Excavation and Additional Studies at The Haynie Site (5MT1905) by the Crow Canyon Archaeological Center Annual Report 2021

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INTRODUCTION

This report describes excavation conducted by the Crow Canyon Archaeological Center (Crow Canyon) at the Haynie site (5MT1905) during 2021. The Haynie site (5MT1905) is an Ancestral Pueblo community center located on a five acre preserve owned by The Archaeological Conservancy (TAC). The La Plata Open Space Conservancy (LPOSC) manages the conservation easement. During 2021 Crow Canyon excavated under a permit (#79308) from the State of Colorado Office of Archaeology and Historic Preservation.

Crow Canyon's work at the Haynie site is part of the Northern Chaco Outliers Project (NCOP), a multi-year research project initiated in 2016 that focuses on the Lakeview community in southwestern Colorado (Figure 1). The Lakeview community consists of four great houses, a great kiva, numerous residential "small sites," and landscape features. Multi–great house communities are an important but poorly understood facet of the Chaco and post-Chaco periods in the northern San Juan region. In addition to the Lakeview community, archaeologists identify northern multi-great house communities at Aztec Ruins (Brown and Paddock 2011; Lekson 2015; Turner 2015, 2019; Van Dyke 2007), Mitchell Springs (Dove 2014; Smith 2009), and Lowry Pueblo (Kendrick and Judge 2000). The NCOP seeks to understand the origins, internal social dynamics, and external connections of the Lakeview community ca. A.D. 850–1225 (Ryan 2016). More broadly, this research examines how aggregated villages gave way to dispersed communities focused on great houses, especially within the context of the larger Chaco and post-Chaco world.

There are four great houses within the Lakeview community (Figure 2)—two at the Haynie site (5MT1905), the Ida Jean site (5MT4126), and Wallace Ruin (5MT6970). Crow Canyon has worked at the Haynie site since 2016. The Ida Jean site includes a great kiva and was investigated in the 1970s (Brisbin and Brisbin 1973). The Wallace Ruin is owned by Bruce and Cynthia Bradley, who have excavated at the site for over 50 years (Bradley 1988, 1992, 1993, 2010, 2015; Bradley and Bradley 2019, 2020). In addition to work at the Haynie site, Crow Canyon laboratory staff, volunteers, and participants are processing and analyzing artifacts from the Wallace Ruin and Ida Jean site.

During the 2021 season, Crow Canyon welcomed back a limited number of in-person programs. From mid-May to early July, we hosted a college field school, supported by a National Science Foundation Research Experience for Undergraduates (REU) grant. REU grants support students from traditionally underrepresented groups. Eleven college students traveled to Cortez, Colorado, and participated in excavation at the Haynie site. Several of these college students conducted group research projects that used data from the Haynie site and presented their results at the Pecos Conference (see Appendix B). College students also engaged in regular conversations (via Zoom) with Native American scholars in the greater Southwest.

We experimented with our long-standing internship programs in 2021. Rather than hosting two back-to-back sessions of separate lab and field internships, we created a Public Archaeology internship that combined all of Crow Canyon's mission areas (research in the field and lab, public education, and Native American engagement). We selected four individuals for this 10-week internship, which ran from mid-May to early August. Public Archaeology interns learned excavation techniques alongside Crow Canyon staff members, conducted public education and outreach at Mesa Verde National Park (supervised by Education Manager Tyson Hughes), and assisted in trail maintenance and other activities on the Ute Mountain Ute Reservation (supervised by Native American Outreach Manager Rebecca Hammond). In addition, the Crow Canyon laboratory hosted its first Dendroarchaeology intern (supervised by Laboratory Director Benjamin Bellorado). The Dendroarchaeology intern analyzed wood samples obtained from the Haynie site.

Finally, during the month of September (and early October), Crow Canyon hosted 28 adult participants for the Archaeology Research Program. Participants assisted in excavation at the Haynie site and conducted analyses on material recovered from the Haynie site.

The organization of this report is as follows. We begin by briefly describing the history of work at the Haynie site and providing an overview of the regional culture history, environmental setting, and an explanation of our recording and documentation system. Next, we describe preliminary results from excavation conducted in 2021. In addition to excavation work we have initiated several supporting studies within the Lakeview community, and we present the preliminary results of that work. Finally, we describe the ongoing laboratory studies of artifacts and samples obtained from the Haynie site. Several appendices provide information on educational programming and outreach efforts related to the work at the Haynie site in 2021.

THE HAYNIE SITE

Crow Canyon began fieldwork at the Haynie site in 2016. Current archaeological knowledge of the site is based on five seasons of test excavations, artifact and sample analysis, architectural documentation, and remote sensing (Charles 2017; Diederichs 2018; Fadem et al. 2019; Fladd et al. 2018; Shackley 2017, 2018; Simon et al. 2017; Throgmorton et al. 2019; Throgmorton et al. 2021; Webster 2019). The data from the last five years is augmented by previous research at the Haynie site by Crow Canyon staff and other researchers from 2008 to 2015 (Brisbin n.d., Glowacki and Ortman 2012; Ryan 2013). This information is supplemented by notes and records stemming from non-professional excavation at the site between the 1930s and the 1990s (Chappell Note Book, Vols 1 and 2; Crosmer 2015, Haynie n.d.).

The Haynie site is a deeply stratified multi-component Ancestral Pueblo community center that was inhabited for at least 400 years between A.D. 800 and 1200. While prior survey demonstrates that there are Basketmaker III (A.D. 500–760) residential sites at the edges of the Lakeview community, work at Haynie has yet to identify structures or features from that period. Pottery sherds dating to the Basketmaker III period have been found at Haynie, but many of these sherds could also be attributed to the early Pueblo I period.

Throughout the Basketmaker III period, Ancestral Pueblo people lived in dispersed communities that covered several square miles. Most settlements contained only one or two households, but some contained public architecture and multiple residences—like the Dillard site. You can read more about Crow Canyon's work on Basketmaker III communities here (Diederichs 2020). During the Pueblo I period (A.D. 760–890), settlement patterns changed dramatically, and Ancestral Pueblo people constructed dense, aggregated villages with 60–200+ inhabitants. Crow Canyon fieldwork has identified Pueblo I sherds across the entire Haynie site, and our excavations at the west end of the site (Figure 3—Block 100, Area A) have identified portions of a Pueblo I roomblock. We do not know the full scale of the Pueblo I component at the Haynie site, but we suspect it was similar to large villages documented in the Dolores River valley, which is located about 8–16 kilometers to the north. Additional nearby Pueblo I villages include Mitchell Springs (Dove 2014; Smith 2009) and several sites on Mesa Verde. You can read more about an early Crow Canyon project that excavated a Pueblo I roomblock here (Lightfoot and Etzkorn 1993).

The Mesa Verde region experienced a significant decline in population during the early Pueblo II period (A.D. 890–1030) (Wilshusen 2002). This depopulation event likely occurred as a result of political instability common within early villages, as well as a period of poor environmental conditions. Ancestral Pueblo people left many of the Pueblo I villages, but not all of them. Pottery and radiocarbon dates demonstrate that people inhabited the Haynie site throughout the early Pueblo II period (Throgmorton et al. 2019). We have identified an early Pueblo II roomblock and pitstructure at the northwest edge of the site (Figure 3—Block 100, Areas C1-C3, C5) and cultural deposits from that period have been found in several

places (Figure 3—Block 100, Area C4, Area C6). Notes and records from previous, non-professional work at the Haynie site describe numerous whole pottery vessels that appear to be early Pueblo II in age (Haynie n.d., Chappell Note Book Vols 1, 2). We have not yet determined whether the Haynie site was reinhabited ca. A.D. 930–940 after a short hiatus (a pattern observed at several sites in the area), or if people lived continually at the site throughout the Pueblo I–Pueblo II transition (a much less common pattern).

During the middle Pueblo II period (A.D. 1030–1100), population rebounded in the central Mesa Verde region and great houses began to serve as community centers. There is good evidence for at least one early great house in the Lakeview community. The core of the Wallace great house dates to the first half of the eleventh century and was probably a two-story structure with a distinct, well-fitted tabular masonry style often associated with early great houses (Bradley and Bradley 2020). Photos, notes, and other evidence from the excavation of the Haynie west great house in the 1980s show several interior rooms with a similar masonry style (Haynie n.d.) and provide evidence that there may have been an early great house at Haynie, too (see also the "Supporting Studies and Analysis" section in this report). Middle Pueblo II pottery (i.e. Mancos Black-on-white) is very common at the Haynie site, and work in 2021 revealed that a masonry roomblock and kiva within Area A (Figure 6—Structures 1101, 1102, 1090, and 1047) likely date to the middle Pueblo II period. The extent of non–great house residential architecture at the Haynie site during the middle Pueblo II period is an important question, and it remains to be seen how much influence Chaco Canyon had on the earliest phases of great house construction in the Lakeview community.

During the late Pueblo II period (A.D. 1100–1140), Chaco-style great houses appeared across much of the northern San Juan region, first in the Middle San Juan at Salmon Pueblo and Aztec (Reed and Brown, eds 2018; Turner 2019), and then more widely throughout southwestern Colorado and southeastern Utah. You can read about Crow Canyon work at other northern Chaco outliers here (Ryan 2015a) and here (Ryan 2015b). Most of the standing great house architecture at the Haynie site dates to the late Pueblo II period, as does the Ida Jean site and the later construction phases at Wallace great house. Crow Canyon has investigated the remnant foundations of the Haynie west great house (Figure 3—Area C4, Area D), and fieldwork continues to build connections between the maps and notes from non-professional work in the 1980s–1990s and the archaeological remains visible today. Crow Canyon is tacking between fieldwork, lab work, and examination of prior excavation records to address questions in the research design (Ryan 2016), particularly addressing the relationship between different great houses within the Lakeview community.

The early Pueblo III period (A.D. 1140–1225) began with a significant drought. Following a poorly understood period of reorganization, people throughout the region coalesced into larger, denser settlements. You can read about Crow Canyon's work at a late Pueblo II–Pueblo III settlement here (Kuckelman 2003). Both Wallace great house and Ida Jean show evidence of continued use into the early A.D. 1200s. We have not yet identified much evidence of an early Pueblo III occupation at Block 100 of the Haynie site aside from pottery sherds indicative of that period (McElmo and Mesa Verde Black-on-white). Based on surface evidence, Pueblo III period deposits may be more prevalent near the Haynie east great house, although notes and maps from the 1980s (Haynie n.d.) suggest there may have been a small Pueblo III component to the West great house, as well.

ENVIRONMENTAL SETTING

The NCOP study area includes an environment defined by the surrounding drainages and by current agricultural use of the land. The Haynie site is located at 1911 m (6270 ft) and sits at the toe of a ridge to the north of, and just above, a shallow, broad valley within Simon Draw. The head of Simon Draw is located about six kilometers north of the Haynie site. Simon Draw empties into McElmo Creek four kilometers southwest of the Haynie site.

The soils of the valley bottom are primarily Ramper and Mickett clay loam, while the ridge tops include soils of the Gladel-Pulpit complex. Suitability for agriculture appears to depend greatly on very local slope, aspect, and drainage conditions, but in general these soils are among those with the greatest agricultural potential in the entire region (Van West 1994:162–167). Today the valley bottom is plowed and irrigated and produces primarily alfalfa/grass hay. Small, undisturbed areas are present in the valley, and these are covered in sagebrush, lesser amounts of greasewood and saltbush, and some riparian vegetation that includes cottonwood, willow, cattails, and sedges. The Chaco-style great houses and the midden deposits at the Haynie site are covered mostly with greasewood, sagebrush, saltbush, and grasses. Sandstone ridges flank and rise above the valley floor, and these ridges support pinyon-juniper woodland.

EXCAVATION, DOCUMENTATION, AND RECORDING SYSTEM

To assist in reading this report, this section describes Crow Canyon's system for excavation, documentation, and recording. In 2009, Dr. Susan Ryan and other Crow Canyon archaeologists established a permanent, primary site datum. Based on this datum, they used a total station to lay out a grid across the entire Haynie site. The "0,0" origin point is located southwest of the property's southwest corner, thus all grid coordinates have a "northing" and "easting" number (e.g., 400N 300E). In 2016, we used a high-resolution TopCon Hifer II High Resolution GNSS Geodetic Receiver to obtain more precise coordinates for the primary datum and backsite. The Haynie site is divided into architectural blocks—the west great house and surrounding remains are referred to as "Architectural Block 100."

Most of Crow Canyon's excavations at the Haynie site occur within excavation units (EU) of defined size (e.g., 2-x-4-m, 1-x-1-m) oriented to cardinal directions. We refer to excavation units by the size of the unit and the coordinate of the southwest corner (e.g., "3-x-2-m unit, 459N 376E"). Field archaeologists choose unit size and orientation based on the archaeological remains under investigation. Occasionally, the field crew conducted excavations that were less concretely defined than grid units—these are referred to as "segments" and assigned a number (e.g., Segment 5). We typically use segments to expose partially buried walls or to extend a grid unit to capture the corner of a room or structure.

During Haynie site excavations, we often place several grid units and/or segments adjacent to one another. Contiguous grid units and segments are generally used for exploring structural remains. Crow Canyon also excavates random 1-x-1-m sample units in suspected midden deposits. Finally, we often use smaller 1-x-2-m or 2-x-2-m test units to target specific archaeological features identified through remote sensing, pedestrian survey, or archival work (for example, units of this size were used to seek remains of mechanically-disturbed areas of the west great house). We refer to clusters of excavation units as "excavation areas" and we assign each excavation area a letter (e.g., Area A, Area B).

