feature 1 should yield sufficient charcoal for C-14 dating, and potentially the charred remains of economic plant species. The two main activity loci do not appear to be temporally or functionally related, but they represent important components of Pueblo or early historic period foraging north of the Santa Fe River.

LA 113949 Site Description and Testing Excavation

LA 113949 is located between NMSHTD centerline stations 687+00 and 688+00 and is almost completely within the western half of the right-of-way. The site is on a gentle, south-facing slope, at the head of a minor tributary of the Arroyo Gallinas. The drainage head is formed by a swale that is cut by two shallow erosion channels. The ridge slope has deep Pojoaque-Rough Broken Land complex soils (Folks 1975:43) capped by a dense and abundant Ancha formation gravel and cobble deposit that is exposed on the slopes. The ground cover is predominantly grama grass and rabbitbrush with prickly pear, cholla cactus, and narrowleaf yucca. Piñon-juniper is sparse to moderately abundant.

The site is deflated. Artifacts are scattered across a thin mantle of eolian sand that caps the dense gravel/cobble lens. Recent erosion is evidenced by the shallow erosion channels that join just outside the site limit (Fig. 7). The elongated artifact distribution reflects the downslope movement of soil and artifacts.

The artifact scatter that defines the LA 113949 site limit is 66 m north-south by 7 to 23 m east-west and covers an estimated 990 sq m (Fig. 7). The artifacts are dispersed across the site with an average density of 1 artifact per 8 sq m. A cluster of Madera chert flakes is in the northern area of the site, but outside the right-of-way. This cluster consisted of eight pieces of chipped stone debris. Feature 1 is a deflated hearth remnant with no spatially associated artifacts.

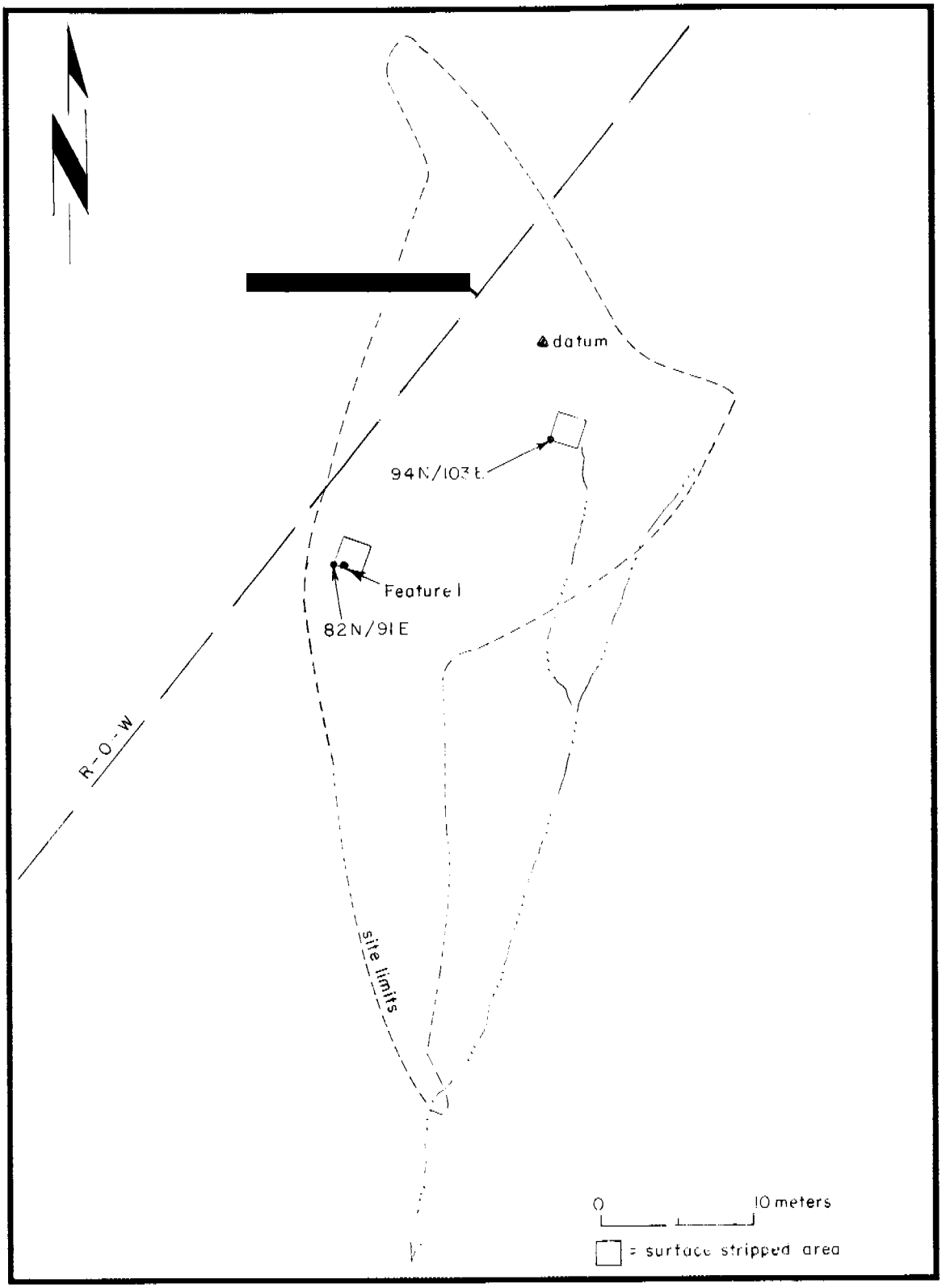

Figure 7. LA 113949, site map.

Testing Results

Testing of LA 113949 focused on determining the condition of the exposed thermal feature (Feature 1) and assessing the depth of the cultural deposit. A 2-by-2-m unit was placed in a cluster of three artifacts at the head of a shallow erosion channel (94N/103E). Another excavation unit abutted the exposed thermal feature (82N/91E). Both were surface stripped yielding two lithic artifacts from 94N/103E and the stained outline of a severely deflated hearth (Feature 1) in 82N/91E. A 1-by-1-m unit within 94N/103E was excavated 15 cm below the surface strip and augered another 15 cm to sandstone bedrock. Excavation Unit 82N/92E was excavated 10 cm below the surface strip exposing the Feature 1 profile. An auger test 25 cm below the surface strip encountered sandstone bedrock.

Excavation of 94N/104E revealed a single stratum of brown (7.5YR 5/4, moist) sandy loam with 10 to 20 percent pea gravel and low calcium carbonate content. The sandy loam is consistent with the Pojoaque-Rough Broken Land complex soils (Folks 1975:43). This layer was above the friable sandstone bedrock that is visible in the 1 m deep arroyo cuts that occur in the surrounding area.

Feature 1. Excavation of 94N/104E exposed a 3-cm-thick, stained lens that is the deflated remains of a thermal feature. Five burned cobbles were present suggesting that the feature was cobble-lined. No charcoal was visible in the feature fill and no artifacts were recovered. The feature dimensions were estimated at 25 cm long by 20 cm wide. Excavation has exposed the bottom of the feature. The upper portion of the feature has been removed by erosion. A 3.35 liter flotation sample yielded no economic plant species, but .04 g of piñon charcoal (Toll 1997).

Chipped Stone Artifacts. Table 9 shows the artifact and material type distributions for LA 113949. Twenty-two artifacts were field recorded and three artifacts were lab recorded. Material types are typical of local raw material sources. The gravel pediments along the Arroyo de los Frijoles and apparently the Arroyo Gallinas contain differentially abundant deposits of raw material for flintknapping. Consistently, chert or Madera chert and quartzite are the most common raw material types found on Northwest Santa Fe Relief Route sites--a pattern that is repeated for the LA 113949 assemblage. Artifact types emphasize raw material procurement and core reduction. Raw material procurement is evidenced by the three cores and one tested cobble. This suggests that raw material was available in the immediate area. Core reduction
focused on removing flakes from cobbles so that cobbles could be transported off-site and the production of flakes as tools. One large quartzite core flake exhibited marginal retouch and an edge angle of 75 degrees. This tool may have been used for plant or fuel-wood gathering and initial processing.

Summary

LA 113949 is a temporally unknown, dispersed, chipped stone scatter with a severely deflated hearth remnant. Excavation revealed no depth to the cultural deposit and few artifacts in the surface-stripped level. The dispersed artifact distribution suggests that LA 113949 was formed by multiple brief visits during which raw material for stone tools was procured, expedient processing tools were produced and discarded, and initial processing of gathered materials occurred. This pattern is similar to the Pueblo foraging pattern suggested for the Las Campanas sites (Post 1996b) and the majority of the Northwest Santa Fe Relief Route sites (Wolfman et al. 1989). It is unlikely that additional excavation of LA 113949 will yield information beyond that recovered by the testing.

Table 9. LA 113949, Artifact Type by Material Type

Count Row Pct Column Pct	Chert	Madera Chert	Chalcedony	Quartzite	Row Total
Angular debris		2 66.7 13.3		1 33.3 16.7	3 12.0
Core flake	3 16.7 100.0	10 55.6 66.7	1 5.6 100.0	4 22.2 66.7	18 72.0
Tested cobble				1 100.0 16.7	1 4.0
Multidirect. core		3 100.0 20.0			3 12.0
Column Total	3 12.0	15 60.0	1 4.0	6 24.0	25 100.0

LA 113954 Site Description and Testing Results

LA 113954 is located between NMSHTD centerline stations 678+00 and 679+00; only one-third of the site is within the western half of the right-of-way. The site is on a gentle, south-facing, dissected ridge slope above a primary tributary of the Arroyo Gallinas. The ridge separates two tributaries of the Arroyo Gallinas and bounds the Arroyo Gallinas on the north. The ridge slope has deep Pojoaque-Rough Broken Land complex soils (Folks 1975:43) capped by a dense and abundant Ancha formation gravel and cobble deposit that is exposed on the slopes. The ground cover is predominantly grama grass and rabbitbrush with prickly pear, cholla cactus, and narrowleaf yucca. Piñon-juniper is sparse to moderately abundant.

The site is in deflated condition with artifacts scattered across a thin mantle of eolian sand that caps the dense gravel/cobble lens. Recent erosion is evidenced by moderately incised to deeply cut erosion channels that drain west into the tributary arroyo (Fig. 8). The main chipped stone cluster is in a swale that is drained by a recent erosion channel. The artifacts probably remain from a single occupation, but have been spread downslope by deflation and erosion. Toward the ridge top the soil is a thin cover of eolian sand with very sparse ground cover. This surface condition results from modern livestock grazing. Artifact visibility in these eolian soils will depend on soil moisture and season--frost will heave and crack the soil, burying some artifacts and pushing others to the surface.

The artifact scatter that defines the LA 113954 site limit is 64 m north-south by 42 m east-west) and covers an estimated 2,688 sq m within the right-of-way (Fig. 8). Except for the main cluster, the artifacts are dispersed across the site with an average density of 1 artifact per 5 sq m. Feature 1 was visible on the surface as a dark gray-brown charcoal stain with no visible cobbles. Sherds and lithic artifacts are spatially associated and may coincide with thermal feature use.

