UNIVERSITY OF CALGARY

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a dissertation entitled "The Integration and Disintegration of Ancient Maya Urban Centres: Charting Households and Community at Buenavista del Cayo, Belize" submitted by Meaghan Marissa Peuramaki-Brown in partial fulfillment of the requirements for the degree of Doctor of Philosophy

K. Reese-Taylor

Supervisor, Dr. Kathryn V. Reese-Taylor, Department of Archaeology

Dr. Geoffrey McCafferty, Department of Archaeology

J. S. Raymond

Dr. James Scott Raymond, Department of Archaeology

Dr. Denise Fay Brown, Department of Geography

Dr. Marcello A. Canuto, Tulane University

Dr. Jason Yaeger, University of Texas, San Antonio

Dec. 6, 2012

Date

UNIVERSITY OF CALGARY

The Integration and Disintegration of Ancient Maya Urban Centres: Charting Households and Community at Buenavista del Cayo, Belize

by

Meaghan Marissa Peuramaki-Brown

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF ARCHAEOLOGY

CALGARY, ALBERTA

DECEMBER, 2012

Abstract

This study examines processes of urbanization, including elements of integration and disintegration, at the low-density/dispersed Classic Period (ca. 300-900 C.E.) Maya centre of Buenavista del Cayo in the Lower Mopan River Valley of west-central Belize. Through an examination of the "biographies" of specific non-elite group constituencies (households and communities -people), represented by their material remains (places and things), I examine their impact on the visibility and characterization of urbanization processes at Buenavista through a multi-temporal, materialistic, and nuanced lens known as "life history".

Survey, testing, excavation, and analysis methods promoted by a life-history approach include those research designs that consider settlement sites from a diachronic perspective. This involves an investigation of settlement from a point of initial occupation, built environment construction, activity/use characterization, and abandonment, incorporated within a multi-temporal perspective. In the application of criteria developed in New Urban Theory that serve to emphasize the role of "places" in community assemblages, and from High Modernist State Schemes and associated theories surrounding knowledge bases that highlight the "people and things" of community assemblages, I chart and evaluate the integrative potential of the Buenavista del Cayo civic centre as it developed over time and eventually disintegrated.

The insights into Maya civic and community organization that are generated by this research not only allow us to reach a better understanding of Classic Maya civilization and its rich diversity, but also contribute to the larger dialogue in anthropological archaeology concerning households and communities and their diachronic relationships to political authority and the institutions of archaic urban centres and states.

Acknowledgements

The completion of this work would have been impossible without the effort and support of a multitude of colleagues, friends, and family. Prior to acknowledging many of them individually, I must first thank the Social Sciences and Humanities Research Council of Canada for awarding me a three-year doctoral fellowship in support of my research. Additional financial support was provided by the Faculty of Graduate Studies, the Department of Archaeology, Research Services, and the Calgary Institute for the Humanities at the University of Calgary. The Choquette Family Foundation also provided me with support over two years to complete my field work and analysis in Belize from 2009 to 2010.

The fieldwork for the Buenavista South (BVS) settlement zone owes its success primarily to the citizens of San Jose Succotz and Benque Viejo del Carmen. During the four seasons of the project, numerous workers from both areas provided the necessary reconnaissance, clearing, excavation, laboratory, and field camp maintenance skills that made collection of this data possible. Although many contributed valuable labour and knowledge, I would like to especially thank Luis Godoy (Foreman, 2007-2009), Gabriel Meneses (Foreman, 2010), Edwin Camal, Minel Camal, Saul Cante, Rafael Castellanos, Ricky Chan, Arnoldo Chuc, Carlos Cocom, Erwin Cocom, Ingmer Cocom, Roni Cocom, Placido Cunil, Reynaldo Cunil, Marcotulio Godoy, Jaime Hernandez, Robert Lopez, Luis Perez, Cruz Puc, Harold Rosado, Eduardo Tut, Ramon Kotch, Ronaldo Tut, Abelino Uck, Felix Uck Jr., Esequias Velasquez, Romier Velasquez, Julio Yacab, Santiago Yacab, Marta Mai, Norma Puc, Vita Uck, Miss Vicki Uck, Miss Marisol Sanchez, and Selene Camal. In addition, the continuing support of the Guerra Family (owners of the Buenavista property) and the Juan Family (owners of Nabitunich Lodge) to the Mopan Valley Archaeological Project has been invaluable. Permission to conduct reconnaissance, testing, and excavation, in addition to remaining in Belize for extended periods for the purpose of post-excavation analysis, was graciously granted by the Belize Institute of Archaeology, and I would like to especially thank Dr. John Morris and Dr. Jaime Awe for their support and input.

To four seasons of students of the University of Wisconsin-Madison Belize Field School, I also owe a great deal of thanks for their efforts and enthusiasm. Whether hiking through mud and scrub brush or toiling away in the hot valley sun, the students with whom I worked between 2007 and 2010 deserve healthy praise for their patience and energy. I would like to especially thank Sylvia Batty, Krista Garcia, Lizzy Hare, Bailey Hudacin, Francie Phelps, and Rachel Stieve who also assisted in supervising Phase 2 testing and Phase 3 excavations.

Over the course of my research I have been fortunate enough to draw on the expertise of several specialists, and I would like to thank them for their assistance regarding particular aspects of my work. Knowledge and advice regarding Maya ceramics has been shared by Dr. Lisa LeCount, Dr. M. Kathryn Brown, Dr. Christophe Helmke, Dr. Jaime Awe, Dr. Laura Kosakowski, Dr. Lauren Sullivan, Dr. Jim Aimers, and Becky Shelton. Advice concerning lithic analysis was provided by Dr. James Stemp, Dr. Tristan Carter, Dr. Brian Kooyman, and Nick Hearth. Guidance with regards to faunal and osteological analysis was graciously provided by Dr. Anne Katzenberg, Dr. Carolyn Freiwald, and Norbert Stanchly. Dr. John Jones, Dr. Matt Boyd, Dr. Derek Wilson, Lucia Guidel, and Clarence Surette have all assisted with macrobotanical, microbotanical, microartifact, and/or soil analyses. Finally, general conversations concerning theoretical foundations and models adopted or contemplated over the course of my studies were greatly enhanced by the wonderful insight and knowledge provided by Dr. Jerimy Cunningham, Dr. Peter Dawson, Dr. Gerald Oetelaar, Dr. Elizabeth Graham, and Dr. Gyles Iannone.

Conversations with many of my friends and colleagues involved with Mesoamerican studies, at times running far into the night and fueled by large quantities of beer and rum, have substantially influenced the development of my own ideas about the ancient Maya. I am especially indebted to Dr. Julie Hoggarth, Bernadette Cap, Dr. Carolyn Freiwald, Sarah Kurnick, Christina Dykstra, Dr. Sonja Schwake, Dr. Jeffrey Seibert, Dr. Sean Goldsmith Carmen McCane, Matt Longstaffe, Scott McRae, Esther Beauregard, Stanley Guenter, Rafael Guerra, Jill Jordan, Chris Awe, Jim Conlon, Mat Saunders, and Josalyn Ferguson. In similar fashion, I also owe a debt of thanks to all of my peers over the years at the University of Calgary, too many to name here.

There are many Belizeans I have come to consider as extended family members. Chief among them are the Espats. Mr. Orlando Espat and Miss Erva Espat I now regard as my Belizean parents, and their love and support has been unending. I lost two good friends over the course of this research: Dave "Ciego" Valencio and Everald "King" Tut. Ciego and Everald were the first Belizeans I ever met, back in 1999 when I first arrived in the country to attend my first field school. Both were actively involved with archaeological projects in Belize and were inspiring in their ability to make friends wherever they went and in their genuine love of their country and its history. Ciego's mother, Miss Julia, and two of his sisters, Kay and Jenine, have become good friends and I look forward to seeing them each time I return to Belize.

Since I was very young, my parents' interest in ancient people and places has been thoroughly contagious, and I am thrilled that they have supported me throughout my pursuit of a career in archaeology. I also owe my mother, Marla Peuramaki, and my father, Glenn Brown, a huge debt of gratitude (and money) for assisting me with my research, both financially and practically. My mother assisted me in the field during my final season, demonstrating her amazing skills at archaeological mapping and profiling, while both my father and mother helped to sort and weigh ceramics and illustrate artifacts while visiting with me in Belize over Christmas 2010. My sister, Caitlin Peuramaki-Brown, has also supported my love of Maya archaeology throughout my degree programs, and even attended a field school in Belize.

Shawn Morton, my husband and fellow graduate student, has put up with more than he should have had to throughout my program of research, and I am humbly grateful to him for his extreme patience and support. Shawn is a brilliant individual and I have been blessed to have had the opportunity to work alongside him in the field and out, as well as sharing almost every day of the past eight years with him.

I would sincerely like to thank the members of my dissertation committee for their assistance in getting me through this program: my supervisor Dr. Kathryn Reese-Taylor; supervisory committee members Dr. Geoffrey McCafferty and Dr. Scott Raymond; internal-external examiner Dr. Denise Brown; and a special thanks to my external examiner Dr. Marcello Canuto, whose comments on this dissertation were invaluable in refining the final product.

The single most important person to the completion of this work, and to my own academic development over the past five years, has been Dr. Jason Yaeger. Since reading his Ph.D. dissertation during my undergraduate degree I have wanted to work alongside him in the field. As the director of the Mopan Valley Archaeological Project, Jason has become a mentor, a valued colleague, and a friend, and the strong philosophy of professional conduct that he carries with him into the field and beyond has been a huge source of inspiration in my career. I cannot fully express my thanks to him for allowing me to join the Mopan Valley Archaeological Project back in 2007, and I am sure that the lessons I have learned from my association with Jason and all the members of the project will be my guide for many years to come.

Dedication

To my grandmother

Hannah Kathleen Peuramäki

(1931-2009)

Who shared her love of reading and history with all her children and grandchildren.

Table of Contents

List of Tables

List of Figures

Chapter One: Question and Core Concepts

The interest in processes of urbanization, and particularly those related to decline, as expressed both in scholarly and popular literature reflects widespread contemporary concerns over issues of environmental sustainability, the impact of warfare, the role of government, and the future of our technologically-driven and demographically-advancing societies (Chapman 1997:11). When such concerns frame our understanding of archaeological works as “cautionary tales”, we become vulnerable to the inherent danger of seeing that which we wish to see. Limited consideration of diverse contexts and perspectives partnered with the desire of Modern Western audiences for straightforward cause-effect conclusions that downplay the complexity of a given topic may erroneously suggest patterns and conclusions that simply do not exist (Davé 2010; deMenocal and Cook 2005; Diamond 1997, 2005).

This study examines processes of urbanization, including elements of integration and disintegration, at the Classic Period (ca. 300-900 C.E.) Maya centre of Buenavista del Cayo in the Lower Mopan River Valley of west-central Belize. Through an examination of the “biographies” of specific non-elite group constituencies (households and communities -people), represented by their material remains (places and things), I examine their impact on the visibility and characterization of urbanization processes at Buenavista through a multi-temporal, materialistic, and nuanced lens known as “life history”.

1.1 The Question: How do Processes of Urbanization Affect a Social Landscape?

Previous studies of Maya urban communities have most often failed to address the role of changing social and built environment landscapes in the characterization of integration and disintegration processes, leading one to believe that these administrative communities are free from the entangled histories of people, places, and things (Harris 2012:5; Hodder 2012). Bourdieu (1977), Giddens (1984), and Sahlins (1981) all argue that individual agents, no matter their social position, have significant influence over the diachronic nature of societal structures, including social relations, political institutions, and economic networks. Unquestionably, the identity of individuals and very small groups are difficult to detect in the archaeological record, however, Joyce and Winter (1996:33) note that "while archaeological data do not allow the delineation of all the social identities of the past, they do permit access to the more visible, institutionalized, and widely shared forms, such as occupations, ethnic affiliation, and statutes" (Joyce and Winter 1996:34; Smith-Kipp and Schortman 1989). Similarly, Smith (1999) associates individual agents with various special interest groups and cites multi-vocal agency as a major factor of face-to-face community and imagined community integration and eventual disintegration. Urban centres, representing a series of nested communities, are places where "everything is connected to everything else" (Greenberg 2011:11) and make them ideal locations for the study of the social impacts of processes of integration and disintegration, and brings us from the totalizing and imagined views of the polity down to the level of "walkers" (de Certeau 1984): the "everyday people" who "contributed to dominant ideas and institution but who could also create distance from and resist in varying ways systems of domination" (Joyce 2009:195).

This research focuses on low-density agrarian-based urban integration and disintegration, representative of the process of urbanization, and its impact on associated social landscapes, through a multi-temporal materialistic approach. How do different forms of civic integration affect the social and built environment landscape of the urban zone, particularly those areas beyond the predominantly elite epicentre? How does the disintegration of Buenavista, previously argued by archaeologists to have been initiated in the late 8th century, reflect the nature of the urban form and larger socio-political organizations and maneuverings in the Maya world? This research will allow me to determine the nature and degree of impact that situations such as changing strategies of urban integration, including the manipulation of the built environment and knowledge bases, pre-existing centrifugal and centripetal forces, and shifting regional sovereignties had on associated households and communities within a low-density urban core settlement cluster, and how the decisions made by such groups affected the outcome and nature of said events and processes.

The Classic period (ca. 300–900 C.E.) urban centre of Buenavista del Cayo, located in the Lower Mopan River Valley of west-central Belize, is thought to have experienced a civic decline early on in the ninth century C.E., reflected architecturally in the contemporaneous abandonment of monumental buildings and major construction programs (Ball and Taschek 1991, 2001, 2004; Taschek and Ball 1987, 2004). The general "collapse" of Classic Maya civilization in this region in the proceeding 9th and 10th centuries C.E. was foreshadowed at Buenavista, one of the earliest Late to Terminal Classic decline episodes in the Lower Mopan and Upper Belize River Valleys. This possible early decay among a comparative sample of stillvibrant neighbours in the valley makes it an ideal location for the study of social transformations associated with urbanization processes prior to the later regional "collapse". This is not to say it did not play a part in the larger collapse process, it most certainly did. Rather, the slightly earlier decline of the Buenavista urban epicentre presents an ideal case study for examining an individual, historically particular, scenario (prior to a larger regional consideration), while highlighting the role of urban entities and processes in the lives of particular face-to-face community populations.

My primary question addresses the nature of civic integrative measures engaged at Buenavista over its life history and how processes of integration and disintegration are reflected in the social landscape of a non-elite site core community, considered part of the "urban shoulder zone" of Buenavista (Greenberg 2011). Employing ideas from New Urban Theory and High-Modernist State schemes, couched within a methodological framework known as "life history", I identify and chart potential integrative built environment features and community-level knowledge bases that operate over the course of urbanization at Buenavista. If Buenavista operates as an urban centre, we should observe a shift in its integrative processes over time to include larger territorial area and encompass greater numbers and types of people. If Buenavista functions in a similar manner to other dispersed urban zones today and in the past, we should also be able to see a degree of conflict and tension over time between more formal centralizing tendencies and more community-focused localized integration and power structures.

The insights into Maya social organization that I anticipate generating will not only allow us to reach a better understanding of Classic Maya civilization and its rich diversity, but will also contribute to the larger dialogue in archaeological anthropology concerning households and communities and their diachronic relationships to civic authority (hegemony) and the institutions of archaic states, and how such relationships are negotiated throughout the diverse processes of urbanization. Many scholars argue that elite politics are relatively insular and suggest a separation between the institutions, actions, and events of High Culture and household/ community *mētis* life; others argue these administrations were simply not powerful enough to transform the daily life of households (Laclau and Mouffe 1985; Manahan 2003, 2004; Scott 1998; Wesson 2008). These are open questions that cannot be answered theoretically, but only by close empirical studies of ancient households and communities (Smith 2010a).

The remainder of this chapter introduces the core overarching concepts that figure prominently in this dissertation: urbanism, community, household, and collapse/decline/disintegration. Chapter 2 introduces the theoretical concepts and methodological framework adopted for the study. Chapter 3 briefly presents the physical environment of the Lower Mopan River Valley, as well as a brief history of ancient Maya settlement and previous related research in the area. Chapter 4 outlines my research design and summarizes the results of each phase, further expanded upon in proceeding chapters and appendices. Chapter 5 presents the life histories of the BVS Cluster 1 community and associated individual settlement sites examined in the bulk of this dissertation. Chapter 6 addresses the urbanization of Buenavista through an analysis of physical built environment features argued to have been involved in civic integration over time, while Chapter 7 addresses the role of knowledge bases operating throughout integrative and disintegrative initiatives within the BVS Cluster 1 zone as reflected in the material remains of "households". Finally, Chapter 8 concludes the dissertation by addressing the overall results and interpretations with regard to a new framework for future analysis of the socio-political and civic organization of the greater Belize River Valley. A series of appendices accompany the text body and provide the empirical foundation for interpretations presented within the text in the form of raw excavation data and procedures and summarized results of individual artifact class analyses.

1.2 Core Concepts

1.2.1 Urbanism

> *Urbanism...is difficult to reduce to essential qualities, or at least to reduce to qualities whose priorities we can all agree on* (Graham 1996).

The heart of this study focuses on broader issues regarding urbanism, specifically its encompassed processes of integration and disintegration and their impact on the social landscapes of the ancient lowland Maya. Garner (1967), Redfield (1955:4), and Trigger (1972, 2003) all suggest that a wide variety of social groups facilitated the rise to prosperity of urban centres, but what of its additional stages of development and decline? Before directly addressing my research question, the status of ancient Maya centres as “urban” must be tackled. How can we characterize urbanism among the ancient Maya? This crucial question has circulated throughout Americanist archaeology since Childe (1950) first wrote about the "Urban Revolution" and the characteristics of prehistoric cities and civilizations.

1.2.1.1 Understanding Precolumbian urbanism

The acceptance of urbanism in much of the Precolumbian New World is a controversial topic. Defining such broad concepts as urbanism is particularly difficult in a field such as anthropological archaeology where the goal is to compare and contrast human cultures and societies across time and space. With research attention on the religious facets of Precolumbian society rather than on the economic or political (Mathewson 1977), and with a generally poor understanding of settlement patterns in the Precolumbian Americas, early scholars, focusing on the equivalence of terms such as "urban", "city", and "civilization", rejected the characterization of the Precolumbian New World as "urban". As such, most centres, including those of the Maya, were regularly viewed as being insufficiently complex to be urban, given the prevailing cultural evolutionary models drawn from Old World examples. This typically placed tropical agrarian urbanists, studying what Meggers’ (1954) termed “Sand Castle Civilizations”, on the defensive (Graham 1999); they would either direct their energies toward explaining the shortfalls or retaliate by claiming statehood or emphasizing the degree of “state-ness” of their associated polities (Chase and Chase 1996; Chase et al. 1990; Hines 1977; O'Brien 1972; Smith 1989). These factors led to the prominent problem of theoretical “leaping”. Meggers’ (1954) view, however, was particularly damaging due to the associated Western bias that saw civilization not being capable of arising in rainforest and other tropical environments. This primarily reflected a lack of understanding at the time among scholars of tropical forest, soil, and water management techniques applied by the ancient Maya (Ford and Nigh 2010).

Many of the Precolumbian centres of Central Mexico have previously been granted the label of “city” and designated “urban” by the majority of scholars (Childe 1950; Southall 1998:45-52). These tend to be the exceptional centres of Teotihuacan and Tenochtitlan; exceptional as they are more similar to traditional Western notions of “urban”, leaving out other large centres such as Cahokia, Paquimé, Tikal, Calakmul, Tiwanaku, Chan Chan, etc. Archaeologists working at these "other" centres, especially Maya centres continue to fight for the designations of "city" or, at the very least, “urban". Conversely, if we see urbanism as scalar, representing a continuum that varies from civilization to civilization, as well as between differing environmental regions, and "city" as simply one of the potential points along such continua, we can argue for urbanism (not necessarily the presence of cities) throughout the Americas during Precolumbian times, thus permitting simpler cross-cultural comparisons.

1.2.1.2 Models of Precolumbian urbanism

Modern western views. A review of current English-language dictionaries presents a very traditional view of the terms "urbanism", "urban", and "city". Merriam-Webster Online (www.merriam-webster.com, accessed 2012) defines "urban" as rooted in the Latin *urbanus* (from *urbs* or city) and "of, relating to, characteristics of, or constituting a city". "Urbanism" is described as "the characteristic way of life of city dwellers... [and] city planning", while “urbanization” is “the quality or state of being urbanized or the process of becoming urbanized”. "City" is from the Middle English *citie*, "a large or small town", and from Old French *cité* (rooted in Medieval Latin *civitat-*, *civitas*) out of Latin for citizenship, state, and specifically the city of Rome (from *civis* meaning citizen). A "city" is "an inhabited place of greater size, population, or importance than a town or village". A "city-state" is also often spoken of synonymously with "city" as "an autonomous state consisting of a city and surrounding territory". These traditional, Western views of urbanism and settlement have greatly influenced many of the following models of urbanism employed in Americanist archaeology. However, can such definitions withstand the contemporary goals of anthropological archaeology involving cross-cultural comparison and critical, reflexive approaches to investigations?

Culture-history and the “Urban Revolution”. Childe's (1950) examination of the concepts of urban and city is a perfect example of the culture-history presence-absence “laundry lists” of traits that peppered the discipline during the first half of the 20th century, and continued to do so in many areas of archaeology (Willey and Sabloff 1996:96). Childe defined the "Urban Revolution" as the process by which small, kin-based, non-literate agricultural villages were transformed into large, socially complex, civilized urban centres (Childe 1950:4). These urban centres were equated with civilization and one settlement type: the city. Cities and urbanism could not exist without civilization, and vice versa: a view now rejected by geographers (Forbes 1998). Childe (1950:9-16) went on to establish a list of criteria that a prehistoric city/urban civilization must possess, including: densely populated settlements, specialization of labour, a surplus capital controlled by an elite, monumental public works, social stratification, the presence of recording and “exact” systems (the beginnings of a “true” science), writing, “great” art styles (naturalistic), long-distance trade, and state-level organization.

O'Brien (1972) attempted to apply Childe's criteria to demonstrate the city status and urban nature of the Middle Mississippian centre of Cahokia in Southern Illinois. Unfortunately, the centre did not meet all of Childe’s criteria, therefore O’Brien went on to explain these deficiencies (the defensive position) and pushed the argument that Cahokia was actually the centre of a Middle Mississippian state, despite protest by other archaeologists (O'Brien 1972:195; Hines 1977:337). Unlike Childe, O'Brien (1972:197) presented the possibility of urbanism as a process and that Cahokia was merely in the early stages of such a process, thus explaining the absence of certain criteria. She also offered Rowe's (1965) model (discussed below) as a point of debate for the urban status of Cahokia, associating the centre with his synchoritic city (O'Brien 1972:196). Although this is an interesting way of interpreting the data, she did not allow for the possibility of variation within urbanism and cities, affixing herself to Childe's laundry list. This highlights the greatest problem with Childe's view of urbanism: the Revolution. Although described as a process, it is an explosion, rapid and revolutionary, with a fixed outcome and no consideration of a slow, varying process or scale. O'Brien described urbanism as an aggregating process, hence her portrayal of Cahokia; she did not consider that urbanism could vary from place to place, therefore not required to fulfill Childe's Old World criteria, nor did she consider the level of the "city" as simply one type of urbanism. To her, Childe's city *is* urbanism, a commonly held perspective.

In an example similar to O'Brien's view, Cowgill used urbanization to denote "the creation of cities by a society that formerly lacked urban settlements" (Cowgill 2004:527). As opposed to O'Brien, Cowgill (2004) did expand on this notion to include the possibility of variation in cities from place to place, not resorting to Childe's laundry list. His was more of a relational approach to cities and included degrees of variables such as area and population, spatial delineation and segmentation, fortification, planning, scale of built features, labour division, and amenities. Such a relational approach is more commonplace in urban studies today, allowing for greater "sensitivity" in urban-city designations. However, Cowgill maintained the strict urban-city relationship and his definition in many ways denied particular forms such as low-density dispersed urbanism.

