NMCRIS No. 137025

Cultural Resource Data Recovery

Final Report for 98th Street Improvements Project Testing and Data Recovery Investigations of a Portion of LA 151618

Volume I: Background Information

Albuquerque, Bernalillo County, New Mexico

Prepared by
Marron and Associates

Prepared for
WH Pacific, Inc.

November 2016

NMCRIS No. 137065

Final Report of Testing and Data Recovery Investigations of a Portion of LA 151618, for 98th Street Improvements Project, Albuquerque, Bernalillo County, New Mexico

Volume I: Background

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Under
New Mexico State Permit
NM-SE-340

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November 2016

ABSTRACT

The City of Albuquerque is proposing road improvements along 98th Street between Gibson Boulevard and Rio Clara Avenue in Albuquerque, Bernalillo County, New Mexico. This 6-volume report discusses the findings, analyses, and interpretation for the results of testing and data recovery investigations at a portion of LA 151618. The site extends to the west onto private land and this part of the site was not investigated.

This site was identified during a cultural resource survey (NMCRIS 131475) and was determined to be eligible to the National Register of Historic Places (NRHP) by the New Mexico Historic Preservation Division (HPD). This project followed the treatment plan (Goar and Mattson 2014) that was approved by the Cultural Properties Review Committee (CPRC), the New Mexico Department of Transportation (NMDOT), and HPD.

Testing was completed by Marron and Associates in July 2014 and revealed that there were intact subsurface cultural remains and an abundant amount of artifacts within the project area. As a result data recovery was necessary. Data recovery was completed November 24 through February 11, 2015. Christina Chavez and Toni R. Goar served as Principal Investigators. The work was completed under New Mexico Permit No. SE-340.

As this final report is a large undertaking, the document has been separated into 6 volumes.

Volume I Background Information provides general information about the project, and it includes an environmental setting, a cultural overview of the area, the research design with research questions, and the field and laboratory methods.

Volume II Results includes the an introduction to the site, followed by a physical description, past investigations, testing and data recovery strategy, the surface characteristics, excavation units (both manual and mechanical), subsurface cultural remains, artifacts recovered, the stratigraphy at the site, and features found. Maps and photographs are included.

Volume III Analysis provides analytical information regarding lithics, ground stone, ornaments, and ceramics.

Volume IV is the results of the faunal analysis.

Volume V is the results of the macrobotanical analysis, pollen analysis, and geomorphological analysis.

Volume VI Summary and Appendices provides an overview of the project findings and interpretation of these findings. Also, included in this volume is a compilation of all references cited in the entire report (all 6 volumes). Appendices in this volume include databases for the lithics, ground stone (Appendix A), ceramics (Appendix B), and faunal (Appendix C). The information provided by Beta Analytic, Inc. for the radiocarbon analysis is included (Appendix D). Lastly, Appendix E is the Field Specimen (FS) logs for each site. In addition, a confidential appendix is related to the burial found at the site.

ACKNOWLEDGEMENTS

This project would not have been possible without the efforts and contributions of many participants. Special thanks to WH Pacific, Inc. and TY Lin International for providing Marron this opportunity to excavate LA 151618 and for the continued support throughout all the phases of the project. Also, we would like to thank the agencies involved, including Matt Schmader at the City of Albuquerque for his constant guidance and encouragement, Michelle Ensey and Jan Biella at HPD, and the CPRC; your guidance and insight was very helpful. A special thanks to the New Mexico Department of Transportation for their support and guidance, which is always appreciated.

Of course data recovery projects cannot be completed without a great crew, including R. Stanley Kerr, Joshua Vallejos, Hunter Claypatch, Christina Allen, Darryl Del Frate, Danielle Schneider, and Travis Altomonte. Thanks to all, as this was a very cold time to be excavating a pithouse ruin, but the crew kept diligently working with positive moral and great teamwork! Lastly, but definitely not least, this report could not have happened without the analysts, writers, editor and graphics. Thanks to Hunter Claypatch and Hannah Mattson for their hard work and time spent analyzing the ceramics. Thank you to R. Stanley Kerr for assisting with the lithic analysis and report writing. Special thanks to Joshua Vallejos for the time spent with artifact and sample processing.

Specialists contributing excellent reports include Marie Brown who conducted the faunal analysis, Paul Knight, the macrobotanical, Dean Wilson, Ceramics, Charles D. Frederick and Arlo McKee, the geomorphological investigation, Maryanne Calleja, Osteological analysis contribution, Darden Hood and staff at Beta Analytic, the radiocarbon dating, and Linda Scott Cummings and her staff at PaleoResearch Institute, the pollen. Operators with the Backhoe Lady Ltd Co. who provided much appreciated mechanical excavation assistance. The graphics were completed by Darryl Del Frate, Kerrie Bushway, and Alex Ochoa who as always, anticipates the writer’s needs for the reports. Kelli James assisted with the artifact and sample processing and helped with tables, at the end. Mary Hamel and Santino R. Hernandez completed the task of editing the volumes and completed much of the formatting.

My apologies to anyone who may have contributed, but has escaped mention. There are at least a handful of folks included here; those who cared enough to visit the site or collections, sharing information, their experiences, questions and concepts Thank you all, sincerely.

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INTRODUCTION

The City of Albuquerque is proposing road improvements along a 2.0-kilometer (km) (1.25-mile [mi]) stretch of 98th Street between Gibson Boulevard and Rio Clara Avenue in Albuquerque, Bernalillo County, New Mexico. This 6-volume report discusses the findings, analyses, and interpretation for the results of testing and data recovery investigations at a portion of LA 151618. The site extends to the west onto private land and this part of the site was not investigated. To comply with the State regulations, Marron was contracted by WH Pacific, Inc. and T.Y. Lin to complete data recovery investigation.

This site was identified during a cultural resource survey (NMCRIS 131475) and was determined to be eligible to the National Register of Historic Places (NRHP) by the New Mexico Historic Preservation Division (NMHPD). This project followed the treatment plan (Goar and Mattson 2014) that was approved by the Cultural Properties Review Committee (CPRC), the New Mexico Department of Transportation (NMDOT), and NMHPD.

Testing was completed by Marron and Associates (Marron) in July 2014, by Toni R. Goar, Kelli James, Darryl Del Frate, Christina Chavez, and R. Stanley Kerr. The results revealed that there were intact subsurface cultural remains and an abundant amount of artifacts within the project area (Goar 2014). As a result data recovery was necessary. Data recovery was completed November 24 through February 11, 2015. Christina Chavez, R. Stanley Kerr, Joshua Vallejos, Travis Altomonte, Hunter Claypatch, Danielle Schneider, Chris Allen, Kelli James, Darryl Del Frate, and Toni R. Goar completed the work. Christina Chavez and Toni R. Goar served as Principal Investigators. The work was completed under New Mexico Permit No. SE-340. Excavation was completed within the City of Albuquerque public roadway easement of the site (LA 151618).

This undertaking complies with the provisions of the Archaeological Resources Protection Act (ARPA) of 1979, the National Historic Preservation Act (NHPA) of 1966, as amended, and applicable regulations. This report is consistent with applicable federal and state standards for cultural resource management.

Laboratory processing was supervised by Christina Chavez and was completed by Kelli James, R. Stanley Kerr, Hunter Claypatch, and Joshua Vallejos. C. Dean Wilson, Hannah Mattson, and Hunter Claypatch analyzed the ceramic assemblage; Christina Chavez and R. Stanley Kerr analyzed the lithic and ground stone assemblage; macrobotanical remains were analyzed by Paul Knight; Marie Brown analyzed the faunal assemblage; and Maryanne Calleja assisted with the osteological analysis. Linda Scott Cummings of PaleoResearch Institute completed the pollen analysis. Radiocarbon samples were processed and analyzed by Beta Analytic, Inc. The geomorphologist is Charles Frederick. Ornaments were analyzed by Christina Chavez. The remainder of the report was completed by Christina Chavez, Toni R. Goar, R. Stanley Kerr, and Hannah Mattson. Figures and maps were drafted by Darryl Del Frate, Kerrie Bushway and Alex Ochoa.