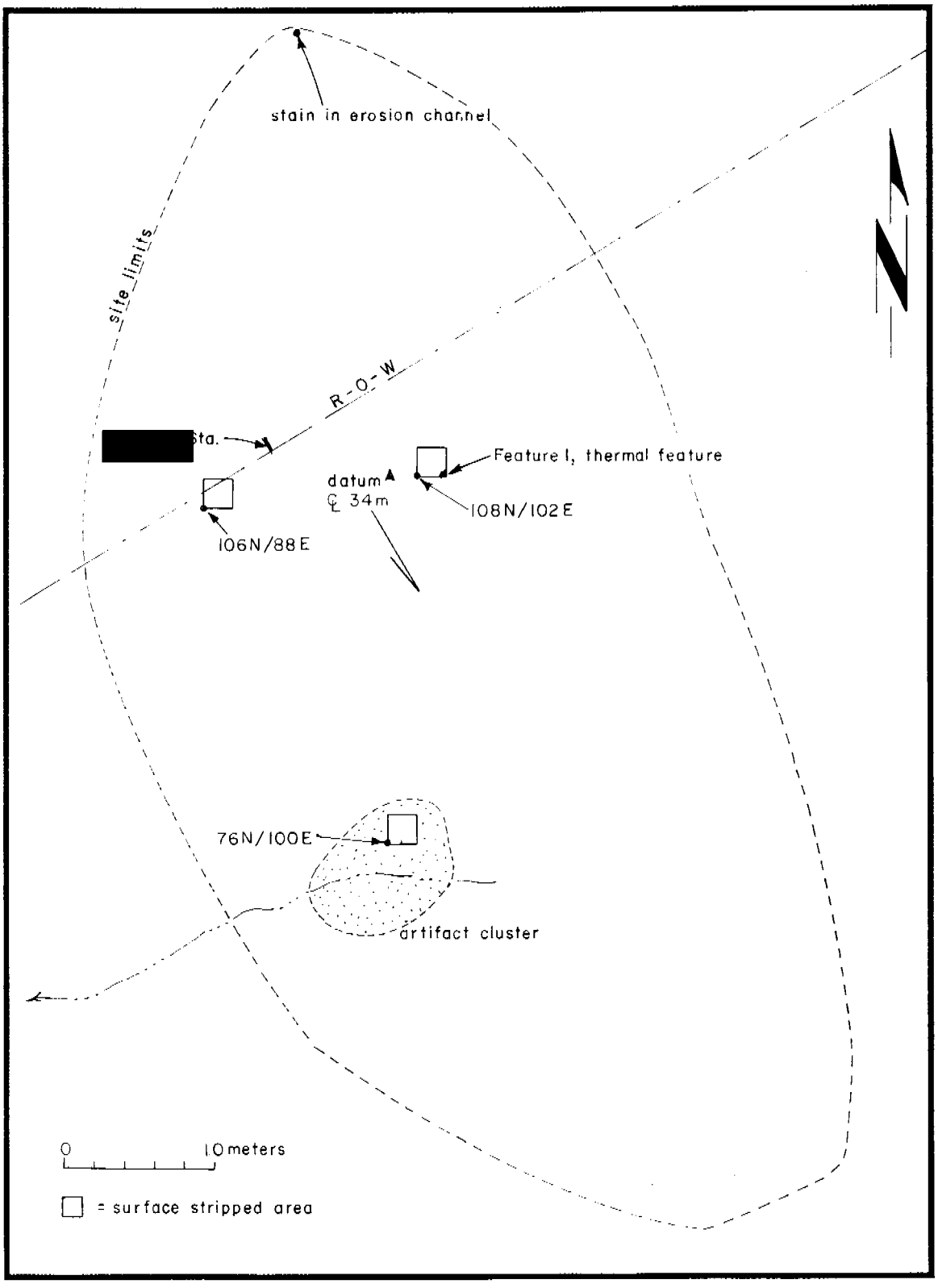

Figure 8. LA 113954, site map.

Testing Results

Testing of LA 113954 focused on determining the condition of the exposed thermal feature (Feature 1) and assessing the depth of the cultural deposit within two artifact clusters. A 2-by-2-m unit was placed in a cluster of more than 20 Madera chert artifacts within a swale that is drained by an erosion channel (76N/100E). Another excavation unit was placed in a Madera chert cluster of 5 to 10 artifacts (106N/88E). A third unit was placed at the edge of the dark soil stain located near the western right-of-way limit (108N/102E). Surface stripping yielded 22 lithic artifacts from 76N/100E and 1 lithic artifact from 106N/88E. Surface stripping at the edge of Feature 1 yielded two sherds and exposed a darkly stained outline with fire-cracked cobbles suspended in the fill. A 1-by-1-m unit within each excavation unit was excavated 10 cm below the modern ground surface. An auger test in 77N/101E reached 140 cm below the surface strip. The auger test in 107N/88E reached 58 cm below surface strip. No cultural material was encountered below the surface strip.

Excavation of 77N/101E revealed a 46-cm-thick stratum of brown (7.5YR 5/4, moist) sandy clay loam with 10 to 20 percent pea gravel and low calcium carbonate content. From 46 to 140 cm below the surface strip, the soil was a very pale brown (10YR 6/4) sand mixed with occasional pea gravel and intermittent calcium carbonate inclusions.

Excavation of 107N/88E revealed a 15-cm-thick sandy clay loam layer (7.5YR 5/4, brown) with 10 percent gravel. From 15 to 46 cm below the surface strip the soil was a coarse granular sand (7.5YR 4/4, reddish brown).

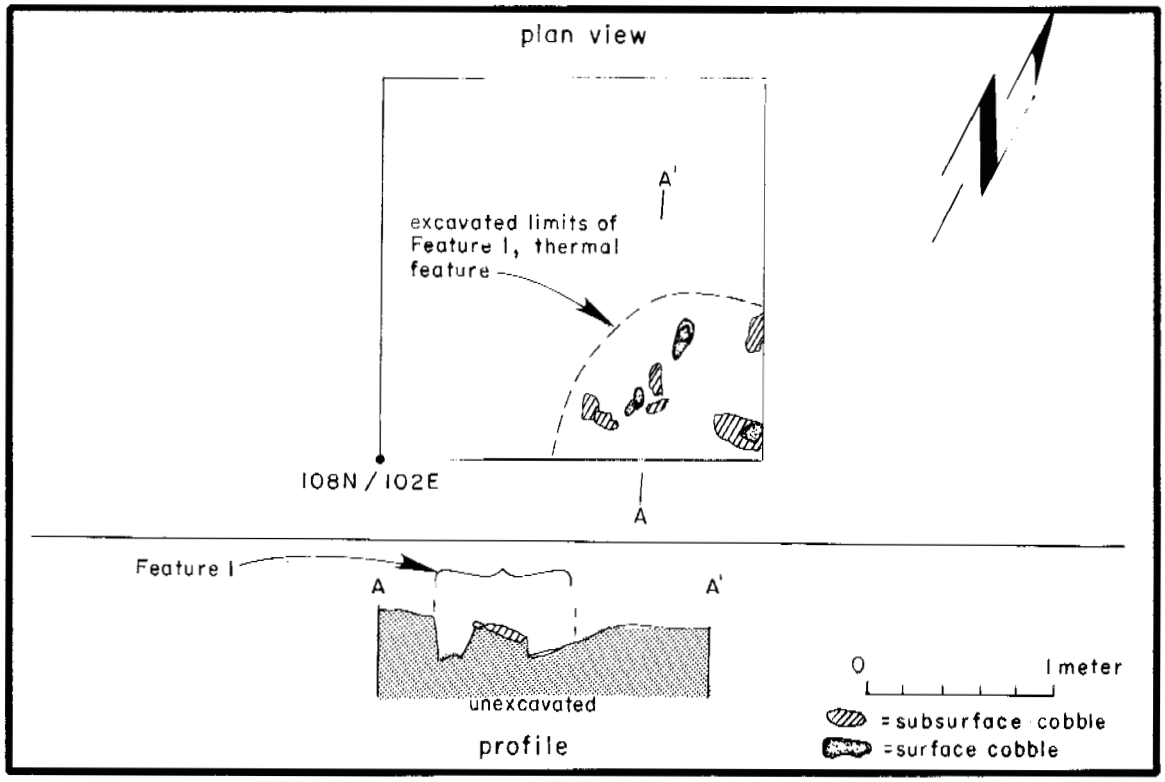

Figure 9. LA 113954, Feature 1, plan and profile.

Feature 1. Excavation of 108N/102E exposed part of an oval-shaped feature outline (Fig. 9). Feature 1 has moderately steep, 40-degree-angle walls that are slightly hardened, but not oxidized. The bottom is irregular and lightly oxidized. The fill was black (10YR 2/2) sandy loam with fire-cracked rock spalls. The cobbles were suspended in the dark soil and inset from the feature walls suggesting that they are hearth furniture rather than hearth lining. No artifacts were recovered from within the feature. The cobbles have a maximum dimension in the 12 to 15 cm range, which is smaller than the cobbles found in the pottery-firing features at Las Campanas (Lakatos 1996). The projected feature dimensions are 120 cm long by 100 cm wide. An 11.2 liter flotation sample yielded no economic plant species, but .19 g of juniper and piñon charcoal (Toll 1997). Further excavation is needed to determine the feature function.

Pottery. Two heavily exfoliated sherds from a single Santa Fe Black-on-white bowl were recovered from the surface strip near Feature 1. Two Santa Fe Black-on-white sherds were recovered from the surface 10 m south of Feature 1.

The two sherds from Feature 1 have a silty paste with abundant mica and quartz inclusions. The quartz and mica are evidence that the clay is from a secondary deposit that has been mixed with granitic materials from the Sangre de Cristo Mountains. The sherds have exfoliated surfaces that are reminiscent, but not conclusively similar to the sherd spalls recovered from the Las Campanas pit kilns (Lakatos 1996).

The two sherds from the surface south of Feature 1 have slipped and polished interior surfaces with plain, smoothed exteriors. One sherd exhibits a solid and hatchured line design. The other sherd exhibits a single solid triangle. This sherd appears to be from near the base of the bowl. The paste of both sherds is similar to the sherds that were recovered from Feature 1. This suggests that they could be from the same vessel or at least from a similar manufacture source.

Chipped Stone Artifacts. Seventy-nine chipped stone artifacts were recovered from excavation units or recorded in the field. Table 10 shows the artifact type and material type distribution for all chipped stone artifacts. Madera chert and chert were the main raw material types. Cores of both material types and a quartzite core suggest on-site core reduction and raw material procurement. Two obsidian artifacts included a biface flake and a late stage biface suggesting that exotic materials were highly curated.

The artifact types are dominated by core flakes and angular debris. Abundant core flakes and angular debris reflect early and middle stages of core reduction and expedient tool production. The two biface flakes indicate a minimal tool maintenance strategy coupled with use of curated tools for specialized processing. This assemblage is typical of the multiuse Coalition-early Classic period foraging sites described for the Las Campanas area (Post 1996b) to the north and the Northwest Santa Fe Relief Route study area (Wolfman et al. 1989).

Summary

LA 113954 is a multiple occupation foraging site with two chipped stone clusters and a thermal feature within a large dispersed artifact scatter. Excavation yielded a substantial quantity of chipped stone in the 76N/100E excavation area with a potential density of 5 artifacts per square meter. Excavation Unit 107N/88E yielded low subsurface artifact counts indicating that the high artifact density was localized. Feature 1 was associated with Santa Fe Black-on-white pottery suggesting an A.D. 1200 to 1425 occupation. The silt-paste pottery is more indicative of the early portion of that period (Habicht-Mauche 1993). Excavation confirmed that intact feature deposit

Table 10. LA 113954, Artifact Type by Material Type

Count Row Pct Column Pct	Chert	Pedernal Chert	Madera Chert	Chalcedony	Obsidian	Quartzite	Row Total
Angular debris	3 23.1 14.3	1 7.7 50.0	6 46.2 13.3	1 7.7 25.0		2 15.4 40.0	13 16.5
Core flake	17 29.3 81.0	1 1.7 50.0	36 62.1 80.0	2 3.4 50.0		2 3.4 40.0	58 73.4
Biface flake			1 50.0 2.2		1 50.0 50.0		2 2.5
Tested cobble			1 100.0 2.2				1 1.3
Unidirect. core			1 50.0 2.2			1 50.0 20.0	2 2.5
Multidirect. core	1 50.0 4.8			1 50.0 25.0			2 2.5
Late stage biface					1 100.0 50.0		1 1.3
Column Total	21 26.6	2 2.5	45 57.0	4 5.1	2 2.5	5 6.3	79 100.0

and internal structure remain and should be investigated further. Feature 1 function could not be determined from testing, but the feature has good potential for comparison with the Las Campanas thermal features. Testing results suggest that LA 113954 does have data potential beyond that recovered during testing.

LA 114071 Site Description and Testing Results

LA 114071 is located between NMSHTD centerline stations 683+00 and 685+00 and is almost completely within the eastern half of the right-of-way. The site is on a southwest finger ridge slope above the Arroyo Gallinas. Artifacts are distributed across a moderate to gentle slope that has a southeast exposure. The ground cover is predominantly grama grass and rabbitbrush with prickly pear, cholla cactus, and narrowleaf yucca. Piñon-juniper is sparse to moderately abundant.

The site surface is deflated. Artifacts occur on top of the gravel/cobble deposit or mixed with the modern eolian mantle. The upper slope is well stabilized, lacks erosion channels, and exhibits cryptogamic cover.