Settlement surveys and demographics. As settlement surveys gained in popularity post-World War II, along with cultural-ecological approaches and later cultural materialism (Willey and Sabloff 1996:172-182), so too did archaeological models of urbanism that focused on population counts and demographic priorities. Many of these arose from models developed in the fields of sociology and human geography. Several of these frameworks followed along many of the now abandoned ideas presented by Burgess (1926; Harris and Ullman 1945) of towns and cities as communities of non-food producers with a minimum of 5000 people or population densities of at least 386 people/km^2, surrounded by food producers (Trigger 2003:120). This was an early version of what became known as the Concentric Model of urban spatial structure, based purely on modern industrial cities, and later elaborated upon by Sjoberg (1955; Sjoberg and Sjoberg 1996) to include notions of preindustrial cities. The notion of lack of food-producing residents within urban centres has been demonstrated as false for many civilizations, most notably among the ancient Egyptians and the ancient Maya (Trigger 2003). A more recent approach to urbanism among such civilizations is the various concepts surrounding notions of “dispersed” or “low-density urbanism” that I will discuss momentarily.

In his now famous sociological essay *Urbanism As a Way of Life*, Wirth (1938) also adopted the traditional view of urban as city and distinguished three primary characteristics: a large population with dense nucleation and a high internal social heterogeneity. Equally important was the overall experience of urbanism/city-living as distinctive from all other settlement experience, particularly the hinterland experience. Of secondary importance to the designation were secularism, anonymity, and vertical and spatial mobility. This theory developed through observation of Western civilization and has had the most influence on works of urban scholars throughout numerous disciplines. In a similar view to Wirth, Weber (1958) saw cities/urban centres as relatively large, dense, heterogeneous communities with significant economic, particularly commercial, functions. This definition excluded those centres that functioned primarily as hubs of political administration, an issue later dealt with by the advocates of functional approaches to urbanism. Weber also saw many cities as communities with their own governments and with relative political autonomy from a state: more similar to currently defined city-states and the role of municipal governments.

A perfect example of an urban model that relies heavily on population counts and density is that of Rowe (1963) based on Precolumbian settlement in the Ica Valley of Peru. Rowe defined urbanism as "any area of human habitation in which many dwellings (at least 20) are grouped closely together" (Rowe 1963:3). Dwellings should be close enough to leave insufficient space between them for subsistence farming, likely linked to Burgess' model, although space for gardens may be present.[1] When no dwelling foundations are visible or are unexcavated, extensive areas of thick and continuous habitation refuse provide a basis for supposing urban settlement (Rowe 1963:3).

According to Rowe's model, urban settlement could be divided into four types: synchoritic pueblos, synchoritic cities, achoritic pueblos, and achoritic cities. Synchoritic urbanism implies a scattered rural population around a settlement, while achoritic urbanism implies that all residents live within the urban settlement, even if they may work daily in rural areas (Rowe 1963:4). A pueblo is an urban settlement in which all residents engaged in hunting, fishing, farming, or herding at least part of the time. A city is an urban settlement that incorporates residents engaged in other activities (manufacture, trade, services, administration, defence, etc.). An additional settlement zone is the ceremonial centre: a grouping of public buildings that house common facilities such as shrines, meeting places, markets, and courts of law. A population from a considerable surrounding area uses them seasonally or at prescribed intervals, and their only permanent residents are caretakers (Rowe 1963:4). This view of ritual centres is reminiscent of the “Vacant Ceremonial Centre” models previously popular among ethnographic and archaeological studies of the Maya (Ricketson 1937:15; Thompson 1927; Vogt 1961). A broad, aggregational approach to urbanism, similar to Rowe’s, is adopted by Kintigh et al. (2004) in their attempt to understand the process of urbanization in the Zuni area of the American Southwest during the thirteenth century C.E.

Although Rowe's definition of urbanism seriously lacked in its considered variables, focusing solely on population counts and spatial correlates, it is useful in that it broadens the concept to consider environmental factors within variation and includes settlements smaller than cities, thus presenting a scalar approach. The model is also one of only a few urbanism

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[1] Such a statement may also suggest a division between models that base their observations on civilizations that practiced extensive agriculture versus intensive agriculture, and should be considered when one decides on a particular model to employ.

representations constructed using New World Precolumbian examples. Rowe also attempted to deal with the specific issues faced by archaeologists, such as imperfect preservation, and how such problems affected archaeological designations of urbanism (Rowe 1963:3). These particular problems dealt with in the archaeology of Peru are very similar to those afflicting Maya archaeologists and the persistent problem of “invisible structures” that plague settlement studies and population estimates (Johnston 2004).

From the popularity of settlement surveys also arose a focus on architecturally based models, also linked to early epigraphy-based models such as Marcus’ (1973, 1976, 1992, 1998) emblem glyph distribution analysis. Adams and Jones (1981) developed a typology of sites to create a rank-size rule for Maya centres during the Late Classic. This involved a simple counting of courtyards with a direct relationship assumed between the number of courtyards and the political and/or social rank of a site. Therefore, a site with fifty courtyards would be of higher rank socially and politically (maybe even ideologically) and of a higher urban nature than a centre with only twenty-five courtyards (Adams and Jones 1981:305-307). Unfortunately there exist numerous problems with Adams and Jones' model of urbanism and site hierarchy. Firstly, it does not present a realistic means of dealing with the temporal issue of sites (synchronic): i.e. an understanding of when each courtyard was built and utilized. There is also no consideration of the functions of specific courtyards, or the overall centre for that matter, mixing domestic with non-domestic courtyards. Finally, this model does not consider the hinterlands of urban centres (only the epicentres of sites, and in some situations the core), which should have an important impact on the "rank" of a site given the number of definitions of urbanism that depend on the surrounding, supportive settlement. Environmental location, history of occupation (vertical vs. horizontal accretional growth and creation of "place"), and many other potential factors are also swept aside, although this can be a “quick and dirty” approach to settlement identification without aid of extensive survey or excavation. Similar models continue to be proposed to this day, such as Helmke and Awe’s (2008) rank-size designations that incorporate site scale and epigraphic data for much of Belize.

Functional approaches. When archaeological theory turned toward functional explanations, so too did Precolumbian urban studies. At this time, Central Place Theory became one of the most influential frameworks adopted for urban studies in archaeology. This was an economic-geographical theory and model that sought to explain the size and spacing of human settlements and rested on the notion that centralization/nucleation is a natural principle of order and that human settlements follow suit (Berliant 2005). Originally outlined by Walter Christaller (1933), the theory suggested a series of laws determining the number, size, and distribution of towns. Christaller was interested solely in the function of centres as markets, thus excluding specialist towns such as mining settlements. He argued that population alone could not measure the significance of a town, as was popular in earlier approaches to urbanism. According to Christaller (c.f. Berliant 2005:1), factors shaping the extent of central place settlement areas included the nature of land use and available resources, accessibility to markets, competition, and technology such as transportation and rate of mobility (i.e. energetics).

Through observations of a functional hierarchy of Southern German settlements, generalizations were made regarding the spacing, size, and function of settlements (c.f. Berliant 2005:1): 1) The larger the settlements are in size, the fewer in number they will be, i.e. there are many small villages but relatively few large cities, 2) the larger the settlements grow in size, the greater the distance between them, i.e. villages are usually found close together while cities are spaced much further apart, and 3) as a settlement increases in size the number of higher-order services will also increase, i.e. a greater degree of specialization occurs in the provided services. Flannery (1972) was one of the first to apply this theory to the Maya lowlands, as did Ball and Taschek (1991) in their model for the Upper Belize River Valley, while an outgrowth of this theory and model informs the concept of “gateway communities” and “multiple gateway regions” in Mesoamerica (Hirth 1978; Hutson et al. 2010).

Fox's (1977) categorization of cities is strictly a functional approach to urban centres based on ethnographic and ethnohistoric observations from the Old World and Postcolonial/ Industrial New World. His classification system developed from the 1955 pioneering study by Sjoberg (1955; Sjoberg and Sjoberg 1996) who discussed the distinction between "preindustrial" and "industrial" cities. Fox described cities (again, the lone consort to urbanism) as central places, adopted from Christaller's concept, although expanding beyond an economic geography and referring to "a process of aggregation of populations where a variety of activities are concentrated" (Fox 1977:20; Sanders and Webster 1988). Cities were conceived of as more functionally specialized or complex than rural communities, and were the permanent residences of people whose occupations differed from the bulk of the population (i.e. not farmers; Burgess

1926) and the location of an unusual amount of ritual, political, and economic decision-making (Fox 1977:17-24; Sanders and Webster 1988:523).

Fox outlined five functional types of cities: regal-ritual, administrative, mercantile, colonial, and industrial. The variability of city function was seen as related to the total nature of a society. The primary role of Fox's regal-ritual city was therefore ideological, emerging "from the prestige and status of the state ruler or the cohesive power of the state religion...its existence depends almost entirely on ideological functions" (Fox 1977:41). The administrative city was a larger, denser, and more heterogeneous urban community as compared to the regal-ritual centres, and its primary functions were political (Fox 1977:58-91). Administrative cities were the capitals of states or centres of administration in political systems that consist of multiple urban centres. A mercantile city tended to be an independent city-state and arose "when political hegemony over a region is weak or absent...[and] is the primary source of wealth, accumulation of which is unhindered by the commercial constraints of a powerful ruling elite...[and] is a place for the production of riches" (Fox 1977:95). Finally, colonial and industrial cities arose only with the Colonial Period and Industrial Revolution in the Americas, therefore only the previous three categories were to be employed in Precolumbian urban studies.

Despite criticism, Fox's model has had significant use in archaeological urban studies, including previous work in the Upper Belize River Valley by Ball and Taschek (1991). Cowgill (2004:542) considered Fox's typology as "too broad and encompassing too much variation" and suggested that it would be more useful to specify more variables on which specific cases can be located in a multivariate space. For example, area and population, although difficult to estimate archaeologically, could be presented with confidence intervals. In their 1988 article "The Mesoamerican Urban Tradition", Sanders and Webster (1988) attempted to determine an urban tradition for all of Mesoamerica transcending time. Their use of Fox's model sparked much debate concerning the concept of urbanism for the Americas and the use of typologies in the study of Precolumbian centres. Most of the criticism surrounding their view of urbanism was not focused on their use of Fox's typology *per se*, although this is censured, but on their actual view of urbanism related solely to demographic definitions. Sanders and Webster adopted Wirth's view of urbanism, but attempted to integrate functional considerations through the use of Fox's categories of cities. Once again, their consideration of urbanism involved cities as settlements with large, dense populations, alongside evidence for social or economic complexity (Sanders and Webster 1988:521-522; Smith 2005:404). Smith (1989:454) criticized Sanders and Webster's model as being overly typological in orientation, consequently suppressing the variability present in Mesoamerican centres, and focused solely on large complex settlements as worthy of the designation "urban". In this sense Smith accused Sanders and Webster of considering all centres, other than Tenochtitlan and Teotihuacan, as less than urban simply due to less dense populations (relative to these two large centres). Sanders and Webster refuted this as a "twisting" of their words, acknowledging that they did not consider Copan to be less urban than Teotihuacan and Tenochtitlan, even though they were not fond of Smith's view of urbanism as applying to almost all levels of settlement (Webster and Sanders 1989:460).

Sanders and Webster's (1988) attempt to outline a Mesoamerican urban tradition in order to make cross-cultural comparisons was a worthy goal. However, Smith felt that we did not know enough archaeologically about centres at that point to understand any sort of broad urban tradition, or to create any grand synthetic statements (Smith 1989:454). Nevertheless he did praise their brief contemplation of energetics as having played a crucial role in the type of settlement within Mesoamerica: the lack of draft animals, importance of canoe travel/trade, and the lack of use of the wheel as potentially explaining the need for marketplaces in trade, smaller sizes of many Mesoamerican centres, and the limited development of craft specialization. He also commended their attempt to reconcile demographic and functional approaches to urbanism. Although Sanders and Webster considered the notion of energetics briefly, Smith noted they did not consider this extensively in the outline of their "tradition", unquestioningly placing most centres into Fox's predominantly Old World regal-ritual category (Smith 1989:454).

In another article by Smith (2005), and elaborated upon in many subsequent articles, archaeological and documentary evidence was assembled on the sizes and populations of urban centres, mainly those currently thought of by Smith as “cities” in Mesoamerica on the eve of the Spanish conquest. The data was analyzed in terms of geographic zone, political type, population size and density, and rank-size distributions. The results suggested that political and administrative factors were the primary determinants of urban rank and size, with geographic zone having only a minor influence (Smith 2005:420). Smith's argument was built largely on earlier uses of Central Place Theory, particularly the anthropological take by Blanton (1976) who saw cities as high-order central places (including Maya centres), later expanding on this concept to consider the nature of relevant urban functions beyond trade (the central place of economic geography) to include political, religious, and other socio-cultural factors.

1.2.1.3 Flexible and diachronic-modeling of urbanism

Taking on the challenge of reformulating a model of urbanism that can be applied throughout prehistory in the Americas requires the development of concepts that encourage recognition and description of functional, cultural, and social variation occurring along the entire settlement continuum. This involves the identification of relations among variables that explain the observed differential distribution of activities, identities, and statuses. It also requires the time and energy to better understand and distinguish between the divisions within the landscape that conform to diverse ancient socio-political units rather than our inherent modern cultural biases. Each of these goals is undeniably difficult. The first step, stressing recognition and description, is occurring within the discipline on a daily basis. Rigid, functionally defined hierarchies rooted in site-size differences have been repeatedly shunned in favour of more fluid, dynamic conceptualizations in which settlement dimensions are not mechanically correlated with the activities performed within their boundaries or the identities and statuses of their occupants. Who lived within a centre and what they did are matters to be determined through direct observation and not to be assumed on *a priori* principles. This is not to suggest that we “flounder in unattainable empiricism”, delaying theory building until all the "facts" are available (Smith 1989, 2010a). Rather, we must create and test concepts and models appropriate to describing the newly perceived complexity with which we are confronted every day in the study of prehistoric settlement (Morton et al. 2012).

Losch (1954), building from Christaller's idealized depiction of functional relations among settlements, modeled the urban landscape as a "flexible settlement hierarchy in which the functions and locations of villages, towns, and cities varied in complex ways" (Haggett 1965:124). The simple urban-rural dichotomy of Western industrialized societies is therefore re-conceptualized as a behavioural continuum, adopting a critical view of previous urban models. Like most geographical models, Losch's formulation is based on economic principles of cost and efficiency appropriate to capitalist settings and cannot be adopted indiscriminately to the interpretation of prehistoric contexts. "Nevertheless, insofar as understandings of the past are informed by perceived relations in the present, shifting views on modern urban-rural patterning alert us to the possibility of similar continuities in the remote past" (Schortman and Urban 2003:132).

The task therefore includes a re-examination of the basic concepts, teasing part their components. Naming those elements that will facilitate cross-cultural comparisons will hopefully also help to specify the archaeological measures of these abstract entities and to chart their relations across space and time: laying out the life history of urbanization. This daunting but necessary challenge must be addressed before we can satisfactorily describe ancient settlement systems or more esoteric political systems. We must remember that indigenous perceptions of the natural and constructed landscape (*urbs*) played major roles in determining the significance of those features in the operation of ancient societies (Brown 1993, 2011), with activities important to that operation possibly taking place in areas well outside traditionally defined settlements, such as cave environments (Bassie-Sweet 1996). As Ashmore (2003:8; Ashmore and Sabloff 2002:201) has noted, contextualizing sites with visible architecture requires paying attention to the broader cognized landscape of which these settlements were crucial parts, including the cosmographic landscapes.

Historically particular, functional, ecological/environmental, socio-political, and demographic models of urbanism are best viewed as complementary vantage points from which to understand the behavioural and material heterogeneity operating at variable scales of urbanism. All societies are, to some extent, adjusting to their environments (both social and physical) just as they provide arenas in which people, organized into communities, contend for valued objectives, power, and the ability to control their own lives (Schortman and Urban 2003). The patterning we identify archaeologically, therefore, is a product of integrative, competitive, and disintegrative processes that we must learn to distinguish. Pursuit of one approach to urbanism or another is justified provided we remember that neither one will provide complete, unambiguous answers in and of itself. Each captures part of an ancient reality and never its totality. As beautifully stated by C.S. Lewis in *The Chronicles of Narnia: The Magician's Nephew* "For what you see and hear depends a good deal on where you are standing: it also depends on what sort of person you are."

1.2.1.4 Reconsidering urbanism.

Urban centres are physical and metaphorical "meeting grounds" for founding, newly incorporated, and immigrant populations. They are representations of new social and physical orders and areas of coexistence for differing groups of individuals. Typically they are the loci of nucleated and relatively densely settled populations, the settings of higher degrees of built environment infrastructure, and places where "the process of daily life takes place as part of the physical landscape that forms and is formed by the negotiated consensus between groups" (Smith 2003:1-2). They are not simple, mechanical constructs, nor are they chaotic, but rather they are “problems in organized complexity” embodied in the entanglement of people, places, and things (Greenberg 2011:44; Harris 2012; Hodder 2012).

When considering urbanism, archaeologists must take into account a degree of historical-geographical particularism and indigenous perspectives within their approach; only after such consideration should they be expanded regionally and compared cross-culturally. Urban centres may come into existence for a variety of reasons such as trade, ceremony/religion, strategic placement, administrative demands, environmental features, etc. (Jacobs 1961). These areas may represent a “natural” process of development or may be legislated into existence (Cowgill 2004), however it takes considerably more to lead them to prosperity.

Graham (1999:185) adopts an agency-oriented view of urban centres, choosing to pay attention to individual decisions made according to local environments: a concept she believes was completely pushed aside when functional views of urbanism became popular. Graham's thoughts on Maya "garden" or "green" cities take a reflexive, critical look at previous concepts of urbanism that originate from European post-Industrial observations, Western dichotomies, and examples from temperate climates (Graham 1999:185; Howard 1902). Although she believes that urban centres cannot be understood apart from the larger societal structure in which they are embedded, her method attempts to escape the Mayanist’s preoccupation with how “state-like” the Maya may have been in order to probe more deeply into how Maya urban centres looked and functioned. As Mesoamerican centres have rarely been considered outside debates regarding socio-political complexity, I believe Graham’s consideration is necessary prior to integrating urban discussions with more esoteric discussions of polity organization.

The most cross-culturally sensitive approach to urbanism from an archaeological perspective, and most closely linked to my personal view, is that of Trigger (1972; 2003:120-141) who adopted examples from both the Old and New Worlds. He pictured urbanism as scalar and dynamic, for example what we call a city, town, village, hinterland communities, etc. are all examples of urbanism occurring along a continuum with no fixed outcome; cities simply requiring a higher level of urban organization (e.g. increased social organization, greater populations, more public amenities, etc.) than most other forms. These scales of urbanism address the number and complexity of functions a centre performs, the size of the hinterland it services and is serviced by, create arbitrary divisions along a continuum of size and function, and do not promote ideas of structurally-functionally distinct entities, therefore no “laundry lists” of criteria are required. Trigger (2003:120) saw a variety of reasons why people settle permanently and in urban aggregations, including: the innate hierarchical and focal nature of human activity which tends to be reflected in spatial organization and takes advantage of scale economies, a tendency for activities and institutions to be more clearly defined and specialized as socio-political complexity increases, and that the size of communities tends to vary with the number of functions they perform.

Models of urbanism applicable to the New World require such multivariable approaches and the use of multidisciplinary tools (Wheatley 1972). They should connote a process of nucleation occurring among multiple settlement levels/types and its attendant social organizational changes (Adams 1981; Graham 1999:186). It can occur among all forms of social organization (hunter-gatherer groups, chiefdoms, states, etc.), although "higher" levels such as cities are typically found within chiefdoms and state societies due to available populations (Fletcher 2009a:4); I stress this does not mean chiefdoms or states must have cities, or be urban for that matter. Such an approach would consider length of residence (year-round vs. seasonal), population size and social demographics (more than direct kin relations), common areas and amenities (often associated with "public" architecture), new forms of social organization aimed at ordering daily life involving different people living together, overall centre functions, and central-place concepts (what are the “pull” factors) such as geography, resources, trade, religious importance, political/administrative associations, energetics (transportation, etc.), environment/ climate, etc. For example, Graham (1999) has suggested that a lack of large domesticated animals and more daily work conducted outdoors among Maya households required more "outdoor" areas around residences, therefore adopting a more spaced out urban formation. The increasingly dispersed nature of urbanism along rivers in the Maya lowlands may also be related to the importance of canoe trade and travel (Gorenflo and Gale 1990).

This approach requires relational descriptions and comparisons of sites within a region. Once this is completed, extending comparisons beyond and cross-culturally will hopefully be facilitated. Reasons for the particular scales and continuums of urbanism present in a given society must be considered using all aforementioned variables. Archaeological excavations must also assume dynamic approaches to urban studies, involving more than simple surface surveys and test pitting. Large horizontal excavation, in addition to vertical, is required to understand the activities and identities represented by settlement remains in order to develop a New World, aboriginal understanding of urbanism, approachable for use in comparative analyses. It is also crucial that these strategies are applied in a variety of locations on the landscape: epicentres (monumental "downtowns"), surrounding core zones ("shoulder zones"), and adjacent peripheries, covering a variety of socio-economic strata. This would also serve to better capture a life history picture of a given urban zone as they typically are born in a focal point, and expand over the course of their history and eventually contract on the landscape in terms of their administrative realm.

1.2.1.5 Maya settlement and urbanism

Since the 1950s, ancient Maya settlement patterns have been described as dispersed (Bullard 1960; Bullard and Bullard 1965; Coe 1965; Willey et al. 1965, etc.), although work since the 1970s, in particular survey of the Belize Valley and the extensive Tikal settlement zone, have demonstrated population numbers and densities were even higher than initially described (Mazzarelli 1976; Puleston 1973). The description of a general low-density character lays behind earlier settlement models such as the "Vacant Ceremonial Centre" promoted by Thompson (1927, 1971). When settlement surveys increased in frequency, the extent of dispersed settlement was noted as were changes in densities related to geography and environment, labour divisions (occupation and specialization), as well as civic form (Fedick 1988). Problematic was the lack of sharp boundaries due to progressive dispersal of domestic settlement over time and the nature of daily activity within the lowlands, existing as part of Classic Period lowland Maya centre development, that gave rise to questions about our concepts of "site" and notions of "community affiliation" in Maya studies (Hutson 2010; Hutson et al. 2004; Hutson et al. 2007).

Instances of dispersed urbanism, or "Edgeless Cities", among agrarian-based societies are common in tropical civilizations, for example the Khemer civilization of Cambodia and the Sinhalese of Sri Lanka, and involve both physical and social landscapes that are highly contested (Baker 1998; Fletcher 1986, 1995, 2009a, b). They are also exceptional with regard to their vulnerability to a combination of social and ecological factors leading to long processes of collapse. Of particular interest is the expressed problem of social engagement as it pertains to physical and social integration and encompassed knowledge bases, best reflected as tensions between pre-existing corporate/power groups and imposed administration. The "dispersed city", or more accurately the "diffuse city", is not necessarily an exploded, sprawled, or fragmented urban zone, but has a rather less restrictive definition in that it covers the territories of dispersion of low density settlement that are difficult to define and delimit (Ascher 1995; Brunfaut 2002). The nature and cause of such dispersion can be multiple, related to the nature of administrative control (e.g. the demand of tribute versus acquisition of territory), the character of local and regional environments, numerous social and cultural factors at a variety of scales, etc.

From ethnohistoric and ethnographic accounts we know the Yucatec Maya define their municipal urban communities as *cah*, consisting of both residential lands and *kax*: areas of forest and communal cultivation (Brown 1993, 2011; Restall 1997). This is essentially an extension of what is seen on an individual houselot or *solar*: a house plot consisting of both residential land/buildings and associated production land (gardens, fields, etc.). Graham's (1999) aforementioned approach to Maya urbanism through the concept of the "Garden" or "Green City" (also Chase and Chase 1998) is an extension of dispersed urbanism concepts and includes this "indigenous view" of the Maya urban landscape. It is also developed from a notion put forward in urban planning in the late 1800s by Sir Ebenezer Howard (1902), who was reacting against the unhealthy and squalid conditions of the British industrial city through promotion of urban plans dating back to the Preindustrial Age. The "Garden City Movement", or dispersed satellite cities, involved the promotion of "self-contained, ex-urban communities in previously undeveloped areas surrounded by greenbelts. Each would include carefully balanced areas for residences, industry and agriculture" (Greenberg 2011:27).