Within excavation units, we excavate strata by natural layers, subdividing strata into 10-cm levels. Archaeological contexts that represent distinct natural and cultural deposits or construction events are designated a "study unit" or "SU." The study unit is the key unit of analysis within the Crow Canyon documentation and recording system. There are three kinds of study units: Arbitrary (ARB), Structure (STR), and Nonstructure (NST). Arbitrary units tend to be deposits with edges that are either difficult to define or are a result of natural processes, (e.g., fallen wall debris, or wind and water-laid post-occupational sediments). Structures include both surface structures and subterranean pit structures and kivas. We give each room within a multi-room surface habitation an individual structure number. Nonstructures typically include "constructed" deposits that are not structures, such as middens and use surfaces. We give each newly defined study unit one of these three designations depending on its origin and assign it a number.

EXCAVATIONS AT THE HAYNIE SITE IN 2021

During 2021, College Field School students, interns, and adult participants assisted Crow Canyon archaeologists in excavation. We chose to focus on Areas A, C1, and C4, leaving Area C2 covered for the duration of 2021 (Area C2 had also remained covered during 2020) (see Figure 3 for locations of excavation areas). Over the course of the season, we opened numerous new excavation units, most of which were in newly designated Areas C5 and C6, located west and south of Area C1 units (all new, in progress, and completed excavation units at the Haynie site are listed in Table 1 and shown in Figure 4). Segments are excavation units that do not necessarily conform to the cardinal grid, and all segments are shown in Figure 5. We identified several new structures in Areas A, C5, and C6 (Figure 6). At the end of the season, we backfilled all of Area C4 and most of Area A.

The following sections are organized by excavation area and component (when separate temporal components can be defined). We describe the excavation strategy employed in each area, followed by descriptions of structures and other important study units. Because a large number of study units were investigated in 2021 we do not provide descriptions of every study unit.

Excavation within Area A: Pueblo II Component

The Pueblo II component of Area A includes Structure 1047 (a masonry-lined pitstructure), Structures 1101 and 1102 (masonry surface rooms), and Structure 1090 (an ephemeral surface room) (see Figure 6 for location of structures). Structures 1101 and 1102 are adjacent to one another within a relatively well-defined roomblock that includes at least one, and possibly two, additional rooms. We identified this roomblock when we used a backhoe to strip off the disturbed and redeposited overburden north of Structure 1047 during the 2020 season. Structure 1090 is located east of Structure 1047 and southeast of Structures 1101 and 1102. It is associated with a long north-south masonry wall segment that was also discovered during backhoe stripping in 2020 (see Figure 6). We think that Structure 1090 is part of an eastern wing to the roomblock containing Structures 1101 and 1102—however, recent disturbances to the site (the construction of what we think is a leach field/septic system) have obscured the point of articulation between this eastern wing and Structures 1101 and 1102.

Excavation Strategy

In 2021 we decided to investigate the masonry roomblock and wall alignment discovered during backhoe stripping to confirm that they were contemporaneous with Structure 1047—together, the surface structures and pitstructure would represent one of the only clear-cut "unit pueblos" yet found at the Haynie site. In addition, our preliminary pottery analysis suggested that these structures probably dated later than the Pueblo I and Pueblo I– to early Pueblo II–period structures found in Areas A and C but prior to the construction of the west great house, filling a major gap in the Haynie site chronology. Finally, the Pueblo I roomblock in Area A (partially excavated in 2020, completed in 2021, and described below) appeared to extend northward, possibly articulating with walls documented by Claudia Haynie beneath the west great House. We suspect these walls may have been surface rooms associated with Structure 1024 (a Pueblo I pitstructure investigated in 2019). If the Area A Pueblo I surface rooms and those associated with Structure 1024 were part of the same roomblock, it would imply that a large, arc-shaped structure may have been present at the Haynie site during the Pueblo I period. Confirming or disconfirming the existence of an arc-shaped structure at the Haynie site has bearing on several of the questions outlined in the research design (Ryan 2016). Thus, we also wanted to investigate whether there were earlier wall alignments associated with a Pueblo I component beneath the Pueblo II roomblock that contained Structures 1101, 1102, and 1090.

Structures 1101 and 1102

Structures 1101 and 1102 are the eastern-most rooms preserved in the Pueblo II roomblock north of Structure 1047 (see Figure 6). The east and south walls of the roomblock—and part of the north wall—

were relatively well-defined, but the west wall was not clearly visible, and the northwest corner was non-existent. We conducted wall trenching around the perimeter of the roomblock to determine the number of rooms and how far west the structure extended. Even after wall trenching the west side of the roomblock was still undefined. Nonetheless, wall trenching established that the Pueblo II roomblock had at least three, and possibly four rooms. After determining which rooms were best preserved, we chose to excavate the east half of the eastern two rooms (Structures 1101 and 1102). Adult participants assisted with this work during a brief Archaeology Research Program (ARP) in September and early October. The fill of both rooms proved to be wall fall comprised of exceptionally hard grey clay mixed with irregular sandstone cobbles, slabs, and boulders (see Figure 7). Before the end of the season, we identified a possible ephemeral floor surface within several test windows in Structure 1101. Work in these two structures remains in progress.

Structure 1090

Structure 1090 is located west of the north-south masonry wall alignment that was discovered during backhoe scraping east of Structure 1047 (Figure 6). To investigate the wall alignment, we placed a 2-x-2-m unit (424N 386E) adjacent to the east edge of 4-x-8-m 424N 378E (see Figure 4; Table 1). This 2-x-2-m unit was also intended to investigate several features thought to be associated with the underlying Pueblo I component (see below). The deposits here were very shallow, and we found that a 30 cm-wide gravel-filled trench containing a PVC septic line passed through the 2-x-2-m unit from north to south. However, with the assistance of two College Field School students we were able to identify an ephemeral floor surface that articulated with the masonry wall segment as well as a poorly preserved masonry cross wall (see Figure 8). We designated this ephemeral surface room Structure 1090 and decided (largely on its location and stratigraphic position) that it was most likely associated with Structures 1047, 1101, and 1102. If so, it forms part of a poorly preserved eastern wing to the Pueblo II roomblock. The floor surface appeared to be resting on a layer of purposefully introduced cultural fill, beneath which we identified a second floor. Based on a few floor-contact artifacts, the second, lower floor is more likely associated with the Pueblo I roomblock beneath the walls and rooms of the Pueblo II unit pueblo (see below). Excavation in 2-x-2-m 424N 386E (and Structure 1093) is ongoing.

Structure 1047

Throughout 2020 it had become apparent that Structure 1047 was a large, deep, masonry-lined pitstructure filled with colluvial deposits (Throgmorton et al. 2021). In 2021 we focused on excavating an area corresponding roughly to the southwest quarter of Structure 1047, designated Segment 14 (see Figure 5, Figure 6). With the help of Scott Evans, a 20-year veteran of the Archaeology Research Program, we reached the prepared floor of the pitstructure.

The bench face and upper lining wall were both constructed of rough masonry, and the bench top and floor were both covered in a thin layer of sand. There were a number of features in the portion of the structure that we excavated, including: a posthole in the bench top; a masonry bin adjacent to the posthole (the bin had apparently been built *against* the wooden post, which was later removed); the ventilator tunnel, which was sealed with a tightly fitted stone slab, behind which was a well-made clay coping surrounding the tunnel; a slab-lined bin in the floor that extended beneath the bench; a portion of a slab-lined hearth (most of which was outside the excavation area); and a line of small, circular, sand-filled pits between the hearth and the ventilator tunnel opening.

Structure 1047 had a notable floor assemblage (see Figure 9). Immediately south of the hearth was an articulated dog skeleton, placed directly on the floor surface. West of the hearth we identified a cranium and other bones of an adult turkey protruding from the profile face of the excavation unit (Segment 14). We believe this cluster of turkey bone is all that is visible (within Segment 14) of a turkey burial on the floor. Several pottery artifacts were adjacent to the hearth near the dog burial, including the handle of a

ladle. On the bench was a cluster of artifacts including ground stone, a broken axe fragment, a projectile point fragment, and a bone awl. Within the bin on the bench was a bone awl. The slab-lined bin built into the floor contained several ground stone items, sherds, and a bone awl. A sandal last with pigment staining was lying on the floor between the slab-lined bin and the ventilator opening.

The sand covering the floor, the clusters of ground stone artifacts, the association of bone awls with features, and the presence of a dog and turkey burial strongly suggested to us that the pitstructure had been ritually closed at the end of its use-life. Following a conversation among the archaeology staff, Dr. Elizabeth Perry (Crow Canyon President and CEO), and Rebecca Hammond (American Indian Outreach Manager), we decided to leave the dog and turkey burials in situ and return all artifacts to their locations within the pitstructure after analysis in the laboratory. After carefully documenting and photographing the artifacts in situ, they were taken to the Crow Canyon Archaeological Center for analysis and photography. Based on the identification of several Dogoszhi-style Mancos Black-on-white jar sherds and a contour-toe sandal last (see Figure 10, Figure 11)—both of which probably date after A.D. 1040—we believe that Structure 1047 dates to the middle Pueblo II period. Following analysis, the artifacts were returned to the field and placed back in their original locations within the pitstructure.

Excavation within Area A: Pueblo I Component

In 2020, Crow Canyon determined that within Area A was part of a Pueblo I roomblock that contained portions of at least six rooms (Structures 186, 1049, 1063, 1066, 1067, and 1073/193). An aerial view of these structures is shown in Figure 12, and their location is shown in Figure 6. Documentation of structures 186, 1063, 1066, and 1067 was completed in 2020 (Throgmorton et al. 2021). During 2021, we sought to complete excavation and documentation of the remaining surface rooms within the excavation area, and to better contextualize the deposits on which this roomblock was constructed. In addition, we identified a possible Pueblo I "front" room (Structure 1093) located east of Structures 1049 and 1063.

Structure 1049

Structure 1049 is north of and contiguous to Structure 1063 (see Figure 6), and both surface rooms had walls constructed primarily of adobe. With the assistance of Public Archaeology intern Ella Crenshaw, we excavated and documented what remained of Structure 1049. The Pueblo II-period construction of Structure 1047 had removed the western two thirds of Structure 1049 prehistorically. Like Structure 1063, Structure 1049 exhibited evidence for remodeling, most notably the sealing of the doorway that connected the two surface rooms. We believe that at the time the door was sealed, the walls of Structure 1049 may have been rebuilt using a post-and-adobe technique, as we identified several postholes seated within orangish adobe that itself had been applied atop a wall stub made of grey-green clay and adobe (see Figure 13). The plug within the door between the two rooms utilized the same materials and technique. Structure 1049 appeared to have been built directly on sterile native sediment.

Structure 1063

Excavation and documentation of Structure 1063 was mostly finished in 2020 (Throgmorton et al. 2021). In 2021, we excavated a narrow hand trench to determine what the room was constructed on. Subfloor investigation revealed that Structure 1063 had been constructed after a layer of redeposited sterile sediment was introduced to level the uneven natural surface at the top of a carbonate-rich soil horizon. Below this redeposited sterile was a borrow pit filled with construction debris (see Figure 14).

Structure 1073/193

We completed most of the excavation and documentation of Structure 1073/193 in 2020 (Throgmorton et al. 2021). Early in 2021, we finished work in Structure 1073/193, creating a final plan map of its original floor and determining that the western part of the room was built atop a baulk of redeposited sterile sediment. The redeposited sterile sediment appeared to cut into a shallow midden deposit (NST 1064) that

pre-dated Structure 1073/193 (see Figure 15); preliminary examination of the sherds suggest the midden dates to the early Pueblo I period.

Structure 1093

Structure 1093, a possible Pueblo I "front" room, is located east of Structures 1049 and 1063 (see Figure 6). We discovered it in 2-x-2-m 424N 386E (see Figure 4). After completing the excavation of Structure 1063 and 1049, several potential features were visible in the east profile face of 4-x-8-m 424N 378E, suggesting there were additional deposits (and possibly structures) east of Structures 1063 and 1049. If our interpretation of Structures 1063, 1049, and 1073/193 as the "back" rooms of a Pueblo I roomblock were correct, it would be logical for a "front" room to be located just beyond the east margin of 4-x-8-m 424N 378E. As mentioned above, backhoe stripping in 2020 identified a masonry wall segment approximately two meters east of 4-x-8-m 424N 378E that also implied additional architecture there.

Structure 1093 became apparent after we removed the ephemeral floor surface of Structure 1090 (which we believe to be a middle Pueblo II surface room). Below the floor of Structure 1090 was a well-prepared floor surface with numerous features and floor-contact artifacts that we suspect is the latest floor in a Pueblo I surface structure (see Figure 16). We have designated these features part of Structure 1093. The gravel-filled trench that damaged Structure 1090 also damaged the floor of Structure 1093. Excavation within 2-x-2-m 424N 386E (and Structure 1093) is still in progress.

Discussion of Area A Pueblo I Component

During 2021 Crow Canyon completed documentation of Structures 1049, 1063, 1066, 1067, and 1073/193, determining that they were contiguous rooms in a Pueblo I-era roomblock. Testing in 2-x-2-m 424N 386E identified Structure 1093, which strongly suggests that there are "front" rooms to the east of these structures. The results of subfloor investigation within Structures 1063 and 1073/193 indicate that they were built on existing cultural deposits including a midden and a borrow pit. The habitation associated with the midden and borrow pit may be Structure 1024, located northeast of Area A (see Figure 6). Dendrochronological analysis of charred beams recovered from Structure 1024 dated to the A.D. 780s and 790s (see "Artifact and Sample Analysis" section below), consistent with the artifacts observed (in the field) within NST 1064, the midden that pre-dates Structure 1073/193. Based on this evidence, we believe it is possible that the Pueblo I period rooms investigated in Area A were either 1) a western wing added to an existing, south-facing early Pueblo I roomblock associated with Structure 1024, or 2) a roomblock with an east-facing orientation that slightly post-dates an A.D. 780s–790s roomblock to the northeast.