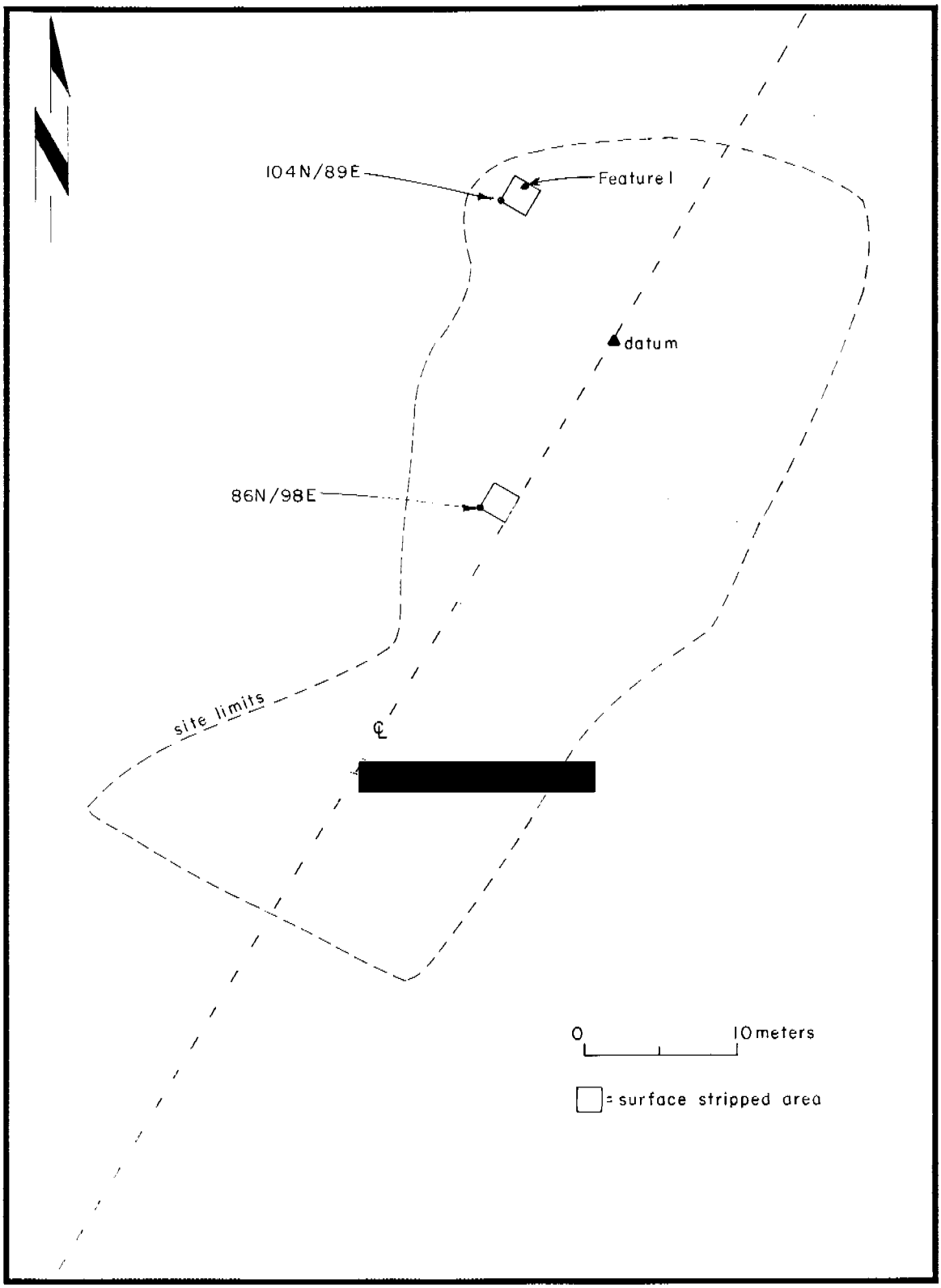

Figure 10. LA 114071, site map.

LA 114071 is a dispersed chipped stone scatter with a cluster of chipped stone debris associated with a thermal feature (Feature 1) at the northern site limit, and purple glass bottle fragments along the western site limit. Site dimensions are 60 m north-south by 24 m east-west, covering an estimated 1,440 sq m (Fig. 10).

Testing Results

Testing of LA 114071 focused on determining the depth and nature of the cultural deposit within the artifact cluster and general site area. A 2-by-2-m unit was placed in a cluster of 10 to 20 Madera chert artifacts at the northern site limit (104N/89E). Surface stripping yielded 20 lithic artifacts and exposed a dark stain at 5 cm below the modern ground surface. The stain was cross-sectioned within a 1-by-1-m unit, 105N/89E. An auger test within 105N/89E reached 35 cm below the surface strip and revealed no cultural deposits outside the feature limit. Another excavation unit was placed in an area of dispersed artifacts near the middle of the site (86N/98E). Surface stripping yielded no artifacts or evidence of a subsurface cultural deposit. A 1-by-1-m unit was excavated to 20 cm below the surface strip and an auger test reached 50 cm below the surface strip yielding no cultural material.

Excavation revealed two main natural strata. The upper level was a 30-cm-thick layer of brown to dark brown (7.5YR 4-6/4, moist) sandy clay loam with 1 to 10 percent gravel and increased calcium carbonate deposits with depth. From 30 to 50 cm, the soil was a pinkish white (7.5YR 8/2, moist) sandy loam with 10 percent calcium encrusted gravel. These soil types are consistent with the Panky series (Folks 1975:39-40).

Feature 1. Excavation of 105N/89E exposed part of circular feature outline. Excavation revealed a small, 30 cm diameter and 20 cm deep thermal feature with steep walls and a basin-shaped bottom (Fig. 11). The feature fill was black (10YR 2/1, moist) sandy loam with 1 percent pebbles, and small charcoal flecks. One Madera chert core flake was recovered from the bottom of the pit. The pit is associated with a surface and near surface Madera chert concentration of core reduction debris. The association of debris from one or two cores with Feature 1 may indicate it was used to heat-treat raw material. No crazing or crackling from excessive heating was observed on any of the artifacts. Preliminary experimentation with heat-treating Madera chert suggests that it fractures when exposed to temperatures between 650 and 850 degrees C for 2 to 3 hours. Feature 1 is not heavily burned nor is the soil oxidized suggesting that it was not active for an extended time or used with high heat. Light heat-treating could improve the material's knapping quality without altering the material surface. Use for heat treating is one possible feature function that can be investigated with additional excavation and experimentation. A 3.5 liter flotation sample yielded no economic plant species, but .15 g of juniper and piñon charcoal (Toll 1997).

Chipped Stone Artifacts. Fifty-seven chipped stone artifacts were recovered from excavation units or recorded in the field. Table 11 shows the artifact type and material type distribution for all chipped stone artifacts. Madera chert was the main raw material type with a tested cobble, unidirectional, and multidirectional core types remaining from on-site core reduction and perhaps on-site raw material procurement. The Madera chert artifacts were primarily from the concentration associated with Feature 1. The quartzite and chert were from the general site scatter.

The artifact types are dominated by core flakes and angular debris. Abundant core flakes and angular debris reflect early and middle stages of core reduction and expedient tool production. This assemblage is typical of material procurement and core reduction associated with Coalition-

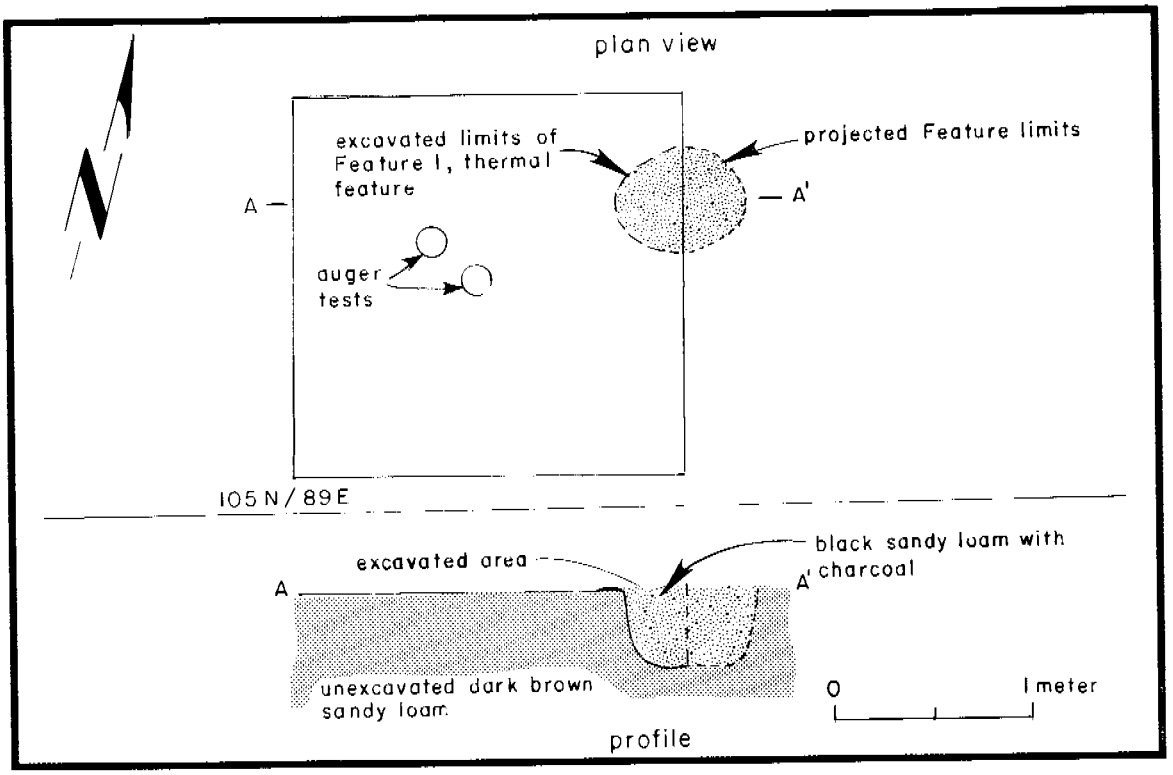

Figure 11. LA 114071, Feature 1, plan and profile.

Table 11. LA 114071, Artifact Type and Material Type

Count Row Pct Col Pct	Chert	Madera Chert	Quartzite	Row Total
Angular debris	1 5.0 25.0	19 95.0 37.3		20 35.1
Core flake	3 8.8 75.0	29 85.3 56.9	2 5.9 100.0	34 59.6
Tested cobble		1 100.0 2.0		1 1.8
Unidirect. core		1 100.0 2.0		1 1.8
Multidirect. core		1 100.0 2.0		1 1.8
Column Total	4 7.0	51 89.5	2 3.5	57 100.0

early Classic period foraging. This sample has strong potential for comparison with the LA 113946 assemblage and the range of multiuse sites located in the Las Campanas area (Post 1996b) and along the Northwest Santa Fe Relief Route (Wolfman et al. 1989).

Summary

LA 114071 is a dispersed artifact scatter with a core reduction debris concentration associated with a thermal feature. The cultural deposit was shallow and primarily restricted to the feature and artifact cluster. Excavation within the cluster showed that four to five times more chipped stone is buried than is evident on the surface. Additional work concentrated in this area should yield an assemblage that will be useful for profiling raw material procurement strategies embedded within daily foraging. No temporally diagnostic artifacts were recovered, but additional excavation of Feature 1 and more detailed examination of the site may yield datable cultural materials.

Archaeological testing of the seven sites yielded a diverse range of information that reflects that found for the sites investigated during the first relief route testing project (Wolfman et al. 1989) and by the Las Campanas project (Post 1996b; Lang 1996). The site data from this testing project will be briefly analyzed and interpreted in light of earlier investigations as a prelude to the recommendations and data recovery plan. The sites will be summarized by chronological data, site structure, and technological information.

Chronological Data

Four of the seven sites yielded temporally diagnostic pottery types. By comparison, the previous Northwest Santa Fe Relief Route project yielded 23 datable sites out of 51 probable prehistoric or early historic era sites. The Las Campanas excavations yielded at least 68 datable components (Post 1996b). The majority of datable components from the projects were from the Pueblo period. Coalition and early Classic period sites or components were the most common. All investigated components from this testing project dated to the Pueblo period, though three historic components consisting of refuse deposits were recorded during the inventory (Post 1995, 1996a; Anschuetz and Viklund 1996).

Three sites, LA 108902, LA 108903, and LA 113954, yielded pottery from the early Coalition or Classic periods. LA 108902 had one sherd each of Santa Fe Black-on-white and Pindi Black-on-white pottery. Pindi Black-on-white was made between A.D. 1325 and 1350 at Pindi and Arroyo Hondo pueblos (Stubbs and Stallings 1953; Habicht-Mauche 1993). LA 108903 yielded a sherd of indented corrugated utility pottery that was probably made between A.D. 1000 and 1350. Indented corrugated utility pottery was the most abundant type recovered from Pindi and Arroyo Hondo pueblos and it was probably of local manufacture (Stubbs and Stallings 1953; Habicht-Mauche 1993). Utility pottery was rarely recovered from the Las Campanas area and Northwest Santa Fe Relief Route sites (Post 1996b; Wolfman et al. 1989). LA 113954 yielded four bowl sherds of Santa Fe Black-on-white pottery from within the right-of-way. They were of the silt-paste variety that Habicht-Mauche (1993) and Stubbs and Stallings (1953) suggest were most abundant in the early A.D. 1300s components of Arroyo Hondo and Pindi pueblos. Santa Fe Black-on-white was the most common pottery type found on Las Campanas sites and was the primary pottery used in foraging and collecting, judging from the low frequency of utility wares that occurred in these areas (Post 1996b).