Also linked to such early discussions of dispersed urbanism is Gottmann's (1957, 1961, 1987; Gottman and Harper 1990) concept of the "megalopolis" as a string of closely interconnected cities. This is achieved over time through the merging of concentrated and dispersed urban populations through the process of "conurbation" (Geddes 1915); a concept I propose in Chapter 8 as a future model to address the development and urbanization of the Lower Mopan Valley and greater Belize Valley.

Of particular interest for the purpose of this dissertation, is the expressed problem of social engagement within dispersed urban forms: a crucial factor when considering the processes of urbanization involving civic integration and disintegration over time (Brunfaut 2002:4). The study of integration, the degree of interconnectedness and interdependence among units within a society, therefore becomes a critical focus within Maya urban settlement studies. In examining Precolumbian centres, Mayanists have successfully applied both top-down (polity focused) and bottom-up (household focused) approaches, and are now more readily applying "middle-out" approaches focused on communities (Johnson 2012; Yaeger and Canuto 2000). This is reflected in Graham's (1996, 1999, 2006; Willey et al. 1965:5) call to focus on the characterization of urban centres prior to engaging in a discussion of polity, requiring approaches that examine diachronic urban environments through the assessment of the total patch of occupation on a landscape, how it developed, how it was divided up, and how in turn it is brought together. A focus on households and communities, as well as a focus on diverse integrative measures, as a means of understanding processes of urbanization is therefore encouraged.

1.2.2 Maya communities

> *What is the authentic Maya? Is it the dress? Is it performing a [Mayan] religious ceremony? No, it is our communal organisation: although it keeps changing, it remains the same.*
> Pedro Ixchı´u, Indigenous Mayor of Totonicapa´n in 2000, speaking at a regional seminar to his fellow communal mayors (Ekern 2011).

In this research I consider urban centres from an Interactional (Yaeger and Canuto 2000) and Contact Hypothesis (Doolittle and MacDonald 1978) approach to communities. Communities are meaningful contexts for social interaction, integration, and legitimization and are ever-evolving, negotiable social institutions that are generated through the social contacts of quotidian interactions and practices, structured and synchronized by places within a particular span of time (Arsenberg 1961; Kolb and Snead 1997; Morton et al. 2012; Winthrop 1991:41).

The humans, animals, plants, things, places, activities, and institutions that make up the affective assemblages that characterize the *loci* of community, determine to some extent its *nature*, and may simultaneously exist as either hierarchically or heterarchically nested subdivisions in any given spatio-temporal social unit—neighbourhood, urban centre, polity, etc. (DeLanda 2006; Isbell 2000; Harris 2012:2).

This leaves us with the difficult task of teasing part particular identities in such a way as to allow, through comparison, the identification of their place in the overall structure of the spatio-temporal unit in question. Methodological traction may be gained by pairing an interactional concept of community with analyses that focus on the entangled nature of people, places, and things, as it relates to human activity and interaction (Harris 2012; Hesse 2010; Hodder 2012). This permits us an understanding of community that is not a pre-given entity but "rather as something that emerges from the conjunction of people and practice" (Harris 2012:3). Such a view is expressed by Yaeger and Canuto (2000) in their definition of community based on co-presence as opposed to the more traditional definitions reliant on co-residence, and allows us to investigate what Lave and Wenger (1991) term "communities of practice"; communities are born of those sites of learning, the acquisition of knowledge for new members, but also from the guarding of such knowledge.

As mentioned above, the *cah* is a Yucatec Maya urban community (extending to both concepts of neighbourhoods and centres as wholes) that encompasses residential, production, and "wilderness" locales. Restall (1997) goes as far as to argue, as does the quote that opened this section, that the *cah* was the most important part of Maya individual identity during the colonial period. However, this importance may be exaggerated because of Spanish tributary documents that focus on community and not household or individual level information and identity.

In examining the total patch of settlement that makes up the urban landscape, the study of individual households and their associated community forms, including their role in the larger urban community, is essential to a multi-scalar approach. Not only do household studies have the potential to examine the nature of change on small (individual and household) and larger scales (society/imagined communities), they also bring into focus a middle level (community/face-to-face community) that is frequently ignored by archaeologists (Anderson 1991; Harris 2012; Nash 2009). This allows for complementary considerations of scales of events and processes not offered by other contexts and concepts: scales that are crucial to any study of urbanization. As such, the household is a focus of much interdisciplinary dialogue and a source of contention among archaeologists who are left only to deal with the material and historical depth of "place and things".

1.2.3 Maya households

In defining the household, current anthropologists and other social scientists emphasize social groups that encompass networks and processes of tasks, roles, responsibilities, and relationships, in addition to the materiality, spatiality, and temporality of their existence and definition (Anderson et al. 1994; Bourdieu 1971, 1977; Cheal 1989; McDermott and Roth 1978; Netting et al. 1984; Sillar 2000; Souvatzi 2008; Wilk and Netting 1984; Yanagisako 1979). The household is the location of action, a collection of actors, as reflected in patterns of social, economic, and ritual activity, including systems of cultural, moral, and emotional configurations (Whitten and Whitten 1972). As such, households incorporate transitional processes experienced throughout their histories; continuity or change in membership, activity and material dimensions, and shifts in intra- and inter- household social, political, and economic relationships including those operating within broader socio-political worlds (Funari 2002; Yaeger and Canuto 2000). Through all of this, households have proven to be enduring, albeit diachronic, and ubiquitous on cross-cultural and social levels (Creed 2000; Kundstadter 1985). For these reasons, they can be of wider analytical and comparative assistance (Bourdieu 1996; Rapoport 1969). It is not difficult to understand why all disciplines, in particular archaeology, have struggled with the study of such diverse, multidimensional, and diachronic entities. However, it is in this very nature of households, in particular the diachronic characterization, that archaeologists can actually strengthen the study of these groups through its exclusive privilege of observing long-term sequences of events (Souvatzi 2008).

An approach to households applicable to archaeology must therefore bridge and integrate the gaps between the disciplines of social science and recognize the diverse, multi-faceted, and diachronic nature of these units, i.e. addressing households as processes (Casella and Fowler 2005; Souvatzi 2008). All this must be achieved while acknowledging the material and time-depth focus of the discipline and in attempt to address issues of significance to anthropological dialogue (Fratkin and Johnson 1990). A social approach to the study of households is therefore required, avoiding the compartmentalization of theories, traditions, frames of research, and method (Chapman 2003). Although archaeologists may not be able to determine the finer points of household composition, the household as an activity group, collective, and enduring social formation, has material components that can be traced over the remarkable time and space scales available to the discipline (Nanoglou 2008, 2009). Through the “temporality, materiality, spatiality, historicity, and specificity” of households, archaeologists can create connections to key social phenomena, creating links between household organization and patterns in the data (Souvatzi 2008; Wylie 2002).

Household archaeology typically focuses on groups sharing the same residence and participating in certain common functions. It contemplates this domestic group and attempts to reconstruct the activities involved in the functions of the production of food, things, houses, etc., the sharing and redistribution of ideas and things, the reproduction of people in the biological sense and in their cultural norms, and in the transmission of goods and property (including knowledge) to the next generation (Blanton 1995:621; Wilk and Rathje 1982). Household archaeology begins from the "ground up" by investigating the functioning of prehistoric societies, beginning with their basic building block, the household (Sheets 1992:20). The roots of household archaeology are found in settlement archaeology (Bullard 1960; Willey et al. 1965), ethnoarchaeology and ethnography (Fox and Cook 1996; Kramer 1982; Wauchope 1938, 1940; Wilk 1983, 1988, 1990, 1997; Wisdom 1940), and in the affiliated social sciences (Arnould 1986).

A "household" from an archaeological perspective, as defined by Ashmore and Wilk (1988:6), is "a social unit, specifically the group of people that shares in a maximum definable number of activities, including one or more of the following: production, consumption, pooling of resources, reproduction, co-residence, and shared ownership". The household is seen as defined historically, rather than universally. Sheets (1992:22) defines the household as the "coresidential task-oriented social and adaptive unit intermediate in organizational level between the individual and the neighborhood". This is very much a behavioural view of the household, although Sheets does not deny the importance of symbolic and mentalist views.

Laslett (1969) states that a convincing case can be made in favour of the household as the fundamental unit in preindustrial society for social, economic, and even educational and political purposes. These components make up an "intricate adaptive mechanism" that we are only now beginning to understand. The most celebrated view of the household is from Wilk and Rathje

(1982:618) who consider the household as composed of three elements: 1) the social demographic unit, including the number, identities, and relationships of the members, 2) the material unit, including the dwelling, activity areas, and possessions, and 3) the behavioural unit, including the activities performed. The household itself culminates with the interplay of all three of these elements.

1.2.3.1 A history of Maya household studies

The earliest details concerning the organization of Maya settlement, including the distribution of household "types", are those described in the 16th century by Diego de Landa (and co-authors) in the Yucatan. Landa noted that those households of the elite or upper strata resided closer to the epicentre of an urban zone, with commoner or lower strata households occupying areas well beyond the monumental core.

> *"The habitation was as follows: in the center of the town were the temples, with beautiful plazas, and around the temples stood the houses of the chiefs and priests, and next those of the leading men. Closest to these came the houses of those who were wealthiest and the most esteemed and at the borders of the town were the houses of the common people"* from Landa's *Relación de las cosas de Yucatán* (Tozzer 1941).

This dichotomy of core versus periphery, elite versus commoner, has infiltrated most models of settlement patterns in Maya studies, the most prominent example being the previously mentioned Concentric or Concentric Zonation model (Adams and Smith 1981, Adams 1981; Coe 1965; Haviland 1963; Haviland and Moholy-Nagy 1992; Herbert and Thomas 1997:199; Scarborough and Robertson 1986). This model views residential patterns of settlement with respect to the differential distribution of occupant socio-economic status. That is, the further one moves away from the monumental civic-ceremonial epicentre ("downtown"), the fewer the elite domestic-residential remains due to a drop in labour investment. However, based on similarities in forms of domestic remains that appear to originate from similar socio-economic strata found throughout sites, some postulate the existence of neighbourhoods that traversed the hypothesized concentric zoning of settlements in the Maya lowlands (Levi 1993:36; Herbert and Thomas 1997:199). A similar conclusion was reached in my undergraduate thesis concerning the presence of lower strata domestic sites within the site core of Minanha, Belize (Peuramaki-Brown 2003, 2004), similar to those findings of Jaeger (1991) at Caracol. The ubiquity of settlement zones beyond the core that contained elite populations is also evident from numerous archaeological investigations within the Lower Mopan Valley and beyond (e.g. Connell 2000; Webster et al. 1998; Yaeger 2000a, b).

Additional studies have examined the presence of "in between" economic and social strata (middle strata) and the diffusion of similar stratum remains throughout site epicentres, cores, and peripheries (Chase et al. 1990; Cook 1997; Hicks 1999; Jaeger 1991; Levi 1993; Yaeger 2000a). In her study of domestic groups beyond the Caracol epicentre and along causeways at the site, Jaeger (1991) demonstrates that our division of core versus periphery at Maya centres is not as defined or as strict as once believed. This once apparently strict border now seems less rigid in nature, with both areas maintaining physical contact with one another (Jaeger 1991:490). This was demonstrated at Caracol through the presence of both small and large plazuela groups in intimate contact with one another and the presence of causeways serving as integrative forces in the urban environment by linking different "zones".

Mesoamericanists most often focus on the need to distinguish between who was elite and who was not (Chase and Chase 1992), with little consideration of variation within socio-economic strata below that of upper strata, ignoring almost ninety percent of the Maya world if not more (Lohse and Gonlin 2007; Robin 1999). Archaeological investigations have only recently begun to focus on divisions within the lower and middle strata of Maya society, concentrating on domestic remains, in order to develop a more complete picture of Classic period Maya society (Blackmore 2008; Lohse and Valdez Jr. 2004; McAnany 1993, 1998, 2010; Robin 2001, 2004; Webster and Gonlin 1988; Yaeger 2004; Yaeger and Robin 2004). However, extensive horizontal exposures and excavations of domestic sites representative of these strata remain less common and are mostly limited to surface survey and test pitting, with a focus on mounded features. In order to associate architectural forms and conventions, domestic practices, artifact assemblages, etc. with socio-economic strata, our excavations must be equally representative of the various strata assumed for Maya society. As the characterization of such strata likely varied from region to region due to a variety of factors (i.e. location, trade, types of natural resources, activity, identity/ethnicity, etc.), it is important that research methods reflect this potential diversity on the individual centre as well as regional scales. Work in the Belize

River Valley Region has taken a leading role in such an endeavour, most recently with work by the Belize Valley Archaeological Reconnaissance (BVAR), the Xunantunich Archaeological Project (XAP), the Mopan Valley Archaeological Project (MVAP), and the Social Archaeology Research Program (SARP) in the adjacent Vaca Plateau.

The majority of lowland Maya household studies have focused on the Late Classic period (ca. 600-800 C.E.) at which time population booms were experienced in numerous regions of the Maya world, and produced abundant domestic remains both within and beyond urban epicentres and cores. Until roughly twenty-five years ago, archaeology in the Maya Lowlands focused almost exclusively on site epicentres (the urban “downtowns”), in particular on monumental ceremonial remains (Arnold 1971; Brunhouse 1974; Craven 1974; Mathewson 1977:205; Schele and Freidel 1990; Thompson 1963), only later jumping out to more peripheral communities (typically more than a kilometre from epicentres) presumed to be predominant “commoner” settlement locales. Other than large elite residential compounds, very little excavation beyond test pitting was conducted at more “modest” domestic sites beyond settlement epicentres in the core or “urban shoulder” zones (typically within a kilometre of site epicentres). Perhaps due to their seemingly mundane and "boringly similar" nature (Rathje 1983:25), middle and lower strata domestic remains were seen to be identical thus not warranting extensive excavations. Unfortunately, many current Maya studies are swinging back to the trend of purely epicentral and elite exploration due to many advances in iconographic studies and epigraphic decipherments, the increasing threat of looting of monumental architecture, as well as a focus on “collapse” issues increasingly referred to as “High Politics” issues (Golden and Borgstede 2004; Marcus 2003; Robin 2003).

Beginning in the 1960s, under the influence of systems theory (Binford 1965; Binford and Binford 1968; Flannery 1968, 1976), archaeologists began to recognize that only through the excavation of smaller portions of a site, such as individual residences or activity areas within residences, could the larger picture of Maya society be more clearly understood (Ashmore and Wilk 1988:7; Kent 1990:4). Domestic remains, including architecture, activity areas, habitation debris, burials, etc., represent the physical manifestations of households that were likely the fundamental corporate and/or social groups of ancient Maya society (Hendon 1996; Wilk 1988). Accordingly, Becker (1982:112) suggested it was more productive to focus our attention on such group level remains in the attempt to organize a site into "cognitive units reflecting, in theory, those held by the Maya occupants and builders".

Interpreting ancient Maya lifeways, domestic variation, and household behaviour solely through settlement pattern surveys can be extremely dangerous and misleading. A great deal of variability exists between and within domestic remains, much of which is not visible at ground surface. To understand Maya domestic units and lots, settlement clusters, and associated households and communities, is to understand broader Maya society and culture. As Gonlin (1993:20) wisely noted, excavations of small residential/domestic groups "fill a methodological gap between the emphasis on large-site excavation and small-site testing". Large regional survey programs currently underway, create regional domestic and non-domestic databases with which we may begin to more closely evaluate social and economic divisions within ancient Maya society. However, it is important that these databases take a conjunctive approach, accumulating various types of information: architectural forms, artifact assemblages, physical environment, etc.

Work in the late 1970s and early 1980s, building from that initiated in the 1950s and 1960s, furthered the study of daily Maya life and activities beyond the confines of elite-dominated epicentres (Ashmore 1981; Vogt and Leventhal 1983; Wilk 1988). It is through such studies that a series of “characteristics” have been determined for Maya domestic sites, many of which resulted from the School of American Research (SAR) Seminar on Maya Settlement Patterns (Ashmore 1981).

The "Principle of Abundance", proposed by Willey et al. (1965; Bullard 1960:357), suggests the architectural category with the majority of structures within any centralized community or city will represent domestic residences (Leventhal and Baxter 1988:52). However, Maya residences come in many shapes and forms. In terms of architecture, common domestic-residential forms are single structures, often consisting of a stone substructure and perishable superstructure, or patio/plazuela groups: a series of structures surrounding a single, central, ambient space (Ashmore 1981:49). Over the course of the SAR seminar it was decided, based on comparison with ethnographic analogies and existing settlement data, that the minimum information required to indicate presence of a domestic residence in the Maya lowlands was a single structure with at least 20 m^2 of possible roofed surface area (Ashmore 1981:47). Similarly, Tourtellot has determined the minimum residential space at the site of Seibal to be 23

m^2 (Tourtellot 1988:101). These structures are generally rectangular in plan, in a centered location on the side of a patio, and often are of two floor levels in height (Ashmore 1981:48; Tourtellot 1988:101). At Copan, the ideal dwelling platform consists of a rectangular substructure with front steps, a terrace, and an interior bench (Webster and Gonlin 1988:186). Generally, within the Belize River Valley, Ashmore's 20 m^2 structure plan and 25 m radius spacing to isolate separate houselots (settlement sites) is accepted (discussed further in Chapter 4).

Features and artifacts typically associated with these domestic-residential structures include benches and/or two platform (substructure) levels, hearths, manos and metates, cooking and serving vessels (mostly ceramic), numerous utilitarian items (expedient flake tools, axes/adzes, spindle whorls, net weights, etc.), and debris deposits to the rear and sides of structures. Burials are also often a feature of domestic-residential structures, although this is not always the case; for example at Copan lower strata houses of the Late Classic yielded no burials within residential structures (Webster and Gonlin 1988:187). The presence of ancillary structures, such as kitchens and shrines, may also be characteristic of domestic compounds.

Although these are all decidedly common features of Maya domestic compounds, Levi (1993:20) wisely concludes that reliance on "ideal types" such as those proposed by guidelines for domestic residence identification, steers us away from variability within the archaeological record. This is particularly true when examining and comparing domestic remains from different sites, regions, etc. Differences in geography, geology, economies, household types, etc. would likely have affected domestic-residential forms and remains. It is for this reason that individual, extensive excavations of domestic-residential groups within sites from various time periods and regions of the Maya area are necessary to help understand variations in domestic behaviour to accompany larger generalized settlement studies and small test-pitting programs.

1.2.3.2 Explaining variability in domestic assemblages

Economic difference. Explanations for variation in ancient Maya domestic assemblages, including place/space and things, are commonly sought through models that focus on economic variables: socio-economic status, occupation, the manufacture and consumption of items, the nature of associated land tenure systems, access to trade networks, etc. (Blanton 1994; Hendon 1991; Hirth 2009; Levi 1993, 2002; Pyburn 1998; Sheets 2000; Webster and Gonlin 1988; Wilk

1983, 1988, 1990, 1997). Economic models of household variation typically address “the house” as a consumer good that is the "product of patterned and constrained choices and decisions" on the part of associated household members (Wilk 1990:35). These studies are further strengthened by the consideration of production and distribution at a level larger than the household. The house is considered to be a workplace and household members are the workers. The type of work conducted within the house and any changes to that work should thus be reflected in the house form (Wilk 1990:34). Similarly, the house is thought to reflect how household activities are organized and divided. Wilk (1983, 1988, 1990:37-42, 1997) provides examples from a modern Kekchi Maya village in southern Belize, considering differences in household activities, local economies, member wages, child labour, inheritance of property, domestic-social cycles, etc., and how they affect domestic assemblage composition.

Haviland and Moholy-Nagy’s (1992) work at Tikal has considered residential size and variability as representations of socio-economic and occupation difference, while Levi (1993, 2002) and Hendon (1991) consider the variability of houses to represent economic opportunity, the ability to harness and access resources, experienced by household groups and their associated organizational and productive strategies. Contrary to common assumptions, Levi’s (2002:120) work at San Estevan, Belize has demonstrated that residential distributions at this site do not readily conform to Maya archaeological indicators of wealth. A similar lack of direct correlation between residential size, assemblage, and status occurs at Buenavista where typical wealth indicators linked to Primary Occupancy groups elsewhere (McAnany 1993, 1995, 1998) do not consistently appear among the domestic remains of Founding Households (Chapter 7).

Many research projects have also focused on the production, distribution, and consumption of diverse forms of material remains to examine how ancient households are defined and integrated within communities. These studies have arrived at diverse conclusions based on history, geographic location, association with specific urban centres and distant regions, etc. (Aldenderfer 1991; Cook 1997; Hruby 2006; LeCount 1996, 1999; Preziosi 2003; Turuk 2006; VandenBosch 1999).

The presence of "wealth" or "prestige" items within residences is also typically linked to economic status, although this has become a more relational view rather than a present/absent determination, as many previously labeled “exclusive” items have been found in lower strata domestic remains (e.g. obsidian, jade, polychrome ceramic vessels, etc.) (Ford et al. 1997;

Lucero 2010; Smith 1987). Quantitative as well as technological (manufacturing) approaches to such items have been more useful in addressing economic status and occupation: studies having demonstrated the manufacture of various "prestige" items being directly linked or attached to elite residences (Braswell 1998; Emery and Aoyama 2007; Inomata 2001; Inomata and Triadan 2000; Reents-Budet et al. 1994, 2000).

Environment. The natural and built environments have also provided numerous explanations for Maya settlement, domestic variation, and household behaviour through a number of behaviour-environmental models (Ashmore 1984; Ball and Kelsay 1992; Becker 1982, 2001; Brown and Witschey 2001; Deal 1984; Dunning and Beach 1994; Eaton 1982; Fedick 1988; Ford 1991; Goldsmith 2006; Harrison 1989; Hayden and Cannon 1983; Hutson and Stanton 2007; Hutson et al. 2007; Inomata and Stiver 1998; Johnston and Gonlin 1998; Jones 1994; Manzanilla and Barba 1990; Mazzarelli 1976; McAnany 1992; McVicker 1974; Muhs et al. 1985; Normark 2009; Reina 1967; Richie 1990; Sanders 1990; Smyth 1989; Webster 1980; Webster et al. 1997). These frameworks suggest a number of environmental factors that can determine ultimate architectural form, distribution, and use: climate, topography, water, soils, available materials (geology, ecology, etc.), energetics/level of technology, activity, refuse types and disposal techniques, rates and nature of abandonment, etc.

Models associated with the built environment are typically based on the assumptions of semiotics: the built environment (architecture) is formed of a knowable language, representing a system of culturally specific signs that cue expected behaviour (Sanders 1990:46). That is to say, such aspects as the interior details of a house may reflect the personal values of the occupants, but also "the generalities and behavioural uses of the architectural organization and forms reflect broader cultural conventions" (Sanders 1990:46-47). In this same manner, cultural conventions are reflected in residential remains, serving to explain behaviour and may also determine household membership, and include concepts of personal space, territoriality, privacy, and psychological and physical boundaries.

Variations in the amount of materials and energy expended on residences can, and has, been linked to changes in household unit size and/or economic status (Hirth 1989). Leslie White's (1959:56) general law states that "culture advances as the amount of energy harnessed per capita per year increases, or as the efficiency or economy of the means of controlling energy is increased, or both (E*C=T)", indicates that knowledge of the amount of energy captured and the type of technology used is required to infer the level of cultural progress. The implied method involves computations of the caloric and protein intake of a culture and the effectiveness of tools used to exploit resources (White 1959:38).

Abrams' (1994, 1998; Abrams and Bolland 1999) study of the energetics involved in masonry construction within Maya urban centres and its reflection on social, economic, political, and religious prosperity relies on many of White's concepts. In this research program, architectural energetics "as the means by which architecture can be quantified" (Abrams 1998:137), is employed to describe the life history of three structures from the Classic site of Copan and to address site prosperity over time. "Rather than rely on the final cost of construction as the basis for comparison, the present analysis quantified the changes in costs through the use life of these buildings" (Abrams 1998:137). His method is based on experimental archaeology of brick manufacture and masonry building construction, an investigation of the reuse of building materials, man hours involved in construction, etc. Among his findings is a range of ancient houses constructed more cheaply than was previously imagined, undermining some previous assumptions of wealth and power reflected in labour investment of architectural construction. Application of his methods indicates that large temple architecture at Copan was much less costly than expected, that labour demands on commoners were low, and that such demands by themselves probably had few if any harmful effects on the polity.