Excavations in Areas C1, C5, and C6

Area C contains the remains of a large Pueblo I to mid-Pueblo II period roomblock (and associated pitstructures) that includes Structures 197, 198, 1002/1036, 1003, 1004, 1010/1088, 1016, 1018, 1026/1042, 1052, 1094, 1100, and 1110 (see Figure 6). Because of its size and complexity, Area C is divided into six parts: Area C1 through Area C6 (see Figure 3). While we opened up Area C1 during 2021, we only worked on Structure 1003, not Structure 1010/1088. No work was conducted in Area C2 during 2020 and 2021; Area C2 includes Structures 1002/1036, 1018, 1026/1042, and 1052. Excavation in Area C3, which contains Structures 197, 198, and 1004, was finished in 2018. Because Area C4 contains deposits that differ significantly from Areas C1–C3, C5, and C6, we will discuss it in a separate section below. Areas C5 and C6 were added in 2021 and include Structures 1094 and 1100.

Excavation Strategy

Remote sensing and test excavation between 2016 and 2020 identified several surface rooms and pitstructures in Areas C1, C2, and C3. Over time, it became apparent that these structures were components of the same large, curving roomblock at the northwest side of the site, but the extent of that roomblock was unclear. We chose to use the 2021 College Field School as an opportunity to address several questions

about this roomblock. Did it have a western "wing" beyond Areas C1–C3? If so, did this wing include Pueblo I, early Pueblo II, and middle Pueblo II components (as seems to be the case in other parts of the roomblock)? Finally, was there a midden associated with this roomblock? Historic aerial imagery and personal photos from the Haynie family suggested that there was once a large cultural deposit, heavily pothunted, located immediately south of a roomblock in an area that is now a gouge/depression created by heavy equipment. Answering these questions would allow us to refine the population estimates at the site, to further define the extent of Pueblo I occupation, and to obtain artifact and ecofact samples from definite secondary refuse deposits. The deposits we chose to test for architectural remains were designated Area C5, while the deposits where we suspected a midden might have once been we designated Area C6.

In Area C5, we placed one meter wide trenches atop two areas of suspected architecture (see Figure 4;

Table 1). A north-south trench (containing units 2-x-1-m 464N 364E and 3-x-1-m 466N 364E) was intended to determine if surface structures visible in 4-x-1-m 461N 370E continued westward—Structure 1094 was identified in this trench. An east-west trench (1-x-3-m 457N 358E and 1-x-3-m 457N 361E) was intended to determine if the structure arced around to the south—Structure 1100 was identified in this trench, as was an associated extramural surface (NST 1105) covered by a shallow midden (NST 1092).

In Area C6 we placed several judgmental 1-x-1-m units around the perimeter of the gouge/depression in places that we hoped would harbor intact deposits from the suspected midden (see Figure 4,

Table 1). After clearing greasewood and sagebrush from Area C6 prior to testing, a small section of masonry wall became visible along the north edge of the large gouge/depression. We placed Segment 28 to explore this wall alignment.

Structure 1094

In 2-x-1-m 464N 364E we identified a floor surface associated with an intact wall segment near the south profile face of the trench. We designated this surface room remnant Structure 1094 (see Figure 6), and we believe it dates to the early Pueblo II period based on pottery observed in the field (see Figure 17). The northern portion of the test trench was badly disturbed by a large looter's pit that removed the north wall of Structure 1094. The pit was later filled with agricultural equipment and other historic debris. Work in Structure 1094 is in progress.

Structure 1100

In 1-x-3-m 457N 358E we identified wall segments that outlined a masonry surface room designated Structure 1100 (see Figure 6). We expanded the trench northward (1-x-1.5-m 458N 359.50E) to define a section of intact prepared floor surface within the structure (Figure 18). Like Structure 1094, much of Structure 1100 had been disturbed by a looter's pit that damaged possible floor features and scattered stones from the structure's walls. We determined that there were likely two sequential floor surfaces dating to the early Pueblo II period based on in-field examination of pottery. Work in this structure is in progress, but we anticipate additional floor surfaces and architecture below.

NST 1092 and NST 1105

The eastern part of 1-x-3-m 457N 361E extended across an area that had been scraped away in the 1970s–1980s to lay an above-ground waterline (see Figure 4). Beneath the cut for the water line were intact extramural deposits, including a shallow midden (NST 1092) resting atop an extramural surface (NST 1105).

Segment 28

Public Archaeology intern Andy Orozco cleared sediment from around the wall alignment that became visible after brush clearing in Area C6. We designated this exploratory trench Segment 28 (see Figure 4;

Table 1) He identified several additional wall alignments that appeared to part of at least one structure—and possibly two—at which time we created 2-x-2-m 449.19N 362.21E to investigate the architecture in a more controlled fashion (

Table 1). Excavation found a historic fence post placed into what appear to be intact prehistoric deposits, and at the end of the season it was still unclear whether the walls represented a single masonry surface room, several (sequential) surface rooms, or a retaining wall—hence no study unit numbers have been assigned to these walls. Work in this unit is in progress.

Midden Testing Units in C6

We placed seven 1-x-1-m test units in Area C6 to try to identify and sample midden deposits associated with the pitstructures and surface structures to the north and east (see Figure 4,

Table 1). Some of the units (e.g. 1-x-1-m 441N 357E) proved to have shallow cultural deposits, but others (e.g. 1-x-1-m 449N 357E and 451N 357E) found 50–60 cm of intact midden deposits (NST 1082). Preliminary in-field analysis of pottery suggests the deposit is early to mid-Pueblo II in age.

We placed two test units (1-x-1-m 449N 369E and 441N 374E) to characterize the eastern side of the suspected midden deposit (see Figure 4;

Table 1). One of these (1-x-1-m 449N 369E) found deposits that we are currently interpreting as cultural material resting atop the upper fill of a possible pitstructure. The other (1-x-1-m 441N 374E) found what we interpret to be redeposited cultural material atop a shallow, intact midden, which itself rests atop a possible cultural surface. In both cases we expanded the original 1-x-1-m unit to a 1-x-2-m unit in order to better characterize the nature of the deposits we found. Work in these two units is in progress.

Structure 1003

In addition to the new test units initiated to clarify the nature and extent of the roomblock in the northwest part of the site, Crow Canyon also continued work in Area C1, a test trench initiated in 2017 (see Figure 3). The Area C1 test trench identified a pitstructure (Structure 1003) that had been filled with eleventh- to twelfth-century midden deposits (see Figure 6). In 2021, Public Archaeology intern Jessica Weinmeister assisted Crow Canyon staff in identifying the floor surface in Structure 1003. The masonry lining of the pitstructure showed changes in construction style and running joints that had led us to suspect it had been remodeled several times. Excavation in 2021 determined that there are at least two floor surfaces within Structure 1003. In addition, we uncovered a hearth associated with the uppermost floor (see Figure 19). The hearth was relatively well oxidized, and Kay Barnett assisted in retrieving samples for archaeomagnetic dating. The samples returned three potential date ranges: A.D. 935–1150, A.D. 1100–1265, and A.D. 1435–1690 (see "Artifact and Sample Analysis" section below). Considering other evidence, such as pottery, the morphology of the pitstructure, and radiocarbon dates obtained from the fill of the pitstructure (reported in Throgmorton et al. 2019), the first date range is most likely. Work in Structure 1003 is in progress.

Excavation in Area C4

Area C4 is located adjacent to the west great house and comprises three 2-x-4-m excavation units originally placed to examine the foundation of the west great house (see Figure 3, Figure 4). Area C4 includes Structure 1016, a Pueblo II surface room (see Figure 6), and a wall associated with Structure 1110, a Pueblo I or early Pueblo II surface room. However, the bulk of Area C4 by volume are extramural deposits located below and against these two structures, as well as below and against the west wall of the west great house. During 2021, Crow Canyon completed excavation in Area C4. Work focused on completing the excavation and documentation of Structure 1016 and excavating a series of superimposed pit features in 2-x-4-m 452.40N 394.50E. Public Archaeology intern Kelsey Hoppes assisted in this work.

Structure 1016

Structure 1016 is thought to be one of the last rooms constructed and used in the large roomblock encompassed by Area C (see Figure 6). Its unexcavated western side appears to be positioned atop earlier architectural remains, while its eastern side was constructed on an extramural surface (NST 1015) atop colluvial deposits (ARB 1020) that had come to rest against the back wall of the Area C roomblock. Several poorly preserved interior features were excavated in 2021 (see Figure 20).

Extramural Deposits, NST 1027, and Micromorphological Analysis

Most of the sediment in 2-x-4-m units 452.40N 390.50E and 452.40N 394.50E had been excavated in 2017–2019 (Throgmorton et al. 2020), leaving only a small amount remaining above sterile. In the cultural deposits remaining, we identified numerous intersecting pit features in the eastern 2-x-4-m unit. Most of these features originated on NST 1027, which we believe to have been a late Pueblo I or early Pueblo II extramural occupation surface. One feature (POT 1; POT="pit: other") is thought to have been an adobe mixing pit, as its sides were coated with sediment similar in color and composition to adobe observed in Pueblo I and early Pueblo II structures elsewhere on the site. Adjacent to POT 1 was POT 5, a large, deep borrow pit used to extract both red-orange clay loam sediment and a greyish-white carbonate-enriched version of this clay loam. The borrow pit was later filled with burned architectural debris (possibly from a pitstructure roof), charred botanicals, and artifacts dating to the late Pueblo I and/or early Pueblo II period.

Backfilling

Crow Canyon completed excavation and documentation within Area C4 and most of Area A during the 2021 season. This work included final excavation photos and photogrammetry, masonry and adobe wall documentation, final plan maps and profiles, subfloor investigations, and sample collection. We contracted local backhoe operator Glenn Fish to backfill these two areas. Area C4 was backfilled with excavated and screened sediment, while Area A was backfilled with 1) excavated and screened sediment and 2) the redeposited overburden stripped off by backhoe in 2020. We also backfilled a unit in Area D that had been left open in anticipation of further work that we chose not to undertake (4-x-1-m 448.50N 401.50E).

Table 1 lists all excavation units that have been backfilled to date.

SUPPORTING STUDIES AND ANALYSES

Micromorphological Sampling

The south profile face of 2-x-4-m units 452.40N 390.50E and 452.40N 394.50E (designated OTH 1109; OTH = "other" study unit designation) contained a detailed stratigraphic record spanning the early Pueblo I period to the early Pueblo III period (approximately A.D. 780–1220). These strata included: cultural deposits that accumulated during the Pueblo I period; a late Pueblo I or early Pueblo II use surface containing extramural pit features; an early Pueblo II ash and artifact midden; a thick (greater than one meter) deposit of alternating colluvial and aeolian cultural material that dates to the early Pueblo II period; two layers of construction debris possibly associated with different phases of construction at the west great house; a late Pueblo II extramural surface and feature associated with the west great house; and post-occupation deposits related to the decay and collapse of the west great house.

We conducted a detailed examination of OTH 1109, and Dr. Kirk Anderson assisted in drafting a final profile of the stratigraphy. Among the broader conclusions of the stratigraphic study is that many of the deposits we previously had classified as middens in this area are more likely redeposited colluvial material, that is, a combination of cultural debris (charcoal, ash, artifacts, and ecofacts) and natural sediment (silts and sand) that washed into a low-lying area from somewhere upslope. In addition, we initiated a micromorphological study of the stratigraphy observed in OTH 1109, which involved taking soil baulks from the south profile face of both 2-x-4-m units (see Figure 21). The goal of the micromorphological sampling and analysis is to determine if extramural surfaces show any indications of preparation, to further characterize the texture, composition, and inclusions within each strata, and to compare different strata to observe changes over time in deposition at the Haynie site.

The soil baulks have been sent to Applied Petrographic Services, Inc., in Greensburg, PA, where they will be vacuum impregnated with epoxy and processed into thin section slides. Dr. Michael Aiuvalasit (Illinois State Archaeological Survey, University of Illinois, Urbana-Champaign) will analyze and interpret the thin section slides in 2022.

Photogrammetric Documentation

Crow Canyon continues to experiment with both terrestrial and drone-mounted photogrammetry as a technique for documenting architecture, stratigraphy, and features. During 2021, we conducted drone-based photogrammetry to create an undistorted aerial image of the Pueblo I roomblock in Area A (Structures 186, 1049, 1063, 1066, 1067, and 1073/193) (see Figure 12). Following the excavation of Segment 14 we collected photos suitable for building a 3D photogrammetric model of the excavated portion of Structure 1047, including its in situ artifact assemblage. Finally, we used photogrammetric methods to document the stratigraphy observed in OTH 1109, the south profile face of the 2-x-4-m units in Area C4. The resulting orthoimage will be used to supplement the detailed, hand-drafted stratigraphic profile of OTH 1109.

Mortar and Adobe Sampling

During 2021 we systematized our collection of mortar, clay, and adobe samples. Understanding how traditions of wall and feature construction varied across the site and through time is an important aspect of the Northern Chaco Outliers Project research design (Ryan 2016). We collected samples from Structure 186, 1016, 1063, 1047, 1049, 1110, the exterior wall of the west great house, and a borrow pit and mixing pit associated with NST 1027. Where possible, our samples included material from visually distinctive sediments and mortars associated with masonry walls, adobe walls, sediment mixtures used within foundations and footer trenches, and natural strata that may be likely parent material for mortars and adobes at the site. Sediment analysis of the samples characterize the soil composition, texture, and inclusions.

Simon Draw Watershed Modeling

Survey work associated with the Lakeview Community Archaeological Project in 2020 observed that the course of Simon Draw may have been different in the past. Perched paleochannels observed to the south of the Haynie site and late nineteenth- or early twentieth-century maps suggested that Simon Draw once curved southeastward, passing between the Haynie site and the Wallace great house. Furthermore, we realized that the Haynie site (and Lakeview Community more generally) are located in a position along Simon Draw that may be especially advantageous for runoff farming, or even ditch irrigation.