The fourth site, LA 111364, yielded a pottery assemblage with a broad temporal range. Identified pottery types included Kwahe'e (A.D. 1000 to 1200) and Santa Fe Black-on-white (A.D. 1175 to 1425), Biscuit A (A.D. 1350 to 1450), Biscuit B (A.D. 1450 to 1550), Sankawi Black-on-cream (A.D. 1550 to 1650), and smeared indented corrugated (A.D. 1000 to 1400) pottery. These pottery types have a combined date range from A.D. 1000 to 1650 and represent the full range recovered during the Northwest Santa Fe Relief Route testing, except for the absence of Glaze A and C and Tewa Series pottery types (Wolfman et al. 1989:148). Kwahe'e Black-on-white pottery was recovered only from LA 61328, Santa Fe Black-on-white occurred on 10 sites, and Biscuit A, Biscuit B, or Sankawi Black-on-cream pottery were recovered from LA 61305, LA 61308, and LA 61314 (Wolfman et al. 1989:144-146).

Basically, the pottery types recovered by the testing project reflect the temporal range observed for the Las Campanas area (Post 1996b) and along the Northwest Santa Fe Relief Route (Wolfman et al. 1989). Settlement along the Santa Fe River before A.D. 1050 was minimal with few sites identified. Between A.D. 1050 and 1200, settlement size and site visibility increases, and the environmental range for site locations establishes the base line for later, more intensive and extensive occupations (Wiseman 1978; Hannaford 1986; Wolfman et al. 1989; Post 1996b; Viklund 1988). Between A.D. 1200 and 1300, the pattern established during the late Developmental period is consolidated, villages are established above the floodplains of the major waterways, including the Santa Fe River and Arroyo Hondo. From A.D. 1300 to 1350, major building episodes at Pindi Pueblo and Arroyo Hondo occurred, suggesting that population peaked in the Santa Fe River Basin. More intensive and extensive use of surrounding environs should have corresponded with community growth--an observation that is supported by the increase in small, limited activity sites as far as 7 km from the villages (Post 1996b). The greatest site frequency for the Northwest Santa Fe Relief Route area coincides with this period as well. From A.D. 1350 to 1650 population fluctuated dramatically. Village locations moved downstream along the Santa Fe River and dramatic population growth occurred on the Pajarito Plateau and in the Galisteo Basin. Use of the middle and upper Santa Fe River drainage and tributaries was sporadic as evidenced by the low frequency of sites from this period. Reoccupation of a few sites during the late prehistoric and early historic periods suggest use of well-defined travel routes and limited foraging or resource collection.

Site Structure

Site structure can be examined using basic attributes of artifact count, size, and feature occurrence. These attributes can be compared by time and project phase to examine land use or subsistence patterns and potential data recovery biases. This brief analysis is not exhaustive, but is intended to examine the Northwest Santa Fe Relief Route data from a perspective that was previously unexplored. In this analysis, time will be divided into "Pueblo period" and "other" or in other words, sites with and those lacking pottery. Northwest Santa Fe Relief Route sites will be divided into the first testing project (SFRR) and the current project (SFRW).

The seven SFRW sites have site areas that range between 551 and 2,940 sq m. Their distribution is in the lower range of the SFRR sites, although the majority of the SFRR sites have areas less than 3,000 sq m. A Student's T-test of area comparing SFRR and SFRW variance failed to reject the null hypothesis of no significant difference in area at the .05 significance level. Excluding the SFRR sites with areas greater than 15,000 sq m, the mean for SFRR sites is 2,437 sq m and the SFRW site mean is 1,839 sq m. Given the sample size difference between SFRR and SFRW assemblages, it is surprising that there was no statistically significant difference. The majority of the SFRR sites are smaller than 3,000 sq m; a seemingly strong pattern that is also reflected in the SFRW sites.

Artifact counts for the SFRW sites range from 25 to 163. Four sites yielded sherds and chipped stone. LA 113946 had the highest artifact frequency with the intensive core reduction area producing an artifact density of 35 per sq m. A linear regression of site area by artifact frequency produced a Pearson's r of .268 or a low correlation between the two variables. A weak correlation indicates that the range of site activities may strongly influence assemblage size with larger site area not necessarily resulting in higher artifact counts. The SFRR sites' artifact frequencies range from 7 to 278 with a higher correlation between artifact frequency and site size indicated by a

Pearson's r of .55. This is not a strong correlation, but it does suggest that increases in artifact count may be partly conditioned by site size.

Figure 12 shows the scatterplot of area by artifact count for SFRR and SFRW sites. This scatterplot lacks three SFRR sites that have an area of greater than 15,000 sq m. SFRR sites do show a gradual increase in artifact frequency as site size increases. Sites larger than 5,000 sq m have 100 or more artifacts. The archaeological record of the limited activity or small sites in the piedmont hills reflects the full array of daily activities pursued by Archaic and Pueblo foragers and collectors. Dispersed artifact distributions may remain from repeated resource extraction activities, which tend to leave few artifacts (Binford 1980; Vierra 1985; Ebert 1992). Repeated use of a location may leave an accumulation of artifacts that are related functionally and in a general temporal sense, but do not reflect a single occupation. Within the piedmont hills there are dispersed artifact scatters and artifact and feature concentrations that remain from single-component activity episodes. Depending on the intensity of the activity or the extent that artifacts are broken, overall site artifact densities will be higher or the single-component density, when it is partitioned from the site assemblage, will be higher than the site scatter. LA 113946 and LA 114071 of the SFRW sites have high density artifact concentrations remaining from intensive lithic raw material reduction. At LA 114071, the concentration is associated with a hearth. At LA 113946, the hearth is part of the general site distribution formed by repeated, brief foraging visits.

Figure 13 shows the artifact count and site area distribution for SFRR and SFRW sites by number of hearths. Again, the three largest sites have been omitted, although two sites had hearths. The general pattern is that hearths occur in similar frequency regardless of site size. To test the null hypothesis that hearths occur homogeneously regardless of size, a chi-square test was performed. The site assemblage was divided into three size classes: less than 2,000 sq m, 2,000 to 4,000 sq m, and greater than 4,000 sq m. Table 12 shows the data and results of the chi square test, which was conducted at the .01 significance level with 2 degrees of freedom. The chi-value of .0317 fails to reject the null hypothesis, confirming a homogeneous distribution of hearths regardless of site size. For the SFRR and SFRW sites, it is clear that larger site areas did not result in the identification of more thermal features. Furthermore, if site size and artifact dispersion are indicative of repeated visits, then as the number of visits increased, the likelihood that a formal hearth would have been needed did not increase. However, LA 61315 (an excavated SFRR site), which was a multicomponent Archaic and Pueblo period site, yielded 13 thermal features and a structure foundation. Obviously, residential occupations generate larger numbers of features as the length of occupation increases or as repeated occupation incorporates existing facilities.

Figure 14 shows the same artifact count and site size data for SFRR and SFRW sites, minus the largest sites. The visual pattern is that as site size increases, the greater the likelihood of a Pueblo Period component. This observation suggests that the larger the search area, the greater the likelihood that a sherd or sherds will be found. It also suggests that Pueblo period foraging resulted in the dispersed artifact scatters as locations were targeted for seasonally available resources.

To test the null hypothesis of no significant difference in site size ranges for Pueblo Period and other or temporal unknown sites, the previously defined site size ranges were used. Table 13 shows the data and result of the chi-square test conducted at the .05 significance level with 2 degrees of freedom. The chi-square value of 12.3549 rejects the null hypothesis, suggesting that identification of a Pueblo component is more likely with increased site size. Of the 22 sites that are larger than 2,000 sq m, 18 had a Pueblo component. Small sites (less than 2,000 sq m) were more likely to lack an identifiable Pueblo component. This does not mean that Pueblo period

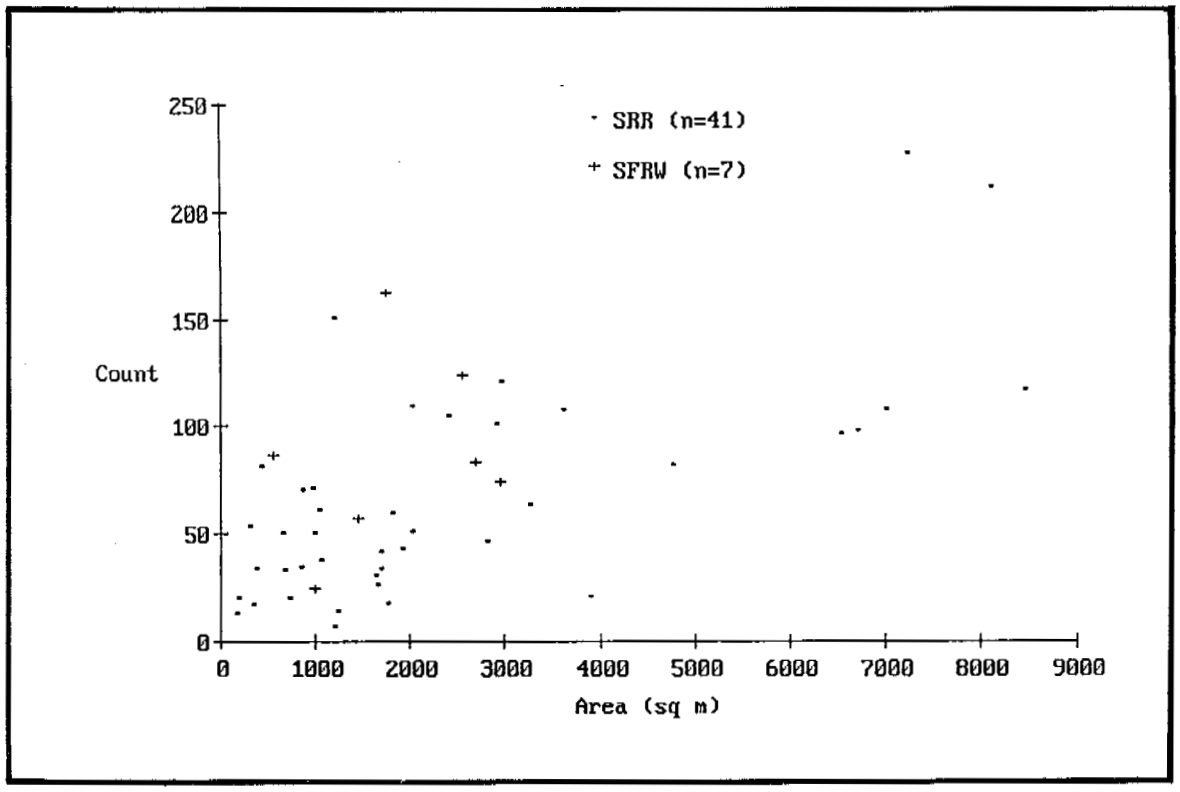

Figure 12. Scatterplot of site area by artifact count for SFRR and SFRW sites.

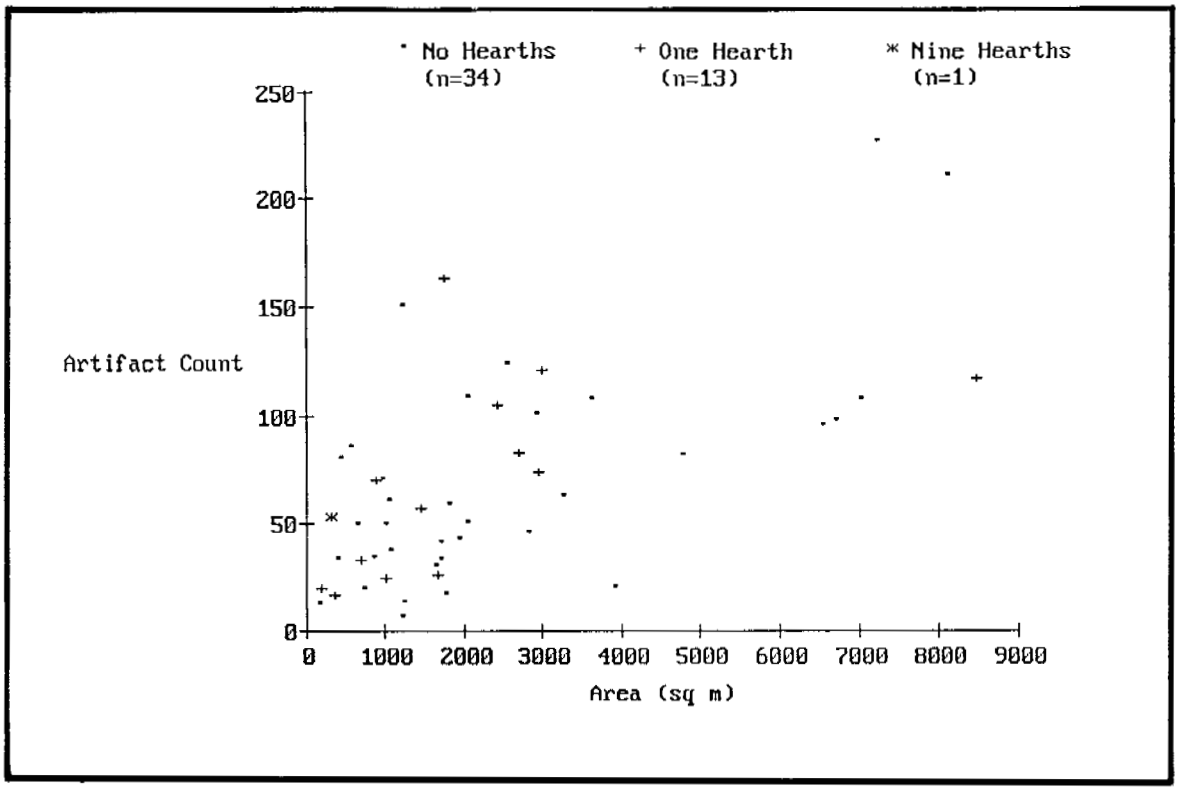

Figure 13. Scatterplot of site area by artifact count and hearth occurrence.