Project Location

Site LA 151618 is located on City of Albuquerque and private land on Albuquerque's West Side in Bernalillo County, New Mexico (Figure 1). The corresponding US Geological Survey (USGS) 7.5-minute topographic quadrangle for the location of LA 151618 is *Albuquerque West* (1990; 35106-A6). The site is located within the Town of Atrisco Land Grant.

Report Organization
As this final report is a large undertaking, the document has been separated into 6 volumes.

Volume I Background Information provides general information about the project, and it includes an environmental setting, a cultural overview of the area, the research design with research questions, and the field and laboratory methods.

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The public disclosure of the location of archaeological sites on state and private lands is prohibited by § 18-11.1 NMSA 1978. The public disclosure of the location of archaeological sites on federal lands is prohibited by 36 CFR 296.18.
(4 NMAC 10.15.2.J.[1])

ENVIRONMENTAL SETTING

By Toni R. Goar and R. Stanley Kerr

The project area lies within the Mexican Highland Section of the Basin and Range Physiographic Province (Hawley 1986:24). It is situated on Albuquerque's West Mesa overlooking the Rio Grande Valley, the only perennial river in the area. The elevation of the site is 1,554 meters (m) (5,100 feet [ft]) above mean sea level (amsl).

Physiography

The Rio Grande Valley in New Mexico consists of a series of north-south oriented basins that composed part of the Rio Grande depression or rift belt that stretches across the state. These basins are linked by narrow valleys and structural bedrock constrictions situated at either end of the basins (Kelley 1977:7, 35). The Albuquerque Basin, the largest in the Rio Grande Rift, is bounded on the west by the Colorado Plateau and on the east by the Sandia, Manzano, and Los Pinos fault blocks (i.e., mountains) that tilt eastward. The surrounding mountains consist of granitic igneous rocks of Precambrian age and metamorphic rocks of schist, gneiss, and quartzite on the rugged west face (Pease 1975:118). The foothills consist of limestones, sandstones, and shale (Pease 1975:118). The Albuquerque Basin is drained by the Rio Puerco in the west and by the Rio Grande in the east. Both drainages are deeply entrenched in a former high basin surface that is preserved in the Ceja Mesa between the two drainages (Kelley 1977:7–8, 35, 43).

This integrated system of linked basins varies in depth. The fill consists of sand, silt, mud, and gravel that eroded from the neighboring mountains. These sediments are generally referred to as the Santa Fe Formation or Group (Miocene-Pliocene) and are thousands of feet thick. The Santa Fe formation contains sandstone, mudstone, gravel, and redeposited shales (Kelley 1977:7). The gravels of this formation include cherts, chalcedonies, quartzites, and obsidian that were important lithic raw materials for the prehistoric inhabitants of the area. The Santa Fe Formation is overlain by the more recent (Pleistocene) relatively thin alluvial pediment gravel and sand of the Ortiz surface (Kelley 1977:20). This widespread erosion surface ranges from 1.5 m (5 ft) to as much as 45.7 m (150 ft) thick (Kelley 1977: 20–21, 25).

West Mesa

The site is on the West Mesa (Ceja Mesa), a physiographic division of the Albuquerque Basin (Figure 2). The West Mesa is a preserved remnant of the former widespread basin surface into which the present Rio Grande is deeply entrenched. It slopes from the Puerco Escarpment toward the Rio Grande (Higgins and Lundquist 2003). During the Tertiary and early Quaternary times, the Rio Grande was larger and flowed over most of the Albuquerque Basin floor depositing piedmont sediments for mountains to the east and west. These tertiary sediments are called the Santa Fe formation and are comprised of sandstones, mudstones, and gravels (chalcedony, chert, and petrified wood) (Higgins and Lundquist 2003). Downcutting by the Rio Grande created the Ceja Mesa. The surface of this mesa is the Ortiz surface (Kelley 1977:25, 28, 30). It is capped by aeolian sand blankets and dunes along the mesa edge. These wind-blown deposits are post-Pleistocene in age (Kelley 1977:21). The soils of West Mesa are gently sloping to undulating. The topography is defined by broad, shallow, closed depressions and by wide, poorly defined terraces (Pease 1975:118). The vegetation of West Mesa was formerly grassland.

Figure 2. Ceja Mesa with Rio Grande Valley in Background

Hydrology

The hydrology of the Ceja Mesa is dominated by intermittent arroyos, which tend to drain east toward the Rio Grande (Higgins and Lundquist 2003).

Climatic changes over time and recent historic activities, such as overgrazing and well digging, have affected surface water availability. Prior to overgrazing and well digging, the groundwater levels were higher and therefore surface water was more readily available, at least for certain times of the year. During the Late Archaic times, high precipitation occurred and it is likely that the arroyos had water and there may have been running springs and seeps (Higgins and Lundquist 2003).

Soils

Bluepoint loamy fine sand, which comprises 100 percent of the project area, occurs on stream terraces with a 1 to 9 percent slope and elevations ranging from 1,359 m to 1,828 m (4,460 ft to 6,000 ft) amsl. The parent material is derived from alluvium and/or aeolian deposits and is associated with a mean annual precipitation of 6 to 12 inches (U.S. Department of Agriculture Web Soil Survey Data, 2016).

Climate

The project area has an arid, continental climate characterized by low rainfall, warm summers, and mild winters. The average annual precipitation for Albuquerque is 17.8 centimeters (cm) to 25.4 cm (7 inches [in] to 10 in). Most of the precipitation, 11.4 cm (4.5 in), occurs from June through October in the form of brief, often heavy thunderstorms. The Gulf of Mexico is the main source of moisture during this period (Houghton 1975:119). Moisture is supplied by southeasterly circulation of moist air over the Gulf of Mexico from the Bermuda high pressure area, which shifts westward in summer (Hacker 1977:95). During winter, precipitation is provided by eastward-moving Pacific Ocean storms. Most of the moisture, however, is lost in the mountains west of New Mexico. In general, precipitation varies greatly from month to month and year to year (Houghton 1975:119).

The average annual temperature for Albuquerque ranges from 15.6° Celsius (C) (60° Fahrenheit [F]) in the Rio Grande Valley to 10°C (50°F) in the Sandia Mountains (Pease 1975:112). Within the project area, temperatures of at least 32.2°C (90°F) are reached an average of 75 days annually. The average frost-free season is 196 days. Relative humidity averages less than 50 percent. On hot, sunny afternoons, it is less than 20 percent. Winds are primarily southerly in summer and northerly in winter. Although winds are light throughout most of the year, averaging 16 kilometer (km) (10 miles [mi]) per hour, spring is the windy season. During this time, the winds are mainly from the southwest (Hacker 1977:95–96; Houghton 1975:119).

Vegetation

The project area is within Bailey's (1913:27) Upper Sonoran Zone and Shreve's (1942:236) Chihuahuan Desert as amended by Schmidt (1979). The vegetation of the West Mesa is variously classified as Plains-Mesa Sand Scrub (Dick-Peddie 1993:124, 128–129), Plains and Great Basin Grassland (Brown 1994:115–121), and Desert Grassland (Castetter 1956). Most of the Plains-Mesa Sand Scrub areas occur in former mesa grassland areas (Dick-Peddie 1993:128). Drought and overgrazing since 1850 have drastically reduced the grass cover (Dick-Peddie 1993:131). As a result, the various bunchgrasses (e.g., grama species) favored by livestock have been replaced by forbs and shrubs. The vicinity of the project area is dominated by species which are deep-sand tolerant or even deep-sand adapted (Dick-Peddie 1993:128). Additional information on vegetation for the area is presented in Volume V in the Macrobotanical chapter.

Fauna

The prehistoric inhabitants of the project area hunted a variety of animals for food, hides, and bone (Findley et al. 1975). All available environmental zones and landforms were exploited. Important game animals included pronghorn, deer, wapiti, bighorn sheep, bison, cottontails, and jackrabbits. Mammals such as bears, wolves, beavers, bobcats, foxes, and river otters were hunted for their pelts. Turkeys, owls, hawks, eagles, and various perching birds were hunted or raised for their feathers. Quail and waterfowl were procured as secondary food resources. In addition, a more diverse fish fauna were available in the Rio Grande than is currently the case.