Household composition and social identity. Many studies have attempted to understand variation in Maya domestic assemblages through the recognition of Maya households and associated communities as social groupings of varying membership. Definitions of household and community variation based solely on kinship, particularly the concept of “family” that is subject to many restricting rules, are far too limited in order to explain the high degree of variation in Maya residential remains. Therefore, many researchers focusing on the Maya and broader Mesoamerican household archaeology have attempted to address domestic variation through broader notions of kinship (consanguine, affinal, and fictive) relations as well as larger concepts of social identity, including gender, ethnicity, religion, age, occupation, etc. (Bawden 1982; Black 2007; Connell 2000; De Lucia 2010; Freter 2004; Gillespie 2000a, b; González-Oliver et al. 2001; Hendon 1999; Hutson 2010; Hutson et al. 2004; Kintz 2004; Leventhal 1983; Longstaffe 2010; Prufer 2002; Tringham 1991; Watanabe 2004; Weiss-Krejci 2004; Yaeger and Canuto 2000).

Gair Tourtellot (1983, 1988; Tourtellot and Sabloff 1989) has considered kinship structures as the basis for household and resulting domestic group formation. In his research at Seibal, Tourtellot (1988) prevailed in using the Family-Growth Model, based on the concept of a "Household Development Cycle" (Goody 1971; Haviland 1972, 1988), to account for variability in Maya residential formation. This model attributes differences in numbers of structures (more specifically, dwellings) within patio groups to generational family growth (Tourtellot 1988:98). Similarly, Yaeger (2000a) employs a working model for the social composition of the San Lorenzo community, a settlement cluster near Xunantunich in the Lower Mopan River Valley of Belize, as a group of related extended families/localized lineages, although his results are less clear-cut as compared to those argued for Seibal. Similarly, McAnany (1995) examines the length of occupation, in particular the presence of initial settling groups known as "Primary Occupancy" households, and the patterned nature of associated residential compounds.

The household is a promising social unit where group identities may be embedded. Bourdieu's (1977) concept of *habitus* implies the remains of the physical house, as well as the material culture remains of practices conducted within and around the house, and should reflect the group social identities of the inhabitants (Yaeger 2000a: 29). It is in this spirit that I will focus on the domestic group (household) and associated community structures as my units of analysis at Buenavista del Cayo.

1.2.4 "Collapse", "decline", and urban disintegration

Studies of decline or collapse processes in the ancient world, whether focused on social, religious, political, economic, or environmental issues, comprise a significant portion of archaeological literature today. What is a "decline" or "collapse" episode? Current popular use definitions provided by Merriam-Webster Online (accessed 2012) include the intransitive verb "to collapse": 1) "To fall or shrink together *abruptly* and *completely* or fall into a jumbled or flattened mass through the *force of external pressure*", 2) "To break down completely or disintegrate", 3) "To cave or fall in or give way", and 4) "To *suddenly* lose force, significance, effectiveness, or worth". This is contrasted with the intransitive verb "to decline", defined as: 1) "To turn from a straight course – stray", 2) "To slope downward or descend, to bend down or droop, to stoop to what is unworthy", 3) "To draw toward a close or *wane*", 4) "To *tend toward* *an inferior state* or weaker condition", and 5) "To become less in amount". From such definitions, rate, time, and degree are identified as critical distinguishing factors.

The concept of collapse, as it applies to facets of society, is a prehistoric and historic global phenomenon traditionally based on dramatic and rare forms such as that seen in Mesopotamia, where religious systems, political ideologies, and languages disappear altogether (Adams 1973; McAnany and Yoffee 2010; Railey and Reycraft 2008; Sabloff 1973; Sharer 1977, 1982; Yoffee 2010). These are displays of rapid, significant loss of established levels of socio-political complexity (Tainter 1988). Current studies of the complex sets of historical processes that make up "collapse" experiences suggest much more subtle scenarios the world over, more conducive to discussions of "declines" (McAnany and Yoffee 2010; Schwartz and Nichols 2006). This complexity of such topics is reflected in the sheer number of new terms applied to such situations: transition, transformation, crumble, etc., each possessing its own semantic baggage (Aimers 2007; Demarest et al. 2004; Tainter 2006).

Although such events/processes differ tremendously in trajectory, a common thread is the blurring, dissolution, or disappearance of boundaries of large-scale socio-political systems encompassing many local and regional groupings of people and institutions (Kaufman 1988:219). Such dissolutions, or in the case of urban centres we might choose to speak of "disintegration", can be tantamount to organizational problems focused on the failure of integration and the control of knowledge (DeMarrais et al. 1996; Joyce and Winter 1996; Scott 1998): the focus of portions of this dissertation. Although these events are often associated with a reduction in capacity for individuals and groups to supply and defend themselves, it is equally recognized that less-inclusive institutions and communities may survive such scenarios (Gailey and Patterson 1987; Scott 1998).

In most instances of collapse, decline, and disintegration, implicated institutions are found to change radically at different paces, and archaeologically these signatures can vary immensely from loss of written records, changes in artistic mediums, halt in monumental construction, loss of population, etc. (Railey and Reycraft 2008). The many possible origins of such intricate processes of change make it virtually inevitable that each system would trace a unique historical trajectory, while at the same time triggering a domino effect (Demarest 2006:6; Rice et al. 2004). Numerous causes for disintegration have been cited, both exogenous and endogenous (Kaufman 1988; Railey and Reycraft 2008), and these categories are recognized as purely analytical, representing the complexity of such events. Both real and imagined uncertainties plague systems throughout their life-histories, applying pressure to pre-existing "cracks" within organizations, and serve as impetuses for both transformations, declines, and even collapse (Inomata 2006a, 2006b; McAnany 1995; Petersen et al. 2008). In essence, these processes are highly tangled masses and Kaufman (1988: 230) rightly notes "since modern observers are alerted to these processes… only by evidence left when the process was already well underway, we can merely guess at the specific cause in a particular instance". This makes the identification of first causes mere speculation, tantamount to "chicken or egg" situations, and as such all we can do with confidence is identify the circumstances, or "kindling", that encouraged the "spark off" of events and piece together reasonable reconstructions of what happened after triggers were pulled.

Although many contemporary enquiries characterize Maya collapses and declines as instances of renegotiations of socio-political life, they are routinely labeled as elite phenomena (Culbert 1991; Freidel 1986; Jones 1991; Lowe 1985; Sabloff 1986), particularly when discussion centres on the infamous Terminal Classic "Great Collapse". For decades, this period and all decline scenarios that fell within were dealt with through blanket statements of cause and effect (Rice et al. 2004). Unfortunately many arguments regarding the "Great Collapse" face a danger of circularity, in addition to gross generalization, as they are sought from purely elite contexts and focus on broad top-down processes, relegating discussion of at least ninety percent of the social spectrum and any households and communities beyond site epicentres to mere population estimates (Freidel 1992; Marcus 1992; Martin and Grube 2008; Ringle et al. 1998). As a result, these studies experience difficulty in speaking to larger demographic trends, specifics of population movements and associated social landscape changes, and larger spectrums of socio-political and economic activity: all recognized aspects of decline scenarios the world over (Coombes 2005; Schwartz and Nichols 2006).

Understanding changes to social landscapes in the characterization of both rise and decline processes, including those within urban settings, has only recently been targeted for deeper contemplation in Maya studies (Ashmore et al. 2004; de Montmollin 1989, 1995; Longstaffe 2010; Longstaffe and Iannone 2011; Manahan 2003, 2004; Schwarz 2004). In Maya archaeology, as is the case with the study of many other Precolumbian societies, we tend toward huge leaps from household to polity and state organization, bypassing important community structures such as urban forms (Yaeger and Canuto 2000; Fox and Cook 1996; Graham 1996, 1999). The reasons for this are many, including the difficulties faced by archaeologists arguing for urbanism in tropical agrarian societies, the current dependence on concepts such as city-states to understand all socio-political activity, the "tyranny" of the epigraphic record, and the tendency for household archaeologists to investigate remains in site epicentres or peripheral regions, bypassing core area settlement. These "shoulder" zones, the edges of urban "downtowns" (epicentres), are essential zones within the urban form and are typically different in demographic and economic make up from both epicentral and peripheral regions (Greenberg 2011; Squires et al. 1987).

In bypassing the crucial analysis of civic form that is integrated within and eventually disintegrated from the polity as a whole, we ignore an important avenue of potential information surrounding larger urbanization processes (Adams 1988: 34). The advantages granted historians and archaeologists by hindsight allow observation of the operation of these superstructures that had the potential to influence the lifestyle of even the humblest of inhabitants in numerous respects, more directly than overarching state bodies whose command may not have been salient to many populations. The roles of such structures are made all the more visible when they first appear or when they falter, suggesting the best way to understand the impact of entities is in the study of their complete "life history".

Ideal forms of rise and decline study should therefore recognize both short-term and long-term causes and effects (Braudel 1972; Iannone 2002), adopting multiple avenues and scales of analysis (Wylie 2002), and provide comparison with similar processes elsewhere in the world over time. Such projects consider the choices people make (or do not make) in situations as important as the events/crises themselves (Aimers 2007:348). It is the flexibility created by human agency that makes instances of revolution or total societal collapse so rare. Some families, villages, cities, and polities survived for decades if not generations past their neighbours (Webster and Freter 1990). Why and how? If pursued, how would this knowledge contribute to ongoing debates surrounding the nature of Maya civic centres and socio-political organization (Demarest 1992; Fox et al. 1996; Iannone 2002; Price 1977)?

Chapter Two: Theorizing Urban Integration and Disintegration

To address the nature and degree of impact that civic integration, disintegration, and shifting regional sovereignty had on individual communities and households at Buenavista del Cayo, I adopt outlooks that focus on the integration and subsequent disintegration of urban environments and communities as exemplified through the manipulation of 1) the built environment (place), and 2) knowledge bases (cultural experts –people and things). Such perspectives, examined through the theoretical frameworks of New Urban Theory and High Modernist State Schemes, emphasize the horizontal and vertical integrative methods adopted and manipulated in local community, urban, and polity settings (Williams 1976). They also stress the aforementioned view of community as an assemblage of people, places, and things, and emphasizes a heterarchical structure to civic life (Crumley 1987, 1995; Potter and King 1995), as opposed to purely hierarchical, and is similar in concept to the "horizontal and vertical differentiation" discussed by Blanton et al. (1996). Another comparable perspective is expressed in Schoenfelder's (2004:402; also DeMarrais et al. 1996) recognition of the goals of polities and cities in simultaneously attaining statements of "inequality" (vertical power relationships) and "affiliation" (horizontal amalgamation) through their various methods of communication: public monuments, symbolic objects, written documents, ceremonial events, and the incorporation of cultural experts.

Urban environments are places that foster interaction and face the daily strain of people dealing with other people, places, and things; coping with products of group activity including noise, trash, etc. (Fletcher 1995:7). They are subject to factors of local ecology (Rapoport 1969; Vayda and McCay 1975), local culture into which people are socialized (Roscoe 1996; Stilltoe 1978; Tuzin 1997), and supra-local events and institutions that constrain as well as liberate (Talen 1999). As such, urban environments are best described as "exercises in organized complexity" (Greenberg 2011:78-79). By examining urban rise, *denouement*, and decline through dual lenses of integration I can address higher polity and urban administrative concerns while also focusing on, and linking to, ground-level household and middle-level community concerns; linking patterns of behaviour between individuals, communities, and institutions, and the materials they leave behind. This theoretical approach is subsequently linked to the archaeological record through adoption of an "object biography" or "life history" methodological framework and ethnographic analogy.

Theoretical frameworks and associated methodologies that emphasize integration ideally create an “organizational” study of urban rise and decline; the operation and organization of administrative systems being central to studies of early state formation processes as well as issues of decline (Munson and Macri 2009:424). All organizations, in essence, seek contribution from their members and beyond; they must declare membership and maintain this membership by negotiating and altering various social and economic situations using a variety of strategies in their struggle for power-authority, prestige, and wealth (Kaufman 1988:219; Munson and Macri 2009:424; Schoenfelder 2004:402). This emphasizes the idea of “urban as process”, with past conditions capable of constraining the form of future social and political circumstances (a “Muller’s Ratchet” scenario; Muller 1932), requiring long-term frameworks of analysis that study not only their waxing, but also the processes of waning. For example, many of the modern public transit versus personal vehicle issues we are facing today in our North American cities stem from the dismantling of streetcar systems by automotive and oil/gas companies post-WWII (Greenberg 2011). The broader goals of this study therefore attempt to understand and chart how administrators of urban centres sought, maintained, and ultimately lost membership, from their initial rise through to eventual decline.

Through this approach I aim to shift Maya urban studies away from an all-encompassing emphasis on shorter, artificially isolated events such as “rise” and “decline”, toward a broader focus on long-term organizational dynamics that might allow us to distance ourselves from overly simplistic and determinist arguments for the causes and effects of socio-cultural change. An examination of the organizing principles and specific relations that created these political networks and evaluating how they changed through time can contribute to a more holistic and synthetic understanding for processes of urban, and associated polity, expansion, contraction, and decline in Classic Maya society.

2.1 Urban integration

As mentioned in the introductory chapter, of particular interest is the situation of dispersed urbanism and the problem of social engagement as it pertains to integration; the manner in which administrations go about securing people/labour/tribute and suppressing uprisings (Scott 1998). Traditionally, archaeologists have focused on the classic hallmarks of state-level integration such as force, infrastructural-water, agriculture, terracing-control, trade, large-scale ritual, and kinship/marriage alliances; often reflecting the polar extremes and at time esoteric and/or ephemeral nature of socio-political organization. However, current models emphasize the dynamic nature of such organization for the Maya (Iannone 2002; Marcus 1992; Martin and Grube 2008), and the need to focus on issues of urban environment organization while pursuing diachronic perspectives and more subtle degrees of integration along a shifting continuum over time (see Swartz et al. 1966 for an anthropological discussion of the continuum of support- the formulation and/or implementation of political ends- from legitimacy to force).

As support and integration are gained and subsequently lost, administrative entities typically seek to employ as many forms as is possible. "In analyzing a political group, one will find different supports operating in different areas and various political competitors trying to manipulate the various sources of support in their favour" (Lewellen 2003:93). Such a statement advocates approaches that aim to examine multiple methods of integration over time. For urban environments to be connected, a variety of methods are required to rectify differing scales of interaction and integration: transport (roads, trains), culture (festival, ritual, and sports), politics (administration, representation, and physical boundaries), economics (tax, markets), etc. By examining multiple potential sign systems and relations involved in civic integration and disintegration, we might begin to better understand the complexity and paradoxical processes of constructing and legitimizing the social landscape; how various methods combine simultaneously both in opposition and cooperation or, horizontally and vertically (Keating 2000:304).

In the case of dispersed, or tropical low-density agrarian-based urbanism, the attention paid to issues of integration is of particular importance. In Cambodia, the Angkor period of the Khemer State (802-1431 C.E.) and its cities has been a focus of study with regard to urban integrative strategies through the distribution of shrines and water management systems in and around cities and their hinterlands. Not only is the physical built environment discussed, but so too is the role of knowledge in the recognition of individual community concerns, designated as a case of extreme locality due to pre-existing "splinter groups" within the city membership (Coe 1957, 2003; Evans et al. 1997; Fletcher 1986, 1995:93,224). In Sri Lanka at the city of Anuradhapura, Coningham and Allchin (1995; Coningham et al. 2007) have presented another example of dispersed urbanism, demonstrating how landscape is a highly contested feature of and key to the understanding of the development of urbanism in tropical agrarian-based environments. Both cases emphasize the built environment in addition to the role of knowledge bases in the urbanization of environments and the integration of populations throughout these processes. It is through this frame of reference I approach urbanization at the lowland Maya centre of Buenavista del Cayo.

2.2 The Built Environment and New Urban Theory

New Urban Theory (NUT), or New Urban Design (NUD), is one of three self-conscious schools of urban design recognized today, alongside Everyday Urbanism and Post Urbanism. NUT/NUD emerged in the 1970s and 1980s as a controversial body of design theory alternative to the conventional patterns of urban development promoted by the modernist movement (Ellis 2002:261). It incorporates ideas surrounding neo-traditional development and neighbourhood design, focused on post-World War II dispersed suburbia urban patterns, and invokes the ability of the built environment to integrate urban settings. In particular, this body of theory focuses on the ability of the built environment to induce a "sense of community" (*communitas*; Turner 1969) in particular as it applies to the rectifying of dispersed settlement forms (Kelbaugh 2001; Solomon 1992; Talen 1999).

Contrary to criticisms of the theory (Audirac and Shermyen 1994; Biddulph 2000; Robbins 1997), NUT/NUD does not maintain that community can be "designed" in any simplistic way; the built environment is recognized as only one aspect that can always be overridden by other cultural variables, but suggests there is a connection between spatial design and a sense of community (Ellis 2002:277). Unlike many other urban design theories, NUT/NUD is applicable at all scales of settlement, from high-density inner-city neighbourhoods to hamlets in the countryside (Steuteville 1999). Communities, or more specifically neighbourhoods (small areas of intensive face-to-face social interaction), are argued to be important as they serve the building blocks of urbanism and provide gateways to the social life of cities through spatial proximity and public "shared-use areas" that can help weave together the fabric of an otherwise fragmented society (Rofé 1995:120; Smith 2010b, 2011).

2.2.1 Theory and assumptions

A focus on the built environment makes NUT/NUD an Utopian idealist/reformist body of thought that is described as "inspirational in style and structuralist in conception" (Kelbaugh 2001:4.2). The public spaces and architecture endorsed by its proponents serve to craft sentiments of belonging and pride in people for a community that is more significant than their individual private worlds. This view builds from the multitude of studies that articulate the importance of civic life and the public realm in the sustaining of communal bonds and in so doing, NUT/NUD attempts to balance individual choice with public responsibilities: the ideal community formula (Arendt 1958; Beiner 1992; Bess 1996/1997, 2000; Etzioni 1995, 1996; MacIntyre 1984; Mulhall and Swift 1996). Unlike other bodies of thought, NUT/NUD is practice-based and not a purely theoretical or academic enterprise; developed from and producing an eclectic meeting ground of people from varied cultural, political, economic, and social backgrounds.

Public spaces and buildings are perceived as integrative forces (Schoenfelder 2004; Scott 1998; Smith 2010b; Trigger 2003:131): locations where people can join together and create an atmosphere and identity of community beyond the home, and is grounded in the idea that "private communication networks are no substitute for real community" (Talen 1999:1361). NUT/NUD emulates and modernizes, rather than demolishing and rebuilding, selected historical urban patterns and applies a cross-cultural and time-depth (dynamic) approach to understanding the development and use of space in urban environments, while emphasizing design for a pedestrian-oriented landscape (Ellis 2002:261,271). Through its engagement in historical research into both vernacular and regional building programs/forms in search of "authentic senses of place", NUT/NUD scholars prepare codes, pattern books, and building typologies for use within their design plans (www.cnu.org). This acknowledgment of historical change and cultural differences in urban design, following important urban planning and anthropologically-oriented studies such as Rapoport (1977), differentiates NUT/NUD planning from other design bodies and allows for the delineation of spatial patterns that appear durable and securely anchored in the human condition (Mumford 1938:445; Alexander 1979). These are spatial patterns that are argued to correspond to innate cross-cultural, biological, perceptual, and psychological structures, that are not completely malleable and maintain considerable continuity through time (Turner 1991,1995).

New Urbanists see the main defect of standard suburban developments not as an issue of aesthetics or even environmental concerns, but their insidious social effects; resulting in the physical fragmentation and functional compartmentalization of urban life. As a structuralist body, its proponents maintain a direct structural relationship between social behaviour and physical form, and support a hierarchy of private and public spaces that are conducive to face-to-face social interaction: the foundation of an interactional view of community. "While community may be perceived as 'liberated' and thus placeless, the role of neighbourhood or place of residence continues to hold weight as a factor in building social relations" (Talen 1999:1366). Through such a perspective, NUT/NUD favours the community over the individual, and was developed and formalized as a response to increasing private rights over group rights in North America, particularly in the United States, and shares many points with concepts of communism (Kelbaugh 2001:14.3). In contrast with the two additional aforementioned bodies of urban theory, NUT/NUD is most precedent as it attempts to learn and extrapolate from the most enduring architectural types, as well as the best historical examples and traditions as they intersect with contemporary environmental, technological, social, economic, and cultural practices.

Alongside the principles promoted by this body of thought comes a series of assumptions critical to the understanding and evaluation of the theory (Talen 1999). These assumptions include: a high degree of spatial determinism with an overplay of physical space, a steady environmental-sociological approach involving theoretical bodies and ethnographic methods developed from the works of the Chicago School of Sociology (Abbott 1999), an emphasis on the importance of low-rise/high coverage building designs and a concern with cultural concepts of safety, and an emphasis on strong "sense of community" through daily interaction that leads to greater political activity (Ellis 2002; Talen 1999).

2.2.2 Principles and Built Environment Criteria

The principles of New Urbanism can be applied to projects at the full range of scales, from a single building to an entire community, and are applied at the full range of urban densities. Succinctly outlined by the Congress for the New Urbanism, or CNU (www.cnu.org), the following principles have been successfully implemented to guide the development of public and semi-public spaces intended to promote solidarity and integration in a dispersed urban environment: walkability, connectivity, mixed land use, appealing architecture and design, emphasis on traditional neighbourhood structures that promote discernible centers and edges with centrally located public spaces, increased density of living areas, smart transportation networks connecting cities-towns-neighbourhoods, and sustainable developments and operations.

From these principles and aforementioned assumptions Talen (1999), in her extensive review of the movement, suggests a set of criteria for evaluating the integrative potential of built environment features that serve to improve social interaction and join communities within and beyond (applied in this study). These stipulate built environments that:

1) Foster *associations* with well-defined spatial communities and encourage *face-to-face* time, use, attractiveness, and group conformity.
2) Provide *accessibility* while maintaining *control and security*, aiding in the *maintenance of boundaries*, promoting membership and personal investment.
3) Contain *architecture and design that engages* public interaction and generates traffic.
4) Create a *sense of place* through close attention to landscape, design, placement, group conformity, and the environmental and social cognition of residents.
5) Provide a *counter pressure* to private life and serve a *symbolic "heart"* for a community as the focus of civic pride and sense of place, creating an area of shared emotional experience.
6) Promote *mixed land use* (* italic emphasis is my own).

These criteria, observed to be cross-cultural, serve to improve social interaction and join communities within and beyond. Through location, architecture, and activity, they stir emotions and promote solidarity horizontally, while at the same time concentrating authority vertically. It is through these principles, criteria, and assumptions that NUT/NUD has assumed a role as an economic, social, and environmental education system, a public policy exploration, and a community-building framework that shifts architecture from its status as "object" into a system encompassing more than buildings: an active agent in the affective assemblage that is community (Harris 2012:11; Hodder 2012). This achieves what Kant (1929:257-275) describes as distinguishing between objects and events as they are (*noumena*) and objects and events as they appear in our experience (*phenomena*). It evaluates communities/neighbourhoods on their own, as well as part of the larger urban process (Ellis 2002:274). Such a framework is important to an archaeology of urbanism that emphasizes the concept as a dynamic process, as opposed to static entity, entangled with both practical functions and social meanings (Lang 1994; Harries 1997).

I propose the use of Talen's framework as one means to study civic integration and disintegration at Buenavista in evaluating the development, use, and abandonment of possible integrative "public" built environments including an epicentral plaza area (East Plaza), two formal causeways (*sacbeob*), and an enigmatic site within the Buenavista South (BVS) settlement zone, argued to have functioned primarily as a location of community-oriented ritual and secondary administration. These examples are "weighed" relative to Talen's criteria, their life histories charted, and compared with ethnographic, ethnohistoric, and other archaeological examples of similar built environments. In addition to the built environment, integrative methods also include the manipulation of symbols and knowledge bases, most often associated with the presence of cultural experts (DeMarrais et al. 1996). To this effect, I also lean on understandings regarding the use of knowledge bases, both esoteric and practical, from studies centred on High-Modernist State Schemes at the scales of household-community-urban.