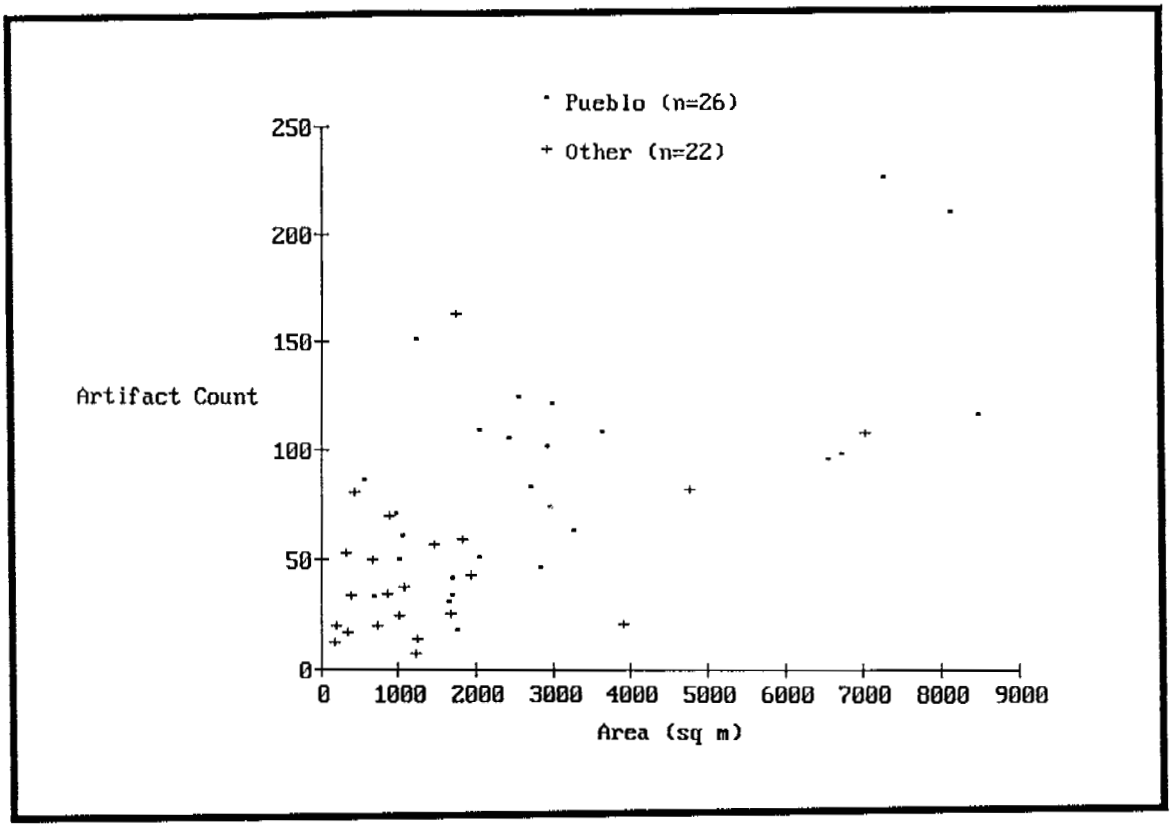

Figure 14. Scatterplot of site area by artifact count by Pueblo period and temporal unknowns.

Table 12. Hearth and Size Distribution and Chi-Square Test

Hearths Observed Expected	Present	Absent	Total
Site Size (sq m)			
1 to 1,999	9 9	20 20	29
2,000 to 4,000	4 4	8 8	12
4,001 +	3 3	7 7	10
Total	16	35	51

sites lack other components or that temporally unknown sites do not have Pueblo period occupations. It only suggests that as site size increases, the likelihood that the site is partly related to Pueblo foraging or collecting also increases. This is not an unexpected conclusion given that the largest population lived along the Santa Fe River between A.D. 1200 and 1400 with travel between later Classic and early Historic Pueblo period villages common until the establishment of the Villa in Santa Fe in 1608.

Table 13. Site Size by Pueblo or Temporal Unknown Period Data and Chi-Square Test Results

Period Observed Expected	Pueblo	Temporally Unknown	Total
Site Size (sq m)			
1 to 1,999	10 16	19 13	29
2,000 to 4,000	11 7	1 5	12
4,001 +	7 5	3 5	10
Total	16	35	51

Technological Information

Typical of limited activity or small site assemblages from the piedmont hills, the SFRW sites yielded primarily chipped stone debris with low frequencies of formal tools and pottery. Features occurred at the rate of one per site, so there did not appear to be a concentration of processing activity or longer duration occupation at any of the sites. For Pueblo period sites, this is generally true for the Northwest Santa Fe Relief Route and Las Campanas sites, though there are a few exceptions where high sherd frequencies accompany pottery-firing features or features cluster near drainage heads in sheltered locations.

The chipped stone assemblages recovered or recorded from the artifact scatters may seem homogeneous on initial examination of the assemblage and artifact attribute patterns. For this brief analysis, two assemblage level and four artifact attribute level chipped stone attributes can be examined for patterning that reflects technological organization of Pueblo foraging. The assemblage level attributes are artifact type and dorsal cortex percentages and the artifact attributes are core flake portion, platform, length, and thickness. These attributes are compared across all seven sites.

Artifact Type

A limited number of chipped stone artifact types were recovered or recorded for all sites. Almost all artifacts were produced from locally available raw material. Only LA 108902 had basalt and obsidian as the main raw material types and they may have been brought from the Rio Grande River Valley. From the remaining sites, obsidian occurs as isolated biface production debris or a single discarded formal tool fragment. As shown in Table 14, when the artifact types are combined into four classes, core reduction, biface production, cores, and formal tools, core reduction debris accounts for more than 80 percent of each assemblage. Cores are the second most common artifact class, which coincides with the high percentages of core reduction debris. Biface production and formal tools occur rarely, except for LA 108902, where biface flakes are 18.1 percent of the assemblage. LA 108902 was recognized as a unique assemblage during the inventory since the assemblage appeared to be more geared to formal tool production (Post 1995).

Table 14. Artifact Classes by Site

Count Row Pct	Core Reduction	Biface Production	Cores	Formal Tools	Row Total
LA 108902	68 81.9	15 18.1			83 14.3
LA 108903	63 86.3		10 13.7		73 12.6
LA 111364	95 95.0	1 1.0	3 3.0	1 1.0	100 17.2
LA 113946	157 96.3		6 3.7		163 28.1
LA 113949	21 84.0		4 16.0		25 4.3
LA 113954	71 89.9	2 2.5	5 6.3	1 1.3	79 13.6
LA 114071	54 94.7		3 5.3		57 9.8
Column Total	529 91.2	18 3.1	31 5.3	2 .3	580 100.0

High percentages of core reduction debris are common for Pueblo period sites in the Las Campanas area and are one of the strongest indicators of daily foraging and casual raw material procurement (Post 1996b).

Dorsal Cortex Percentage. The distribution of dorsal scar percentages within an assemblage or for a group of sites is an indication of the proximity to the raw material source and an indicator of reduction stage. The Las Campanas sites tended to exhibit high percentages of noncortical core flakes for Archaic period sites and variable percentages of noncortical and cortical core flakes for Pueblo period sites (Post 1996b:404-405). Northwest Santa Fe Relief Route sites show a high proportion of sites with more cortical than noncortical core flakes (29 of 44 sites) (Wolfman et al. 1989:136-142). Sites with a greater proportion of noncortical to cortical flakes tend to have low frequency assemblages. These assemblages reflect brief high-intensity reduction episodes or discard of curated flakes that were produced at sites having chert or quartzite-bearing gravel deposits.

The SFRW sites display cortex percentage distributions similar to the SFRR sites (Table 15). Four of seven sites have more cortical than noncortical debris, if all artifacts are examined. If only core flakes are examined, the percentage of noncortical debris increases marginally, but the general pattern remains the same. High frequency of cortical debris reflects the occurrence of material on-site or nearby. Suitable nodules, especially tabular forms, were observed in the gravel at LA 108903. These nodules were visible in deflated areas. At LA 111364, quartzite cobbles were abundant on the slopes. LA 108902, LA 113946, and LA 114071 had more noncortical than cortical debris. LA 113946 and LA 114071 had core reduction concentrations with two to four cores represented. Obviously, raw material was obtained and then reduced to portable cores and flakes. LA 108902 had the highest percentage of biface flakes and nonlocal material. The 80.7 percent noncortical debris is more similar to the Archaic period pattern of the Las Campanas sites (Post 1996b:404). Low percentages of cortical debris are expected when distant material sources

Table 15. Dorsal Cortex Percentages, All Artifacts

Count Row Pct	No Cortex	10-50%	60-100%	Row Total
LA 108902	67 80.7	9 10.8	7 8.4	83 14.3
LA 108903	25 34.2	23 31.5	25 34.2	73 12.6
LA 111364	36 36.0	39 39.0	25 25.0	100 17.2
LA 113946	88 54.0	47 28.8	28 17.2	163 28.1
LA 113949	8 32.0	9 36.0	8 32.0	25 4.3
LA 113954	31 39.2	31 39.2	17 21.5	79 13.6
LA 114071	30 52.6	12 21.1	15 26.3	57 9.8
Column Total	285 49.1	170 29.3	125 21.6	580 100.0

were used, or as a by-product of extensive reduction or early stage formal tool production (Chapman 1977; Kelly 1988; Andrefsky 1994). The SFRW site cortex percentage data evidence differences in material procurement and reduction strategies that may have temporal significance and result from shifting or flexible land-use tactics.

Core Flake Portion and Platform. Core flake portion and platform are attributes that may reflect reduction stage. Early and middle stages of reduction generally produce thicker flakes, which are more resilient, resulting in higher percentages of complete flakes or proximal portions (Moore 1994; Sullivan and Rozen 1985). Late stage or early stage tool manufacture produces thinner flakes that snap more easily, resulting in lower frequencies of complete flakes and higher percentages of distal fragments.

Table 16 shows the SFRW site core flake portion distribution. All sites have 50 percent or higher whole flakes. It is expected that LA 108902 would have a low whole flake percentage if the assemblage results from late stage reduction. Unexpected is the low whole flake percentages from LA 113954 and LA 114071. Both sites had a core reduction concentration, suggesting early and middle stage reduction. Low whole flake and relatively high distal fragment percentages suggest that later stage reduction occurred at these sites or that material impurities affected successful flake removal. The highest whole core flake percentage was from LA 108903, which evidenced raw material testing and early stage reduction in the dorsal cortex percentages. The high frequency of whole flakes strengthens the interpretation.

Core flake platforms reflect reduction stage. Material testing and early stage reduction are best represented by cortical platforms. Single-facet platforms are more common in early stage reduction, but are common for middle stage reduction and expedient core flake tool production. Multifaceted and collapsed platforms occur most often in late stage reduction and tool manufacture.