CULTURAL OVERVIEW OF THE AREA

By Toni R. Goar, Hannah Mattson, and Maria Hroncich-Conner

The project area lies in the Middle Rio Grande Valley. The prehistory and history of this area consists of four major cultural-temporal periods—Paleoindian, Archaic, Ancestral Pueblo, and Historic. Cordell (1997), Lintz et al. (1988), and Raymond (2010) have provided excellent general cultural overviews for the area. More detailed summaries are available for the Paleoindian (Judge 1973, Huckell 2002; Huckell and Kilby 2002a, 2002b), Archaic (Irwin-Williams 1973), Ancestral Pueblo (Wendorf and Reed 1955), and Historic (Simmons 1982) periods.

Paleoindian Period (10,000–5500 BC)

The earliest well-documented human occupation in New Mexico, the Paleoindian period (10,000–5500 BC), developed when the local climate was cooler and wetter and is characterized by stylistically distinct large, often fluted, lanceolate projectile points. This period is associated with late Pleistocene and early Holocene megafauna, as it was the local abundance of these megafauna that likely attracted Paleoindian groups to the area. The Paleoindian period is divided into three subperiods—Clovis (10,000–9000 BC), Folsom (9000–8000 BC), and Plano (8000–5500 BC)—named for different cultural groupings. Paleoindian lithic assemblages demonstrate a very refined and standardized technology, with each temporal period exhibiting diagnostic projectile points and associated toolkits. Clovis sites, which are generally associated with the hunting, killing, and butchering of mammoths and other late Pleistocene fauna, are typified by the Clovis point. The Clovis point is a bifacial, lanceolate projectile point with a concave base and channel flaking near the proximal end of at least one face. Folsom and Plano sites were generally associated with hunting, killing, and processing of now-extinct forms of bison. Folsom points are identified as large, fluted projectile points, while Plano points are large and unfluted. Additional lithic tools associated with the Paleoindian period are hammerstones, drills, utilized flakes, end and side scrapers, and bifacially worked knives (Brandi 1999: 19; Murrell 2009:17). By the end of the Paleoindian period, only modern fauna remained. In addition to hunting megafauna, the early Holocene hunters and foragers also exploited a variety of floral and smaller faunal resources (Cordell 1979:20, 1997:96, 99; Martin and Plog 1973:159–160).

Judge's (1973) investigations of the Middle Rio Grande Valley documented Paleoindian occupation of the area throughout the entire temporal span of the period. Paleoindian exploitation of this area was less intense, however, than that of the Great Plains. In general, Paleoindian sites in the Middle Rio Grande Valley were occupied for short periods, probably not more than several weeks at a time. In addition, the region may have been abandoned periodically due to the paucity of game (Judge 1973:310–311). Within the Albuquerque area, Paleoindian materials are most commonly found as isolated surface finds of partial or complete diagnostic projectile points. Some assemblages with stratified deposits, however, have been identified in the region (Judge 1973). Substantial work has been done recently on Paleoindian sites near the Boca Negra Wash north of the project area (e.g., Huckell and Kilby 2002a, Holliday et al. 2006).

Boca Negra was located near a playa that is thought to have once exhibited lush vegetation that would have attracted large numbers of bison (Huckell 2002a:23). Excavations conducted by the University of New Mexico yielded a variety of stone tools in addition to fragmented bison tooth enamel (Kurota 2006). Other Paleoindian projectile points and sites that have been recorded on the West Mesa (Brandi 1999; Marshall 1995), including Deann's Site (Huckell 2002b), correspond well to Judge's (1973) initial theory that the playas were closely associated with Paleoindian occupation (Kurota 2006:7).

Archaic Period (5500 BC–AD 400)

The Oshara tradition sequence developed by Irwin-Williams (1973) provides the framework for the Archaic period in the middle Rio Grande Valley. The Oshara, the hunter-gatherer predecessor of the Ancestral Pueblo period, is divided into five Archaic phases—Jay (5500–4800 BC), Bajada (4800–3200 BC), San Jose (3200–1800 BC), Armijo (1800–800 BC), and En Medio (800 BC–AD 400). The succession of Oshara phases likely reflect a continuum of adaptations to fluctuating climatic conditions, as the onset of the Archaic period coincides with a period of increased aridity. As described by Wase et al., "the Jay and Bajada phases may reflect generalized hunting and foraging strategies by small groups while the San Jose, Armijo, and En Medio phases may represent increasingly heavy reliance on plant foods by larger groups in an increasingly crowded landscape" (2000:1.21).

Early Archaic (Jay phase) sites are usually small seasonal camps and activity areas located in environments with access to multiple resource zones, indicative of highly mobile hunter-gatherers (Murrell 2009:18). Jay phase assemblages often include bifaces, scrapers, choppers, and Jay points, which are described as large, slightly shouldered projectile points with convex or straight bases (Murrell 2009:18). Bajada and San Jose phase sites are characterized by an overall increase in site size and density, subsurface hearths, and groundstone artifacts (Raymond 2010). The appearance and increase of groundstone artifacts such as manos and metates is indicative of an increasing reliance on plant products. The diagnostic Bajada point has abrupt shoulders and a concave base, while the San Jose points are characterized by relatively long stems, robust serration, and concave bases. The Armijo phase is distinguished primarily through the introduction of maize, as well as a wide range of tool classes, and population aggregation into small villages (Raymond 2010). The projectile points affiliated with this phase include a variety of stemmed and corner-notched types. The En Medio phase corresponded to a continued increase in site frequency, particularly within the West Mesa. Prepared storage pits become abundant, which is likely connected to an increasing reliance on agricultural foodstuffs (Brandi 1999:20). Dwellings still generally lack investment, though this begins to change at the end of the En Medio phase.

Artifacts generally seen across all Archaic period phases (though in varying proportions) include a variety of stemmed or corner-notched dart point styles, basin metates, and one-hand manos. Although diverse, the remainder of the stone tool assemblage—scrapers, drills, choppers, knives—is undiagnostic and chipping debris is abundant (Cordell 1984, 1997). The Archaic is also associated with a biface-oriented chipped stone technology and a diversity of lithic raw materials (Lintz et al. 1988).

Some of the earliest documentation of Archaic period sites on the West Mesa began with Campbell and Ellis' (1952) Atrisco sites, which included multiple Archaic period sites, which mostly dated to the Late Archaic through their association with Late Archaic-style Atrisco points (Campbell and Ellis 1952; Murrell 2009:18). In addition to sites associated with Atrisco, En Medio, and San Pedro style points, several other unclassified points were also documented across several locations, which suggest that a range of earlier Archaic phases might be represented within the Atrisco sites (Murrell 2009:18). Campbell and Ellis (1952) proposed that, based on geological manifestations, the Atrisco sites are contemporaneous with the San Pedro phase, which dates between 3000 and 500 BC (Murrell 2009:19). Other early investigations included Reinhart's in the 1960s, which consisted of surveys of Black, King, and Bond Ranches in addition to the housing developments of Rio Rancho Estates and Volcano Cliffs (Brandi 1999:37). He also excavated La

Boca Negra Cave in Petroglyph National Monument, which yielded evidence of early corn cultivation as well as artifacts and features indicating a history of occupation spanning over 3,000 years (Brandi 1999:37; Raymond 2010; Reinhart 1968).

More recent work includes a large-scale survey of the Petroglyph National Monument between 1992 and 1994, which identified 15 newly recorded sites with diagnostic Archaic materials, two previously recorded sites with Archaic materials, and another 16 sites recorded as possibly dating to the Archaic period pending further investigation (Brandi 1999; Raymond 2010). This survey also documented 15 diagnostic Archaic projectile points located as isolated occurrences. Prior to this survey, only one Archaic site had been documented within the Petroglyph National Monument boundaries (Brandi 1999: 116). Diagnostic Archaic materials included San Jose style, Bajada style, and Jay style projectile points and bases, among others.

Numerous other Archaic sites have been reported in and around the Albuquerque area, including Tijeras Canyon, Sandia Cave, and Mesa de Sol. The sites on Mesa del Sol range from Early to Late Archaic (Acklen et al. 1995).

Ancestral Pueblo Period (AD 400–1540)

The Ancestral Pueblo period was an era of increasing dependence on cultigens such as maize, beans, and squash. It was marked by population growth, greater residential sedentism, the appearance of the bow and arrow, pottery, increasing dependence on storage of foods, and developments in architecture and sociopolitical organization.