2.3 Knowledge Bases (Cultural Experts) and High Modernist State Schemes

The destructive potential of most administrative organizations lies typically in their ignorance and/or suppression of the practical knowledge and skills that underwrite any complex associations. Scott (1998) notes the "formal order, to be explicit, is always and to some considerable degree parasitic on informal processes, which the formal scheme does not recognize, without which it could not exist, and which it alone cannot create or maintain." Society itself is a field of forces that are an exercise in dynamic tension, exhibiting both centrifugal and centripetal tendencies (Swartz et al. 1966). When tension between these forces becomes acute, a situation of crisis can develop, and seldom does a complete resolution occur. Rather, a readjustment of individual forces is required that lends greater strength to one side and reduces the strength of others, allowing for a diachronic model of political phase development. Authority and power can therefore be inherent in the use and abuse of knowledge bases associated with each force/group (Potter 2000:295). These are the primary tenets behind such bodies of theory as Chaos and Complexity Theory, and the science of Self-Organizing Systems that suggest progress is made not by overthrowing all hierarchies and previous forms, but by incorporating and surpassing them in emergent new orders (Argyros 1991; Wilber 1995). These designations of “orders/processes” are tantamount to a study of knowledge bases or socio-cultural capital (DeMarrais et al. 1996; Joyce and Winter 1996): formal and informal, regional and local, esoteric and practical.

Although recognition of the power of local knowledge is present in administrative organizations, particularly with regards to pacts made with influential merchants and local leaders/cultural experts, allowing these separate powers and associated knowledge bases to be maintained can both support a system while also undermining and fracturing systems when failure is eminent. “Splinter groups”, or built in centrifugal forces, within communities (e.g. landless households vs. landholding households) can defect from a group and those who survive are typically those with the tools to do so, causing institutions to be weakened or even destroyed by such internal dynamics and fractures (Kaufman 1988:225; Lewellen 2003:104). These splinter groups can be more adaptive than the larger communities, political organizations, and institutions, particularly in periods of rapid social change. The resulting disorder in the system then moves to pit “haves” and “have-nots” (e.g. Founding vs. “other” households) against one another, which can significantly influence decline processes (Kaufman 1988:222).

In his book *Seeing Like a State* Scott (1998) compares and contrasts two bodies of knowledge existing in High Modernist State Schemes (HMSS) and other organizational forms: esoteric versus practical knowledge. He presents the concept of *mētis*, a Greek term for knowledge embedded in localized experience (“cunningness”, “wisdom”, “craft”, “skill”), in his examination of the successes and failures of states. This is largely derived from considerations of power, as discussed by Foucault (1977), as an issue of discourse and knowledge implicit in all human social relations. *Mētis* is contrasted with more esoteric, instrumental, or policy-making knowledge employed by the State and its technical agencies; intended for, or likely to be understood by, only a small number of people with specialized knowledge or interest (Baumard 1999). Conversely, *mētis* represents a wide array of practical skills and acquired intelligence, most often displayed in communities that are marginal to markets and the state, and is most valuable in settings that are mutable and indeterminant (e.g. decline scenarios). However, *mētis* is not democratically distributed. Access to the experience and practice necessary for its acquisition can be restricted based on history, social structure, and recognized monopolies exercised by particular groups, guarded by associated culture-knowledge experts. In situations of newcomer colonizers-immigrants to a landscape in which pre-existing resident populations are encountered, the transfer of knowledge from the latter to the former cannot be assumed in its entirety and reflects a potential situation of eventual splinter-group control (Rockman 2003:12). The couching of this knowledge in practice (people), potentially reflected in “places/spaces” and “things”, makes it an ideal focus of study for household archaeology.

Urban centres are often reflections of state organization that attempt to create a “functional order” on the landscape (Greenberg 2011:24). Greenberg applies a similar knowledge-based approach to explaining the vitality, success, and failures of some modern cities, such as Toronto, Ontario, by understanding the integration and use of *langue* (language – representing syntax, structure) versus *parole* (speech - unique history/form) *á la* Saussure (1916; Lévi-Strauss 1988). Cities thrive on enormous variety of *parole* (*mētis*) but still need a level of predictability and stability, or *langue*. City builders must engage with complex formal and informal politics and maintain intense and ongoing involvement with independent players pursuing their own agendas. A loss of this integration can be detrimental to the urban form. For example, during the process of amalgamation for the Greater Toronto Area (GTA), an enlarged centralized bureaucracy became inefficient, inaccessible, and out of touch. “Its inclination to insist on one-size-fits-all solutions”, ignoring or failing to implement community-specific understandings (*mētis*), and the tendency toward outward thrusts of the organization (versus more local, inward focus) was a constant problem (Greenberg 2011:299; Kaufman 1988:222). The couching of *parole* or *mētis* knowledge in practice and the division created by its potentially unequal distribution makes it an ideal topic of study for commoner household archaeology and centrifugal forces within community and urban structures over time.

2.3.1 Households and Knowledge

Any discussion of knowledge on a household level would consider the functions of households in society. Wilk and Rathje (1982:621) outline the major functions of households cross-culturally including production, distribution, transmission, and reproduction (Goody 1972; Meggitt 1965; Murdock 1949). A study of knowledge would therefore consider ideas concerning transmission and reproduction: the former involving the transferring of rights, roles, land and property (we could add knowledge to this list) between generations, and the latter involving the rearing and socializing of children/members. Both transmission and reproduction involve the transference of knowledge bases within a household and beyond. Households, as discussed by Souvatzi (2008:98), are "agents of change" and as such are a crucial focus of any community and urban study. While being the locus for change, households also represent many of the structuring properties -rules and resources in social reproduction- required for successful survival in society, providing: knowledge (including social memory, understandings of "how things are done", and *habitus*), the loci of social practices through the mobilization of knowledge, and the capabilities of social actors determined by practice and expectations based on past experience (Joyce et al. 2001).

For a study focused on households and *mētis* knowledge, a useful consideration from an archaeological perspective would be to address knowledge about the spaces and environments in which we live, including resources, unique characteristics, limitations, etc. Much of the accumulation of such knowledge is based on personal (practical) and transmitted (social memory) experience (Rockman 2003:3). In terms of archaeology we must then ask, as did Bruce Trigger commenting on Childe's (1956) work with knowledge and the environment, "do the things we leave behind represent what we knew?" According to Childe (1956), knowledge is a set of shared mental approximations of the real world that permit human beings to act upon it, and functions as a form of effective adaptation. Because artifacts/features are produced and consumed, they provide information on adaptation and also how we share knowledge and how long such activity takes, or if it is not shared at all but controlled in its degree of dissemination.

In situations of colonization, or arrival into a "new world", the key to survival in a new environment is therefore the acquisition, control, and use of knowledge (Rockman 2003:4). To an archaeologist and/or social scientist interested in knowledge and households, how environmental knowledge develops and functions in interactions between people and the places they occupy and how this affects traces of people is of great concern. An examination of differences between households in time and over time might therefore choose to focus on such issues. The topics of knowledge and learning are already so integral to our conceptions of households and how people come to be in places and how they live there once they arrive. We must therefore assume such topics are also important to our understanding of how and why people eventually leave places, encompassing the entire scope of urbanization.

In her study of knowledge and landscape [spaces in which a group of humans actively interact with a natural environment and includes natural topographic features, a range of built/modified features, and socially determined patterns of activity within and amongst these features (Tolan-Smith 1997:1)], Rockman (2003; also Soja 1989) outlines three types of practical (*mētis*) knowledge to consider in the development of social landscape:

1) Locational knowledge
2) Limitational knowledge
3) Social knowledge

Locational knowledge involves the acquisition of data concerning locales, including the physical characteristics of necessary resources, and the ability to relocate sources once found. This might include organic and non-organic resources such as plants and lithic materials, and is concerned with the knowledge of spatial distribution of materials and the desirable properties of such resources (Rockman 2003:19). Sources such as stone are unevenly distributed across a given landscape, dependent on long-term geologic and tectonic history, and must be encountered directly in order to be accessed and assessed, therefore requiring substantial locational and limitational knowledge. In addition, substantial social modifications may be necessary to establish new non-organic resource access patterns and/or maintain access to previously used sources. In terms of a single resource, such as patchy lithic resources, it is possible that risk-reducing social strategies may be used to cope with the possibilities of not being able to locate necessary outcrops (e.g. the guarding of knowledge concerning such resources). Other resources might include food, land, water (courses and cycles), weather patterns, clays, etc. This is the easiest form of knowledge to acquire, with large amounts potentially gathered over a short period, however, sources need time to realize their potential, often at least a generation/35 years (e.g. how workable certain types of stone can be or how fertile a soil can become) (Rockman 2003:5).

This leads to limitational knowledge that involves understandings of boundaries and costs regarding the exploit of necessary resources (e.g. harvesting potential of vegetation, extremities of seasonal variation) leading to larger understandings such as the carrying capacities of landscapes. Finally, social knowledge involves the attribution of names, meanings, and patterns to natural features (e.g. "appropriate" movement across a landscape), as well as the transformation of a natural environment into a human landscape and the attribution of experiences (including "survival" methods) to specific local landscape features (Basso 1996). Because this involves a collection of social experiences by individual members over time, older inhabitants (households) might be expected to hold more knowledge and maintain a longer and larger base. Ethnographic approaches emphasize the development of social knowledge within a landscape, which in turn is informed by both locational and limitational knowledge, and takes much longer to accumulate and develop (i.e. 100s of years) and is heavily guarded (Rockman 2003:17). Unfortunately, it is this final category that is most difficult to address from archaeological finds (Price 1983).

These forms of knowledge are not exclusive, and may function as a feedback loop at any time. As is the case with all archaeological study, it is the patterns of activity that are key to the investigation of knowledge bases, how they develop, and how they change or remain consistent over time (Rockman 2003:6). Also important to an archaeology of knowledge, with regard to landscape settlement, is the observation that "the longer and more closely tied a group is to a particular bounded environment, the more likely it is that the various ways in which the group members consider it 'their' landscape will affect the ways in which they use that landscape and ultimately the archaeological traces of that use" (Rockman 2003:7). This is bound to observations from household studies of the Sunk-Cost Effect (Janssen et al. 2003) that suggest when we have put effort into something we are often reluctant to pull out because of the loss that we will take, even if continued refusal to "jump ship" will lead to even more loss. Such an observation is crucial to a study of urban disintegration and the behaviour of specific factions of communities over time.

Knowledge is useful, to the extent that it can be swiftly recalled and applied, without effort, to practical ends (Basso 1996:134). Individuals gather environmental (social and physical) knowledge from two sources that operate on different timescales; the first being direct individual exploration and experience (Binford 1980, 1983), and the second being knowledge that is incorporated into social practice, interaction, and lore (Widlok 1997). In any consideration of household establishment within and eventual departure from a settlement zone, we must consider two primary aspects: Motivations considered for initial colonization, or "pull" factors, and emigration "push" factors (Anthony 1997), and the actual physical orientations and directions of movements such as regional migrations, etc. (Rockman 2003:8). Most studies of social landscape/settlement examine colonization and migration without significant consideration of push/pull factors, described primarily as ecological strategies, such as responses to overcrowding and drought. This highlights the problem faced by most functional-environmental discussions of Maya collapses and declines, leading to incomplete, monocausal explanations.

For our archaeological purposes Souvatzi (2009), in her work on Greek Neolithic households, has devised a list of key elements in the creation of individual and collective identities, which are directly linked to distinctions between esoteric and *mētis* knowledge bases derived from physical and social environmental considerations. On an individual/*mētis* household level, these include observations of:

1) Internal architectural variability such as location and construction quality,
2) Variation in economic activity and craft production,
3) Variation in domestic rituals including the symbolic founding and closure of houses, and
4) Variations in individual domestic context burials.

Issues of collective identity and esoteric knowledge can be addressed through observations of:

1) External uniformity and orientation of architecture and the presence of large scale architectural works that emphasize open and public space,
2) Standardization and control of economic activity and craft production (workshops, etc.),
3) Differential intra-site distributions of material products, particularly exotic and ritual items,
4) Presence of collective and public rituals and collective burial practices.

These criteria are considered in the evaluation of individual household and community roles over time, and linked to the discussion concerning the built environment, as they are played out in the urbanization of Buenavista.

2.4 Life History Approach

The methodological framework applied to this research program on urbanism, community, and households draws from the "object biography" or "life history" literature. The development and application of this approach spans the social sciences and beyond, including anthropology, psychology, history, medicine, and biology (Bertaux 1981; Chamberlayne et al. 2004; Chamberlayne et al. 2000; Margaretta 2001; Stanley 1992; Thompson 1978). Its most frequent use in anthropology involves the ethnographic interviewing of informants to create life history narratives (Dollard 1935; Frazier 1978; Luborsky 1987), having recently shifted to a focus on object biographies (Appadurai 1986; Gosden and Marshall 1999).

The life history approach views the house (and all other buildings), and its associated spaces and activities, as having a biography. It is a multi-faceted "living space" that is socially constructed and experienced: organized by and around humans (Gosden and Marshall 1999; Robin and Rothschild 2002). As such, it has a history and memory, inscribed by the people (households) inhabiting it through time (Matthews 2006; Robin 2001). This approach examines houses/built environments through time and is capable of adopting multiple theoretical tools (NUT and HMSS) derived from diverse disciplines to account for small patterned changes observed. It also allows the archaeologist to sidestep the problem of dwelling-household distinctions, as they simply become alternative hypotheses for changes in the material patterns – the relationships between people, places, and things- that may or may not emerge from a field study (Barile and Brandon 2004; Hutson 2010). This approach allows me to focus on explaining household level changes through time and to "tack", *á la* Wylie (2002), between different scales of analysis from household to community to society writ-large (urban, polity, state, culture, etc.) (Samson 1990).

Similar approaches have been applied beyond the Maya world with great success (Matthews 2006; Meskell 2004; Nanoglou 2008) and to the analysis of Maya osteological remains, outdoor spaces, and artifact deposits (Buikstra et al. 2004; Robin and Rothschild 2002; Wille 2007). This research program, that delineates houses, "neighbourhood" community settlement, and urban landscapes from birth to burial, charting their life histories, is unique in application to Maya household and community archaeology focused on processes of urbanization, and allows me to "people" this diachronic process of the past (Robin 2001). This requires conjunctive considerations of excavation programs, built on the integration of independent lines of evidence, assisted by the long history of research and well-established ceramic micro-seriations (Appendix II) in the Lower Mopan River and Belize River Valleys.

Survey, testing, and excavation methods promoted by a life-history approach include those research designs that consider settlement sites from a diachronic perspective over time. This involves an investigation of settlement from a point of initial occupation, built environment construction, activity/use characterization, and abandonment, incorporated within a multi-temporal perspective. In the application of criteria developed in New Urban Theory that serve to emphasize the role of "places" in community assemblages, and from High Modernist State Schemes and associated theories surrounding knowledge bases that highlight the "people and things" of community assemblages, I will chart and evaluate the integrative potential of the Buenavista del Cayo urban centre as it developed over time and eventually disintegrated. The following chapter provides background information for the Maya World, the Belize River Valley, the Lower Mopan River Valley, and previous investigations at Buenavista del Cayo and surrounding areas.

Chapter Three: Physical Context and Historical Background

This chapter establishes the regional and local settings of my research in terms of physical geography and environment, prehistory, and previous archaeological investigations. The ancient people, places, and things of the greater Belize River Valley and Lower Mopan River Valley have been the subject of numerous archaeological enquiries on which this research builds and expands, requiring of us an understanding of such contexts prior to further discussion.

3.1 Physical Environment

The Southern Lowlands of the Maya World, further divisible into central and southern areas (Sharer and Traxler 2006:24, 42), are located typically at elevations below 800m and encompass a section that extends from Tabasco, Campeche, and Chiapas, through the Guatemalan departments of Petén and northern Huehuetenango, El Quiché, Alta Verapaz, and Izabal, and most of Belize (Figure 3.1). The largest and most famous of Maya urban centres, particularly those of the Preclassic and Classic periods, were established in this subregion.

Southern Lowland landscapes are typically characterized by undulating topographies and tropical forests, and dissected by several large river waterways. These navigable rivers served as major transportation corridors and trade highways, traveled by dugout canoe, allowing for relatively easy short and long distance exchange and contact between people, places, ideas, and things (McKillop 2010). Important exports from this subregion included jaguar pelts-teeth-claws, cacao and other agricultural products, bark clothing, chert (in particular the superior materials from the northern areas of Belize, Hester and Shafer 1984), clays, tobacco (Zagorevski and Loughmiller-Newman 2011), and copal/*pom* incense (Cano 2008; Pyburn 1996).

3.1.1 The Belize River Valley and Lower Mopan River Valley

The modern country of Belize, formerly British Honduras, is located on the eastern edge of the Maya world (Figure 3.2). Covering an area of approximately 24,000 km^2 (290 km north-south by 110 km east-west at the widest points), Belize is both geographically and ecologically highly complex. Over a distance of roughly 60-80 km a traveler can encounter many of the world's biomes, a function of latitude and geography, with elevations varying from sea level along the eastern coast to above 1200 meters on Victoria Peak in the Maya Mountains (Graham 1987). This region of the Maya world has been an important geographic setting from Paleoindian through to modern times, as it is an area of numerous rivers allowing access from the interior heartland and southerly highlands of Guatemala to the Caribbean coast and vice versa (Peuramaki-Brown et al. 2013).

The medium-sized Classic Maya centre of Buenavista del Cayo[2] (Figure 3.3), the focus of this research, is located along the east bank of the Lower Mopan River: part of the Belize River Valley system in west-central Belize and the larger Petén-Central Lowlands region of the Yucatan Peninsula (Figure 3.4). The Belize River Valley bisects the country from its western border with Guatemala to the Caribbean Sea, and is defined by Chase and Garber (2004)[3] by its waterways, including two topographic subregions: (1) The Upper Belize Valley (UBV) consisting of the upland area west of the confluence of the Macal and Mopan rivers (near the modern town of San Ignacio), encompassing the hills and steep slopes of the area in addition to the alluvial plains, and (2) the Central Belize Valley (CBV) consisting of the broad alluvial flatlands and bordering hills from the confluence to the area of modern Belmopan. From this point, the river begins to descend into the lower, coastal plain region. It is in these two subregions where the densest ancient settlement occurred along the Belize River, likely due to the rich alluvial soils offered in many parts of the valley (Fedick 1988).

3.1.1.1 Rivers and Water.

Situated alongside a major river meant residents of the valley enjoyed a year-round, readily available, and abundant supply of fresh water (Fedick 1988; Smith 1998). In addition, water-bearing pits such as *aguadas* and *chultunob* could be used in the rainy season to collect potable water, along with standard domestic compound collection in large *ollas* (Lucero 1999;

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[2] A "major centre" based on Bullard's (1960) typology, and a Level 8 or 9 site based on Hammond's 1975 nine-tier classification scheme of Classic period sites developed for the Corozal Project. A "2nd order centre" consisting of 10-19 courtyards, based on Adams and Jones' (1981) courtyard count designation scheme. Also classified as an "upper level" site based on Iannone's (2004:282) designation scheme, and a "secondary major centre" based on Helmke and Awe's (2008) categorization. Finally, Driver and Garber (2004) consider it a "Major centre – large".

[3] Based also in part on definitions provided by Hammond and Ashmore (1981) and Willey et al. (1965)

Healan 2000: 105; Scarborough and Gallopin 1991). This relatively easy access to water is critical in karst settings where water rarely stays at ground level, seeping into underground chambers.

The Upper Mopan River and its tributaries drain the areas of the south-eastern Petén, and the southern Maya Mountains, causing the lower reaches of the river to differ significantly in terms of flood regime and valley morphology as compared to its sister river, the Macal (Smith 1998). Even during periods of excessive rainfall, the water levels rise and fall slowly and rarely exceed the current floodplain. The swamps and plains located upriver in Guatemala serve as reservoirs that absorb and discharge floodwaters (Yaeger 2000a).

The lower stretch of the Mopan, beginning around the Belize-Guatemala border, is relatively wide and accompanied by broad alluvial terraces, although narrower as compared with the Belize River proper in particular around the site of Baking Pot. The river makes its way north in a relatively straight line (Figure 3.5), minus occasional meanders such as that near Callar Creek, and represents an old fault line (Smith 1998) most visible topographically in Guatemala by the north-south running escarpment upon which the large site of Naranjo is strategically positioned between the Holmul and Mopan rivers (Fialko 2004) (Figure 3.4).

During periods of heavy rainfall the Lower Mopan becomes murky due to a significant quantity of suspended sediment within its waters. Its passage through the limestone topography of the area causes the Mopan to become suspended with calcium carbonate which is deposited into the troughs of river bottom cobble-gravel bars, creating “dams” which then consequently form rapids and pools (Smith 1998). These accumulations of porous rocks (tufa) obstruct modern canoe traffic above the confluence, and likely did so in the ancient past. However, this can be overcome through a more frequent usage of *portages* (Mazzarelli 1976). This “end point” of easy upriver navigation is important to consider in terms of the establishment of Buenavista and other Lower Mopan sites, as is the “jog” near Calla Creek/Guerra (discussed below). Also to consider is the location of the Lower Mopan region at a nexus of environmental and physical zones: the Vaca Plateau and Maya Mountains to the south and southeast; the Petén forests to the southwest, west, and northwest; and the low-lying floodplains of the Belize River to the north, northeast, and east (Figure 3.4).

The nature of the Mopan lies in stark contrast to that of the Macal, whose surging waters cut through igneous and metamorphic lands that offer no potential reservoirs, and have nowhere to go but downriver. This surging nature is of importance archaeologically, as it cuts through and dislodges large pieces of igneous and metamorphic materials and sweeps them downriver where they could be collected and used in mano and metate production, etc. (still used today as a source of slate). Its water has a much higher capacity to dissolve and erode the calcium carbonate bedrock of its lower reaches, allowing it to cut through in narrow gorges, and often flooding the area around San Ignacio, although the new dam has altered this activity significantly over the past decade (Hartshorn et al. 1984; Smith 1998). Given the propensity for such activity, the Macal is notoriously considered the "most tumultuous river in Belize" (Hartshorn et al. 1984).

The Lower Mopan and Belize River Valleys generally consist of four main alluvial terraces (although in some areas there may be only three), including the modern floodplain, an occasionally inundated second terrace, and two higher terraces rarely exposed to flood waters (Fedick 1988; Jenkin et al. 1976; Smith 1998). This pattern is not consistent throughout the valleys, and I will further explain the alluvial terracing around Buenavista.

3.1.1.2 Geology.

Cretaceous and early Tertiary period limestone formations make up the bottomland of the Lower Mopan, and are extensions of the larger central Petén uplands (Hammond 1982: 69-74; Hartshorn et al. 1984). The Cretaceous deposit consists of two formations: the younger *Campur limestone* above the *Coban limestone*, with the former described as very porous in some areas (Smith 1998). These limestone deposits are some of the oldest geological formations in Central America. Being along an ancient fault line has caused folds and faults throughout the area, due to the impact of the Antillean and Central American Plates. The thick soils and alluvial deposits of the area therefore hide many of the karst bedrock features. The *Cayo Group* deposits of the early Tertiary contain chert nodules and breccias within the limestone (Smith 1998). These cobbles have formed the basis for ancient local tool/flake production throughout the Lower Mopan region including the Buenavista area, where local chert deposits have been located nearby the minor centre of Callar Creek, in the Xunantunich area around the modern village of San Jose Succotz, and around the ancient hinterland area of San Lorenzo (Horowitz 2012; Rieth 2003; VandenBosch 1999; Yaeger 2000a).

Hartshorn et al. (1984) describe the modern day soils of the Buenavista region of this geologic area as a subunit of the Northern Karst Foothill Ranges, while King et al. (1991) place it within the Western Uplands Landform. The production of soils is limited and variable, due to their highly stony nature, though their strengths include a low erosion rate and relatively fertile lithosols and rendzinas (lime-rich soils). Fedick (1988) has demonstrated that differences in soil quality distribution correlate to some degree with prehistoric settlement patterns and organization within the Belize River Valley.