Table 16. Core Flake Portion

Count Row Pct	Indeter.	Whole	Proximal	Medial	Distal	Lateral	Row Total
LA 108902		31 52.5	1 1.7	5 8.5	21 35.6	1 1.7	59 14.2
LA 108903		40 72.7		2 3.6	10 18.2	3 5.5	55 13.2
LA 111364		58 68.2		1 1.2	16 18.8	10 11.8	85 20.4
LA 113946		75 70.1	4 3.7	4 3.7	20 18.7	4 3.7	107 25.7
LA 113949		12 66.7	1 5.6		5 27.8		18 4.3
LA 113954	3 5.2	29 50.0	6 10.3	2 3.4	12 20.7	6 10.3	58 13.9
LA 114071		17 50.0		3 8.8	12 35.3	2 5.9	34 8.2
Column Total	3 .7	262 63.0	12 2.9	17 4.1	96 23.1	26 6.3	416 100.0

Table 17 shows the core flake distributions for all SFRW sites. The lowest percentage of cortical platforms occurs on sites where reduction intensity was highest: LA 108902, LA 113946, and LA 114071. Higher cortical platform percentages occur at LA 111364, LA 108903, and LA 113949. LA 108903 and LA 111364 have raw material on-site and were procurement locations. Multifaceted platforms are not abundant at any site, but when combined with collapsed platforms, the highest percentage occurs at LA 111364. These platform data are not the strongest indicators of reduction and they are somewhat ambiguous. However, the data do reinforce patterns observed in core flake portion and dorsal cortex.

Core Flake Dimensions. Length, width, and thickness were recorded for all artifacts. Previous studies have shown that core flake length and thickness may be sensitive to reduction stage given some limitations (Sullivan and Rozen 1985; Elyea 1994; Moore 1994; Post 1996b). Length may be sensitive because it is affected by raw material size. Thickness may be affected by raw material grain size. Coarser materials produce thicker flakes.

Table 18 shows the whole core flake dimensions for all material types combined for each site. All sites have the full range of flake sizes. Mean lengths of greater than 35 mm for all sites, except LA 108902, suggest medium to large raw material size. LA 108902 has more small and medium size flakes, which fits well with the late stage reduction profile indicated by other attribute data. Flake thickness is not as clear--mean flake thicknesses range between 8 and 13 mm. LA 108902 has thinner flakes and a narrower size range. The other sites have flake thicknesses that are similar, reflecting the mix of raw material procurement and early and middle stage reduction that was common to all sites.

Table 17. Core Flake Platforms

Count Row Pct	Cortical	Single	Multifacet	Collapsed	Absent	Row Total
LA 108902	7 11.9	14 23.7	6 10.2	7 11.9	25 42.4	59 14.2
LA 108903	17 30.9	18 32.7	2 3.6	7 12.7	11 20.0	55 13.2
LA 111364	24 28.2	31 36.5	4 4.7	8 9.4	18 21.2	85 20.4
LA 113946	15 14.0	54 50.5	5 4.7	9 8.4	24 22.4	107 25.7
LA 113949	5 27.8	6 33.3	2 11.1		5 27.8	18 4.3
LA 113954	12 20.7	21 36.2	2 3.4	4 6.9	19 32.8	58 13.9
LA 114071	5 14.7	12 35.3	1 2.9	1 2.9	15 44.1	34 8.2
Column Total	85 20.4	156 37.5	22 5.3	36 8.7	117 28.1	416 100.0

Table 18. Whole Core Flake Length and Thickness

Site	Mean (mm)	Standard Deviation (mm)	Range (mm)
LA 108902 (n=31)			
Length	27	12	9-63
Thickness	8	4	2-20
LA 108903 (n=40)			
Length	37	16	8-81
Thickness	11	7	3-27
LA 111364 (n=58)			
Length	35	15	9-83
Thickness	10	6	1-27
LA 113946 (n=75)			
Length	37	12	14-74
Thickness	12	5	3-25
LA 113949 (n=12)			
Length	44	19	12-66
Thickness	13	7	4-24

Site	Mean (mm)	Standard Deviation (mm)	Range (mm)
LA 113954 (n=29)			
Length	39	14	10-79
Thickness	11	4	4-25
LA 114071 (n=17)			
Length	39	12	18-60
Thickness	11	6	2-24

Summary

This brief examination of the site data in terms of chronology, site structure, and lithic technology provides a good basis for recommendations and future study considerations. The SFRW sites are a microcosm of chronological, site structure, and technological patterns observed for the SFRR and Las Campanas sites. The majority of the SFRW sites yielded Pueblo period ceramics; datable multicomponent occupations are documented for LA 111364. All sites seem to have been formed by multiple occupations. Artifact concentrations and thermal features remain from specific extraction and processing activities. By far, the most common debris-producing activity was lithic raw material procurement and reduction. Based on the site structure and technological data, tactics associated with lithic production were flexible and highly responsive to gravel deposits containing suitable raw material. This pattern is repeated in the SFRR and Las Campanas sites. Artifact clusters or well-preserved thermal features associated with or isolated from artifact clusters seem to hold the greatest data potential.

LA 108902 has a chipped stone cluster associated with Coalition period sherds, but the technological pattern is more similar to Archaic period sites from Las Campanas. The potential for high artifact frequencies in the shallow surface deposit should provide the opportunity to document a poorly understood component of Pueblo period hunting and gathering or single component Archaic period component that is comparable with Las Campanas and Northwest Santa Fe Relief Route sites.

LA 108903 is a Coalition period site with at least three activity components. The two low frequency chipped stone concentrations and the deflated thermal feature reflect brief, low-intensity visits en route to the major drainages to the north. The thermal feature suggests an overnight stay in conjunction with exploitation of the Arroyo de las Trampas drainage system. LA 108903 lacked substantial subsurface artifact frequencies and Feature 1 was compromised by an erosion channel. These factors combine to indicate that further study of LA 108903 would not be fruitful.

LA 111364 is a multicomponent Pueblo period raw material procurement and resource gathering site. Sites with late Developmental to early Historic period Pueblo components are rare in the piedmont hills (Post 1996b). Late Developmental and Coalition to early Classic period settlements are within 5 km, which is within a daily foraging range. The nearest middle Classic to early historic period site is Cieneguilla Pueblo, which is 16 km distant. This distance would have required a logistically organized procurement or foraging strategy, or visits to the Santa Fe River tributaries may have been embedded in other transient activities. The presence of subsurface chipped stone associated with late Classic period pottery make LA 111364 a potentially important

contributor to the understanding of changing Pueblo foraging practices.

LA 113946 yielded no temporally diagnostic artifacts, but the core reduction cluster and the buried, intact thermal feature represent two occupation episodes. The core reduction cluster has substantial subsurface artifacts that remain from a single episode. Debris from single episode reduction is important for comparison with assemblages that formed through numerous low intensity visits and to test assumptions regarding core reduction stages and strategies. The buried thermal feature with 20- to 25-cm-thick intact deposits may yield datable charcoal and evidence of plant or animal processing and consumption. The buried context suggests that the absence of associated artifacts relates to geomorphology and not human behavior. The activity space adjacent to the feature should be more closely examined for artifacts and spatial structure. LA 113946 has good data and future study potential.

LA 113949 yielded no temporally diagnostic artifacts, though a low frequency artifact cluster was recorded and a badly deflated thermal feature was investigated. LA 113949 was formed by repeated, brief visits. For the most part, the artifact distribution resembles a collection of isolated occurrences. The informal thermal feature may have been used for heat during an overnight visit. The lack of depth or intact morphology limit its data potential beyond testing results. LA 113949 is similar to the majority of SFRR sites that have been tested. The data are important to the small site profile of the piedmont hills, but future study would not yield substantially more information.

LA 113954 is a multioccupation Coalition to early Classic period site with an intact thermal feature and a core reduction cluster associated with a dispersed artifact scatter. Outside the right-of-way is a series of five charcoal stains exposed in an erosion channel and dispersed sherds and lithic artifacts. LA 113954 is set above the floodplain, but near the confluence of the Arroyo Gallinas and two tributaries. The thermal feature is mostly intact with internal cobbles suspended in the dark charcoal-stained fill. A suspiciously spalled sherd was recovered from the upper levels, suggesting association with the feature. Similar features excavated at Las Campanas were for pottery-firing, while others were for roasting and other food processing activities (Lakatos 1996; Post 1996b). The chipped stone cluster yielded subsurface artifacts indicating a higher artifact density than was evident on the surface. High density clusters have the best comparative potential. LA 113954 fits the profile of similar intensively investigated Coalition period sites from Las Campanas (Post 1996b), suggesting that it has potential for future study.

LA 114071 is primarily a temporally nondiagnostic artifact scatter containing a thermal feature associated with a core reduction concentration. LA 114071 is similar to LA 113946 in the potential for yielding a core reduction profile from a single core reduction episode. Spatial association between the core reduction cluster and a small, intact thermal feature is unique for SFRW sites. It appears that the feature and core reduction are related, and it is possible that the thermal feature was used to heat-treat Madera chert cores. LA 114071 has good potential for future study of technological and site structure patterns.

RECOMMENDATIONS

This report provides the test excavation results for seven sites located along the Northwest Santa Fe Relief Route. Archaeological testing determined the extent, nature, and data potential of LA 108902, LA 108903, LA 111364, LA 113946, LA 113949, LA 113954, and LA 114071.

LA 108902 is a multicomponent artifact scatter with Pueblo period sherds and an Archaic patterned chipped stone concentration. The chipped stone artifact count from the subsurface excavation suggests that surface stripping may yield as many as 500 artifacts. Additional investigation within the cluster may yield chronological information, site structure patterns, and technological data. LA 108902 has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

LA 108903 is a multicomponent artifact scatter with Pueblo period sherds, two low-frequency chipped stone clusters, and the deflated remains of a thermal feature. Test excavation revealed no potential for substantial subsurface cultural deposits. The feature is heavily deflated and the fill has been mixed. LA 108903 does not have the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage.

LA 111364 is a multicomponent Pueblo period raw material procurement and resource gathering site. Sites with late Developmental to early Historic period Pueblo components are rare in the piedmont hills (Post 1996b). The presence of subsurface chipped stone associated with late Classic period pottery make LA 111364 a potentially important contributor to the understanding of changing Pueblo foraging practices. LA 111364 has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

LA 113946 yielded no temporally diagnostic artifacts, but the core reduction cluster and the buried, intact thermal feature represent two occupation episodes. The core reduction cluster has substantial subsurface artifacts, and the buried thermal feature with 20- to 25-cm-thick intact deposits may yield datable charcoal and evidence of plant or animal processing and consumption. This portion of LA 113946 has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

LA 113949 yielded no temporally diagnostic artifacts, although a low frequency artifact cluster was recorded and a badly deflated thermal feature was investigated. Test excavation revealed no subsurface deposits and the deflated condition of the feature limits its data potential. The portion of LA 113949 within the right-of-way does not have the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage.

LA 113954 is a multioccupation Coalition to early Classic period site with an intact thermal feature and a core reduction cluster associated with a dispersed artifact scatter. Outside the right-of-way is a series of five charcoal stains exposed in an erosion channel and dispersed sherds and lithic artifacts. The thermal feature should yield datable charcoal samples and intact internal morphology. The chipped stone cluster yielded subsurface artifacts indicating higher artifact density than was evident on the surface. The portion of LA 113954 within the right-of-way

has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

LA 114071 is primarily a temporally nondiagnostic artifact scatter with a thermal feature associated with a core reduction concentration. Spatial association between the core reduction cluster and a small, intact thermal feature is unique for SFRW sites. It appears that the feature and core reduction are related and it is possible that the thermal feature was used to heat-treat Madera chert cores. The portion of LA 114071 within the right-of-way has the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage and further data recovery is recommended.

The site limits of LA 113946, LA 113949, and LA 113954 extend outside the right-of-way. It is not known if these site areas have the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage. Fencing should be erected along the right-of-way during construction. LA 113946 should be fenced along the northwest right-of-way from NMSHTD Station 688+50.00 to 690+50.00. LA 113949 should be fenced along the northwest right-of-way from NMSHTD Station 686+00 to 687+50.00. LA 113954 should be fenced along the northwest right-of-way from NMSHTD Station 677.50+00 to 679+50.00.

LA 108902, LA 111364, LA 113946, LA 113954, and LA 114071 have the potential to yield data and require a data recovery plan. The data recovery plan for these sites is provided in the following section. LA 108903 and LA 113949 have no further data potential and no additional archaeological investigation should be required within the right-of-way.

This research design and data recovery plan is for five sites, LA 108902, LA 111364, LA 113946, LA 113954, and LA 114071. These sites were determined to have the potential to yield important information on prehistoric occupation of the piedmont hills and Santa Fe River drainage. Wolfman et al. (1989:152-170) submitted a data recovery plan for the excavation of 12 sites located along the Northwest Santa Fe Relief Route. Data recovery at three sites, LA 61315, LA 61318, and LA 61321, was completed for NMSHTD Project DE-0107 (807) or the portion of the Northwest Santa Fe Relief within the Santa Fe city limits. Nine sites are located within the second phase (NMP No. 599-1[3]), which is within Santa Fe County. None of these sites has been excavated. The five sites covered under this research design and data recovery plan will be combined with the nine sites when data recovery commences in the late winter or early spring of 1997.