<u>Developmental (AD 400/600–1200)</u>

In the northern Rio Grande Valley, the early Developmental period posited by Wendorf and Reed (1955) subsumes the Basketmaker III through Pueblo I periods of the Pecos Classification system, and the late Developmental period subsumes the Pueblo II to early Pueblo III periods. Schmader (1994) provides a comprehensive overview of the early Ancestral Pueblo period in the Albuquerque area.

During the early Developmental period, agriculture became the dominant subsistence strategy (Cordell 1979). Lino Gray was the major ceramic type. At later sites, Alma Neck-banded, Kiatuthlanna Black-on-white, La Plata Black-on-red, and Abajo Black-on-orange were also present (Wendorf and Reed 1955:138).

The artifact inventory includes basketry, matting, sandals, turquoise pendants, *Olivella* shell beads, one-hand manos, and basin and slab metates. Specialized storage facilities increased in frequency and ground-stone morphology changed. Dwellings increased in size, were more substantial, and were likely to be occupied for longer periods both during the year and from year to year (Cordell 1979:42).

Early Developmental sites in the Albuquerque area typically consist of one to four pit structures that are generally round or round with a slight concavity on the eastern side. Both interior and exterior storage facilities are present. Where identified, floors consist of hard-packed clay or plaster. Central hearths, sometimes with adobe collars, are present. Ventilator shafts are oriented toward the east. Roof support posts are variable, with two or four posts common (Cordell 1979:42–43). Also, Schmader (1994:491) noted that early structures investigated during his excavations at River’s Edge were quite variable, lacking uniformity of depth, size, and numbers of features, including storage pits. He also observed that sites have at least two structure types, one for sleeping and another for cooking. The late Developmental period is marked by the appearance of Red Mesa Black-on-white, but no changes in architecture (Cordell 1979). Later in this period, Socorro Black-on-white appears.

Some projects documenting the Developmental period in the Albuquerque area include Reinhart (1968), Frisbie (1967), Schmader (1990, 1991), Marshall (1995) and the previously mentioned Petroglyph National Monument survey on the West Mesa (Brandi 1999). This survey located three sites that exhibited diagnostic Developmental ceramics while another seven sites were classified as possibly dating to this period pending further investigation (Brandi 1999:26-27). Another previously recorded site also contained Basketmaker III-Pueblo I ceramics, while plain gray ceramics were recorded as isolated occurrences throughout the project area, which reaffirms the use of the Monument's landscape during the Developmental period (Brandi 1999:26).

Coalition (AD 1200-1325)

Wendorf and Reed's (1955) Coalition period is equivalent to the Pueblo III and early Pueblo IV periods of the Pecos Classification. The beginning of this period coincides with a shift from mineral to organic paint for ceramics. This period, however, is characterized by a great diversity of painted ceramic types. In the Albuquerque area, these include Santa Fe Black-on-white, Galisteo Black-on-white, some St. Johns Polychrome, and a persistence of Kwahe'e Black-on-white (Cordell 1979:43–44). Later in the Coalition period, Wiyo Black-on-white and Heshotauthla Polychrome also appear.

This period is also marked by architectural diversity as evidenced by the transition to substantial aboveground structures. Although pit structures were still used, surface masonry and jacal roomblocks of varying sizes became dominant. In the Albuquerque area, roomblocks sometimes incorporated rectangular kivas (Cordell 1979:44).

An increase in the number of habitation sites during this period suggests an increase in population. Disagreement exists concerning whether this increase was the result of internal growth within the Rio Grande Valley (Frisbie 1967; Wendorf and Reed 1955:146–147) or of migration from the San Juan Basin (Marshall 1989; Stuart and Farwell 1983:152). Sites are generally situated immediately adjacent to major drainages and arable land, away from upland settings. Frisbie (1967) believes this settlement pattern change may reflect an adjustment both to population expansion in the central Rio Grande Valley and to a decrease in agricultural land resulting from rainfall change and arroyo cutting.

Results from Brandi's 1992-1994 survey identified four sites that contained ceramics diagnostic of a Late Developmental/Coalition occupation; while assemblages from an additional 11 sites might contain Coalition ceramic types as well (Brandi 1999:28). While it is thought that the Albuquerque area might have been lightly settled during the Coalition period (Anschuetz 1984; Raymond 2010), there are other Coalition period sites that have been documented in the Albuquerque area. Several late Developmental/Coalition sites have been recorded at Kirtland Air Force Base, but the area was abandoned in the late Coalition period (Acklen et al. 1995). In addition, the Coors Road Site (Sullivan and Akins 1994) and the Meade Avenue Site (Marshall and Marshall 1994) both date to this period, as well as a variety of Coalition sites in Tijeras Canyon (Cordell 1979) and around the Corrales area.

Classic (AD 1325–1540)

The beginning of the Classic period corresponds with the introduction of glaze-decorated, red-slipped ceramics (Wendorf and Reed 1955:153). The population of the northern Rio Grande attained its maximum prehistoric extent during this period. An "elaboration" of material culture was expressed by mural paintings, decorated pipes, stone effigies, the variety of vessel forms, elaborate stone axes, and carved bone tools (Cordell 1979:45). The richly-detailed kiva murals preserved at Kuaua (Dutton 1963) and Pottery Mound (Hibben 1955, 1975) are examples of this cultural elaboration in the Albuquerque area. Ditch irrigation along major rivers probably commenced during this period. In addition, a variety of farming techniques were used (Lang 1977). The observed land-use pattern suggests primary occupation of the pueblos, with numerous outlying fields and frequent logistical forays to procure a variety of wild faunal and floral resources (Gerow 1990:13).

Black-on-white pottery was quickly replaced by glazewares during the Classic period. Although Shepard (1942:197–199) interpreted the introduction of glazewares as a migration from the Little Colorado and Zuni areas, Wendorf and Reed (1955:150, 161) attributed it to diffusion. It is this appearance of glazeware ceramics that serves as a diagnostic marker for Classic period occupation in addition to creating a series of chronological markers within the Classic period. As time passed within the Classic period, so too did the popular glazed rim styles; their relative associations created a well-known sequence of temporal indicators: Glaze A spans from AD 1300 to 1450, Glaze B from AD 1400 to 1475, Glaze C from AD 1425 to 1490, Glaze D from AD 1490 to 1515, Glaze E from AD 1515 to 1600, and Glaze F from AD 1600 to 1650 (Museum of New Mexico 1966). The presence of these diagnostic rims at archaeological sites helps to determine a higher resolution Classic period affiliation. Near the end of the Classic period, we also see the appearance of polychrome ceramics, which are hypothesized to be a result of increased contact with, or imitation of, the far western pueblos, such as Zuni and Hopi (Shepard 1942).

During the Classic period, the scattered hamlets coalesced to form nuclear villages in the Rio Grande Valley (Marshall 1989:14). The dramatic population increases are attributed both to indigenous growth and to an influx of peoples from the San Juan region. The marked population instability of the Rio Grande Valley during this period is cited as evidence for this migration (Cordell 1979:103). Widespread trade networks and alliances were standard features of the Puebloan adaptive system. Consequently, as groups in the San Juan region were forced to abandon the area, these networks facilitated entry into the Rio Grande area (Cordell 1979:103). The union of these populations in the Albuquerque area signaled the inception of the ancestral Southern Tiwa (Marshall 1989:15). Some of the Classic-period settlements in the general vicinity of the project area are Corrales Pueblo, Kuaua Pueblo, Santiago Pueblo, Alameda Pueblo, and Calabacillas Pueblo. All of these pueblos are located on benches or in the floodplain adjacent to the Rio Grande (Raymond 2010).

Although numerous new settlements were established, many settlements were abandoned throughout the period (Cordell 1979:45; Lambert 1954). The reasons for this are unclear. Probable causes include overpopulation, overexploitation of resources, warfare, and drought (Cordell 1979:45; Wendorf and Reed

1955:153). Whatever the causes for abandonment, progressive adjustments to internal strife and resource imbalances occurred.