To better understand the ecological setting of the Haynie site, we initiated a study to 1) identify and map the total Simon Draw watershed, 2) determine the most likely path of the watercourse prior to the development of nineteenth- and twentieth-century irrigation canals, and 3) develop a digital model of the watershed that could be used to forecast irrigation potential following rainfall events of varying magnitude. Jeremy Grundvig (Educator and Mission Associate) has helmed this project as part of his coursework in the University of Arizona's online Master of Science in GIS program.

Mapping the extent of the watershed at 30 m resolution indicates that the Haynie site is located just below the confluence of five main tributaries of the total watershed, which extends to the highlands of Summit Ridge, just south of Lost Canyon, where Highway 184 is today (Figure 22). The position of the Haynie site maximizes the streamflow potential of Simon Draw and is especially advantageous given its location at the transition from sloping terrain on the north, to flatter, floodplain deposits on the south. Preliminary results also show that based on 30 m Digital Elevation Model (DEM) data from the United States Geological Survey, our hypothesis that Simon Draw may have once passed between the Haynie site and Wallace great house may be correct (Figure 23). Higher resolution DEM data does not show this particular course, but we believe that the 10 m and 1 m resolution DEM data is incorporating many recent and historic agricultural features into the streamflow and velocity model.

Now that the watershed has been delineated, we plan to begin incorporating soils, temperature, and rainfall data to more accurately model the paleohydrology of the Simon Draw watershed. Modeling will use the Automated Geospatial Watershed Assessment Tool (AGWA), hosted by the University of Arizona, Tucson.

Archival Study of the West Great House

The Haynies hand-excavated several rooms at the west great house in 1983–1984 before entering into an agreement with two local pothunters in January of 1985 to use heavy equipment to excavate the structure. Claudia Haynie created numerous maps and diagrams showing various stages of the excavation/deconstruction of the building, and she kept a running log of the work conducted between January and March of 1985. Photographs of the work show wall abutments, masonry styles, artifacts, and features as they were discovered. During the winter of 2021, Kellam Throgmorton and Tim Wilcox undertook a study of Claudia Haynie's maps, photographs, and notes pertaining to the west great house at the Haynie site.

The most important results of the archival study are:

1. The 1987 plan map of the west great house is not an accurate portrayal of the structure. It collapses Pueblo I, early Pueblo II, late Pueblo II and Pueblo III components into a single composite map. There are numerous rooms depicted on the map that do not appear on the original sketch maps drawn in 1984 and 1985 during the excavation of the great house. Finally, the 1987 plan map appears to be strikingly similar to the east great house plan map in scale and layout. Bruce Bradley helped Claudia map the east great house in 1987, and we believe that she redrafted the original west great house maps, making it appear more similar to the east great house than it actually was.
2. The eastern and western halves of the west great house were constructed using different masonry techniques and styles. Much of the western half of the structure was either compound, double, or core-veneer masonry construction while the eastern half was single-wythe, utilizing carefully shaped

tabular stone. The rubble of the western half of the structure was taller than the eastern half by a meter or more.

3. The masonry style of the eastern half of the great house is analogous to the masonry styles documented in the oldest rooms at Wallace great house (Bradley and Bradley 2020). Both utilize single-wythe tabular masonry construction. This suggests that the eastern half of the west great house dates between about A.D. 1020–1050, making it one of the earliest Pueblo II great houses north of the San Juan River. It also suggests that the western half of the west great house was constructed somewhat later than the eastern half.
4. Much of the pottery recovered from the west great house was Cortez Black-on-white, including both the Kiatuthlanna style (earlier) and the Red Mesa style (later). Few Dogoszhi-style Mancos Black-on-white vessels are shown, suggesting much of the artifact assemblage pre-dated about A.D. 1040 or 1050.
5. Maps and sketches suggest that an earlier, Pueblo I-era structure was located beneath both phases of the west great house. Claudia sketched several pitstructures in a line extending west-to-east between the current willow tree and paint shop and showed a series of rooms extending northeastward from the paint shop. One of the pitstructures corresponds to the location of Structure 1024, which we determined dated to the A.D. 780s–790s. We believe the roomblock represented by these pitstructures and surface structures *may* articulate with the Pueblo I roomblock we excavated in Area A. If so, it would be a large, arc-shaped, multihousehold structure.
6. The Kiatuthlanna-style Cortez Black-on-white sherds reinforce the notion that a late Pueblo I or early Pueblo II component may have been present beneath the west great house.

ARTIFACT AND SAMPLE ANALYSIS

In-house cataloging and analysis of artifacts from the Haynie site are in progress. Staff, participants, and volunteers have catalogued more than 9597 bags of artifacts and samples from the Haynie site thus far. While our ability to work with volunteers and participants was limited in 2021 due to the COVID-19 pandemic, the staff, participants, and volunteers were still able to catalogue more than 1936 bags of artifacts and samples from the Haynie site excavations. We also analyzed 6804 pieces of pottery and 84 ornaments. Eighty-four flotation samples from the site were processed. In addition, the lab staff analyzed 5498 pieces of Bulk Chipped Stone (BCS) with the help of one of our Public Archaeology interns, Jessica Weinmeister. Forty-six projectile points, bifaces, and drills and 17 pieces of ground stone were also analyzed. The heavy fractions of 100 flotation samples have been sorted and processed and the data are in the process of being entered into the database. One of our most resolute lab volunteers, Robin Lyle, conducted microscopic temper, rim form, and rim radius analyses on 130 rim sherds from the Haynie site in 2021. She also examined and verified 115 gizzard stone samples, bring the site total to 300 individual gizzard stones.

Crow Canyon conducted seven additional special analyses that contributed to our research at the Haynie site. In anticipation of the arrival of ARP participants in September, the lab team developed two new analyses that we could teach and conduct with participants while observing social distancing protocols and reduced group size. In this process we developed a new lithic core-tool analysis and a worked sherd analysis. During the ARP, we tested these new analyses and are in the process of refining the forms and methods and checking the work of the participants before the data is entered into the database. During this trial implementation of the analyses our participants and staff analyzed 29 cores and 79 modified sherds.

An additional focus of the 2021 laboratory analyses at Crow Canyon was on faunal (non-human) bone and bone tools. Crow Canyon's newest post-doctoral scholar, Dr. Jonathan Dombrosky, assisted us in analyzing 2028 faunal specimens in 2021. In late 2020, the lab team also developed a new analysis for modified bone tools. While the majority of the bone tool analyses conducted in 2021 focused on materials from other sites in the Lakeview Community—i.e., the Ida Jean great house (5MT4126), Wallace great house (5MT6970), and Greenstone Pueblo (also 5MT6970), six bone awls from the Haynie site collection were analyzed.

With the help of our first post-doctoral scholar, Dr. Michelle Turner, the lab team also conducted two types of design analyses for pottery from the Pueblo II and Pueblo III periods. The lab team focused efforts on analyzing the pottery from the Wallace and Ida Jean great houses using these two design analyses in 2021 as part of the Lakeview Community Archaeological Project (LCAP). With the help of the College Field School program, however, we applied our Pueblo II design analysis to 35 sherds and the Pueblo III design analysis to 32 sherds.

Dendrochronology Analysis

In 2021, Crow Canyon began its first Dendroarchaeology internship and analysis program. Under the instruction and supervision of Dr. Benjamin Bellorado (Laboratory Director), our first intern in this position, Katie Portman, analyzed the dendrochronological samples from the Haynie site. Katie began by analyzing each of the 47 point-located dendrochronological samples using a combination of skeleton plotting and ring-width measuring methods of crossdating. In all, 26 samples returned dates. Of the dated samples, 19 piñon pine samples originated from Structure 1024, a pitstructure sampled in 2019 (see Figure 6). Figure 24 shows the orientation of charred beams above the floor of Structure 1024, with provisional tree-ring dates on each beam that dated. Sixteen of these dates clustered in the late A.D. 780s, indicating that the majority of the beams in the roof were felled in A.D. 787 and 788 and the structure was built soon after. Two additional samples from the structure that dated to 793 and 803 were added to the roof during small-scale remodeling events and the structure was likely retired in the first decade of the ninth century.

Archaeomagnetic Sampling and Analysis

Excavation within Structure 1003 resulted in the discovery of a well-preserved hearth associated with the upper-most floor. Kay Barnett collected samples for analysis, which were then sent to Dr. Stacey Lengyel at East Tennessee State University. The location of the Earth's magnetic poles drift over time, occasional doubling back on themselves. As a result, archaeomagnetic samples sometimes return multiple potential date ranges. The samples from Structure 1003 resulted in three potential date ranges: A.D. 935–1150, A.D. 1100–1265, and A.D. 1435–1690.

Crow Canyon had previously obtained radiocarbon results from charred maize samples found in the fill of Structure 1003 (see Throgmorton et al. 2019). One sample provided a date range (2-Sigma) of 1070–1154 cal AD (49.4%) or 993–1058 cal AD (46%), while the other provided a range (2-Sigma) of 1033–1190 cal AD (94%) or 1198–1204 cal AD (1.4%). Thus, a charred maize fragment deposited in the structure *after* the hearth was no longer in use dates no later than A.D. 1154. While it is possible that this maize fragment was an old piece of charcoal later incorporated into the fill of the structure, we think that the radiocarbon dates suggest that the first date range of the archaeomagnetic sample is the most likely.

SUMMARY OF 2021 SEASON

Crow Canyon's work in 2021 involved excavation, laboratory analysis, and several supporting studies and analyses. Our efforts in the field focused on completing work within Area A and Area C4, determining the extent of architecture in Area C, and identifying midden deposits associated with surface rooms and pitstructures in Area C. We were assisted in our efforts by college students, interns, and adult participants. The work included photogrammetric documentation of completed excavations, mortar and adobe sampling, collecting archaeomagnetic samples and samples for micromorphological analysis. In November of 2021, we backfilled most of Area A and all of Area C4, completing nearly five years of excavation in two of the most complex parts of the Haynie site.

In addition to excavation, Crow Canyon staff and participants analyzed thousands of artifacts in the lab. The Dendrochronolgy intern analyzed dozens of tree-ring samples from Structure 1024. Laboratory staff developed several new analyses and refined others. We initiated a GIS modeling project intended to help us understand the factors affecting agriculture in the Simon Draw watershed, and an archival project revealed much about the archaeology of the now-demolished west great house. Outreach activities included social media posts, tours at the Haynie site, and webinars that reached hundreds of interested members of the public (see Appendix B). Educational activities included a college field school and conversations with educators enrolled in a National Endowment for the Humanities teacher education program.

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FIGURES AND TABLES

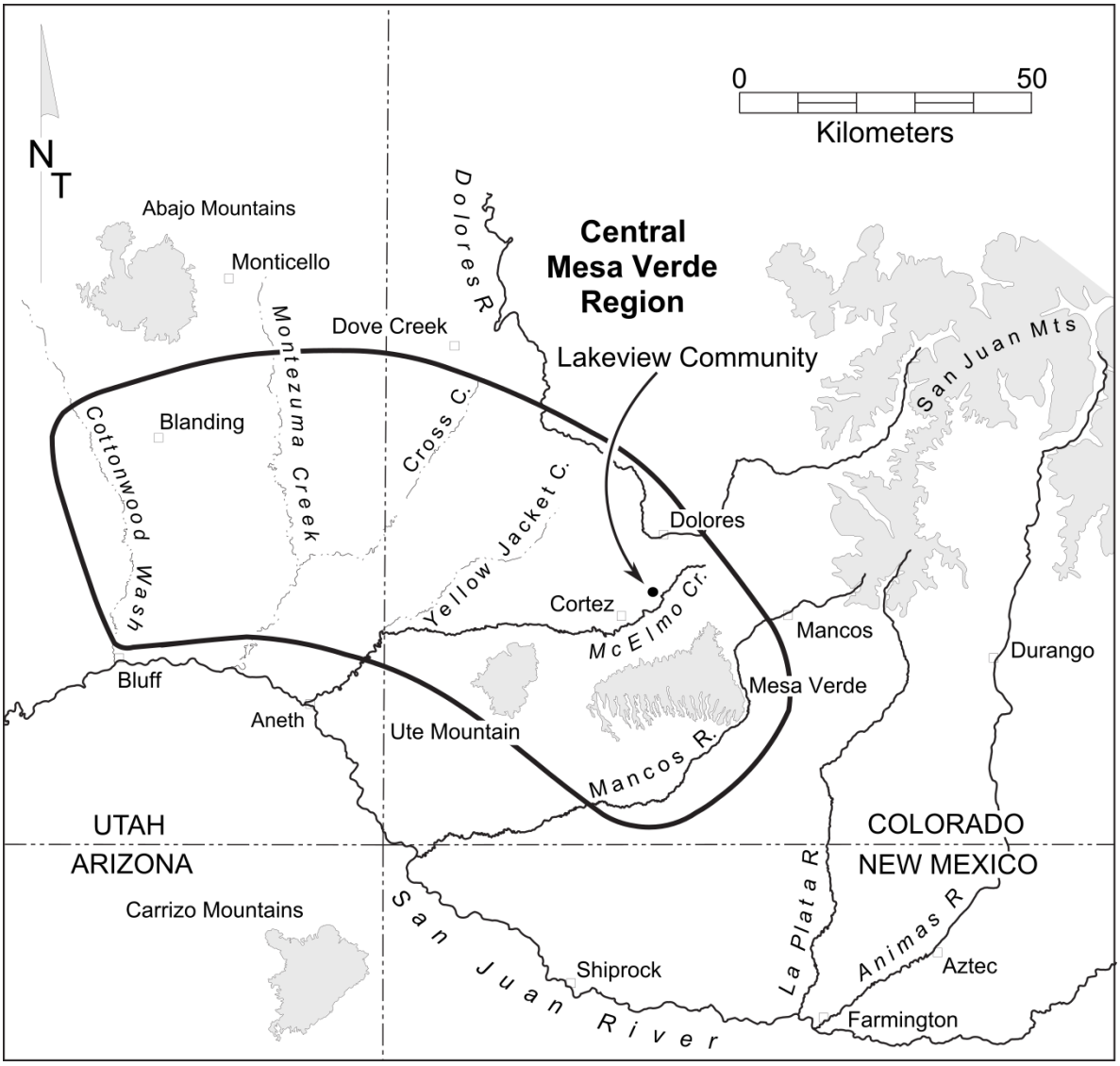

Figure 1. Location of the Lakeview community in southwestern Colorado.