The nine sites described in Wolfman et al. (1989) and the five sites addressed by this research design and data recovery plan are similar in artifact types and distribution, depth of cultural deposits, and the presence of intact thermal features. In reviewing Wolfman et al. (1989), it is clear that the proposed problem orientation, problem domains, and data recovery methods can be applied to the five sites currently under consideration. The following proposal is derived from Wolfman et al. (1989) with updating or changes in statements or research orientation inserted, as is necessary.

Problem Orientation

Theoretical developments in the past three and one-half decades, including a heavy emphasis on changing settlement and subsistence patterns through time, have demanded a shift in research orientation away from individual sites and towards the archaeology of local areas or even broad regions. This newer perspective is important to remember, because it conditions our understanding of the data potential of the Northwest Santa Fe Relief Route sites. Individually, each of the sites provides us with only a very limited glimpse of the prehistoric cultures of the Northern Rio Grande area. However, the data recoverable from the sites as a whole, if interpreted as part of a regional pattern, allow us to understand portions of the overall subsistence and land-use patterns that we conceivably could not study at large habitation sites.

The Northwest Santa Fe Relief Route sites appear to have played at least three roles in the general adaptive strategies of local prehistoric peoples. They were locations where chippable stone could be obtained, tested, and initially worked prior to transportation to habitation sites or foraging or resource extraction locations. They were areas where people paused briefly during the seasonal gathering of wild food resources and nonfood biotic and geologic resources (besides lithic raw material). Finally, they were areas in which farming could be practiced, if soil and moisture could be concentrated through the use of checkdams or similar features. The focus of the data recovery efforts, therefore, should be to better define these three functions *as parts of larger subsistence and settlement patterns* (though only two of these general functions apply to the five sites under consideration in this research design).

As a further consideration, the Northwest Santa Fe Relief Route sites cannot be fully interpreted in terms of the traditional concern with placing remains within phases or other slices of time. This is because the temporal orientation of many Southwestern archaeological studies is predicated on the existence of a specific type of site structure. The most desirable sites, of course, are those with stratigraphy. Almost as useful are a series of archaeological sites, each of which represent a single short-term occupation, as the sites can then be seriated to establish a local occupational sequence. In contrast, sites without datable remains, or where the remains of several periods are mixed together, are seen as a difficult or impossible methodological challenge.

Yet this is exactly what the Northwest Santa Fe Relief Route sites appear to be. In a sense they are a fossil remnant of a landscape that people used for many centuries, periodically or seasonally procuring and reducing lithic raw material, foraging for plants, seeds, and nuts, planting and tending a small maize crop or spending a few days in a temporary camp. Until recently it seemed that there was no local geographic focus, such as a spring or a rock shelter, at which these activities would tend to be concentrated. Recent research in the Las Campanas area, which adjoins the Northwest Santa Fe Relief Route on the north, has shown that sites do tend to cluster along primary tributaries of the Santa Fe River. Extensive, but shallow cultural deposits exist on the ridge and terrace slopes (Post 1996b; Lang 1996). As a transect sample of the cultural deposits in the piedmont hills, the remains within the Northwest Santa Relief Route are an unstratified, diffuse record of limited actions. Because of the nature of the prehistoric or early historic land-use patterns, spatial proximity or artifacts and features may or may not indicate contemporaneity. We may find a hearth near a checkdam, and both within a light scatter of chipped stone, but that does not mean that those remains were all left by the same individuals. An Archaic hunter may have built the campfire; centuries later, a Pueblo farmer may have built his garden plots; and for several thousand years, local people may have been testing and reducing nodules of chert.

Thus, an emphasis on chronology-based interpretations is inappropriate. We may be able to tell which periods saw the heaviest use of the project corridor, due to the number of diagnostic artifacts from those periods, and by the temporal distribution of radiocarbon and other dates, but it may often be impossible to associate dates with specific remains. The alternative is to see the Northwest Santa Fe Relief Route sites as evidence of general subsistence approaches shared by various groups through time, and to assess the nature and importance of these various approaches. For example, were piñon nuts the primary wild food resource along the Northwest Santa Fe Relief Route, as we currently suppose, or were other wild foods more important? What made the use of checkdams a practical farming tactic in this specific area? And why were local gravels such an attractive source of chippable stone?

In summary, traditional "site" approaches will not work for this project. Instead, it is necessary to define the Northwest Santa Fe Relief Route corridor as part of an "archaeological landscape" that also includes habitation sites outside the right-of-way. Within this landscape, each feature capable of yielding useful excavation data represents the proper unit of field study, while the proper unit for final analysis is the set of all excavated features. Once analysis of the excavation data are complete, it may be possible to define finer grained cultural or temporal trends, but such distinctions are not the primary goal of the study. Instead, we are trying to understand the use of a landscape in a general sense, over hundreds or even thousands of years.

Problem Domain I: Use of Chippable Stone

Prehistoric inhabitants of the Santa Fe area used chert, quartzite, and other types of stone in the local surface gravel and cobble deposits as a source of raw material for the production of stone tools. Given the scattered nature of the chipped stone found along the Northwest Santa Fe Relief Route, and tributaries of the Santa Fe River, it appears that the inhabitants could obtain raw material as an embedded strategy within daily foraging or travel or specifically for transport back to the village. Prospecting would consist of cracking open or removing single flakes from likely looking surface cobbles. If the material was suitable, then the promising cores or flakes they had produced would be removed off-site, and the remaining debris would have been left. The degree of dispersion following discard would depend on erosion, the degree of slope, how often the same location was visited, and how intensely the remaining debris was high-graded.

Archaeologists typically draw circles around artifact clusters and call them sites, but they may not be appropriate units of analysis. Artifact clusters may represent the accumulation of chipping debris over many decades or centuries. Indeed, the same nodule may have been reduced several times over the years. Palimpsest artifact distributions will always offer a challenge to accurate or meaningful temporal assignment, but they should not deter the use of sites or components as tools for examining subsistence and land use-patterns at broader temporal scales. The Las Campanas study has shown that there is a continuum of assemblage and attribute level variability that reflects that range of activity and intensity at locations used by prehistoric populations (Post 1996b:468-470). Furthermore, comparison of temporally unknown sites with Pueblo or Archaic period sites and components shows that temporally unknown sites are more similar to the Pueblo period sites (Post 1996b: 470-472). Individual sites with palimpsest or multicomponent distributions may not be informative, but the Las Campanas project has shown that assemblages of sites and components can be productive research domains. Because of the relatively large number of sites and the intensity at which they have been and will be studied, the Northwest Santa Fe Relief Route site chipped stone assemblages are important.

Wolfman et al. (1989:153) defined one major concern for the study of chipped stone recovered from the Northwest Santa Fe Relief Route sites:

I.1. What was the relationship, if any, between the procurement of chippable stone in the Northwest Santa Fe Relief Route area and the other adaptive behavior (farming, food gathering) evident in the Northwest Santa Fe Relief Route sites? Did lithic procurement take place as part of subsistence activities, or independently from them?

This broad question incorporates technological, functional, and structural studies of lithic artifact assemblages, attributes, and distributions. Surface artifact attributes were recorded during the testing phase. The chipped stone artifact data have been presented in this report. Additional chipped stone artifacts will be recovered from more extensive excavation of core reduction concentrations or clusters and feature/activity areas. The excavation strategy will focus on systematic recovery of artifacts for spatial analysis of artifact and attribute distributions. Analysis strategy will ensure that artifact type and attribute data can be compared with other Northwest Santa Fe Relief Route excavations and the Las Campanas excavations.

Problem Domain II: Foraging

The second major activity posited for the Northwest Santa Fe Relief Route that can be addressed with the site data is foraging for wild foods and collection of nonfood biotic and geologic resources (other than lithic raw materials). Wild food procurement could include both hunting and plant-food gathering. Wolfman et al. (1989:156) assumed that the emphasis was on plant food gathering with a seasonal focus on the harvesting of piñon nuts. Though not confirmed by macrobotanical or pollen analysis, it is more likely that prehistoric Santa Fe River villagers obtained a broad spectrum of resources from the piñon-juniper piedmont hills. As described in the Contemporary Environment section (this report), "Piñon-juniper woodlands had 135 of the 271 plant species observed within the Arroyo Hondo pueblo catchment (Kelley 1980:60). Of these, 63 species are edible or have medicinal qualities. However, with the exception of piñon, most of the species are not abundant or are most productive in disturbed soils."

In considering the Northwest Santa Fe Relief Route sites, it is instructive to consider a brief article by Sebastian (1983), which considers the nature of single-day use sites in the Chaco Canyon area. According to Sebastian, such sites have either structures or hearths--but not both--and contain high percentages of utility wares (about 80 percent of the total) and jar sherds (about 70 percent). Chipped stone artifacts were not especially diagnostic relative to site function. One problem with interpreting such sites is the lack of ethnographic information on historic Pueblo day-use site practices. As Sebastian (1983) notes, "Beaglehole (1937) provides the most comprehensive discussion of Pueblo gathering practices (Hopi in this case) that I could find, and this section of his monograph covers a scant two pages."

Ellis (1978) does provide some specific information on piñon nut gathering. Apparently, outings of a single day to several days were used to gather this resource. Many of the gathering camps described by Ellis contained no structures, but those used overnight often had perishable structures that might include a single dry-laid stone wall. Although it is not clear, Ellis seems to indicate that piñon nuts were roasted at the camps (see Sebastian 1983 on this point). Lanner (1981), in his brief description of Eastern Pueblo piñon collecting, describes the practice of roasting the nuts in the pueblos instead of in the field. Consequently, based on the limited ethnographic information, piñon nut gathering sites may or may not contain thermal features used for roasting the nuts.

The situation is further complicated for archaeologists because it was a common aboriginal practice to tray-roast piñon nuts, using coals removed from hearths. Thus, even if a thermal feature was used as part of the nut-roasting process there may be no burned hulls present in the thermal feature itself. However, charred piñon hulls were recovered during testing from at least one thermal feature (LA 61286, Feature 3; SFRR, see Wolfman et al. 1989), suggesting that further attempts at recovering such remains is worth the effort.

Excavation of over 30 thermal features from Las Campanas sites failed to yield any evidence of nonwood charcoal economic species and very limited evidence of meat roasting, processing, or consumption (Mick-O'Hara 1996; Post 1996b; Toll and McBride 1996). Recovery strategies varied from water and fine-screening of 2 to 4 liters of soil from features to removing all fill from the feature. While there is no immediate reason to believe that current efforts will be more successful, intensive sampling of features may provide information on why the paucity of charred plant and faunal remains exists.

Part of this effort will be the recovery of charcoal from fuelwood, which should provide evidence of continuity or change in the local environment. As a supplement to ceramic manufacture dates, the thermal features should provide charcoal for radiocarbon dating in direct association with other remains. This means that analysis of foraging patterns can include some sorting of data through time.

These same concerns can be framed into the following research questions:

II.1. What evidence of plant and animal foods is contained in the various thermal features located along the Northwest Santa Fe Relief Route? Do these suggest a dependence on local wild foods, and if so, which ones? Is the archaeological distribution of these food types consistent with their modern spatial distribution? Or do the data suggest a dependence on crops, and if so, which ones?

II.2 Are there functional differences in thermal features that is evident in morphology, internal fill and structure characteristics, or artifact assemblage?

II.3. What are the ages of the various hearths? Do they occur over an extended time span, or are they most common in a single period?

II.4. Given the known content and age of hearths, can we suggest any changes in subsistence emphasis along the Northwest Santa Fe Relief Route through time?

II.5. What is the relationship between foraging activities and other activities in the Northwest Santa Fe Relief Route area?

Answering these questions requires recovery of flotation and datable samples from and careful systematic excavation of the thermal features. It would be ideal if excavation would also reveal use surfaces in association with the hearths, but since the sites are largely surficial, this is not likely. As a consequence, it may not be possible to establish the relationship between the thermal features and the other remains.

Problem Domain III: The Settlement-Subsistence System

Once the basic questions from studies of farming and foraging behavior have been addressed (and the chipped stone data evaluated in terms of that behavior), it should be possible to step back and interpret the project results in terms of the known prehistory of the Santa Fe area as a whole. When this is done, we hope to be able to explain how the limited or seasonal activities encountered along the Northwest Santa Fe Relief Route form part of a greater subsistence and settlement system:

III.1. When the Northwest Santa Fe Relief Route is viewed as a whole, what was its basic role as a sustaining area or resource area? If temporal distinctions are possible, can we also define any continuity or change in this role through time?