The Classic period terminated when European incursions began to directly affect Rio Grande peoples (Cordell 1979:45). During the hiatus between Coronado's expedition of AD 1540 to 1542 and major Spanish colonization, which began in AD 1598, Puebloan populations in the Rio Grande area probably declined as the result of diseases (e.g., measles, smallpox) introduced by various Spanish expeditions. Consequently, fewer villages were occupied when Spanish colonization efforts began in earnest (Marshall 1989:16).

Evidence of large Classic period sites along the West Mesa has been identified adjacent to the Rio Grande at Piedras Marcadas and Montaño Pueblos, while several smaller Classic period sites have been identified within the Petroglyph National Monument by Beal (1976), Clifton (1985), Rodgers (1978, 1983), Schmader (1986), Schmader and Hays (1986), and Stiner (1986) among others (Brandi 1999). Prior to Brandi's 1992-1994 survey of the Monument, 10,423 petroglyphs and 65 sites were documented on the east face of the escarpment, and it was estimated that approximately 90 percent of the petroglyphs and 78 percent of the sites all contained a Classic period component (Brandi 1999:29). During the survey, an additional 55 sites contained Classic period components along with six previously recorded sites, and 16 sites with possible Classic period affiliations pending further research (Brandi 1999:30).

Historic Period (AD 1540–Present)

The 1540–1542 *entrada* of Francisco Vasquez de Coronado was the first official European entry into the present Albuquerque area. At that time, Coronado's expedition found 12 large pueblos clustered along the Rio Grande between present-day Bernalillo and Isleta, and two to four smaller villages to the south. The pueblos, occupied by southern Tiwa groups, were referred to collectively as the Tiguex Province.

After the Coronado expedition, the Spanish ignored New Mexico for almost 40 years. The Rodríguez-Chamuscado expedition of 1581 traveled up the Rio Grande as far north as Galisteo Creek (Ortiz 1979:280) and included the bison plains east of the Pecos River. In 1582, Antonio de Espejo and Fray Bernaldino Beltrán led an expedition to discover the fate of the priests from the previous expedition. After reaching the Tiwa pueblos and learning that the priests had been killed, the expedition went to Pecos Pueblo and then followed the Pecos River to Mexico. In 1590, Gaspar Castaño de Sosa led an unauthorized expedition up the Pecos River to Pecos Pueblo and then to the villages of the upper Rio Grande. He was arrested by a pursuing Spanish force and taken back to Mexico. Another unauthorized, ill-fated expedition occurred in 1593 when Captain Francisco Leyva de Bonilla and Juan de Humaña led a small group of soldiers looking for gold up the Rio Grande to San Ildefonso and eastward onto the plains of Kansas where Bonilla was killed during a quarrel with Humaña. Later, Indians killed the rest of the party. Juan de Oñate, leading a group of 400 soldiers, friars, and colonists into the Rio Grande valley in 1598, founded the first European settlement—San Gabriel—in New Mexico. This settlement, near the confluence of the Rio Grande and Rio Chama, was the first capital and marked the beginning of a permanent Spanish presence in the region. In 1610, the capital was founded in Santa Fe, after San Gabriel was flooded (Athearn 1992:3–4; Jenkins and Schroeder 1974:17, 19; Roberts and Roberts 1988:29–37).

Although Spanish settlement of the Rio Grande Valley and adjacent areas increased steadily between 1610 and 1680, life was far from peaceful. Quarreling between religious and civil leaders was common. In spite of laws to the contrary, the Pueblos were often mistreated. By 1675, rumors of a possible Indian revolt reached authorities in Santa Fe. Drought, famine, and increased Apache attacks added to the tension between settlers and the Pueblos. One major cause for the uprising in 1680 was the suppression of Puebloan religion by the Franciscans. As a result, a clash between these two vastly different cultures began. The Spaniards were expelled from New Mexico for 12 years. The reconquest of New Mexico (1692–1696) was under the leadership of Governor Diego de Vargas Zapata y Lujan Ponce de León. With the reestablishment of Spanish rule in New Mexico under Vargas, Spain became more committed to the region (Athearn 1992:8–9, 15; Jenkins and Schroeder 1974:20, 22–23).

The dominant Spanish settlement pattern in the New Mexico of the 1600s was dispersed, consisting of isolated farms, ranches, and hamlets throughout the rural areas (Simmons 1969:10). Several dozen estancias—later abandoned during the Pueblo Revolt—had been established near present-day Bernalillo and between the pueblos of Sandia and Isleta by the mid-1660s. Spanish settlement of the Albuquerque area, however, largely post-dates the reconquest. The population of Albuquerque, founded in 1706 by Governor Francisco Cuervo y Valdés with 12 (Armijo 1929:274) or 19 (Simmons 1980:201; 1982:89) families, and its surrounding communities grew rapidly during the early 1700s. By 1750, colonists were petitioning for land on the Rio Puerco to the west. During the 1700s and the early 1800s, Albuquerque was primarily a farming and ranching area. Because of its position along the Camino Real, however, Albuquerque became a staging area for trading caravans to Mexico. Consequently, merchants, traders, and weavers settled in the area.

When American traders attempted to establish trade with the Taos and Santa Fe areas in the early 1800s, they were arrested and Spanish authorities confiscated their goods. The trade situation changed in 1821, when Mexico declared its independence from Spain. The previous prohibition against trade with the US was dropped and open trade became possible and legal. William Becknell of Missouri began trading in the fall of 1821 (Athearn 1992:90). Becknell's route, the Mountain Branch of the Santa Fe Trail, crossed northeastern New Mexico by way of Raton Pass. The Santa Fe Trail served as a major trade route between the United States and New Mexico, as well as Mexico, from 1821 to the coming of the railroad. The first railroad entered New Mexico at Raton Pass in December 1878 (Myrick 1990:xiv, 4).

The establishment of the Republic of Texas in 1836 and the annexation of Texas by the United States in 1844 led to poor relations between Mexico and the United States and eventually resulted in the outbreak of war in 1846. New Mexico was captured by General Stephen Watts Kearny's military force. The Treaty of Guadalupe Hidalgo, which ended the Mexican War in 1848, ceded nearly all of present-day New Mexico to the United States. The Territory of New Mexico was created in 1846 and New Mexico became a state in 1912 (Jenkins and Schroeder 1974).

The arrival of the Atchison, Topeka and Santa Fe Railway (AT&SF) in 1880 allowed greater economic growth. The railroad's depot and yards were built a little more than a mile east of the plaza (Old Town). Consequently, a new town site (New Town) was planned and built around the railroad facilities (Simmons 1982:218, 224).

The present tourist industry in Albuquerque and New Mexico owes a large debt of gratitude to the railroad. The Santa Fe Railway and Albuquerque were able to exploit a nationwide interest in the cultures of Southwestern Indians. Many Easterners discovered the wonders of the Southwest, including cultural attractions such as the petroglyphs of Petroglyphs National Monument. Tourist traffic increased steadily during the first quarter of the twentieth century. In 1925, the Santa Fe Railway began bus tours through New Mexico's scenic Pueblo country, allowing rail passengers to make side excursions into the backcountry for several days (Simmons 1982:330). Tourism expanded even more with the opening of Route 66 in the 1920s and later with the construction of I-40 and I-25, as automobiles eclipsed travel by rail.

RESEARCH DESIGN

By Toni R. Goar and Hannah Mattson

An archaeological research design establishes an explicit framework for carrying out field investigations, conducting analyses, and constructing interpretations of recovered and documented remains. It presents region-specific research topics and discusses how the cultural remains requiring treatment can provide insights into these issues. The end result is a synthesis that maximizes the interpretive potential of the data collected from the investigated sites and makes a contribution to our understanding of both specific cultural developments and the ways in which larger patterns of human behavior are expressed within a particular region.

General Theoretical Orientation

The general theoretical orientation employed by Marron draws upon concepts developed in human behavioral ecology, settlement archaeology, and social theory (specifically, social network and practice theories). At the most fundamental level, human behavior is shaped by natural selection. Like all other organisms, the decision-making of humans is evolved to enhance inclusive fitness, or the ability to survive and reproduce (Bird and O'Connell 2006; Cannon and Broughton 2009). In the context of particular environmental and social conditions, individuals face behavioral trade-offs (Smith and Winterhalder 1992). These trade-offs are evaluated with regard to specific currencies (e.g., nutrient energy or social prestige) and external constraints (e.g., resource abundance and distribution). According to behavioral ecology, the appearance and persistence of behavioral patterns can therefore be understood as adaptive (fitness-maximizing) responses to unique sets of socioecological circumstances.