3.1.1.3 Flora.

The ecological zone of the Lower Mopan River Valley within the Cayo district is part of the Lowland Ecosystem (less than 400m above sea level) and home to a Subtropical Lowland Broadleaf Floral Community and Riverine Ecosystem (Jolly and McRae 2008:51). The area of the Lowland Broadleaf Forest that borders the area of Upland Broadleaf Forest of the nearby Vaca Plateau is also described as a Subtropical Moist Forest (Hartshorn et al. 1984) or "quasi-rainforest" (West 1964). These forest ecosystems develop on calcareous as well as non-calcareous soils that range from moderately drained to well drained (Jolly and McRae 2008:53). Tree roots in Broadleaf Forests meander for considerable distances over the forest floor because nutrients are only available in surface soils. This can cause much difficulty for the preservation of shallow archaeological materials, as is the case for many of the settlement sites investigated at Buenavista del Cayo where large tree and palm roots have significantly disturbed many mounds.

The broadleaf forests along the river valleys of west-central Belize are specifically Riverine or Riparian Broadleaf Forests and they experience an average annual rainfall of 1300 to 2000 millimetres (Di Fiore 2002; Jolly and McRae 2008:68). The rainy season, including the tropical storm and hurricane season, runs from roughly June to December/January, with the extremely dry months of April and May climbing into the high thirty and low forty degrees Celsius. April and May are therefore ideal times for *milpa* burning in the area, prior to the onset of June rains.

Natural vegetation includes high canopy forest, although local geography leads to different frequencies of plant and tree species. Along the river bottom and banks, typical species include willow, bucut, guanacaste, amate, bullet tree, bri-bri, white tamarind, and bamboo (Jolly and McRae 2008:69). The cohune palm (*Attalea cohune*) forests prevail in the Buenavista area, both in the past and present, although today this species presents a bias, as it is mostly what remains within bottomlands dominated by cow pasture. Mature forests would have been the norm in the UBV in ancient times, thus providing inhabitants with multiple resources, including trees, plants, and wildlife. A decrease in the availability of many species is noted for the Late to Terminal Classic within the valley, as pine species (Caribbean pines, *Pinus caribaea*) from the upland areas of the Pine Ridge and Maya Mountains were imported for use in elite households, potentially providing an important piece of information regarding the nature of "decline" and "collapse" in the valley at this time (Lentz et al. 2005; Morehart et al. 2005; Yaeger 2000a).

3.1.1.4 Fauna.

Although many wildlife species are rare within the densely populated valleys today, prehistoric species would have included those typical of the Central American jungle. These include deer (brocket and white-tailed), monkeys (spider and black howler), peccary (white-lipped and collared), tapir, paca, agouti, coatimundi, armadillo, various felines (jaguar, pumas, ocelot, margay), anteaters (tamanduas), and river otters in addition to many small rodents and marsupials (Jolly and McRae 2008:68; Willey et al. 1965; Yaeger 2000a: 84). Bird species would have also been extremely abundant, as they are today, including hawks, eagles, vultures, turkeys, scarlet macaws, parrots, sungrebes, kingfishers, herons, boatbills, flycatcher, etc. (Jolly and McRae 2008:68; Yaeger 2000a: 85). Reptiles are also key species along the rivers, including iguanas, crocodiles, snakes (venomous and non), as are many fish species, turtles, eels, and crayfish. The jute snails (*Pachychilus glaphyrus*, *Pachychilus indiorum*, *Pachychilus largillierti*), apple snails (*Pomacea*), and bivalve molluscs (*Nephronaias ortmanni*), prominent in small tributaries and creeks, were particularly important to the ancient Maya as well as modern populations as a readily available food source and raw material for ornament manufacture (Healy et al. 1990; Hohmann 2002; Moholy-Nagy 1978; Solis 2010; Stanchly 1995).

3.1.2 Buenavista del Cayo

Located roughly 400 m from the east bank of the Mopan River, Buenavista del Cayo lies approximately 6 km north of the ancient centre of Xunantunich and the modern Maya village of

San Jose Succotz,[4] 5 km west of Cahal Pech, 13 km south-southeast of El Pilar, 14 km east of the major city of Naranjo, 40 km northeast of Ucanal, 42 km north of Caracol, and 54 km east-northeast of Tikal (Ball and Taschek 2004:149) (Figure 3.4). The epicentre and core settlement of this upper-level centre are situated roughly at the divide between the two BV subregions, although more consistently within the UBV: exhibiting possible geographically-related similarities with centres in both areas in terms of settlement nature, size, and layout (Peuramaki-Brown and Hoggarth 2009).

The site is situated on the uppermost alluvial terrace (fourth, including the alluvial floodplain) of the Lower Mopan Valley bottomland, approximately 13 km above its confluence with the Macal, and at an elevation of 104.45 m a.s.l. (Ball and Taschek 2001). The surrounding landscape is marked by gentle rolling hills of dolomitic limestone and limestone-based clays of the Yaxha and Melinda Suites (Ball and Kelsay 1992:261; Lopez-Ramos 1975: 272; Kingery 1993:15; Rieth 2003; Smith 1998), and the area is drained by fresh water streams and creeks of the Mopan River drainage.

The site also lies roughly 1.5 km north of an important "jog" in the Mopan River (Figure 3.5). Located at this jog is the minor centre of Callar Creek on the west side of the river, and the "suburb barrio" of Guerra on the east side (Taschek and Ball 1986). Both sites are suggested hinterland zones of Buenavista, areas of presumed political subordination (Connell 2000; Yaeger 2000a: 170), particularly during the Early Classic period (300-600 C.E.) and early facet of the Late Classic (600-670 C.E.). Positioning and subsequent development of these outlying sites at this jog may be related to overall control of the river. Such a jog could easily be used to supervise, control, and even defend, if need be, movement on the river: possibly key to the general placement and development of centres along the Lower Mopan. This is similar to a feature known in military terms as a "diamond traverse", a crucial tool in trench warfare, comparable to river control situations (www.mhsm.ca).

The site epicentre, consisting of four large conjoined, open plaza complexes (East, Central, West, North), an Acropolis-Palace compound, two ballcourts (Late Preclassic and Late Classic), two pyramidal platform structures (exceeding 30 m in height), and more than ten

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[4] The village of San Jose Succotz is home to a descendent refugee population of Yucatec Maya who have emigrated from Yucatan (Mexico) and Guatemala over the years since the 19th century (Maurer 1997:17).

courtyard groups, comprises 0.12 km^2 of contiguous monumental construction spread out over approximately 0.18 km^2 (Ball and Taschek 2004:150) (Figure 3.6). Until roughly the 1960s the Buenavista locality was covered by humid riparian broadleaf forests at which time some significant historic disturbance began when much of the area was converted for heavy cattle and sheep pasturage (Hector Guerra, personal communication, 2009). This disturbance included the construction of modern buildings (today both active and abandoned) and clearing for livestock grazing, and most recently (2009-present) is being ploughed by tenants leasing portions of the property. Currently, the property is owned by the Guerra family, and the site was first officially reported to the Department of Archaeology (now Institute of Archaeology, Belize) in 1968, and formally recorded the following year (Ball and Taschek 2004:149, 164; Taschek and Ball 1986).

Overall, the site has been minimally impacted by looting activity, thanks in large part to its location just out of view from the nearby Mopan River and protection by property owners, and was not subject to the "dynamite archaeology" of Thomas Gann who investigated the region in the early 1900s (Gann 1925). In 1981, Joseph Ball and Jennifer Taschek of the San Diego State University visited the site to perform an informal archaeological reconnaissance and to assess the feasibility of conducting research and excavations. From 1984-1989 the Mopan-Macal Triangle project (MMT), directed by Ball and Taschek, conducted 22 months of survey and excavations at Buenavista and the nearby "suburb" of Guerra (discussed below).

3.2 Maya Prehistory

The archaeological Maya world is defined by the presence of shared material culture. Nonetheless its prehistory varies from subregion to subregion and even site to site (Table 3.1). The following outline covers the prehistory of the lowlands as understood from the subregion of Belize: an important "suburb" of the Maya heartland of the Central Petén (Hammond 1983, 1987; Rice 1974; McKillop 2004). A more detailed account of the Lower Mopan Valley history is provided in the discussion/concluding chapter when I couch the historically particular life history of the Buenavista del Cayo urban zone within a regional context.

3.2.1 The prehistory of Belize

The Paleoindian Period (ca. 10,000 – 8000/7000 B.C.E.) marks the first colonization of the Americas by peoples from Asia by way of the Bering land bridge and/or by watercraft along the coasts (Fiedel 2000). In Central America this period has been successfully pushed back to 11,000-13,000 years B.P. (Lohse et al. 2006:210) and is associated with the end of the Pleistocene era, with major subsistence patterns focused on the hunting of large Pleistocene (now extinct) megafauna. With their few stone tools and other implements, the first inhabitants of the New World gathered edible plants and fruit, and hunted the large animals once present along open savannas and river valleys. Their nomadic lifestyle meant they constructed no permanent houses and used few non-perishable material objects – mostly items of wood, bone and stone (Zeitlin and Zeitlin 2000). For this reason and the likelihood of their presence in areas that continued to be occupied over millennia (thus evidence is located far below current occupation on the landscape), remains from this period are extremely rare.

In Belize, most finds attributable to this period come from serendipitous surface finds or single diagnostic artifact finds (Lohse et al. 2006:210). These include a small number of highly distinctive fluted points from the northern and southern regions of the country. Two types of points, fishtail and fluted lanceolate points (Clovis-like), have been found along the New River Lagoon in Orange Walk, Lowe Range, Big Falls, Ladyville, and the Pine Ridge (Lohse et al. 2006:214-216). Faunal remains of an extinct horse, dated to the Terminal Pleistocene, were also found at Actun Halal in Western Belize (Griffith and Morehart 2001).

The Archaic and Preceramic Periods (ca. 8000/7000 – 2000/1000 B.C.E.), initiated with the Holocene in most areas of the world, is marked by wetter and warmer climates and the initial extinction of many of the large Pleistocene animals that once flourished in the Americas (mastodons, giant sloths, horses, etc.). These changes had important effects on human populations, such as an increased reliance on plants and smaller animals for subsistence. These changes led to the invention of new tools for use in the exploitation of different resources, the most diagnostic of which are large stone bowls and pestles (precursors to manos and metates), and smaller, wider projectile points. The new projectile or spear point had an appearance somewhat like a fishtail, aptly named Fishtail Points, and was used for hunting smaller Post-Pleistocene animals (Lohse et al. 2006).

The best evidence for Archaic Period human activity in Mesoamerica comes from the Tehuacan Valley (MacNeish 1981) and the Valley of Oaxaca, Mexico (Flannery 1986; Flannery et al. 1981; Marcus and Flannery 1996), including rockshelter campsites used by people during this period. Remains found within these arid environments include preserved plant/food remains, often in the form of carbonized seeds found within ancient hearths. Over time, many of the plants originally collected became domesticated, eventually leading to the establishment of the first permanent settlements.

Evidence for Archaic Period human activity in Belize is only slightly better than the preceding period, and ultimately little evidence exists before 3400 B.C.E. (Lohse et al. 2006:216). Numerous projects working in Belize over the years have helped to outline the Late Archaic period (ca. 3400 – 900 B.C.E.). Evidence suggests that during the last few centuries of the Archaic, a highly dynamic landscape existed involving both rapid changes in subsistence patterns, the start of horticultural practices, and associated settlement patterns. Proportionally more temporary sites are known from this time, suggesting expanding populations (although this may be due to archaeological biases for this period). Settlement is found to be diverse in location, focusing on swamps and lagoons, rivers, near-coastal, and upland areas, including rockshelters and caves, and may also have focused on lithic resource availability, as was the case at Colha in Northern Belize and the high-quality chert outcrops found in this area (Hester and Shafer 1984; Lohse et al. 2006:216).

Two types of diagnostic points are identified from Belize for the Archaic period. These include: Lowe points, dated to roughly 2500 -1900 B.C.E., known from finds at Ladyville, Pulltrouser Swamp, Western Belize, Sibun Gorge, and August Pine Ridge, and Sawmill points, currently lacking distinct dates, known from finds at Ladyville, Colha, Callar Creek (near Buenavista), and Actun Tzimin Cave. Additional Late Archaic find spots include the Rio Bravo Escarpment, Cobweb, and Blue Creek (Lohse et al. 2006:216-217).

In other areas of the Maya world, the Archaic ends with the advent of ceramic use: beginning ca. 1850 B.C.E. on the Pacific Coast of Chiapas, Guatemala, and western El Salvador with Barra phase ceramics (Blake et al. 1995). In Belize, however, after 2000 B.C.E. ceramics still are not in use. Therefore, an additional chronological distinction has been made known as the Preceramic, and further divided into an Early and Late phase.

The Preceramic, unique to Belize, is marked by a transition to maize agriculture and increasing regionally established populations. Macroblade technology, which continues into the Maya culture era, is known from the Early Preceramic (1500 – 900 B.C.E.). It is during the Late Preceramic, around 150 B.C.E., when an additional distinctive artifact appears in the toolkits of populations: the constricted uniface (Hester et al. 1980). These artifacts were used to cut hard to medium-hard materials, possibly wood, and also to impact soft surfaces such as soil (Gibson 1991). This would suggest, along with the changes in subsistence practices, use in the clearing and hoeing of land (Jones 1994). I also suspect they are the precursor to the General Utility Thick Bifaces (GUTB) commonly found in Late Classic household deposits (Appendix III). Constricted unifaces have been found at Colha and Altun Ha, in the Belize Valley, along the coastal plain, in Northwestern Belize, Caye Coco, Pulltrouser Swamp, Fred Smith, and Laguna de On (Lohse et al. 2006:216). These artifacts demonstrate a wide range of morphological variations, as does the Late Classic GUTB, as they were repeatedly resharpened and worn down (Aldenderfer et al. 1989; Rosenswig 2004).

Toward the end of the Late Archaic and start of the Early Formative (Early Preclassic, ca. 2000-1000 B.C.E.), some of the first permanent agricultural communities were established in the Maya area, many in Belize (Pohl et al. 1996). These early inhabitants also relied heavily on the consumption of terrestrial and aquatic animal resources for protein. However, the Early Preclassic is a difficult period in Belizean archaeology. In northern Belize, Iceland (2005) even suggests it does not exist due to the lack of pottery, and the shift from Preceramic to pottery does not occur until around 1000 B.C.E. (hence the aforementioned Preceramic transition phase). However, in other parts of Belize, most notably the Belize Valley, increasingly this period is represented at centres such as Blackman Eddy, Cahal Pech, and most recently, Xunantunich (Awe 1992; Brown 2010; Brown et al. 2011; Garber, Brown, Driver et al. 2004). Ceramics from this time and area are known as the Kanocha and Cunil Ceramic Complexes (Awe et al. 1990; Ball and Taschek 2003; Brown 2007; Cheetham 2005).

An issue of great interest in the study of the Early Preclassic centers is that of the cultural identity of people at this time. Many believe the first Maya-speakers settled along the Pacific coast (Guatemala and Chiapas) or along the Gulf Coast (Veracruz and Tabasco) and did not move into the Maya lowlands until about 1200 B.C.E. (Sharer 2000). If this is true it could mean the first agricultural settlements, discussed above, were not those of Maya-speaking peoples, and would suggest that people of Maya culture immigrated later into Belize and either displaced or intermarried with existing Preceramic populations. A shift in lithic technology between the Archaic and Early Preclassic (Cunil) may also support such an interpretation (James Stemp, personal communication, 2012).

Some of the earliest settled villages in Belize appear in the northern portion of the country around 1200 B.C.E. at Cuello, Colha, and Santa Rita. Early inhabitants constructed low, oval, masonry substructure platforms on which they erected pole and thatch superstructures for dwellings (Hammond et al. 2002; Hendon 2000). Most architecture at this time is residential, although some ritual buildings also exist (Aimers et al. 2000). The early ceramics of this area are known as Swasey. The first Maya settlers in the Belize Valley may have moved into the area around 1200 B.C.E., although debate still exists as to whether autochtonous development occured, establishing villages on hills overlooking the rivers and engaging in lifeways very similar to those of the north. By this time, people were already engaged in long distance trade, including the procurement of obsidian, jade, and iron pyrite from the highlands and marine resources from the coastal regions (Brown et al. 2004; Garber and Awe 2008).

The Middle Formative (Middle Preclassic, ca. 1000-300 B.C.E.) period was a time of rapid expansion with many new areas colonized across the Maya lowlands, including parts of Belize. These changes in population triggered an increase in social and political complexity, the appearance of chiefdoms, as well as interaction between distant areas (Garber and Awe 2008). Important large Middle Preclassic centres in the Maya world were focused on the Mirador Basin of the Péten (Hansen 1998), while those in Belize include Cahal Pech, Lamanai, Cuello, Santa Rita, Colha, and Blackman Eddy (Garber et al. 2004; McKillop 2004), although most sites in Belize have initial colonization at this time including Buenavista del Cayo.

Populations in the Maya area continued to grow during the Late Formative (Late Preclassic, ca. 300 B.C.E. – 100 C.E.) period, with many new sites being founded. Many of these centres were concentrated along trade routes that connected the Maya heartland region with the highlands and the coastal zones. The Belize River system is one of these important trade routes (Graham 1987; Hammond 1972).

Many of the hallmarks of later Classic Maya civilization are now known to have developed in the Late Preclassic, or even earlier: mathematics/calendrics, writing, stelae, monumental architecture, corbelled vaults, cross-regionally uniform ceramics and polychromes, and definite elite strata and possible kingship systems (archaic states) (Hansen 1998). In Belize and the Petén a stucco mask tradition on buildings may have preceded the use of stelae monuments (Estrada-Belli 2001; Freidel and Schele 1988). In addition to masks, Preclassic stelae have been recovered from Cahal Pech (Stela 9, earliest in Belize), Actuncan, and Cuello

(Helmke et al 2010). Important Late Preclassic centres in Belize include Lamanai, Cerros, Cahal Pech, Actuncan, Nohmul, and La Milpa (McKillop 2004).

The Protoclassic, or Terminal Late Preclassic (ca. 100-300 C.E.). Early Classic (300-600 C.E.), and subsequent Late Classic period (ca. 600-800 C.E.) witnessed further population increase throughout the Maya world. This is represented by a proliferation of new sites in all areas and the continuation of urban tendencies initiated in the Preclassic with the increased clustering of people around civic-ceremonial centres. Along with this settlement change came an increased specialization in the arts, public works, administrative duties, and commerce. The expansion of trade networks and increased contact with other communities also led to greater cultural similarities, particularly among the elite and noble strata of societies, with regards to architecture, ritual paraphernalia, pottery, hieroglyphic inscriptions, and ideological concepts (Friedel 1986; Chase and Chase 1992). Nearly all carved monuments in the Maya area date to the Classic periods, predominantly expressing historical data, and recording the births, marriages, accessions, deaths, and exploits of kings and queens (Martin and Grube 2008; Schele and Mathews 1991).

Studies of ancient settlement patterns suggest populations of Classic period centres were far greater than previously believed, with Belize alone containing more prehistoric mounds than modern houses, with population estimates in the millions by 600 C.E. (Sharer and Traxler 2006). This information has subsequently led to the negation of earlier hypotheses that argued the ancient Maya were predominantly non-urban *milpa* farmers (Harris 1972; Mathewson 1977; Reina 1967; Turner, II 1974; Wilken 1971). New research has recorded evidence of a variety of intensive agricultural systems that were utilized by the Maya during the Classic period. In the Vaca Plateau and Maya Mountains, thousands of stone-walled terraces have been mapped around major centres in the region, in particular the large city of Caracol (Chase et al. 2011; Healy et al. 1983; Macrae 2010). In the Belize Valley, series of ditches to control water levels during the rainy season have been recovered, and further to the north along the New River and Rio Hondo, ancient Maya inhabitants created an expansive system of raised fields (Fedick et al. 2000; Lucero 2002; Neff 2008; Scarborough 1998).

Further increases in population later in the Classic period likely led to increased competition for limited resources, including quality agricultural land. This in turn may have strained relations between centers, possibly resulting in widespread conflict and perhaps warfare

(Webster 2000), although evidence for the latter is scarce in Belize and many other regions of the Maya world. Excellent evidence does exist for increasing conflicts and competition between the large cities of Caracol, Naranjo, Tikal, and Calakmul provided by the inscriptions found on various monuments (Martin and Grube 2008), although the nature of such conflict is still largely unclear (Helmke et al 2012). The chronologies and histories of these sites, particularly Naranjo, are further addressed in Chapters 8.

The Terminal Classic period (ca. 800-900/1100 C.E.) is characterized by dramatic changes in many parts of the central/southern Maya lowlands, including the cessation of construction of large civic architecture, a halt in the erection of monuments, a decline in resident populations at many centres, and the subsequent abandonment of many sites. Throughout the study of Maya prehistory, these events have traditionally been associated with the famous "Great Collapse". However, sites in the Northern Lowlands, such as Uxmal, Kabah, Sayil, Labna, and Chichen Itza, actually increased in size and population at this time. These northern centers rose to prominence and truly began to flourish at the time when other lowland regions were failing. In the Yucatan, Chichen Itza became the dominant center during the Early Postclassic (ca. 900/1100-1200 C.E.); suggesting Maya civilization did not in fact fail, but changed drastically following a shift in location of the heartland (Sharer and Traxler 2006).

Despite these changes, one should not assume that every single site in the central/southern lowlands was abandoned between 800 and 900 C.E.: the standard time span quoted for the Terminal Classic in the Maya lowlands. At Baking Pot in the Cayo District, occupation continued into the Early Postclassic (ca. 900-1200 C.E.) and Tipu (Negroman), Lamanai, Santa Rita, and many coastal sites remained important centers, maintaining contact with the cities in the north (Aimers 2004, 2007).

At the start of the Late Postclassic period (ca. 1200-1502 C.E.) cities such as Chichen Itza and Mayapan were among the most prominent in all of Mesoamerica. Many of the surviving Itza eventually left the Yucatan and moved south to the Petén where they founded a new island capital by the name of Tah Itza (Tayassal, present day Flores). Cities in this area survived well past the initial arrival of the Spanish in the New World (Jones 1998). In the Belize region, Maya populations survived into Spanish times, with occupations at Lamanai and Tipu (Negroman) attracting Spanish mission activity (Graham 2011; Pendergast et al. 1993).

3.3 History of Research in the Belize Valley

Significant research conducted in the Maya Lowlands over the past half-century now permits archaeologists to develop broader regional comparative statements concerning patterns of ancient settlement, households, and potentially, associated social and political organization. This is particularly true for the Belize Valley where significant settlement studies have taken place since the 1950s (Chase and Garber 2004:11; Willey 2004). Today, and in the more recent past, numerous projects continue this legacy of research, examining settlement of various scales (upper, middle, and lower-level) on the socio-political spectrum. Much of this recent and past research has been excellently summarized in the volumes *The Ancient Maya of the Belize Valley: Half a Century of Archaeological Research* edited by Garber (2004), *Perspectives on Ancient Maya Rural Complexity* edited by Iannone and Connell (2003), *Classic Maya Provincial Politics: Xunantunich and Its Hinterlands* edited by LeCount and Yaeger (2010a), and most recently *Chan: An Ancient Maya Farming Community* edited by Robin (2012), as well as in the annual *Research Reports in Belizean Archaeology* published by the Belize Institute of Archaeology. In the following section I summarize some of the studies most critical to this research.

Due to the long established tendency in Maya archaeology involving the focus of studies on elite segments of society, including the investigations of large centres, elaborate burials, monumental architecture, hieroglyphic inscriptions, etc., a significant bias has been created in our knowledge of the ancient Maya, creating a disproportionate view of Maya society. It is generally accepted that the elite portion of complex societies encompassed no more than 5-15% of a given population, while among ancient Mesoamerican populations it is generally accepted that only 5-10% of populations were elite (Trigger 2003). This creates a paucity of information for the majority (commoner) of populations and a bias in conclusions drawn for any given enquiry. The development of settlement archaeology and household archaeology sought to address the questions that remained unknown for Maya commoner populations. Early efforts were made in the 1940s, although significant progress was not achieved until the 1950s and 1960s, beginning with the work of Gordon Willey in the Viru Valley of Peru and later in the Belize Valley (Willey 2004; Willey et al. 1965).