III.2. How do patterns along the Northwest Santa Fe Relief Route, as a sustaining area, compare to the known settlement and subsistence patterns for the Santa Fe area as a whole? For example, does the most intensive use of the Northwest Santa Fe Relief

Route coincide with the heaviest local occupations? Or can we see a fairly consistent use of the area, independent of other changes in the area?

III.3. Does the relationship between the Northwest Santa Fe Relief Route sites and nearby habitation areas provide us with insights about the future study of sustaining vs. habitation areas in the northern Rio Grande region as a whole?

Answering these questions will require a comparison of the results of the Northwest Santa Fe Relief Route analysis with known data about local occupations. The latter can be obtained both from site survey records and from existing reports on Santa Fe area archaeology.

Field Methods

The Northwest Santa Fe Relief Route sites are primarily surficial and within each site, it is probably not safe to assume that individual features or artifact concentrations are associated with one another. Although, as a result of the proposed studies, we may be able to conclude that features were in fact associated, but we should not assume this. The focus of field studies will therefore be individual features or artifact concentrations that represent components, not sites.

The first step at each site will be to reestablish the grid system. At that point, the excavation strategy will depend on the nature of the component being investigated, discussed below.

Unless noted otherwise, all excavation will be by hand and will include screening of fill through ¼-inch mesh screen. Any artifacts or samples recovered will be collected in terms of the horizontal site grid, by feature provenience if any, and by vertical controls (natural stratigraphy, if visible, or by 10-cm levels).

Once excavations are completed, the testing phase site maps will be revised as needed. Each feature will be photographed (using scale north arrow and mug board), drawn (plans and profiles), and recorded on field forms. Any stratigraphic information will also be recorded as a series of profiles.

Thermal Features

Most of the thermal features from the five sites have been sampled by the testing program. During data recovery, we propose to completely excavate the remaining portion of the thermal feature.

For thermal features with less than 10 liters of fill, we propose to remove the entire fill (using vertical controls) for flotation analysis. For larger hearths, at least 10 liters of fill will be sampled in this manner, and the remaining fill will be excavated and screened through ⅛-inch screen in the field. During this process, suitably large pieces of carbonized wood will be culled for possible use as radiocarbon samples. If sufficient clay content and baking is observed, each thermal feature will then be sampled for archaeomagnetic dating.

Collection of a large sample of thermal feature fill is based on the assumption that most of the carbonized material will represent fuel, not food. While the data on fuelwood may yield

useful paleoenvironmental data, this is not the emphasis of the research design. Instead, the preparation and sorting of large flotation samples should enhance our chances of recovering statistically meaningful samples of food remains that happened to fall into the thermal features (and happened to survive as carbonized remains).

Once the thermal feature is excavated, a plan and profile will be prepared. A written feature description will include Munsell Soil Chart color, texture, content, and condition of the fill, morphological description, characterization of internal cobbles, and any evidence that relates to feature use or function.

In addition to feature excavation, a minimum 8-by-8-m area will be surface stripped with the feature at the center. This will ensure that debris or ancillary features within a minimum hearth-seat area will be recovered or exposed. Artifact type distribution data may provide additional functional or temporal information.

Artifact Concentrations

Artifact concentrations occur at all sites. These concentrations may remain from single occupations or site visits. LA 108902 has multiple concentrations that may be temporal and functional components. LA 111364 has a cluster that reflects late stage core reduction or tool production. LA 113946, LA 113954, and LA 114071 have chipped stone concentrations from the single episode intensive reduction of one to five cores. Artifact type and attribute frequency and distribution data from the sites can be compared with Northwest Santa Fe Relief Route and Las Campanas sites. Recovery of near 100 percent of the material is possible through extensive surface stripping and screening. The limits of these artifact concentrations will be defined and the area surface stripped until recovered artifact frequencies drop significantly or cease. Surface stripping will cover 8-by-8-m to 16-by-16-m areas. In addition to artifact recovery, features may be exposed providing more functional information.

Summary of Proposed Site-Specific Research

LA 108902

This site contains an artifact concentration that covers a 15-by-15-m area. The 1-by-1-m grid system will be reestablished across the densest area of the cluster. Surface stripping will entail the removal of the upper 5 to 10 cm of loose top soil. A running count will be maintained of the artifacts recovered by screening. If after the area is stripped, units with 5 to 10 artifacts occur at the edge, then additional units will be surface stripped until the artifact density decreases. If during the 15-by-15-m stripping, artifact counts decrease dramatically, then stripping may be halted. If a thermal or pit feature is encountered, it will be excavated and recorded as described in the previous section. Data from the artifact concentration will be used to address subsistence activities at the site and regional levels (Problem Domains I and III). Data from the thermal features will be used to address subsistence activities (Problem Domain II) as well as paleoenvironmental reconstruction.

Chipped stone artifacts and pottery sherds may be recovered. Laboratory analysis of chipped stone artifacts will assess the relationship between the procurement of chippable stone in

the region and other adaptive behavior (Problem Domain I). Laboratory analysis of ceramic artifacts will assess subsistence activities in terms of storage and food preparation, as well as trade, production, and other aspects of the settlement-subsistence system (Problem Domain III).

LA 111364

This site contains two artifact concentrations that may each cover an 8-by-8-m area. The artifact concentrations reflect raw material procurement, core reduction, and expedient tool production during the entire Pueblo period. The 1-by-1-m grid system will be reestablished with two 8-by-8-m excavation areas centered on the densest area of each cluster. Surface stripping will entail the removal of the upper 5 to 10 cm of loose top soil. A running count will be maintained of the artifacts recovered by screening. If after the area is stripped, units with 5 to 10 artifacts occur at the edge, then additional units will be surface stripped until the artifact density decreases. If during the 8-by-8-m stripping, artifact counts decrease dramatically, then stripping may be halted. If a thermal or pit feature is encountered, it will be excavated and recorded as described in the previous section. Data from the artifact concentration will be used to address subsistence activities at the site and regional levels (Problem Domains I and III). Data from the thermal features will be used to address subsistence activities (Problem Domain II) as well as paleoenvironmental reconstruction.

Chipped stone artifacts and pottery sherds may be recovered. Laboratory analysis of chipped stone artifacts will assess the relationship between the procurement of chippable stone in the region and other adaptive behavior (Problem Domain I). Laboratory analysis of ceramic artifacts will assess subsistence activities in terms of storage and food preparation, as well as trade, production, and other aspects of the settlement-subsistence system (Problem Domain III).

LA 113946

This site contains one thermal feature and a chipped stone concentration. The grid system will be reestablished with two 8-by-8-m units established at Feature 1 and the artifact concentration.

Excavation of Feature 1 will begin at the edge of the excavation area exposing artifact distributions and ancillary features. Once the 8-by-8-m area is stripped, Feature 1 and any other features will be excavated as described in the previous section. Data from the thermal features will be used to address subsistence activities (Problem Domain III) as well as paleoenvironmental reconstruction.

Excavation of the artifact concentration will include surface stripping of the upper 5 to 10 cm of loose top soil. A running count will be maintained of the artifacts recovered by screening. If after the area is stripped, units with 5 to 10 artifacts occur at the edge, then additional units will be surface stripped until the artifact density decreases. If during the 8-by-8-m stripping artifact counts decrease dramatically, stripping may be halted. If a thermal or pit feature is encountered, it will be excavated and recorded as described in the previous section. Data from the artifact concentration will be used to address subsistence activities at the site and regional levels (Problem Domains I and III).

Laboratory analysis of chipped stone artifacts will assess the relationship between the procurement of chippable stone in the region and other adaptive behavior (Problem Domain I).

LA 113954

This site contains one thermal feature and a chipped stone concentration. The grid system will be reestablished with two 8-by-8-m units established at Feature 1 and the artifact concentration.

Excavation of Feature 1 will begin at the edge of the excavation area, exposing artifact distributions and ancillary features. Once the 8-by-8-m area is stripped Feature 1 and any other features will be excavated as described in the previous section. Data from the thermal features will be used to address subsistence activities (Problem Domain III) as well as paleoenvironmental reconstruction.

Excavation of the artifact concentration will include surface stripping of the upper 5 to 10 cm of loose top soil. A running count will be maintained of the artifacts recovered by screening. If after the area is stripped, units with 5 to 10 artifacts occur at the edge, then additional units will be surface stripped until the artifact density decreases. If during the 8-by-8-m stripping artifact counts decrease dramatically, stripping may be halted. If a thermal or pit feature is encountered, it will be excavated and recorded as described in the previous section. Data from the artifact concentration will be used to address subsistence activities at the site and regional levels (Problem Domains I and III).

Chipped stone artifacts and pottery sherds may be recovered. Laboratory analysis of chipped stone artifacts will assess the relationship between the procurement of chippable stone in the region and other adaptive behavior (Problem Domain I). Laboratory analysis of ceramic artifacts will assess subsistence activities in terms of storage and food preparation as well as trade, production, and other aspects of the settlement-subsistence system (Problem Domain III).

LA 114071

This site contains one thermal feature associated with a chipped stone concentration. The grid system will be reestablished with an 8-by-8-m unit centered on Feature 1 and the artifact concentration.

Excavation will begin at the edge of the excavation area exposing artifact distributions and ancillary features. Once the 8-by-8-m area is stripped, Feature 1 and any other features will be excavated as described in the previous section. Data from the thermal features will be used to address subsistence activities (Problem Domain III) as well as paleoenvironmental reconstruction.

As the excavation proceeds, a running count will be maintained of the artifacts recovered by screening. If after the area is stripped, units with 5 to 10 artifacts occur at the edge, then additional units will be surface stripped until the artifact density decreases. If another thermal or pit feature is encountered, it will be excavated and recorded as described in the previous section. Data from the artifact concentration will be used to address subsistence activities at the site and regional levels (Problem Domains I and III).

Laboratory analysis of chipped stone artifacts will assess the relationship between the procurement of chippable stone in the region and other adaptive behavior (Problem Domain I).

Laboratory Analysis

Before artifact analysis, all recovered materials will be cleaned, and any materials requiring conservation will be treated. Collected samples of charcoal and ethnobotanical remains will be processed and prepared for shipment to the appropriate laboratory. The specialists will be consulted for special preparations required before shipment. Working copies of field maps and feature drawings will be prepared and made available to the specialists.

The lithic artifact analysis will follow the guidelines of the Office of Archaeological Studies Lithic Artifact Analysis Manual (1994). The lithic analysis is particularly suited to monitoring technological organization. Morphological and functional attributes emphasize reduction stage, manufacture and maintenance, and tool use and discard. These are the main foci of the research orientation and implementation.

The ceramics will be identified according to existing regional typologies for the Middle and Northern Rio Grande. Sources of information may include Stubbs and Stallings (1953), Lang and Scheick (1989), Mera (1935), and Chapman and Enloe (1977). The primary foci of the ceramic analysis will be dating, function, use-life, and source of manufacture.

Faunal remains will be analyzed in the OAS Laboratory by Linda Mick-O'Hara. Depending on the size, condition, and preservation of the specimens, they will be monitored for species, sex, age, portion, condition, evidence of butchering, and evidence of taphonomic processes. Faunal remains are important indicators of subsistence strategy and site formation. The detail of the analysis will be tempered by the abundance and condition of the faunal remains.

Upon completion of the attribute identification, the coded data will be computerized. Statistical manipulation of the database will be performed using SPSS PC + Version 3. Statistical tests will be geared towards examining patterns in artifact distribution that reflect technological organization. Tests and analytical techniques that may be used include Chi-square tests for independence, correspondence, and cluster analysis to identify similar assemblages within the Las Campanas area. Results of the tests will be illustrated with graphs, tables, charts, and distribution maps. The computerized database may be used to generate a project artifact catalogue. Artifacts with attributes important to site interpretation will be illustrated for the report.

The flotation and macrobotanical remains will be analyzed at the Office of Archaeological Studies by the staff ethnobotanist. The analyses will identify plant resources that were used prehistorically.

Carbon-14 dating will be conducted by Beta Analytic, Inc., of Coral Gables, Florida. Archaeomagnetic analysis will be conducted by Jeff Cox, on staff at the Office of Archaeological Studies. The purpose of these analyses will be to obtain the most accurate range of dates possible for cultural strata and features.

Research Results

The final report will be published in the Museum of New Mexico, Office of Archaeological Studies' *Archaeology Notes* series. The report will present all important excavation,

analysis, and interpretive results. Included will be photographs, maps, and tables. Raw data such as field notes, maps, photographs, and artifact catalogues will be given to the State Historic Preservation Division, Archeological Records Management System, currently located in the Laboratory of Anthropology in Santa Fe. The artifact collection will be curated in the Museum of New Mexico's Archaeological Research Collections.

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