These same principles also apply to settlement decisions. Settlement ecology, an outgrowth of both economic geography and settlement archaeology, hinges on the fundamental concept that interaction breeds proximity. In general, people will locate their settlements in order to minimize travel time with respect to resources such as water and arable land; the pull of a settlement to a resource is directly related to how often the resource is accessed by its residents (Chisholm 1979). The concept that settlement geometry is the outgrowth of interaction forms the basis for several types of settlement analyses used in geography and archaeology, including the analysis of site catchments (Vita-Finzi and Higgs 1970), central places (Christaller 1966), core-periphery relationships (Chorley and Haggett 1967), and nearest neighbors (Haggett et al. 1977; Thomas and Haggett 1980). Although they are not sufficiently explanatory on their own (Hodder 1981; Moore 1983), the patterns revealed by such analyses may be meaningfully interpreted in terms of human behavior through a consideration of subsistence strategies, unique ecological circumstances, and sociocultural factors.

In addition to physical and economic influences, social relations also play a key role in structuring spatial organization at every level (Fish 1999). For example, settlements and communities are structured in relation to political organization, kinship, and units of collaboration; the region is comprised of settlements that are arranged with respect to landscape features, resource density, historical ties, and cooperation and competition; and household organization reflects family ties, gender roles and relations, group membership, and communal labor (Agorsah 1993; Holl 1993; Stone 1993).

Social network theory is a construct used to examine patterns in the relationships between various social units (e.g., individuals, family groups, kin groups, and communities). Within this framework, social structures are determined by the nature of the interactions between their various units (Kadushin 2011). The connections between units/actors are influenced by factors such as physical/geographic proximity, homophily (having one or more common social attributes), group size and density, and relative degrees of reciprocity. In addition, the form of these structures is constrained by ecological conditions such as the seasonality of resources (Hamilton et al. 2007).

While social network theory emphasizes the properties of the relationships between social units rather than the properties of the units themselves, practice and structuration theories focus on the actions of individuals (Bourdieu 1977, 1990; Giddens 1979, 1984). In these perspectives, individual actions—including choices, perceptions, and techniques—are patterned because they are influenced by social prescriptions and structural conditions (Bourdieu 1977, 1990). These "habituated" practices or dispositions result from the "unintentional internalization of different external structures" (Bourdieu 1990:60). Within contemporary applications of practice theory within anthropology, individual actions are conceived as being both shaped and empowered by larger structures; thus, while the behavior of individuals is largely habituated, it is not necessarily unconscious or non-reflexive (Dornan 2002; Meskell 2001).

Research Questions

The following section outlines research topics that guided data recovery investigations at a portion of LA 151618, including the field methodology implemented, laboratory analyses, and the final interpretation of the site. These topics include chronology and cultural affiliation, site function, subsistence, technological organization, ceramic assemblage, and geomorphology. The research questions presented below were designed to address these general topics using the information most likely to be present within the portion of the site included in the proposed data recovery effort (14 percent of the total site area). Specific data required to address each of these topics are also discussed.

<u>Chronology and Cultural Affiliation</u>

Determining temporal and cultural affiliation is essential to placing an archaeological site within its appropriate sociohistorical context. In-field ceramic analysis from the 2013 update indicates that the site was occupied at least during the Ancestral Puebloan Coalition period. As the ceramics from the testing phase have not been analyzed, however, the temporal affiliation of the site was revised.

Specific questions related to site chronology and cultural and temporal affiliation include:

- When was the site occupied/reoccupied?

Data Requirements:

Datable materials (charcoal, ash, *in situ* burned adobe, etc.) were recovered, and submitted for chronometric dating. The distribution of absolute dates, in conjunction with diagnostic ceramic types and projectile points, were used to examine the timing of occupations/reoccupations within the project area.

<u>Site Function</u>
During the Coalition period, population increased sharply, evidenced by an increase in the number and size of habitation sites. In addition, settlements expanded into higher elevation areas, and agricultural strategies became more varied and extensive. Population aggregated into fewer and larger residential sites that clustered into groups separated by relatively uninhabited buffer zones. The presence of these distinct clusters suggests that subregional social territories became increasingly defined.

LA 151618 is a fairly dense artifact scatter with several stains and possible pithouses. Although no pithouses were clearly identified during the testing phase of the project, the large number of artifacts present suggests that occupation was fairly intensive. The lithic assemblage does not indicate that this area was utilized for lithic procurement, but testing did yield hundreds of artifacts, suggesting that this area may have served a residential function, at least on a short-term or seasonal basis.

- What activities were conducted at the site?
    - What types of features, and associated activity areas, are present? Do features contain identifiable macrobotanical or faunal remains that might indicate what types of resources were being processed/collected/consumed?
    - What do the attributes of the lithic assemblage suggest about what kinds of activities (e.g., hide processing; plant processing; lithic tool manufacture, repair, and refurbishment) were occurring at the site?
    - What do the diversity and spatial patterning of the artifacts and features suggest about how these activities were organized at the site?
- What was the probable size and composition of the group utilizing/occupying the site?
    - What does the size of the assemblage indicate about occupational intensity, group size, and repeated reuse of the site?
    - What range of functions is represented in the recovered artifact assemblage?

- Given that most Coalition period residential sites documented in the Northern Rio Grande Valley are aggregated, how did LA 151618 fit within the local settlement system?
    - Does the site represent a small residential hamlet, a fieldhouse, a logistical site, etc.?
    - With which, if any, larger aggregated site(s) is it likely to have been associated?

    - Are there any comparable Coalition period sites on the West Mesa? If so, what does this suggest about the use of the area during the period? If not, why was this particular site locale occupied when other areas were not?
- What do the relative percentages of decorated vs. utility wares and bowls vs. jars suggest about the nature of occupation?

Data Requirements:

The nature and intensity of occupation represented in the project area can be inferred primarily on the basis of identified features. For habitation structures, size, formality, the number and type of intramural features, and the nature of the superstructure/roof support system will be examined. The function of extramural features were inferred based on size, content (e.g., fire-cracked rock, ash/charcoal, macrobotanical and/or faunal remains), and association with both habitation structures and other features. In addition, the attributes and depositional contexts of the recovered artifact assemblage were used to examine the types of activities (e.g., hide processing, lithic reduction, food preparation) conducted in the project area.

<u>Subsistence</u>
During the Developmental, Coalition, and Classic periods in the Middle Rio Grande region, the subsistence regime included agriculture and continued foraging of wild plant and animal resources. Macrobotanical and pollen analyses of late Ancestral Puebloan assemblages indicate that, in addition to cultigens such as maize and beans, a variety of wild species was utilized, including pigweed, goosefoot, purslane, beeweed, and others. Archaeofaunal assemblages from large residential sites in the region are generally dominated by rabbits, birds, artiodactyls, and rodents. There appears to be a decrease in the consumption of larger-bodied mammals in the Classic period, likely related to population increase and resource stress.

- What types of plant and animal resources were being consumed, processed, and/or stored at the site?
- Were these plant and animal resources locally available or would their procurement necessitate travel?
- What was the seasonal availability of these plant and animal resources?

Several sites in the surrounding area have been excavated, and these results will be used for comparison with the results from the partial excavation of LA 151618. These include habitation/extramural sites (including LA 169775, LA 169978, LA 169980, and LA 169981) located near 98th Street and Interstate 40 excavated by Marron, TRC's excavations on the Ceja Mesa and Rio Puerco Valley (Higgins and Lundquist 2004), testing at the northwest corridor (Kovacik 1998), and RGC excavations in Rio Rancho (Brandi and Dilley 1998; Kennedy et al. 1998). These projects mentioned above are all testing and data recovery projects that excavated pithouses from the Ancestral Pueblo period as well as Archaic habitation sites. In addition, smaller short-term use sites were also excavated at many of these projects. The types of features uncovered and the dates obtained from absolute dating on this data recovery project determined which sites and projects will be used for comparison.