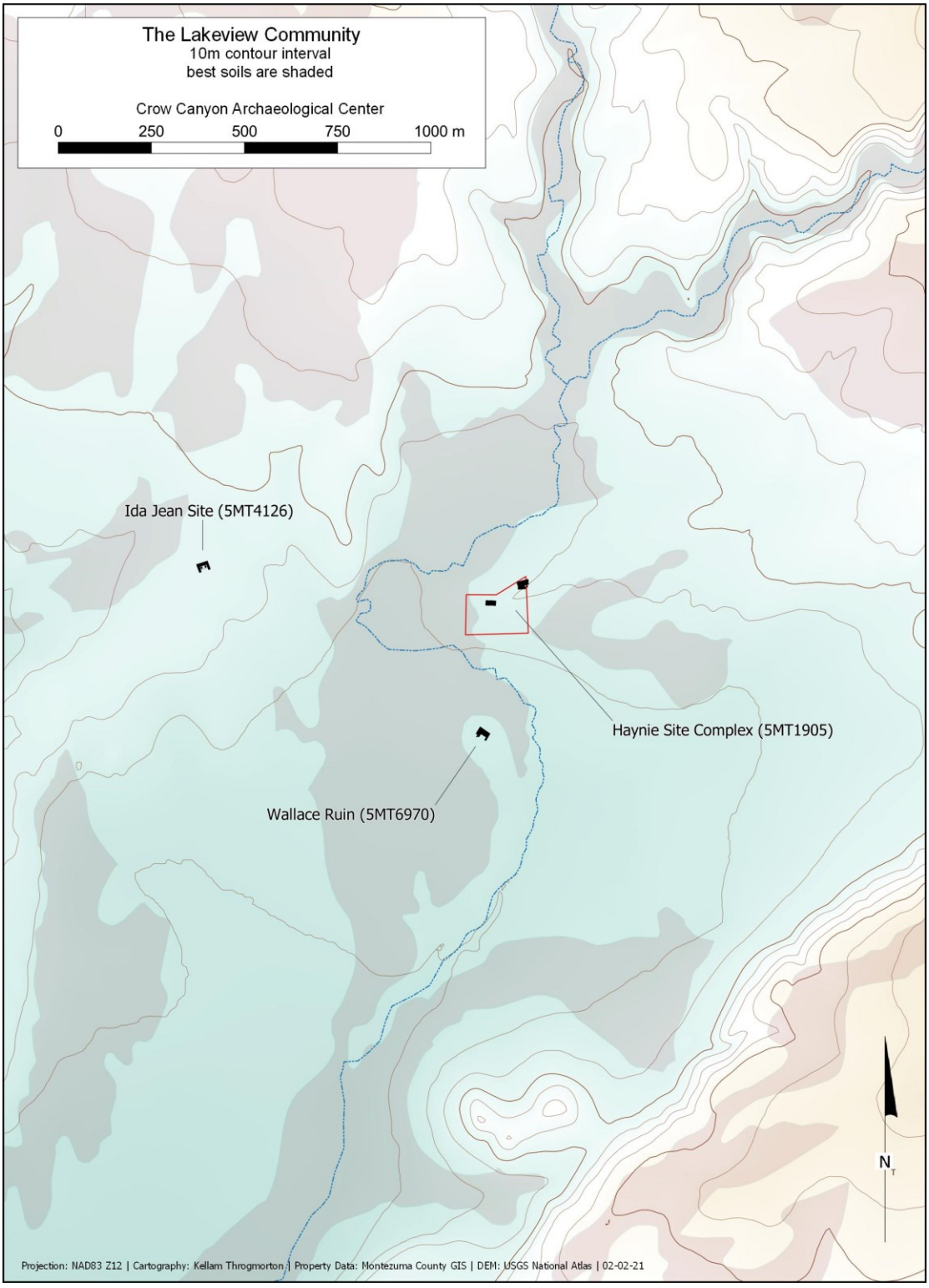

Figure 2. Topographic map showing location of the Haynie site within the Lakeview community. Pertinent landscape features are shown. The course of Simon Draw is a reconstruction based on historic maps and aerial photos, which suggests its course was different prior to the twentieth century. The best soils (USDA-rated) in the area are shaded.

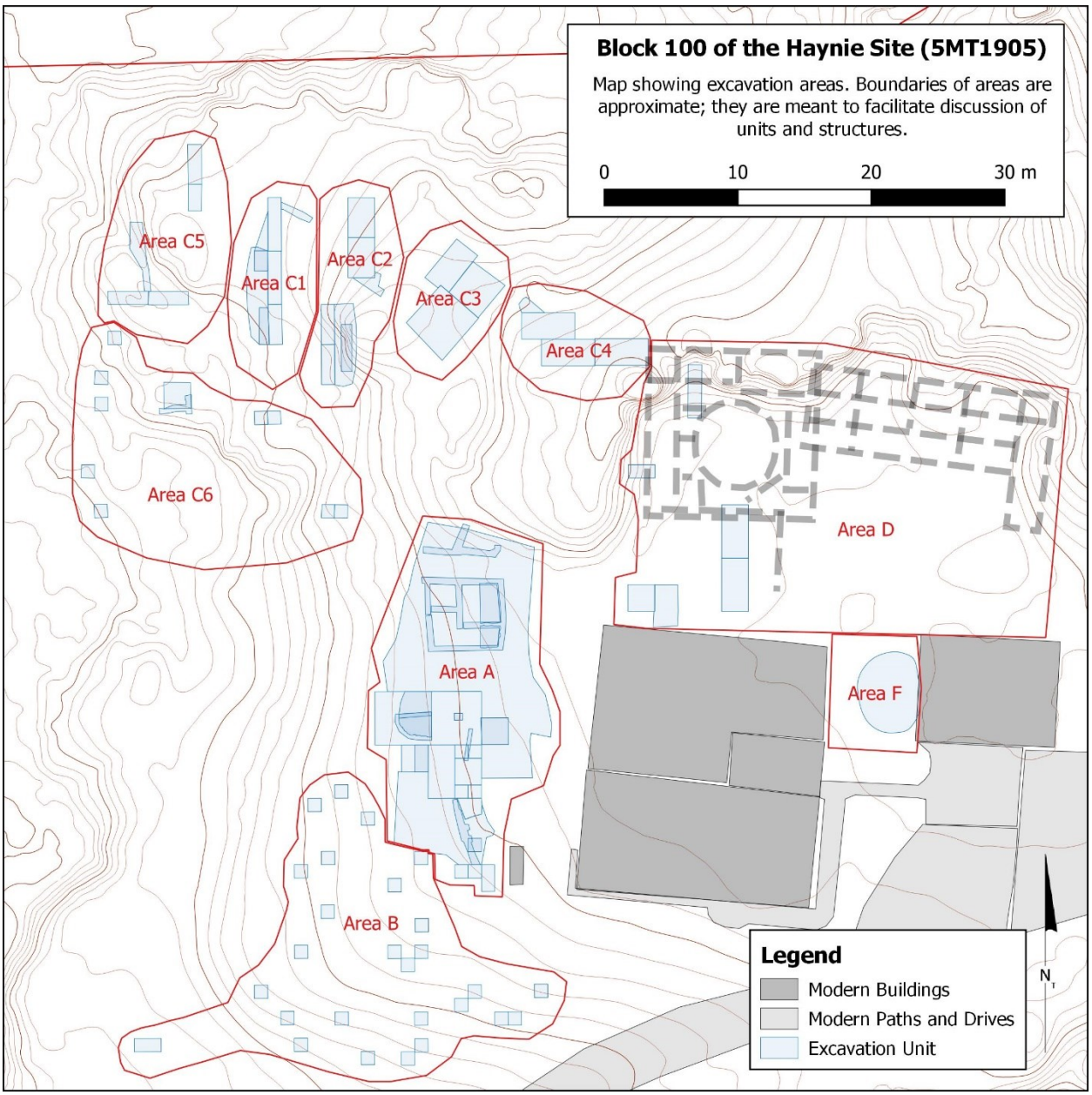

Figure 3. Excavation areas at the Haynie site.

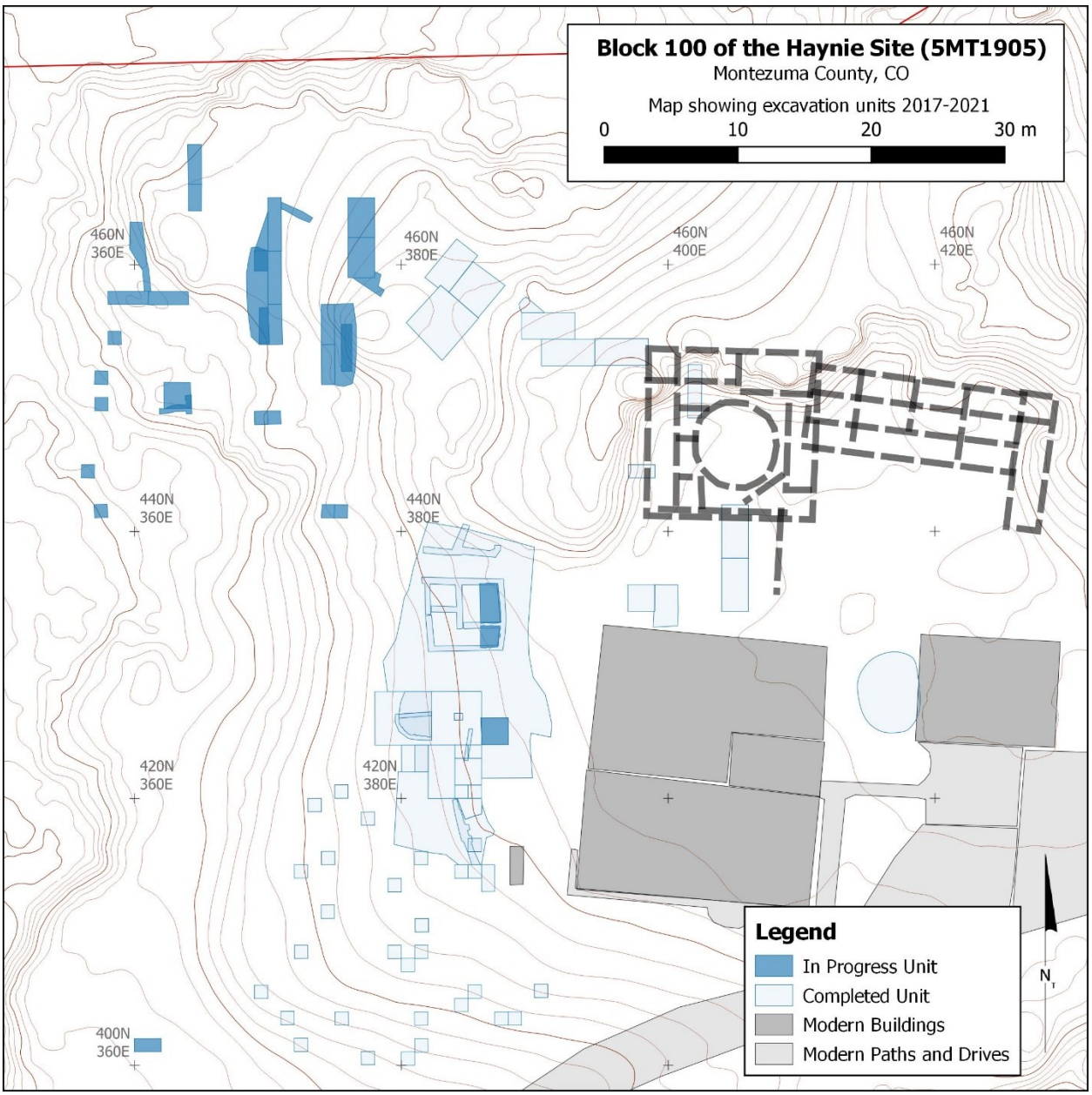

Figure 4. Excavation units at the Haynie site. In progress units are shown in dark blue.