The growing interest in settlement pattern studies during the 1950s and 1960s aimed to better understand Maya society as a whole, with main questions concerning the functional aspects of urbanism (Chapter 1), including issues surrounding “Vacant ceremonial centers”, “regal-ritual centres”, and “economic exchange centres”, and settlement pattern issues focused on the understanding of the spatial correlates of social groupings (stressing social and ideological determinants of settlement patterns), and the study of relationships between people and the environment (ecological factors such as soil types, agricultural potential, resource catchment areas). These early settlement pattern studies could be divided between those of the Mesoamerican highlands, particularly the Basin of Mexico survey (Blanton 2005) that tended to focus on the ecological factors, while in the Maya Lowlands a greater emphasis was placed on issues of social organization and cultural patterning (Willey 2004). This was likely due to the difficulty posed in conducting large-scale, full coverage surveys in most of the Maya lowlands due to significantly greater vegetation cover (surveys tending to be transect-based).

It wasn’t until the work of Gordon Willey and his colleagues along the banks of the Belize River proper in the 1950s and 1960s, building on earlier unique settlement survey and housemound research at Uaxactun, that settlement and household archaeology in the Maya world really came into its own (Bullard 1960; Bullard and Bullard 1965; Mazzarelli 1976; Wauchope and Ricketson 1934; Willey et al. 1965). Rather than examining solely monumental epicentres, scholars began addressing questions of social organization from the bottom-up, examining house mounds in order to gain a more thorough understanding of Maya society. Subsequently, household archaeology came to the forefront in Mesoamerican archaeology in the 1970s, particularly after the publication of *The Early Mesoamerican Village* (Flannery 1976): a systematic investigation at a micro-scale, focusing on activity areas, households, and communities in Oaxaca. Household archaeology took off in the 1980s, and in many respects, work in the Belize Valley has led the charge.

In the 1950s Gordon Willey and others conducted settlement research at several archaeological sites in the Belize Valley, including Barton Ramie, Baking Pot, Melhado, and Spanish Lookout (Willey et al. 1965), in addition to a series of test excavations of house mounds. This work eventually led to the seminal volume by Gifford (1976), outlining the ceramic sequence for this subregion of the Maya world, found to be different from the already established sequences at Uaxactun (Smith 1955) and San Jose (Thompson 1939). This sequence has been further refined by recent ceramic studies (LeCount 1996; Shelton 2008; Sunahara 2003, etc.). Since this time, subsequent research throughout the Belize Valley carried out by numerous scholars and projects have served to confirm and significantly expand our knowledge of the developmental trajectory and cultural historical sequence of this area of the Maya world, spanning the Palaeoindian to Historic times.

In terms of general settlement for the valley, an observed trend noted by all projects is with regards to dispersed settlement (Chapter 1) and centre placement. Early on in the valley history, during the Preclassic, important sites were positioned on higher areas of elevation. For example, Actuncan is located on a ridge, Blackman Eddy is positioned on a hill overlooking the valley, and Cahal Pech is located at 166 m a.s.l. on the highest knoll of a steeply rising bluff overlooking the town of San Ignacio and the Macal River. Later on, important centres are established at lower elevations on the valley floor, such as Baking Pot and Buenavista that is located at 104 m a.s.l. Finally, in the terminal phases of the valley, important sites are once again placed at higher elevations, such as Xunantunich that sits at 172 m a.s.l. on an artificially leveled limestone ridge (Ball and Taschek 2004). It is also generally accepted that Cahal Pech served as the "gateway" to the Macal River, while Actuncan (Preclassic), Buenavista (Early Classic and Early Late Classic), and Xunantunich (Terminal Classic) served as the "gateway" to the Mopan (discussed further in Chapter 8).

3.3.1 Belize Valley Archaeological Reconnaissance (BVAR)

In the CBV, the Belize Valley Archaeological Reconnaissance (BVAR, 1992-present) resumed settlement research initiated by Willey, focused particularly around the sites of Baking Pot and Cahal Pech (Conlon et al. 1994; Hoggarth 2012; Hoggarth et al. 2010). This program has provided a wealth of information concerning the organization of settlement at many of the sites in the CBV and their relationship to agricultural production and community integration. This research complements, and at time contradicts, findings of the previous Belize River Archaeological Settlement Survey (BRASS) that undertook a huge project involving the survey of residential remains from different riverine environmental zones, with close attention paid to soil quality, within the Belize River area in particular around the large site of El Pilar and its hinterlands (Fedick 1988; Ford 1984, 1991; Ford and Fedick 1992). Although residential excavations were not an extensive focus of the BRASS project, the necessary framework for a more complete database was established.

Current research by BVAR at Baking Pot, particularly work by Hoggarth (2012), is investigating settlement organization and household variability within the core and hinterland zones. Similar to investigations at Buenavista, research at Baking Pot seeks to better understand Maya social and political dynamics of the region through a community-based approach, avoiding the pitfalls of both the top-down polity-based approaches and bottom-up approaches that focus on individual households. The site of Baking Pot is located on the southern bank of the Belize River, east of the confluence of the Mopan and Macal rivers that make up its upper branches. Baking Pot was occupied as early as the Middle Preclassic period into the Early (and perhaps Late) Postclassic period, reaching its peak during the Late Classic.

Hoggarth's work examines changing domestic and community organization in the transition from the Classic to Postclassic, and is particularly concerned with commoner strategies of adaptation and their role in social reorganization. To better understand these processes Hoggarth tested three models for active participation of commoners in social reorganization: (1) a political model suggesting that commoners were increasingly incorporated in feasting activity from the Late to Terminal Classic, (2) a mercantile model suggesting that with diminished tribute demands, along with an increasing emphasis on maritime trade, commoner households were able to utilize their surplus to trade for long distance goods they may not have had access to, and possibly establishing new market exchange systems, and (3) a model exploring commoner appropriation of foreign religious ideology and practice. To date, Hoggarth's work has demonstrated that commoners continued to live at Baking Pot well into the Early Postclassic, actively shaping new decentralized, political, mercantile, and ideological organizations of society.

3.3.2 Xunantunich Archaeological Project (XAP)

In the UBV, work by the Xunantunich Archaeological Project (XAP, 1991-1997) and the associated Xunantunich Settlement Survey (XSS), spawned numerous offshoot investigations including the Mopan Valley Archaeological Project (MVAP), the Actuncan Archaeological Project, the Mopan Valley Preclassic Project (MVPP), and the recently completed Chan Project. Work by XAP outlined the development of Xunantunich and it hinterlands through a joint focus on the monumental epicentre and surrounding settlement. This work served to outline a chronology for the site's development, and Xunantunich is argued to be the "successor" centre to

Buenavista del Cayo. Along with research at Xunantunich, preliminary investigations were engaged at the nearby site of Actuncan, argued to be the predecessor of Buenavista in matters of valley control (Chapter 8).

Throughout this research, a number of dissertation studies on households and communities under the auspices of XAP will be referred to repetitiously. These works, on which much of the design of this dissertation is based, include hinterland household and community studies by Yaeger (2000a) at San Lorenzo, Robin (1999) at Chan Nohool, and Connell (2000) at Chaa Creek. All studies focused to some extent on the transition period from the early (600-670 C.E.) to late (670-780 C.E.) facets of the Late Classic (represented by a shift in ceramic assemblages between the Samal and Hats' Chaak phases, Table 3.1), at which time it is argued Xunantunich took over from Buenavista as the dominant centre in the Lower Mopan Valley. Due to the similarities in investigative methods and topics of focus, I use the databases compiled by these project to compare/contrast with my own findings.

XAP research determined that the medium-sized centre of Xunantunich rose to prominence rather rapidly and late in local valley history (Yaeger and Robin 2004; LeCount and Yaeger 2010b). During the early facet of the Late Classic (Samal phase, 600-670 C.E.), large-scale construction began on the prominent "El Castillo" (Structure A-6) at the site. In the late facet of the Late Classic (Hats' Chaak phase, 670-780 C.E.), the bulk of the site's monumental architecture was constructed, although several areas fell into disuse by the late facet of the phase. During the Terminal Classic (Tsak phase, 780-890 C.E.), the ritual life of the city became focused around El Castillo, Structure A-1, and Plaza A-1. Several buildings were modified, although these projects were neither large nor extensive, and required less labour than earlier Late Classic projects. At this time, leaders may have sponsored more explicit representations of individualized political authority, represented by three carved stelae of nobles in ceremonial and military garb. By the end of the Terminal Classic, most of Xunantunich proper and its sustaining hinterlands were abandoned. The life history of Xunantunich and its hinterlands is further addressed in Chapter 8.

3.3.3 Mopan-Macal Triangle Project (MMT)

As mentioned above, Buenavista del Cayo was first officially reported to the Department of Archaeology, Belize, in 1968 and formally recorded in 1969. In the 1980s Joseph Ball and

Jennifer Taschek conducted the first survey and mapping of the site, aimed at understanding the interaction of different sites of varying sizes within the Upper Belize Valley. Investigations focused on the sites of Buenavista del Cayo, Nohoch Ek, Cahal Pech, Las Ruinas de Arenal, and to a degree, Xunantunich (Ball 1993; Ball and Kelsay 1992; Ball and Taschek 1988, 1990, 1991, 2001, 2003, 2004, 2007; Kelsay and Taschek 1987; Taschek and Ball 1986, 1987, 1992, 1999, 2003, 2004). Work by MMT created an initial chronological sequence for the site and its hinterlands, producing many Masters' theses focused on individual artifact classes and excavations (Black 2007; Blankenship-Sefczek 2011; Clowery 2005; Gilmer 1999; Lumsden 1994; Mitchell 2006; Otto 1995; Rieth 2003; Sandoval 2008; Tritt 1997). Since 2005 the Mopan Valley Archaeological Project (MVAP), directed by Dr. Jason Yaeger of the University of Wisconsin-Madison (until 2009) and the University of Texas-San Antonio (current), has continued investigations at the Buenavista epicentre and core, and in the surrounding hinterlands (Yaeger et al. 2009, 2010, 2011, 2012). The following section summarizes findings of both the MMT and MVAP projects, relevant to this research.

From their work, including large "stripping" excavations of the palace complex, investigations in all major plaza areas, and in the hinterland "suburb" of Guerra 1.2 km to the south, MMT research established that the Buenavista epicentre was first occupied in the Late Middle Formative and declined relatively quickly at the start of the 9th century. The following is summarized from the latest publication by Ball and Taschek (2004), as well as personal communication with Ball by various MVAP project members regarding MMT excavations and results, supported by over 80 radiometric and 50 obsidian hydration dates from the Late Preclassic to Terminal Classic periods.

The Middle Preclassic (ca. 950-650 B.C.E., Kanluk and early Umbral phases) (Table 3.1) hosted the initiation of settlement at the site on or above the third alluvial terrace through twelve recovered discrete loci, including four in the centre proper and two patio groups at the suburb of Guerra. At this time, the location was likely the site of a single discrete farmstead or possibly a small agricultural hamlet. No human remains, dressed or plastered masonry architecture (monumental) were recovered; as opposed to the richer remains discovered at Cahal Pech for the 10th through the 6th centuries B.C. (Awe 1992; Garber et al. 2004).

It is during the Late Preclassic and Protoclassic (ca. 650/550 B.C.E. – 240/420 C.E., late Umbral, Xacal, and Madrugada phases) that clear social distinction and ranking between sites emerges in the archaeological record of the Belize Valley. At Buenavista, this period provides evidence of the earliest formal architecture within the epicentre – as is also the case at Barton Ramie, Cahal Pech, Tolok, Nohoch Ek, Actuncan, Arenal, and El Pilar. By the late first century B.C., major architectural endeavours were pursued in the epicentre, including a substantial and elaborate residence platform complex in the southern portion of the site. It is at this time that Taschek and Ball (2004; Ball and Taschek 2003) see the possible initiation of a tripartite political structure developing between Cahal Pech, Buenavista, and Actuncan (later replaced by Xunantunich): an idea that has caused much controversy among Belize Valley scholars (Driver and Garber 2004; Helmke and Awe 2008; Leventhal and Ashmore 2004; Leventhal et al. 2010). In terms of ceramic variability, there is little visible change from Late Preclassic through to the Protoclassic, with limited import of materials such as Petén glosswares. Some evidence exists at this time for local intra-community status difference, as displayed in burials found from a number of sites.

By the Early Classic (ca. 240/420-540 C.E., Ahcabnal phase) the valley, including Buenavista, witnesses dramatic discontinuities in long-established ceramic types, groups, wares, and forms, both in terms of elite and commoner assemblages. Residential settlement increases in size as testified though an increased number of new suburban residential house mounds, patio groups, and plazuelas in the immediate environs of Buenavista and across the rural countryside and at Cahal Pech. Ball and Taschek suggest seasonal distributions of populations, linked to their ideas of a tripartite organization to the royal court, however little evidence exists in support of this idea. The site epicentre witnesses a surge in large-scale, formal architectural activity, in addition to increased residential construction in both the northern and southern sectors of the site. Ceramic assemblages now incorporate Mount Maloney forms, a domestic utilitarian black slipped ware (LeCount et al. 2002), along with the Balanza Black group and orange-base polychromes.

The Middle Classic (ca. 540-670 A.D., Gadsden phase) is marked by the fall of the Central Mexican site of Teotihuacan, which had significant repercussions across Mesoamerica. This period led into the Late Classic florescence and Terminal Classic decline of the site (ca. 640/660-950+ C.E., Mills, Paloverde, Sacbalam, and Jirones phases). Much of the monumental construction continues during the Middle Classic and beginning of the Late Classic, including

Structure 46, the unfinished *sacbe* that was initiated sometime late in the Paloverde phase (ca. 780~820 C.E.) but never completed (it simply peters out on its east end).

During the Late Classic, the placement of caches within the central plaza area of Buenavista becomes a common practice. Mid-7th century ceramic assemblages include the reappearance of volcanic ash temper within red wares: ash was present in Middle Preclassic materials, but by the end of the period an increase in carbonate (calcite) temper occurred, with disappearance by Protoclassic and entirely absent in the Early Classic (Sunahara 2003).

The appearance of what Ball and Taschek (2004:160) term the "Buenavista Device" on Palmar Orange-polychrome vases occurs in the late seventh and continuing into the eighth and ninth centuries: an octopod-like design on decorated finewares, which they feel may have functioned as an emblem or toponym associated with the Buenavista ruling house. It should be noted that this device is not isolated to Buenavista, and appears frequently on Saturday Creek polychromes from Barton Ramie depicted in Gifford (1976:199). Buenavista is also associated with a Late Classic palace school of decorated ceramic vessels: documented archaeologically by palace-associated dumps producing polychrome painted ceramics (Reents-Budet et al. 1994, 2000). This consisted of the production of special-purpose, high-status painted ceramics.

Also from the early 8th century was the discovery of Burial 88B-11 in the summit of the BV-1 pyramidal structure (Mitchell 2006). This is the "cairned crypt" of a young adult male burial, from which the polychrome "Buenavista Vase" was recovered. Also known as "Lord Smoke Squirrel's Cacao Cup", this Cabrito Cream Polychrome cylinder vase is well known for providing iconographic and hieroglyphic evidence potentially connecting the site of Buenavista to the larger Petén site of Naranjo, believed to be the principle polity controlling the Belize River Valley throughout most of its history in the Classic period (Houston et al. 1992; Taschek and Ball 1992).

During the Early Postclassic (ca. 950 – 1100/1200 C.E.), a possible remnant Late Classic palace population survived the centre's decline and aftermath, and some Postclassic material was found at surface on mounds in the Guerra settlement. Elsewhere in the valley, household material assemblages indicate the influence of northern styles in ceramics and other artifacts at this time, possibly linked to significant trade route shifts in the Maya world (Aimers 2004; McKillop 2010; McKillop and Sabloff 2005).

3.3.4 Mopan Valley Archaeological Project (MVAP)

Since 2005 MVAP has sought to understand the social, political, and economic complexity of the Lower Mopan River Valley, with special attention paid to the relationships between the civic-ceremonial centres of Xunantunich and Buenavista del Cayo. From 2007 to 2010, extensive research was conducted in the East Plaza of the epicentre, in the core settlement zone immediately south of the epicentre known as the Buenavista South settlement zone or BVS (this dissertation), and on the opposite side of the Mopan River at the minor center of Callar Creek and the Callar Creek North settlement zone (Cap 2011, 2013; Yaeger et al. 2009, 2010, 2011, 2012).

3.3.4.1 Callar Creek

Recent work by Sarah Kurnick (Yaeger et al. 2011, 2012) at the minor centre of Callar Creek is increasing our understanding of settlement development of the area between Buenavista and Xunantunich, particularly during the early to late facet Late Classic transition. Current excavations suggest much more activity in the late facet Late Classic and Terminal Classic periods than previously believed, as expressed in Ehret (1995), where an 89% abandonment during the transition was suggested for the Callar Creek Buffer Zone. Kurnick's preliminary work has uncovered ceramics ranging in date from the Middle Preclassic to Terminal Classic periods (1000 B.C.E.-890 C.E.). Ceramics dating from the Early Classic (300-600 C.E.) and early facet of the Late Classic (600-670 C.E.) appear localized to certain areas of the site, and specifically to the area west of Mound 7, suggesting that some, but not all, of the site was occupied at that time. Ceramics also suggest a significant increase in activity during the Late Classic Period, and include final construction phases of Mound 2, Mound 14, and Plaza 1 dating to the late facet of the Late Classic (780-890 C.E.) or later.

3.3.4.2 Buenavista South (BVS) Settlement

The following chapter outlines my program of investigation and results of work in the Buenavista South (BVS) settlement zone (Figure 3.5). Results of Cap's (2011, 2013) research in the East Plaza, in addition to information about the *sacbeob* (formal causeways) at Buenavista, are presented in Chapter 6 where they are featured in the discussion of urban integrative built environment at Buenavista.

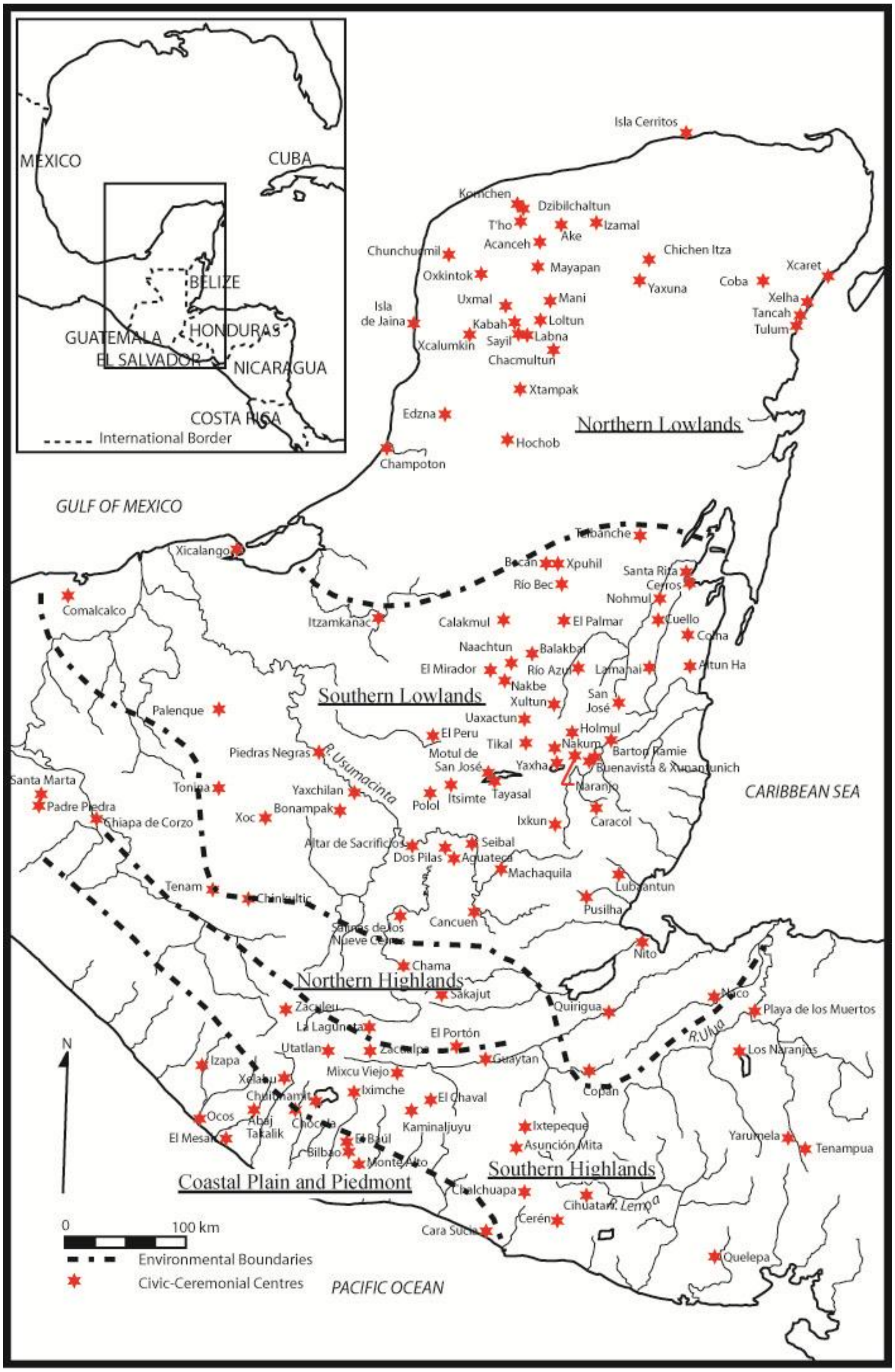

Figure 3.1: Map of Maya area showing major sites and environmental zones (redrawn from Sharer and Traxler 2006).

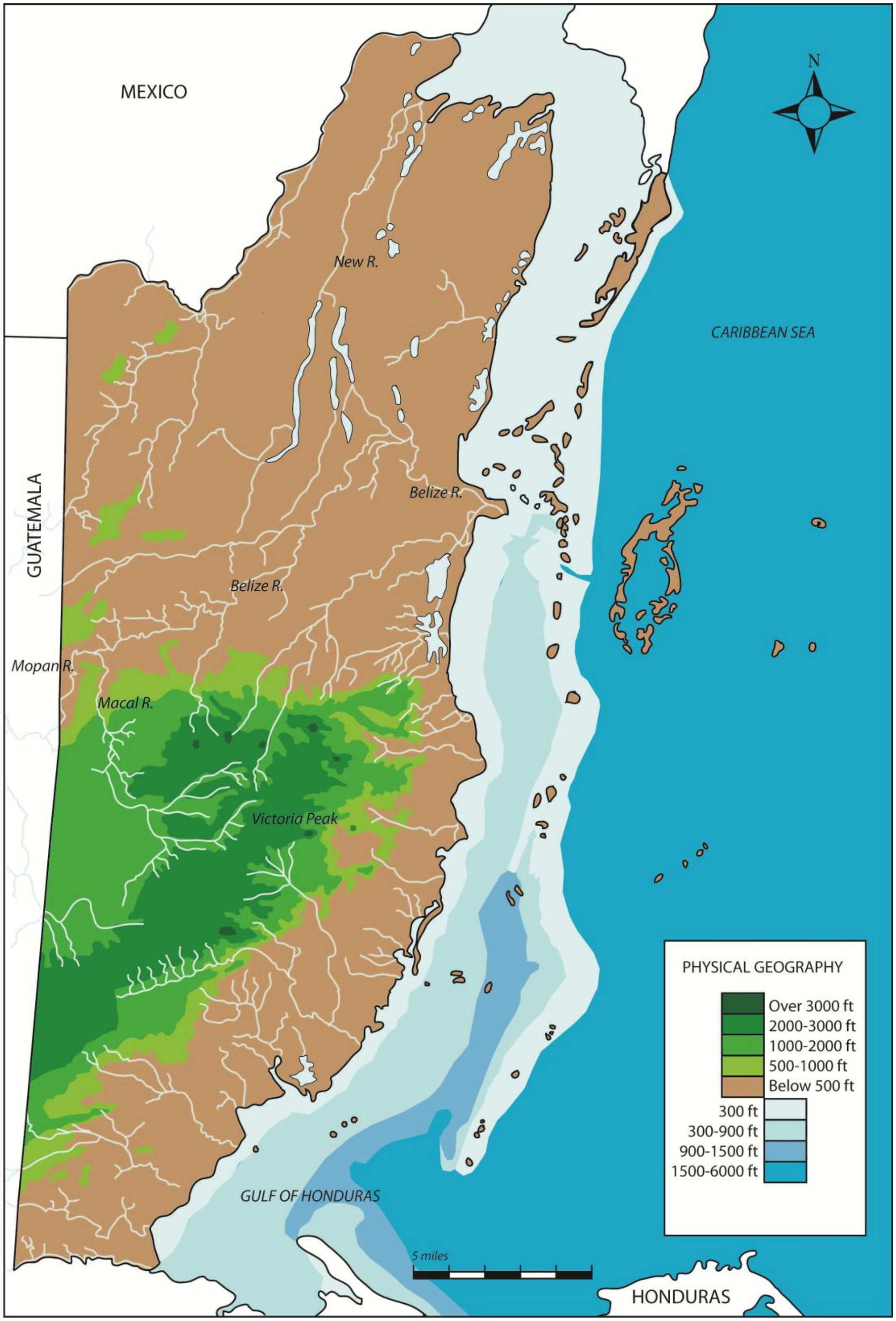

Figure 3. 2: Physical map of Belize with major rivers (redrawn from Gray and Leslie 2008:13).