Data Requirements:

Pollen, macrobotanical, and faunal remains will be used to identify which domesticated and wild species were being targeted by the prehistoric occupants. The geographical distribution and seasonal availability of these resources can be used to make inferences regarding mobility, procurement patterns, and the season of occupation. Ground stone morphology, size, and usewear will also be utilized as indicators of the intensity of on-site plant processing. In addition, the depositional context of botanical remains, such as storage versus refuse features, will be important in determining whether resources were stored for later consumption.

<u>Technological Organization</u>

Lithic Assemblage

The organization of lithic technology is often framed in terms of expediency and curation (Bamforth 1986; Binford 1979; Nelson 1991). These are seen as two ends of a continuum of technological strategies adapted to different mobility patterns. Expedient behavior is expected under conditions in which access to adequate raw material is regular, or at least predictable, and time for tool manufacture is not restricted—namely, involving long-term or repeated occupation of a location. Conversely, curated behavior is expected under conditions in which a future need for raw material is anticipated and time for future tool manufacture is at a minimum; these conditions occur with increasing mobility and shorter-term and/or irregular occupations. Research questions related to the organization of flaked-stone technology include:

- What stages of lithic reduction were emphasized at the site? Is there evidence for core and/or biface reduction? Tool production and/or refurbishment?
- Are the raw materials represented locally available? If not, can their source areas be determined?
- Do certain raw materials appear to be preferred for formal tools? For expedient tools?

Ceramic Assemblage

- The ceramic assemblage from the site contains both mineral-painted and carbon-painted ceramics, including the first locally produced carbon-painted type in the Northern Rio Grande Valley—Santa Fe Black-on-white. Given that both ceramic traditions are represented at the site, what do the similarities and differences in temper and clays suggest about the nature of local pottery production during the Coalition period?
- The surface assemblage at the site includes a high percentage of Pitoche Brownware. Do these represent local brownware production, or is there evidence that they were imported? How does the percentage of brownware recovered from both surface and excavated contexts compare to those documented at other contemporaneous sites in the area?

Data Requirements:

These research questions will be addressed using information collected during lithic and ceramic analyses. The specific attributes included in these analyses are presented in the *Laboratory Methods* section of this document. The published results of the analyses of other comparable assemblages in the area will also be consulted.

Geomorphology

Geomorphological studies have been completed on several projects on the West Mesa (Higgins and Lundquist 2004; Murrell 2009; Hall et al. 2008; McCullough, Okun, and Mattson 2010). These studies found that cultural deposits on the West Mesa are primarily found in two stratigraphic units —Unit 1, comprised of a thick blanket of aeolian sand deposited between 4000 to 600 BP; and Unit 2, which contains a distinctive red paleosol that dates between 18,000 and 5,500 BP. These two units are underlain by a culturally sterile stratum, Unit 3, which has been dated to ca. 130,000±30,000 BP.

- As the aeolian sands that cover portions of the West Mesa are between 600 and 4000 years old and therefore cover prehistoric cultural remains, does the stratigraphy at LA 151618 compare to the other geomorphological studies in the area?

FIELD AND LABORATORY METHODS

by Christina R. Chavez

Field Strategies

To retrieve data necessary in addressing the research questions previously outlined, a field program of surface artifact collection, manual excavation, and mechanical excavation was required. These are each discussed in detail below. Following the general field strategies are the specific excavation units at the site.

Permits

A NM State Permit **(**NM-SE-340) was obtained prior to any excavation.

Mapping, and Surface Collection

As testing had been previously completed within the APE, much of the mapping and surface collection had been completed. Remaining surface artifacts found from foot and mechanical disturbances, the data recovery excavation units, the mechanical scrapes, and trenches were mapped with a total station (Topcon GTS-240NW).

Following the data recovery, a detailed map of the site was produced using Geographic Information System (GIS) software. The map included the site boundary, the project boundary, the location of the datum, any features identified, all surface artifacts collected, landscape features, areas of disturbance, and excavation units (both from the testing project and the proposed data recovery units). The manual excavation units were referenced by the coordinates of their southwest corners.

Manual Excavations

Manual excavation were conducted in order to probe for buried cultural deposits. All fill was removed in arbitrary 10-cm levels and screened through 1/8-inch mesh. Each excavation unit was documented through detailed notes, photographs, and both planview and profile drawings.

Three 4-m by 4-m units, one 1-m by 4-m unit, one 6-m by 5-m unit, one 5-m by 5-m unit, and one 1-m by 2-m units were all placed within the site in order to expose features and associated activity areas; one was placed over Trench 2 stains noted in the Testing phase, one over Trench 3 stains, also discovered during the Testing, one unit over the surface feature identified during the testing phase, and the last unit was placed near the Test Unit 9. Test Unit 9 recovered 200 artifacts, and this area was to be further investigated. Excavation of these units will be conducted prior to mechanical scraping. Each unit will be excavated in 1-m by 1-m subunits.

After the horizontal extent of a feature was exposed, features were then be bisected along their long axes, and half of the fill was removed in 10-cm levels. After bisection, a detailed profile was drawn, and any stratum observed was described. The remaining half of the feature was removed in stratigraphic levels, if appropriate, or in 10-cm arbitrary levels. Archaeobotanical (including flotation) and chronometric samples were collected routinely from *in situ* feature contexts. If features are larger than the 4-m by 4-m unit, then the unit was expanded to excavate the entire feature and/or activity area.

When pit structures were found, a 1-m by 1-m unit was excavated to the floor in 10-cm levels. This unit was placed towards the center of the feature and placement was determined by the Principal Investigator or Field Director. The structure was then bisected, and the feature fill removed to 10 cm above the floor of the structure, in 1-m by 1-m units. Then a profile was drawn, and the other half of the feature excavated to 10 cm above the floor. The last 10 cm was removed with a trowel to ensure that artifacts and features on the floor were *in situ* when uncovered. All feature fill was screened through 1/8-inch mesh. The artifacts and features found on the floor were piece plotted. Archaeobotanical and chronometric samples were recovered from the floor and intramural features. Intramural features were excavated as described above.

<u>Mechanical Excavations</u>

A backhoe was used to complete trenching and mechanical scrapes in order to remove overburden and expose cultural strata. Four backhoe trenches were placed on the site, three of which were exposed during the testing of the site. Backhoe trench 4 was added during the data recovery. Based on information from the testing phase, the scrapes removed approximately 20 cm of loose Aeolian sands. A total of three 15-m (east/west) by 20-m (north/south) mechanical scrapes were excavated. All fieldwork adhered to the stipulations and regulations of the Occupational Safety and Health Administration (OSHA).

If features were uncovered, mechanical excavation was halted, and investigation proceeded through manual excavation, following the methods previously discussed. A qualified archaeologist monitored all mechanical excavation within the site area.

<u>Geomorphology</u>

Geomorphological investigations were conducted at the site in order to gain a better understanding of local site stratigraphy, the relationship between the processes represented at the site and larger regional cycles of erosion and stability, and the integrity of features and cultural deposits. After the units and features have been excavated and the mechanical scraping has been completed, Trenches 2 and 3 were re-opened. Trench 1 was excavated in a deflated portion of the site and caliche was encountered at 10 cm below surface; the trench did not reveal any intact cultural deposits. The stratigraphy exposed in these trenches were assessed by a professional geomorphologist.

Human Remains

If identifiable human remains, funerary objects, or objects of cultural patrimony are encountered, all activities within 30 m (100 ft) was immediately halted, and both NMDOT and SHPO was notified. Concurrent with the agency notification, the Albuquerque Police Department (who notified the Office of Medical Investigations) were also be notified. Provisions of §18-6-11-2 of the *Cultural Properties Act NMSA, 1978*, and NMAC 4.10.11 were observed. All activities within 30 m (100 ft) ceased until regulatory guidance is obtained.

If it has been determined that the remains are to be removed, then standard archaeological field methods were utilized as appropriate and included the use of smaller digging instruments, such as trowels, brushes, and dental picks. The remains were fully exposed, if possible, and drawn in detail. In addition, the completeness of the remains and any funerary goods present were recorded; special attention was given to the precise placement of mortuary offerings in the event that reburial is required. There was no washing, cleaning, photography, or mending of remains. For safety reasons, removed remains were curated in a locked storage area at Marron's office until arrangements are made in consultation with the appropriate tribe(s).