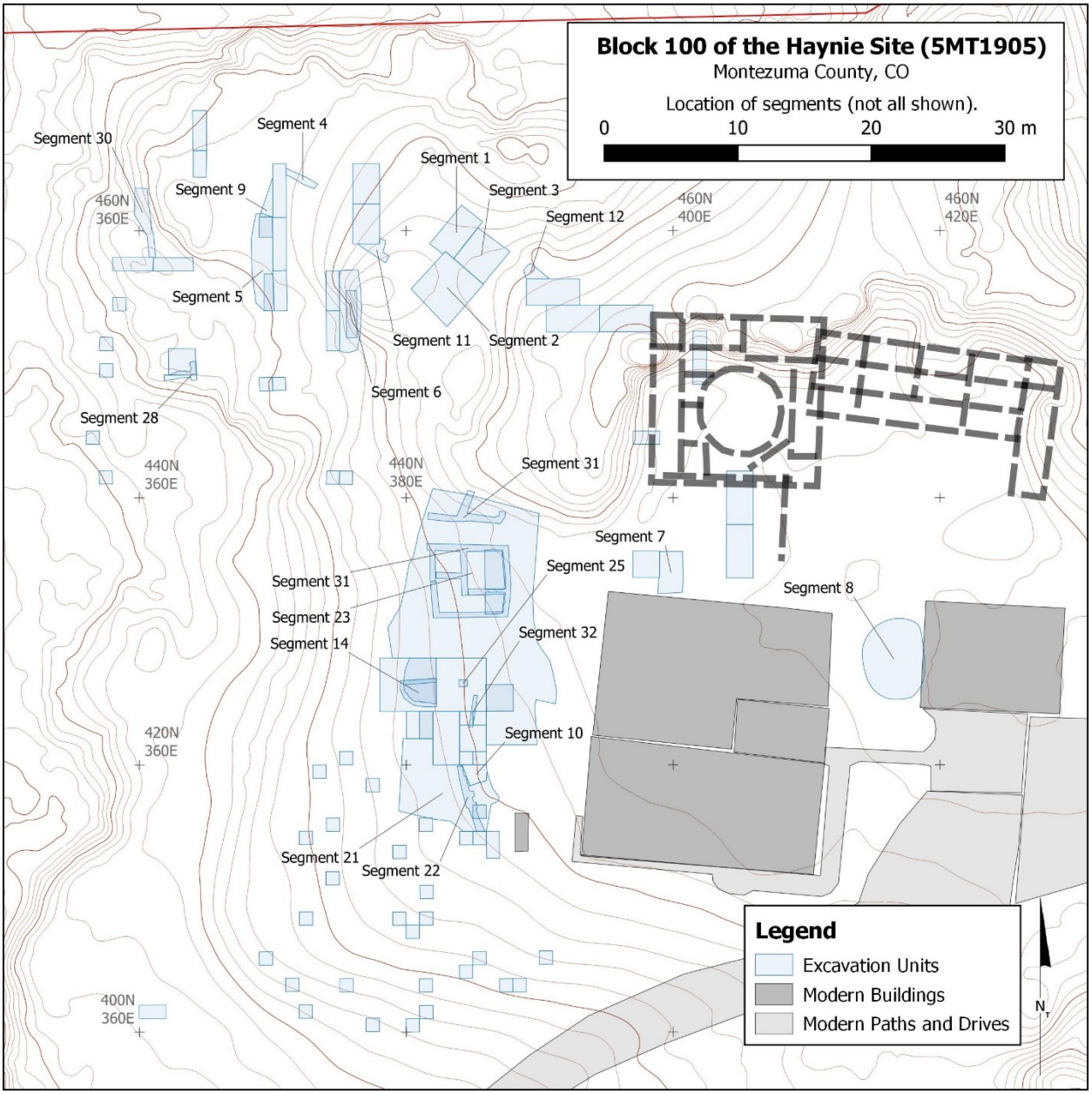

Figure 5. Location of segments at the Haynie site.

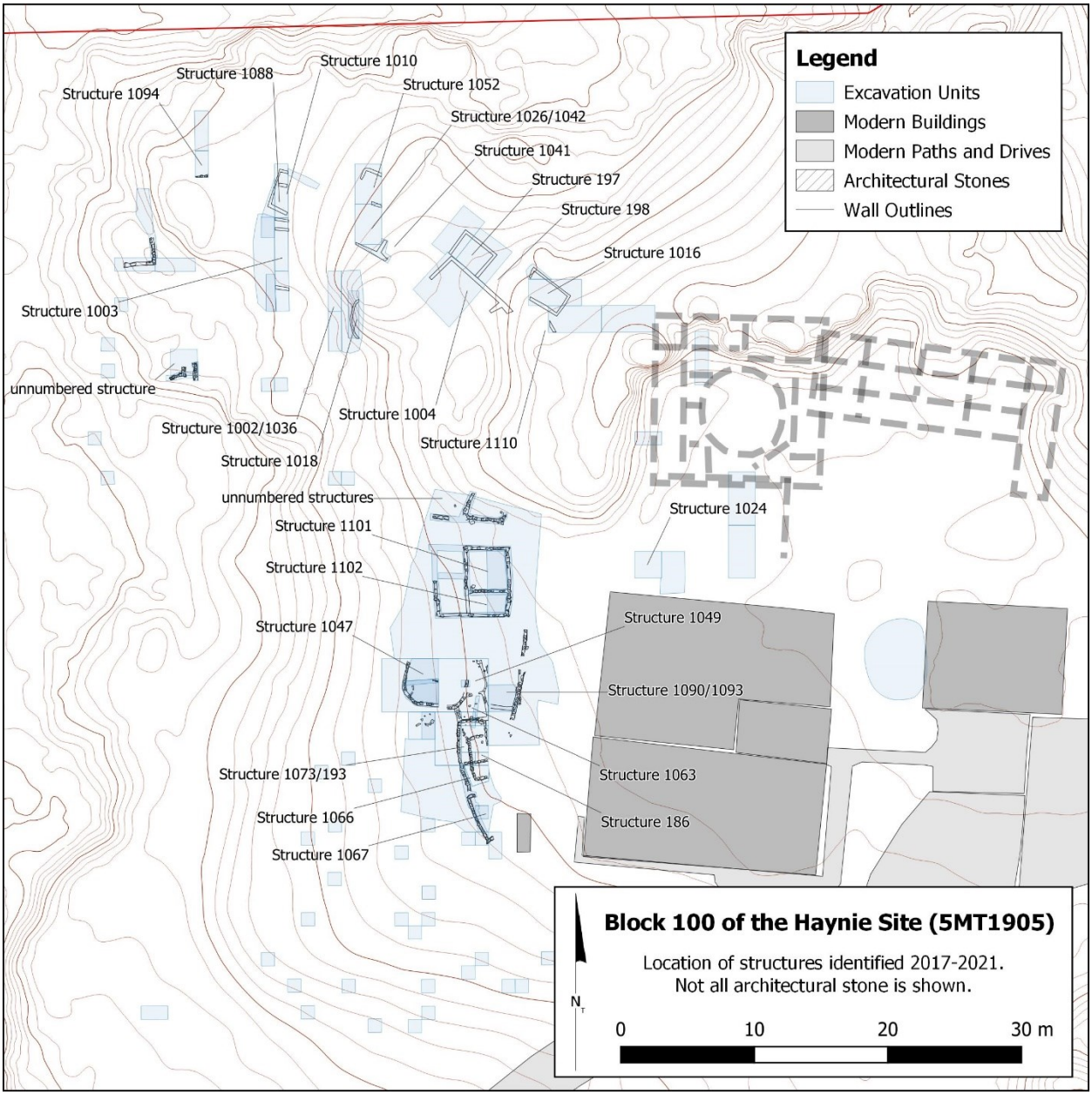

Figure 6. Location of structures identified and/or excavated at the Haynie site.

Figure 7. Photo showing Structure 1101 in progress. Overburden cleared away and wall fall visible.

Figure 8. Structure 1090 east wall showing poorly preserved floor and cross wall.

Figure 9. Structure 1047 final excavation photo showing features, artifact assemblage, and dog burial.

Figure 10. Dogoszhi-style Mancos Black-on-white sherd from Structure 1047.


Figure 11. Contour-toe sandal last from Structure 1047.

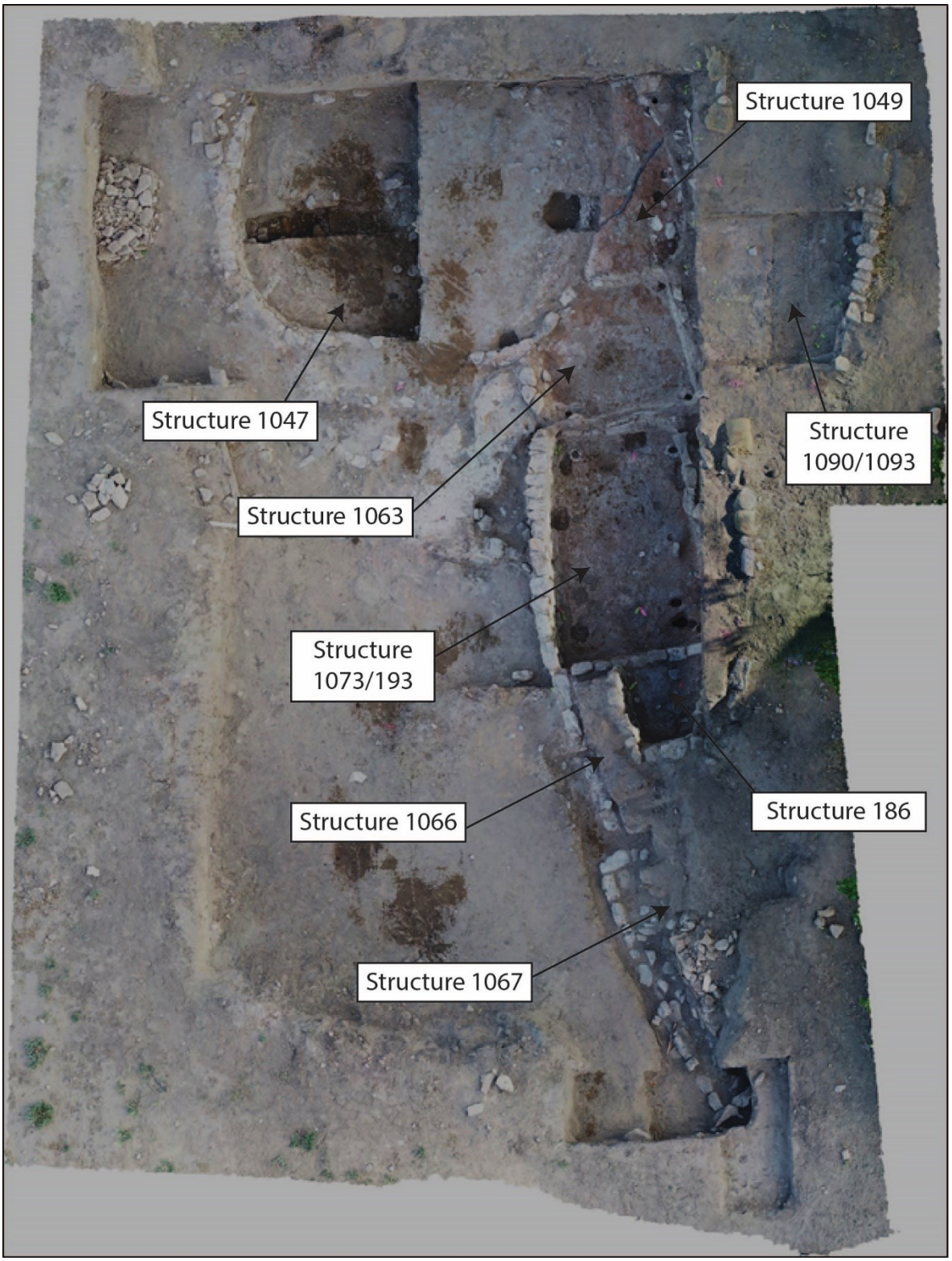

Figure 12. Aerial orthoimage of southern portion of Area A, showing Structures 186, 1047, 1049, 1063, 1066, 1067, 1073/193, and 1093. Structures 1047 and 1093 in progress, all others completed. Structure 1047 cuts through Structures 1049 and 1063. The portion of Structure 186 that overlay Structure 1073/193 has been removed.

Figure 13. Structure 1049 in progress photo showing several postholes. Red-orange clay layer of east wall has already been removed. East wall of Structure 1047 is visible in test window (Segment 25).

Figure 14. Borrow pit identified beneath prepared floor of Structure 1063 (floor is grey plaster atop red stratum above feature fill).

Figure 15. Test window showing midden deposits below foundation of Structure 1073/193, which is located to the right in this image.

Figure 16. In progress photo showing Structure 1093 floor. The floor is bisected by a 1970s-1980s septic line. The wall segment in the lower margin of the photo belongs to Structure 1090, which was above Structure 1093.

Figure 17. Structure 1094 in progress photo, showing extent of preserved floor surface and reconstructable vessel(s) resting on floor in upper right of photo.

Figure 18. Structure 1100 in progress photo showing artifacts on a floor surface. Looter's pit intrudes on floor in upper right of photo (below north arrow).

Figure 19. Half-excavated hearth in Structure 1003.

Figure 20. Structure 1016 final excavation photo.

Figure 21. Dr. Kirk Anderson assisting with the removal of soil baulks for micromorphological analysis.

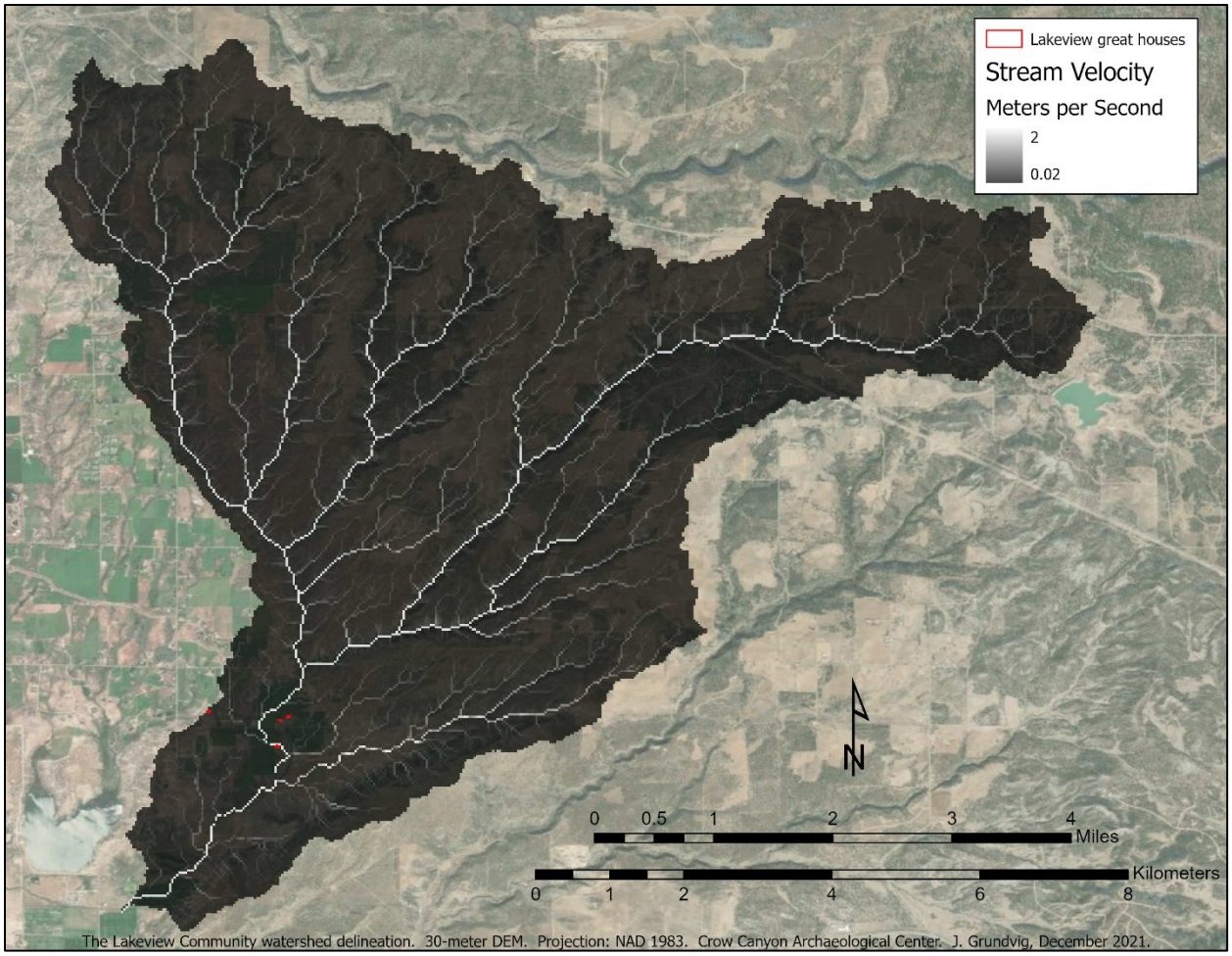

Figure 22. The Simon Draw watershed. Lakeview community great houses are small red dots at lower left of image.

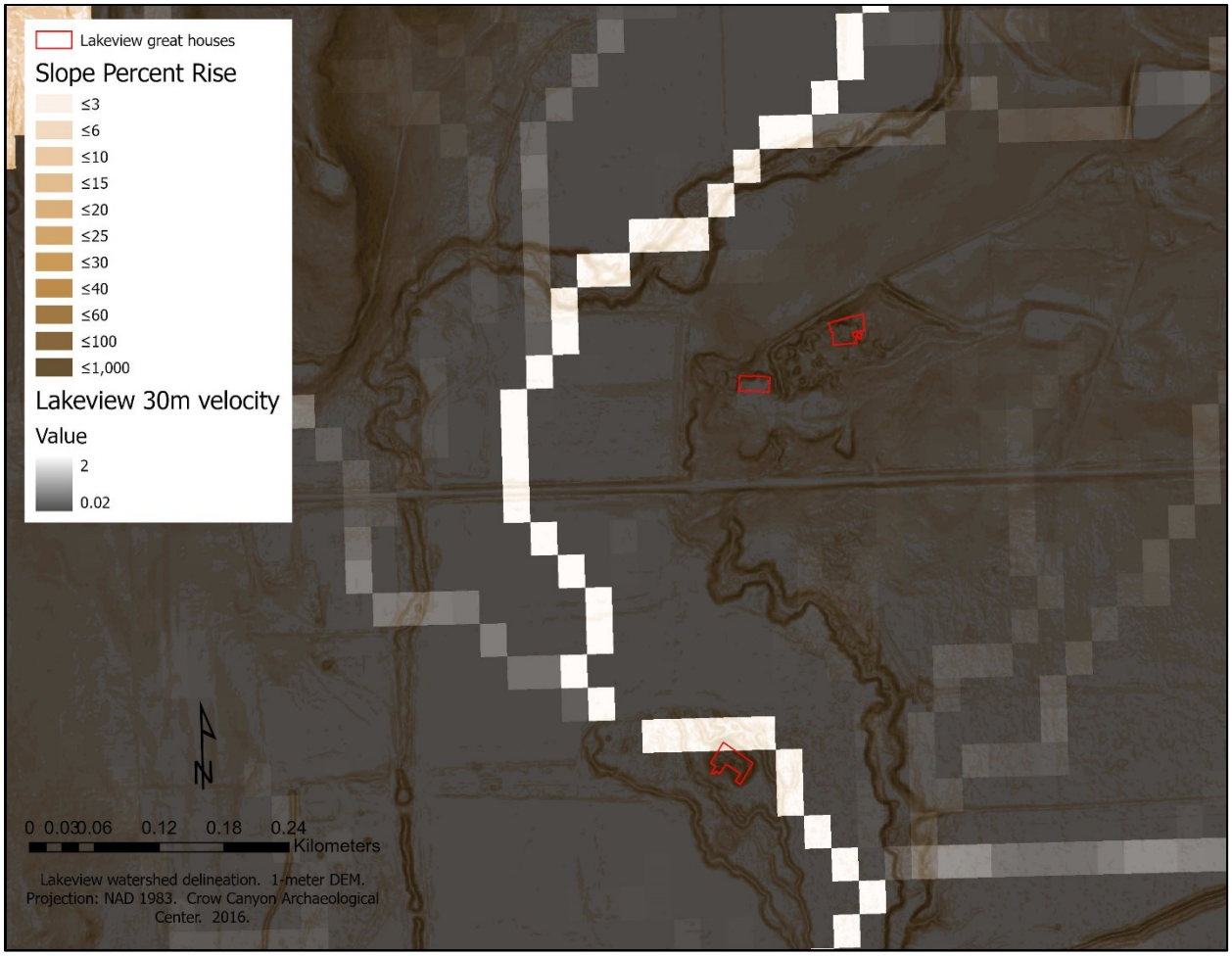

Figure 23. Detail image showing slope of terrain, modeled course of Simon Draw (i.e., stream flow path and velocity based on 30 m DEM), and location of the Haynie site great houses and Wallace great house.

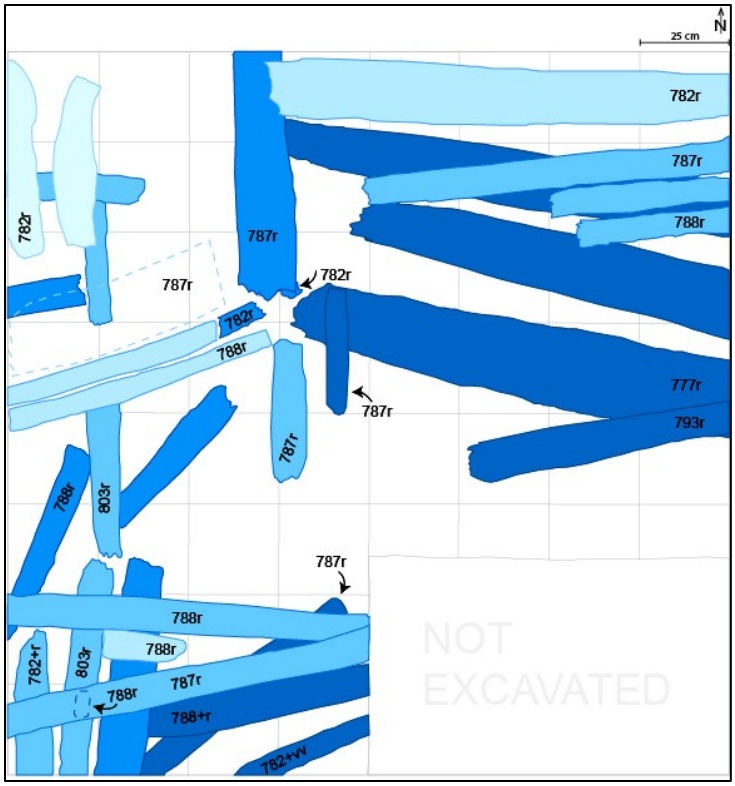

Figure 24. Plan map showing orientation of charred beams above floor in Structure 1024 with provisional tree-ring dates.

Table 1. List of all excavation units at the Haynie site, with opening/closing dates and rationale for excavation.

Area	Unit Number	Date Opened	Date Closed	Comments
A	1-x-1-m 416N 385E	4/13/2017	7/24/2018	Probability test unit. Unit found a PVC leach field pipe. Backfilled.
A	1-x-1-m 420N 385E	9/6/2017	4/31/21	Sterile identified. Backfilled.
A	4x2 420N 382E	9/7/2017	10/4/2021	Unit closed after test windows confirmed stratigraphy of deposits. Backfilled.
A	1-x-1-m 420N 384E	4/13/2017	5/5/2021	Probability test unit. Sterile identified. Backfilled.
A	2x2 421N 384E	5/3/2017	10/5/2021	Sterile identified. Backfilled.
A	2x2 422N 380E	8/5/2020	10/6/2021	Unit placed to identify ventilator of STR 1047, and replaces 2x1 422N 381E after backhoe stripping. Unit closed after ventilator identified and mapped. Backfilled.
A	2x1 422N 381E	6/26/2019	7/17/2020	Unit created to explore possible extramural surface and suspected ventilator of STR 1047. Unit closed prior to backhoe stripping and replaced by 2x2 422N 380E. Backfilled.
A	1-x-1-m 423N 385E	4/13/2017	5/6/2021	Probability test unit. Sterile identified. Backfilled.
A	1-x-1-m 423N 384E	5/3/2017	10/29/2020	Sterile identified. Backfilled.
A	4x8 424N 378E	5/23/2018	11/5/2021	Unit placed to explore anomaly identified during electrical resistivity testing. Sterile identified, testing of STR 1047 completed. Backfilled.
A	2x2 424N 386E	5/20/2021		Unit created to explore a feature visible in east wall of 4x8 424N 378E, and to investigate wall segment identified during backhoe stripping. In progress.
A	1-x-1-m 427N 388E	4/18/2017	10/11/2018	Probability test unit. Unit found a PVC leach field pipe. Backfilled.
A	Segment 14	9/17/2020	11/5/2021	Segment created to test western portion of STR 1047. Testing of STR 1047 completed. Backfilled.
A	Segment 22	7/24/2020	11/3/2020	Hand trench to chase walls after backhoe stripping. Segment closed after mapping location of wall segments and structures. Backfilled.
A	Segment 23	7/24/2020	11/3/2020	Segment used for backhoe stripping. Backhoe stripped area closed at end of season. Backfilled.
A	Segment 13	9/17/2020	9/29/2020	Exploratory hand trench in west part of STR 1047 Testing of STR 1047 complete Backfilled.
A	Segment 25	9/24/2020	9/24/2020	Hand trench to identify and map east wall of STR 1047. Segment closed upon identification of STR 1047 east wall. Backfilled.
A	Segment 21	7/21/2020	7/22/2020	Segment used for backhoe stripping. Backhoe stripped area closed at end of season. Backfilled.
A	Segment 10	8/13/2019	7/7/2020	Hand trench used to identify south wall of STR 186. Segment 10 expanded in 2020 to include fill within STR 186. Closed on completion of STR 186. Backfilled.
A	STR 1101 E 1/2	9/10/2021		Unit created to test the east half of STR 1101, then to look for underlying walls. In progress.
A	STR 1102 E 1/2	9/10/2021		Unit created to test the east half of STR 1102. In progress.
A	2x1 413N 386E	9/16/2019	7/17/2020	Unit created to expand on adjacent unit after wall segment found. Deposits overlying architecture were mostly redeposited overburden, unit closed prior to backhoe stripping. Backfilled.
A	1-x-1-m 414N 384E	4/13/2017	7/17/2020	Probability test unit. Deposits overlying architecture were mostly redeposited overburden, unit closed prior to backhoe stripping. Backfilled.
A	1-x-1-m 414N 385E	4/13/2017	7/17/2020	Probability test unit. Deposits overlying architecture were mostly redeposited overburden, unit closed prior to backhoe stripping. Backfilled.
B	1-x-1-m 400N 380E	4/17/2017	7/9/2018	Probability test unit. Bedrock identified. Backfilled.