The archaeological documentation of human remains were limited to visually evident characteristics related to age, gender, obvious pathologies, and any obvious traits that helped determine cultural affiliation. Funerary objects were recorded at a descriptive and non-invasive level.

Analytical Procedures

All artifacts and samples collected from a discrete provenience (i.e., surface location, excavation unit, or feature) were assigned separate Field Specimen (FS) numbers. Artifacts were grouped by type (e.g., ceramic or lithic) during collection. During excavation, an FS catalog was maintained to keep a record of all collected materials; subsequent to fieldwork, the FS catalogs was cross-checked and entered into a Microsoft®Access database and linked to individual analysis databases for each artifact category. The FS catalog for the data recovery phase was separate from the testing phase FS catalog.

Laboratory Procedures

After the completion of fieldwork, all artifacts were taken to the Marron facility for processing and analysis. Upon arrival at the laboratory, the FS catalog were cross-checked against the labels of artifact bags. Lithic and ceramic artifacts were washed, rebagged, and organized. Table 1 lists the analysts for the project.

Sampling Strategy for Sample Analysis

Archaeobotanical and chronometric samples were routinely collected from feature contexts. However, depending on how many features are identified and excavated during the course of the project, it may be necessary to analyze only a portion of these. First, samples were selected such that features from different portions of the site are represented. Second, samples were selected based on their potential to yield identifiable and/or datable remains; this includes, for example, flotation samples of feature fill with abundant organic material, pollen samples from contexts with minimal evidence for post-depositional disturbance or burning, and radiocarbon samples with either plentiful charcoal/organic material or that are from in-situ contexts. In addition, samples from features without associated temporally diagnostic artifacts will be given priority for radiocarbon dating.

Table 1 —Analysts

Analysis	**Analyst**
Ceramics	Hannah Mattson/Hunter Claypatch/C. Dean Wilson
Lithics	Christina Chavez/Stanley Kerr
Macrobotanical	Paul Knight
Radiocarbon	Beta Analytic
Faunal	Marie Brown
Pollen	PaleoResearch Institute
Geomorphologist	Dr. Charles Frederick

Lithic Analysis

Flaked Stone

The lithic analysis was conducted using basic attributes that are consistent with Sullivan and Rozen's (1985) model for "interpretation free" analysis in order to best collect the needed data to properly address the research issues. The data collection provided an analysis strategy that is based on interpretation-free attributes, and captured characteristics within the assemblage that are functional, small and necessary.

All lithic artifacts were individually analyzed in the Marron laboratory. The analysis included the attributes of lithic material type, artifact type, condition, dorsal cortex, dorsal flake scars, platform preparation, and platform size. Length, width, and thickness were recorded for complete flakes. For fragmentary flakes, only thickness and maximum dimension was measured, while the only dimension recorded for angular debris was the maximum dimension. Lithic material type, artifact type, condition, total percent of cortex retained, and dimensions were recorded for tools and cores.

Analysis of tools included examination under magnification and the recording of additional attributes related to usewear, including location of use (if on an artifact with anatomical orientation); edge completeness; utilized edge length and shape; and type, side, and depth of usewear for each utilized edge. Functional interpretation of usewear attributes followed Banks (2012; after Elyea 1999 and Andrefsky 2005) in defining edge angles less than 55 degrees as representing cutting motions and those greater than 75 degrees as representing scraping motions. For edges with angles measuring between 55 and 75 degrees, those exhibiting bidirectional usewear was interpreted as representing cutting activities, while those with unidirectional usewear was interpreted as associated with scraping. Edge angles over 75 degrees with bidirectional usewear was associated with chopping motions. Furthermore, microflaking and edge-rounding was interpreted as resulting from working hard and soft materials, respectively.

Attributes recorded for projectile points identified at the site included haft type, base type, stem shape, notch placement, neck width and thickness, stem length, shoulder width, and basal width.

Ground Stone

For each ground stone tool collected, recorded attributes included artifact and material type, other maximum dimensions, dimensional completeness, weight, shape in plan-view and cross-section, presence of burning, presence of residue, and characteristics of each worked surface. Artifact dimensions was recorded as maximum length, width, and thickness. Both the completeness of these dimensions and of the overall tool was recorded categorically as “complete,” “less than half complete,” or “more than half complete.” Attributes recorded for each grinding surface on a tool included maximum length and width dimensions (as the size of the ground area often does not match perfectly with the overall artifact dimensions), the configuration or shape of the ground surface when observed in profile (“flat,” “concave,” “convex,” “irregular,” and “indeterminate”), the intensity or degree of grinding evident on the ground surface (“light,” “moderate,” or “heavy”), the orientation of the grinding surface relative to the long axis of the tool (“parallel,” “perpendicular,” or “indeterminate”), and evidence of intentional preparation of the surface through pecking.

<u>Ceramic Analysis</u>

Ceramic artifacts will be processed using standard laboratory techniques. Most ceramics will be lightly washed. Small sherds (1 cm or less in size) will include counts, and weights by provenience. All other sherds will have full analysis at the Marron laboratory. Recorded attributes will include ware, type, vessel form, vessel portion, paste characteristics (color, texture, firing attributes), temper, wall thickness, maximum dimension, rim, surface finish, and decoration. Use-altered or worked sherds will be analyzed separately. Use alteration can also be examined by looking for residues, locations of pitting, and striations on vessels.

In addition to recording the relative frequency of specific ceramic types, identification of the composition of clays and tempering materials will be important in examining the nature of local pottery production and trade. A sample of ceramic sherds may be selected for clay oxidation (refiring) analysis; these will allow for the identification of broad groups of compositionally similar clays that can be compared with known geological clay sources.

<u>Macrobotanical Analysis</u>

Intact features provide an opportunity for recovering macrobotanical remains. Flotation samples were collected from features; the entire feature if small (i.e., hearth or storage feature) or at least 5-liter samples if the feature is large from separated stratigraphic levels (i.e., pithouse, roasting pit). Flotation samples were processed using a standard water separation technique, and both light and heavy fractions were examined using a stereoscopic zoom microscope. Identification of wood and plant seeds and parts, especially when charred, may provide direct indicators of important cultigens and wild plant resources utilized. Quantitative methods were used to derive measures of both ubiquity and total frequency. Relative abundance or taxonomic importance of identified taxa, absolute counts, minimum number of individuals (MNIs), and species ubiquity, a quantification method used by archaeobotanists to identify possible trends or patterns in plant exploitation, were performed for selected samples. The identification of subsistence patterns also incorporated seasonality data including the ecology of specific plant species and knowledge regarding the potential uses of those plants, whenever possible.

Pollen Analysis

Pollen samples were collected from features and sent to PaleoResearch Institute for analysis. Samples were processed and viewed under a microscope. Comparative reference material was used to identify the pollen to family, genus, and species level, where possible. This information is used by archaeologists as a reference for plant use in prehistoric times, which helps to address questions relating to subsistence patterns, and use of the landscape by prehistoric people.

Faunal Analysis

Faunal remains can provide direct evidence bearing on issues of subsistence and settlement research questions. To examine these issues, faunal samples was cleaned using a dry brush technique, sorted, weighed, and identified as to taxon and skeletal element. Calculations of the MNIs was conducted in order to compare faunal assemblages between this data recovery project with other excavation projects in the region. The number of individual specimens (NISPs) was also be determined. Burning, gnawing, and cut marks were recorded, along with other attributes appropriate for making cultural and taphonomic inferences.

Chronological Analysis

In conjunction with temporally diagnostic ceramic and projectile point types, chronometric analyses will be used to establish the age of features and various site components. Samples were carefully selected from well-defined features or stratified sediments in trenches. If only small amounts (less than 10 g) of charcoal or seeds are available, then the accelerator mass spectrometry (AMS) technique was necessary to date individual samples. The carbon isotope C^{13}/C^{12} ratio was individually determined for each sample dated, and the measured value will be used to adjust and establish the "Conventional C^{14} age." Radiocarbon samples will be sent to Beta Analytic for analysis.