Area	Unit Number	Date Opened	Date Closed	Comments
B	1-x-1-m 400N 377E	4/17/2017	9/19/2017	Probability test unit. Bedrock and sterile identified. Backfilled.
B	1-x-1-m 401N 381E	4/17/2017	7/25/2018	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 401N 372E	4/17/2017	7/9/2018	Probability test unit. Bedrock identified. Backfilled.
B	1-x-2-m 401N 360E	5/23/2018		Unit placed to test nature of deposits at southwest edge of site. In progress.
B	1-x-1-m 403N 381E	4/17/2017	8/23/2018	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 403N 375E	4/17/2017	7/26/2018	Probability test unit. Bedrock and sterile identified. Backfilled.
B	1-x-1-m 403N 371E	4/18/2017	7/18/2018	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 403N 387E	4/17/2017	5/7/2018	Probability test unit. Backfilled.
B	1-x-1-m 403N 388E	4/17/2017	5/7/2018	Probability test unit. Backfilled.
B	1-x-1-m 404N 384E	4/17/2017	8/23/2018	Probability test unit. Bedrock and sterile identified. Backfilled.
B	1-x-1-m 405N 385E	4/17/2017	6/19/2019	Probability test unit. Bedrock and sterile identified. Backfilled.
B	1-x-1-m 405N 369E	4/20/2017	6/12/2019	Probability test unit. Large sandstone slabs blocked further progress. Backfilled.
B	1-x-1-m 405N 390E	4/17/2017	8/29/2018	Probability test unit. Large quantity of rodent burrows and potential leach field line. Backfilled.
B	1-x-1-m 407N 380E	4/13/2017	8/28/2019	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 408N 380E	9/9/2019	9/26/2019	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 408N 379E	4/17/2017	8/22/2019	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 408N 381E	4/13/2017	8/22/2019	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 408N 372E	4/20/2017	6/7/2019	Probability test unit. PVC pipe found. Backfilled.
B	1-x-1-m 410N 381E	4/13/2017	8/28/2019	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 411N 374E	4/20/2017	10/22/2020	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 413N 379E	4/13/2017	6/3/2019	Probability test unit. PVC pipe found. Backfilled.
B	1-x-1-m 414N 372E	4/20/2017	11/3/2020	Probability test unit. Bedrock identified. Backfilled.
B	1-x-1-m 415N 374E	4/20/2017	11/5/2020	Probability test unit. Bedrock identified. Backfilled.
C1	2.75-x-0.65-m 454N 369.35E	5/28/2019		Unit expands on test trench to expose architecture. In progress.
C1	3-x-1-m 454N 370E	6/1/2017		Test trench placed to investigate anomaly identified during remote sensing. In progress.
C1	4-x-1-m 457N 370E	4/21/2017		Test trench placed to investigate anomaly identified during remote sensing. In progress.
C1	1.5-x-1-m 459.5N 369E	5/28/2019		Unit expands on test trench to expose architecture. In progress.
C1	4-x-1-m 461N 370E	5/29/2018		Test trench placed to investigate rubble north of anomaly identified during remote sensing. In progress.
C1	Segment 9	6/26/2019		Segment placed to identify corner of structure just beyond adjacent grid unit. In progress.
C1	Segment 5	5/28/2019		Segment was a backhoe cut to step back a deep excavation unit. In progress.
C1	Segment 4	10/30/2018		Hand trench to identify orientation of wall segment. In progress.
C2	3-x-1-m 451N 374E	6/1/2017		Test trench placed to investigate anomaly identified during remote sensing. In progress.
C2	3.5-x-1-m4 52N 375.5E	5/29/2019		Unit expands on test trench to expose architecture. In progress.
C2	3-x-1-m 454N 374E			Test trench placed to investigate anomaly identified during remote sensing. In progress.

Area	Unit Number	Date Opened	Date Closed	Comments
C2	3-x-2-m 459N 376E	5/29/2019		Test trench placed to investigate rubble north of anomaly identified during remote sensing. In progress.
C2	3-x-2-m 462N 376E	9/3/2019		Expands on adjacent test trench to include additional architecture. In progress.
C2	Segment 11	8/26/2019		Used to identify corner of structure just beyond grid unit. In progress.
C2	Segment 6	5/28/2019		Segment was a backhoe cut to step back a deep excavation unit. In progress.
C3	Segment 1	5/4/2017	8/16/2018	Segment placed atop a visible masonry surface room. Backfilled.
C3	Segment 3	4/21/2017	10/18/2017	Segment placed atop a visible masonry surface room. Backfilled.
C3	Segment 2	6/28/2017	10/5/2017	Segment placed atop a visible masonry surface room. Backfilled.
C4	2-x-4-m 452.40N 394.50E	4/26/2017	11/9/2021	Unit placed to investigate foundations of west great house. Sterile identified. Backfilled.
C4	2-x-4-m 452.40N 390.50E	4/26/2017	11/2/2021	Unit placed to investigate foundations of west great house. Sterile identified. Backfilled.
C4	2-x-4-m 454.40N 389E	7/22/2019	7/27/2021	Unit placed to investigate masonry surface room identified in adjacent unit. Testing of STR 1016 completed. Backfilled.
C4	Segment 12	9/2/2019	9/2/2019	Segment placed to identify corner of structure just beyond adjacent grid unit. Testing of STR 1016 completed. Backfilled.
C5	1-x-3-m 457N 361E	5/17/2021		Test trench to identify wall alignments. In progress.
C5	1-x-3-m 457N 358E	5/17/2021		Test trench to identify wall alignments. In progress.
C5	1-x-1-m.5 458N 359.50E	8/31/2021		Unit placed to identify a floor surface of STR 1100, noticed in adjacent unit (but badly disturbed there). In progress.
C5	2-x-1-m 464N 364E	5/17/2021		Test trench to identify wall alignments. In progress.
C5	3-x-1-m 466N 364E	5/17/2021		Test trench to identify wall alignments. In progress.
C5	Segment 30	7/27/2021		Hand trench to identify walls of STR 1100. In progress.
C6	1-x-1-m 441N 375E	8/31/2021		Unit expands on adjacent 1x1 after a possible floor surface identified. In progress.
C6	1-x-1-m 441N 374E	5/20/2021		Judgmental test unit to investigate cultural deposits between Areas A and C suspected to be a midden. In progress.
C6	1-x-1-m 441N 357E	5/20/2021		Unit placed to test presumed midden deposits. In progress.
C6	1-x-1-m 444N 356E	5/20/2021		Unit placed to test presumed midden deposits. In progress.
C6	1-x-1-m 448N 370E	8/31/2021		Expanding adjacent unit after possible pitstructure fill identified. In progress.
C6	1-x-1-m 448N 369E	5/20/2021		Unit placed to test presumed midden deposits. In progress.
C6	1-x-1-m 449N 357E	5/20/2021		Unit placed to test presumed midden deposits. In progress.
C6	2-x-2-m 449.19N 362.21E	6/30/2021		Unit placed to investigate several wall segments identified by Segment 28. In progress.
C6	1-x-1-m 451N 357E	5/20/2021		Unit placed to test presumed midden deposits. In progress.
C6	1-x-1-m 454N 358E	6/15/2021		Unit placed to test presumed midden deposits. In progress.
C6	Segment 28	5/28/2021	8/5/2021	Segment created to clear overburden from around an exposed wall segment. Placed a grid unit after extent of wall was better defined.

Area	Unit Number	Date Opened	Date Closed	Comments
D	2-x-2-m 434N 397E	5/26/2017	10/22/2019	Unit placed to determine whether anything remained of southwest corner of west great house. Testing of STR 1024 completed, sterile identified. Backfilled.
D	4-x-2-m 434N 404E	4/26/2017	10/5/2017	Unit placed to determine whether any foundations remained from west great house. Active leach field found. Backfilled.
D	4-x-2-m 438N 404E	4/26/2017	10/23/2017	Unit placed to determine whether any foundations remained from west great house. Active leach field found. Backfilled.
D	1-x-2-m 444N 397E	5/26/2017	11/2/2017	Unit placed to determine whether any foundations remained from west great house. Sterile identified. Backfilled.
D	4-x-1-m 448.50N 401.50E	9/20/2018	9/24/2019	Unit placed to determine whether any foundations remained from west great house. Sterile identified. Backfilled.
D	Segment 7	9/2/2019		Backhoe excavation to step back deep unit. Sterile identified. Backfilled.
E	2-x-1-m 388N 410E	5/13/2018	8/29/2020	Unit placed to determine nature of deposits in area south of driveway. Unit deemed unlikely to reveal much without significant unnecessary effort. Backfilled.
F	Segment 8	6/3/2019	6/5/2019	Segment created for backhoe stripping atop a possible pitstructure identified by auger testing. Gas line found. Backfilled.

APPENDIX A—CURATION AGREEMENT

Crow Canyon entered into an agreement with the Canyons of the Ancients Visitors Center and Museum (formerly the Anasazi Heritage Center), Dolores, Colorado, for the curation of collected materials from the Haynie site. The Canyons of the Ancients Visitors Center and Museum will take possession of these materials after the completion of fieldwork and analyses as stipulated in the research design for the NCOP (Ryan 2016).

APPENDIX B—RESEARCH PRESENTATIONS, SOCIAL MEDIA, AND PUBLIC OUTREACH

Throughout 2021, Crow Canyon staff and College Field School students presented updates on research at the Haynie site, both digitally and in person. Kellam Throgmorton led several scheduled tours of the Haynie site to members of the public, including two large groups as part of the Pecos Conference Sunday site tours. Finally, the Haynie site (or the Northern Chaco Outliers Project more generally) was mentioned in numerous social media posts made to Crow Canyon's Facebook and Instagram pages.

Talks, videos, and posters describing Crow Canyon research at the Haynie site during 2021.

Title	Authors	Venue
Northern Chaco Outliers Project Update	Kellam Throgmorton	Video for BigMACC Digital Newsletter, March 16, 2021
The Lakeview Landscapes	Timothy Wilcox	Video for BigMACC Digital Newsletter, March 16, 2021
Excavations in Structure 193/1073 at the Haynie Site (5MT1905)	Steve Copeland	Video for BigMACC Digital Newsletter, March 16, 2021
Lumping and Splitting: Design Variation on Mancos Black-on-white Pottery in the Central Mesa Verde Region.	Schleher, Kari, et al.	Poster presented at 86th Society for American Archaeology Meeting (digital), April, 2021
Excavations at the Haynie Site: a Pueblo Village in Southwest Colorado	Kellam Throgmorton	Presentation for the Crow Canyon National Endowment for the Humanities Summer Institute for Educators Program, July 2021
Updates on the Northern Chaco Outliers Project	Kellam Throgmorton	Pecos Conference (in person), Mancos, Colorado, August 13, 2021
Lumping and Splitting: Design Variation on Mancos Black-on-white Pottery in the Central Mesa Verde Region.	Schleher, Kari, et al.	Poster presented at the Pecos Conference (in person), Mancos, Colorado, August 13, 2021
Ornaments and Social Identity at the Haynie Site: Color Correspondence and Meaning	Hector Campos, Liliana Domenici, Alyssa Henss, and Julisa Rojas	Poster presented at the Pecos Conference (in person), Mancos, Colorado, August 13, 2021
Geophysical Survey at the Haynie Site (5MT1905)	Alannah Bell, Lanae Caldwell, Arianna Martinez, and Frank Martinez	Poster presented at the Pecos Conference (in person), Mancos, Colorado, August 13, 2021
3D Modeling at Crow Canyon	Grant Coffey	Annual Colorado Archaeological Society Conference Meeting, Montrose, CO, October 9
2021 Field Update – Annual Meeting Haynie Site Tour	Kellam Throgmorton	Video for Crow Canyon Annual Meeting (digital), October 15, 2021
Archaeological Investigations at the Haynie Site	Kellam Throgmorton	Presentation for the Archaeological Conservancy (digital), December 16, 2021

Official tours at the Haynie site in 2021.

Date	Group
June 3, 2021	Members of Pojoaque Pueblo
June 14, 2021	Colorado Archaeological Society, Hisatsinom Chapter
June 18, 2021	Members of the Crow Canyon Board
August 14, 2021	Two tours for attendees of the Pecos Conference
August 23, 2021	"Cuisines Through Time" Crow Canyon Cultural Explorations trip
September 7, 2021	The Archaeological Conservancy
September 17, 2021	Sacramento Archaeological Society
October 19, 2021	Students of the Verde Valley School

Posts involving the Haynie site made to Crow Canyon's social media accounts in 2021.

Month	**Subject**	**Media**
February 18	Improvements to Haynie Wifi (important for mapping)	Facebook, Instagram
March 5	Crow Canyon Field School at Haynie Advertisement	Facebook
March 18	Site Reports (including NCOP)	Facebook
March 24	Season in Review (NCOP)	Facebook, YouTube
June 4	Public Archaeology Interns Announcement	Facebook, Instagram
July 8	Scholarship Awards to Field School Students	Facebook
July 9	Finds Friday: GIS at Lakeview	Facebook, Instagram
July 21	Intern post on Public Archaeology	Facebook, Instagram
August 16	Intern post on burden basket effigies	Facebook, Instagram
August 26	Introducing Dendrochronology Intern	Facebook, Instagram
August 27	Introducing Faunal Post-Doctoral Scholar	Facebook, Instagram
September 16	Continuing Excavations at Haynie Site	Facebook, Instagram
Nov 3	Announcing Hart Award Nomination	Facebook
Nov 18	Announcing NSF funding for Field School at Haynie site	Facebook
Dec 14	Announcement for Haynie lecture with Archaeological Conservancy	Facebook

APPENDIX C – PERSONNEL

Mission Staff
Susan Ryan, PhD – Chief Mission Officer
Kellam Throgmorton, PhD – Field Director
Benjamin Bellorado, PhD – Laboratory Director
Jamie Merewether – Collections Manager
Tim Wilcox, MA – Field Archaeologist
Steve Copeland – Field Archaeologist
Kate Hughes, MA – Laboratory Analyst
Susan Montgomery – Laboratory Analyst
Daniel Hampson – Laboratory Analyst
Tyson Hughes – Education Manager
Paul Ermigiotti – Educator
Rebecca Hammond – Educator and American Indian Outreach Manager
Jeremy Grundvig – Education Intern, Mission Associate

Research Institute at Crow Canyon Staff
Mark Varien, PhD – Executive Vice President
Grant Coffey, MA – Research Database Manager
Michelle Turner, PhD – Postdoctoral Scholar
Jonathan Dombrosky, PhD – Postdoctoral Scholar

IT Support Staff
Dylan Schwindt – Director of Information Technology

Social Media and Outreach
Sarah Payne – Chief Outreach Office
Strategies 360 – Marketing and Advertising
Taylor Hasbrouck – Community Outreach Manager

Interns
Katie Portman – Dendrochronology
Andres Orozco – Public Archaeology
Ella Crenshaw – Public Archaeology
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