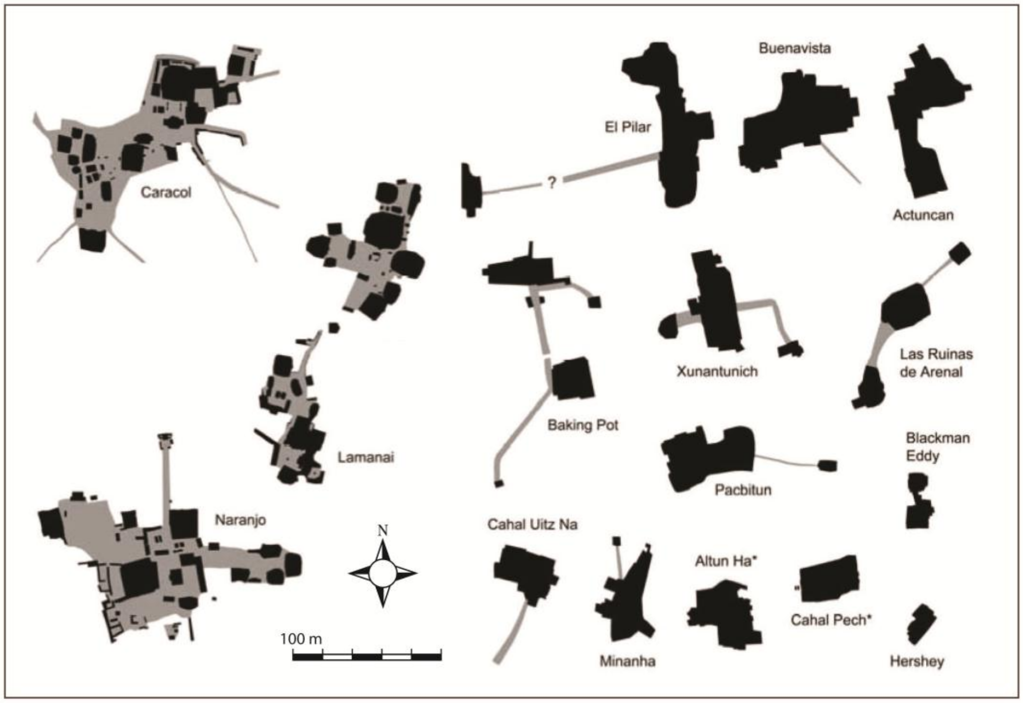

Figure 3. 3: Comparison of various "major centres" of central Belize and Eastern Guatemala (modified from Helmke and Awe 2008: Fig.4).

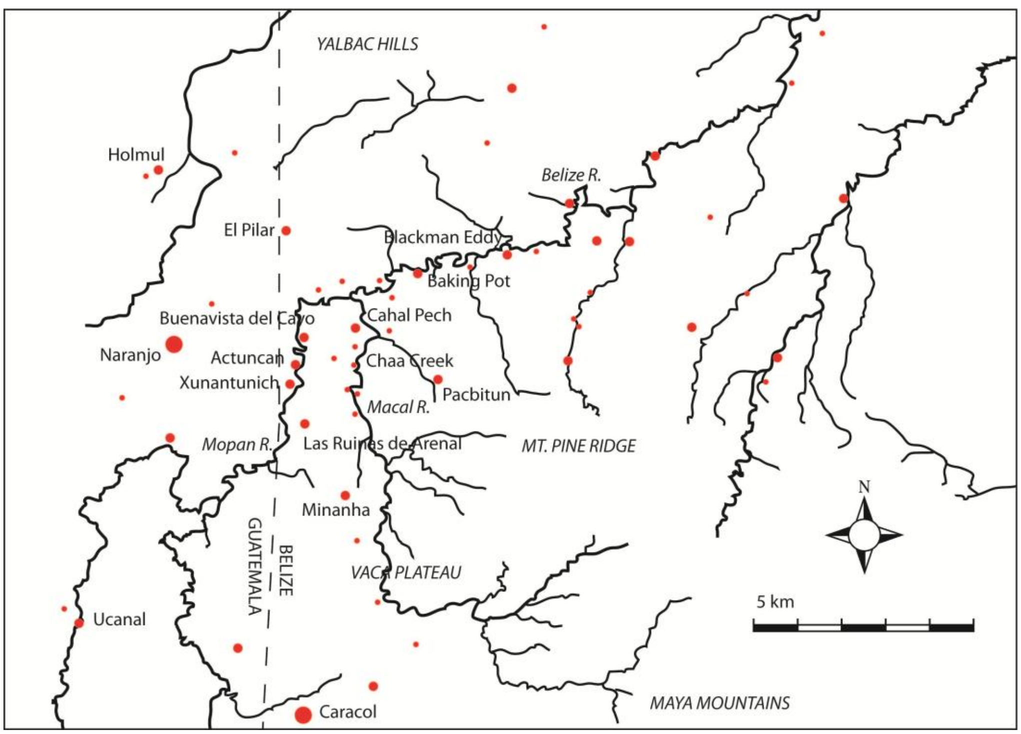

Figure 3.4: Map of central Belize or the greater Belize Valley showing many of the sites discussed in the text (redrawn from Helmke and Awe 2008: Fig.2).

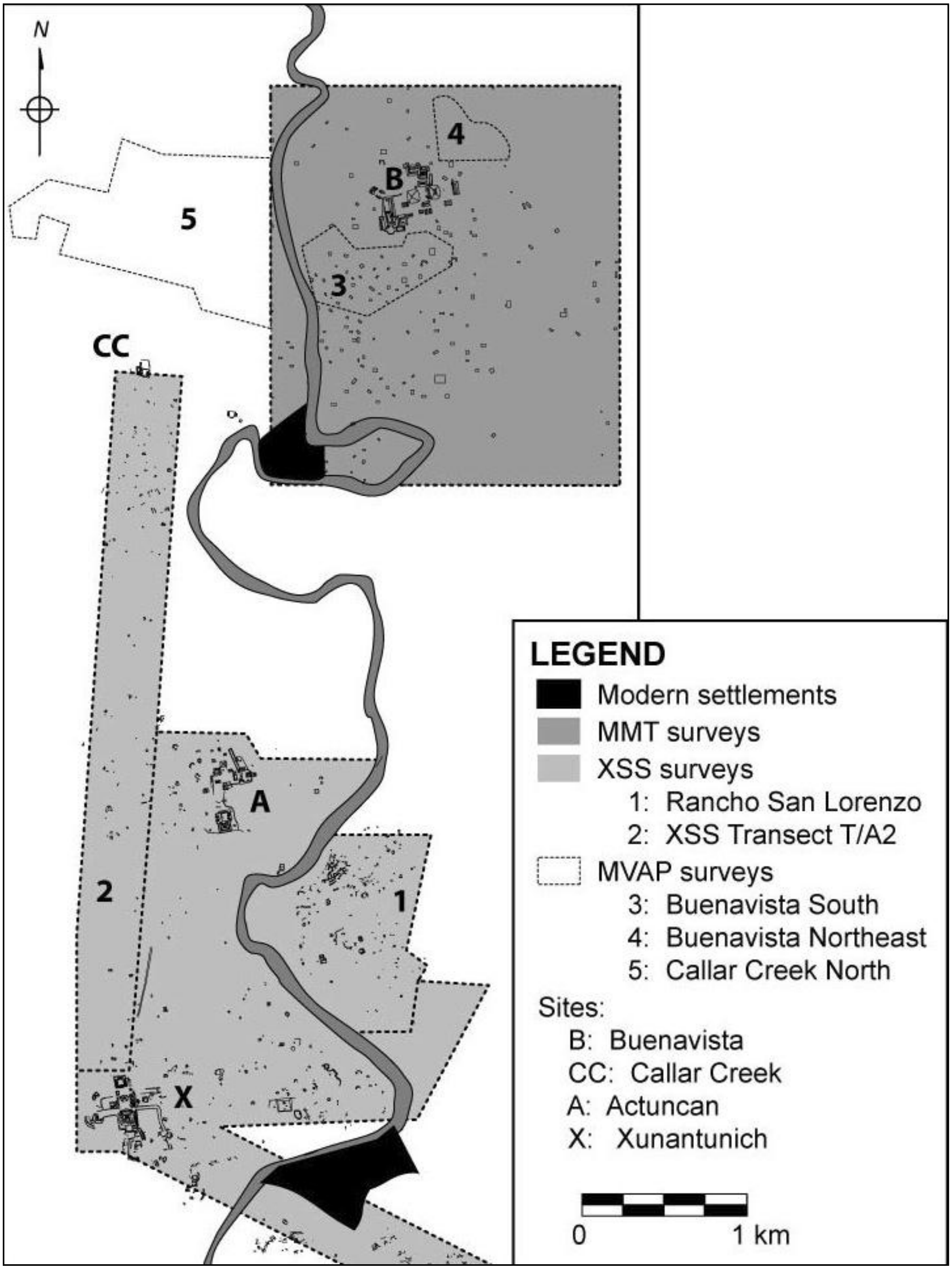

Figure 3. 5: Map of the Lower Mopan Valley (modified from Yaeger et al. 2011: Fig. 2).

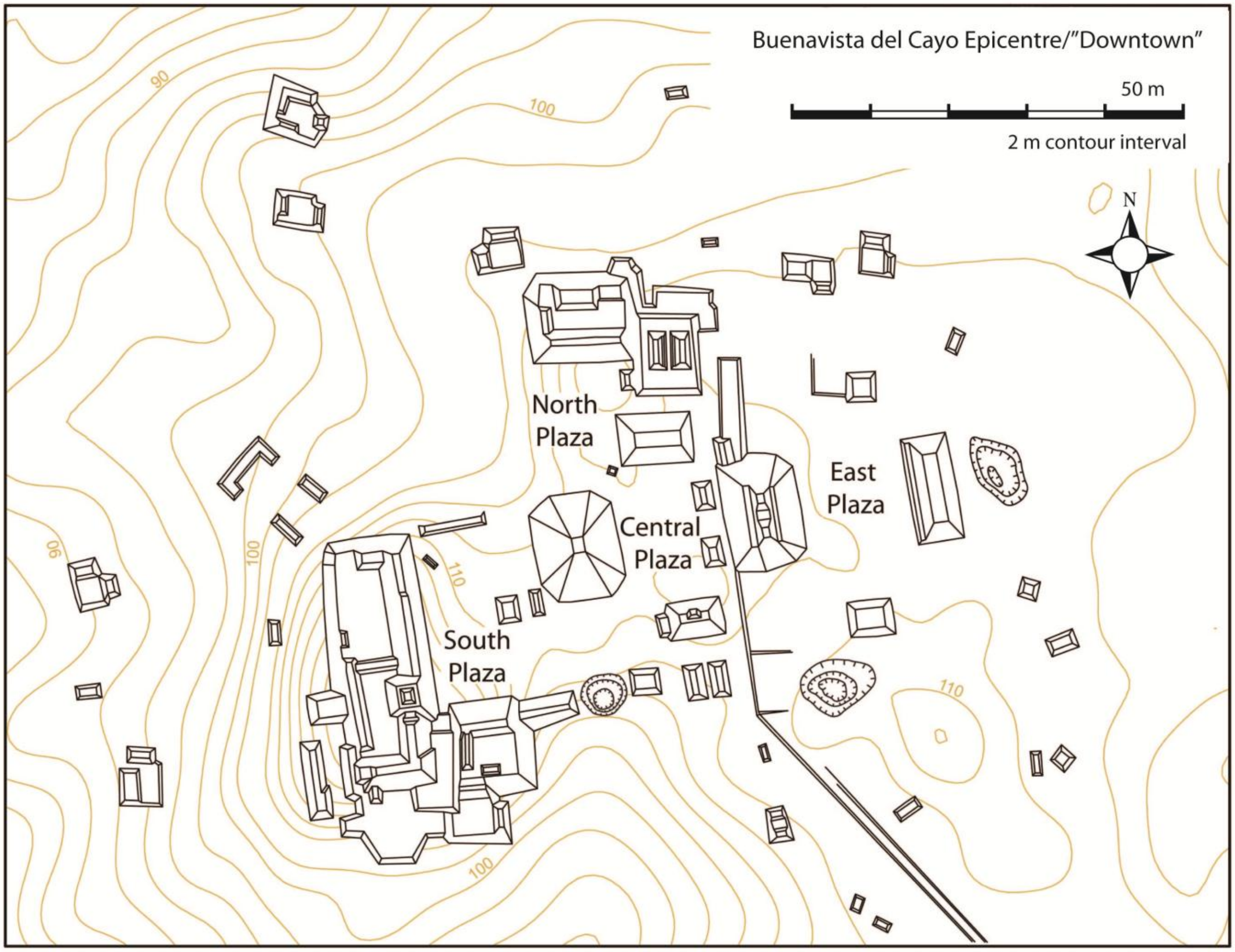

Figure 3.6: Buenavista epicentre (modified from Ball and Taschek 2004).

Date	Major Periods	Buenavista ceramic phases	Xunantunich ceramic phases	Barton Ramie ceramic phases	Codes	
1500	**Late Postclassic**					
1400					LPC	
1300						
1200	**Early Postclassic**	Jirones		New Town		
1100					EPC	
1000	**Terminal Classic**	Sacbalam				
900		Paloverde (750-820)	Tsak' (780-890)	Spanish Lookout	TC	
800	**Late Classic**	Mills (670-750)	Hats' Chaak (670-780)		LCII	LC
700		Gadsden (540-670)	Samal (600-670)	Tiger Run	LCI	
600	**Early Classic**					
500		Ahcabnal (240-520/540)		Hermitage	EC	
400						
300	**Protoclassic**	Madrugada		Floral Park/Mount Hope	PP	
200						
100 CE	**Late Preclassic**	Xakal		Barton Creek	LP	
100 BCE						
200						
300						
400	**Middle Preclassic**	Umbral (550-220)				
500						
600						
700		Kanluk		Jenny Creek	MP	GP
800						
900						
1000						
1100	**Early Preclassic**					
1200					EP	
1300						
1400						

Table 3.1: Culture history chronology: comparison of general periods with ceramic phases mentioned in text.

Chapter Four: Research Design and Results

My program of research consisted of four phases: Reconnaissance, Testing, Excavation, and Analysis (Table 4.1). Each phase was designed from a life history/object biography perspective, addressing the need for a diachronic approach to settlement and urbanism (rise/birth, *denouement*/life, and decline/death), in conjunction with the larger goals of the Mopan Valley Archaeological Project (MVAP) at Buenavista del Cayo and its environs. These concerns also led to a greater "targeting" of the built environments and use-debris deposits associated with individual settlement sites, required when adopting New Urban Theory (focus on "place") and High Modernist State Theory/Knowledge (focus on "people" and "things") frameworks.

Whenever possible, the specifics of survey, testing, excavation, and analytical methods were largely drawn (unless otherwise noted) from criteria, designs, and typologies developed by the Xunantunich Archaeological Project (XAP) to ease comparison with extant datasets, in particular the household/community-focused dissertations of Connell (2000), LeCount (1996), Robin (1999), and Yaeger (2000a). The ensuing datasets summarized in this chapter and associated appendices, include results of: 1) a Global Positioning System (GPS) and transect survey of a 0.35km^2 settlement area of the site core known as Buenavista South (BVS) settlement zone, 2) test excavations (87.15m^2, 31.58m^3) into all mounded features of the fifteen settlement sites encompassed within the largest settlement cluster of the survey zone, and 3) geophysical and ground-truthing investigations of a 2650m^2 area between settlement sites (Peuramaki-Brown 2007, 2008; Yaeger et al. 2009, 2010) (Table 4.2). It culminates with 4) the results of extensive horizontal and vertical excavations (340.75m^2, 84.84m^3) of five settlement sites and one inter-site midden (Peuramaki-Brown 2009, 2010; Yaeger et al. 2011, 2012). The Phase 4 formal analyses of artifacts, spatial patterning, and architectural remains recovered from all stages, focused on issues of urban integration and disintegration as reflected in the biographies of built environments (places) and associated household/community knowledge bases (people and things), particularly through production and consumption patterns of material culture integral to such concepts (McAnany 2010; Souvatzi 2008). Results of this final phase are presented throughout the dissertation and in associated appendices.

4.1 Phase 1 Reconnaissance

Reconnaissance and survey was initiated in a settlement zone that begins approximately 200 m (geodesic distance) south and southwest of the Buenavista epicentre (Figure 4.1). This area includes portions of the first, second, and third/fourth alluvial terraces of the east bank of the Mopan River. Its geographic delineation—the Mopan River to the west, feeder streams to the north and south (North Arroyo and South Arroyo), and an ancient causeway (*sacbe*) to the east (continued by a modern road)—made this an ideal zone for archaeological survey and possibly representative of one or more ancient communities of daily interaction or neighbourhoods: “a small area of frequent face-to-face interaction” (Smith 2010b: 137; 2011). The majority of mounded sites within the zone were assumed to be residential based on number and repetition of form (Willey et al. 1965) and associated surface material, and appeared to represent a broad sample of the centre’s past socio-economic diversity within the commoner strata.

Phase 1 reconnaissance aimed, (1) to conduct an exploration of the delineated settlement zone in order to relocate mounded sites and additional features previously mapped in the 1980s by the Mopan Macal Triangle (MMT) Project, and (2) to re-survey the area to identify additional settlement sites and features not indicated on existing maps. This process allowed for the development of a more comprehensive Phase 2 testing program and provided an understanding of overall mound visibility, density, access, condition, etc., contributing to this research as well as overall MVAP project goals.

Reconnaissance was also initiated in the immediate vicinity of the site epicentre (north of the North Arroyo) to relocate the larger nearby mounds mapped by the MMT project, and to “situate” myself on the larger MMT settlement map before initiating reconnaissance in the BVS zone. Site locations were documented using a handheld Garmin GPS to assign Universal Transverse Mercator (UTM) coordinates (North American Datum 1983, precision of +/- 3 m), and served to compare our findings based on location and form to sites indicated on previous MMT maps.

Following two days of reconnaissance, comparison of located mounds with the MMT settlement map revealed disparities in terms of site locations, forms, sizes, distances, and orientations, etc. These inconsistencies were likely due in part to changing ground cover in the area over time. While the MMT project was operating the area was predominantly cattle pasture, while during MVAP investigations of 2007-2008 only the southwest corner of the zone was pasture, while remaining areas were covered in low secondary-growth scrub brush (*zubin*/bullhorn acacia in particular), with much of the area having been subject to wildfire in 2007. These conditions allowed for greater surface visibility in many instances, including the ability to note many low mound and non-mounded settlement traces not indicated on available MMT maps. However, this ground coverage also made traversing the area considerably more difficult, particularly in the 2008 season when significant secondary scrub had returned. Another source of potential conflict may have been attempts over time by MMT to join different maps with different scales and north arrow orientations, as well as moving between NAD 1927 (the original British Military maps adopted this grid and MMT appears to have adopted these in their survey) and WGS 1984/NAD 1983 grid systems that can cause "shifting" of approximately 200m over greater distances. Due to these inconsistencies, it was decided that a re-survey of the area was required in light of current research interests.

In order to achieve a re-examination of the study area, a systematic pace-and-compass survey was executed. Survey transects, spaced 10m apart and cut 2m wide, were walked and archaeological materials and features were flagged when encountered (Figure 4.2). These transects ran parallel to the Site Access Road (Transect 0) that extends north to the edge of the monumental epicentre ("downtown") where the formal *sacbe* begins and abruptly ends. Cutting and walking of transects was initiated from the intersection of the Site Access Road (running roughly north-south) and the Main Property Road (running roughly east-west), moving north-south along the transects (oriented to magnetic north) from arroyo to arroyo, and terminating at the river's edge with the final two transects (Transect 89 and 90) traversing the first alluvial terrace (floodplain). When a potential site/feature was located, the surrounding bush was further cleared to better assess the feature.

In total, 90 transects were cut and walked, covering an area of approximately 0.35 km^2 (35 ha). Settlement features located within 25 m of each other were defined as part of the same settlement site, employing criteria and typologies developed by the Xunantunich Settlement Survey based on ethnographic houselot observations and regional archaeological considerations of mound clustering statistics (Ashmore et al. 1994:13; Ford 1991; Ford and Fedick 1992; Fry 1972, 2003; Killion 1990). Settlement sites encountered were numbered provisionally (GPS Site

###),[5] alongside additional locational data and descriptions (Table 4.3, Table 4.4). UTM data was entered into an Adobe Illustrator program to generate a GPS settlement map and included within an Excel spreadsheet typology chart (Figure 4.3). Criteria for designation of a GPS site number included: (1) the alignment of at least two boulders (without evidence of significant displacement), (2) large piles of cobbles (considering context, e.g. ignoring "farmer's field piles" or road/ditch disturbances), or (3) the presence of significant artifact scatters or other features (e.g. limestone outcropping, chert bearing zones, etc.) (Table 4.5, Table 4.6). Due to time constraints, only mounded sites in BVS Cluster 1 were rectilinearly mapped (Malerized maps) although preliminary notes were recorded for all sites (e.g. number and organization of mounds in addition to rough height estimates) alongside UTM coordinates.

4.1.1 Phase 1 Results

Re-survey of the BVS zone revealed that settlement site density in many areas is somewhat greater than indicated on the MMT settlement maps and somewhat lower in other areas. Many of the four-sided single mounds (presumed to be structures) noted on the MMT map were found to be alternative landscape features such as ancient elongated artificial terraces and modern ridges created for property fences (noted particularly on the north side of the zone), and piles of bulldozer "push" from historic road construction.

The Main Property Road runs roughly central within the zone between the North and South Arroyos, following the flattest route (least-cost path) across and down the alluvial terraces toward the river; effectively dividing the zone into a northern and southern half. The descent to the lower alluvial terraces begins roughly around the area of BVS-100, and appears to serve a natural and possibly intentional break zone within the settlement. The degree of descent to the lower alluvial terraces varies along the length of the survey area, the steepest sections being adjacent the river and in the northwest corner of the zone.

A large slump is located approximately 20 m east of the Mopan River along the Main Property Road. Such slumps are caused by the shrinking and swelling actions of the many

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[5] This number serves the formal BVS site number designation at present, as MVAP directors have not agreed on a formal designation system at this time. For the purpose of identifying mounded settlement sites from other landscape features noted in the GPS survey, I designate occupation sites as BVS-### from this point on.

expanding-lattice clays in floodplain accumulations and are noted elsewhere along the Mopan by Smith (1998:50-56). It is possible that ancient structures and features are missing from the area around the slump: Such areas being highly susceptible to erosion and collapse. A visual inspection of the slump revealed nothing in terms of cultural material, suggesting settlement remained higher up on the alluvial terrace, securely out of the floodplain zone. It is possible that a mound also existed in the location of the Old Property House on the second terrace adjacent the river. Large limestone boulders and ceramics were noted in its cement conglomerate foundation, and many ceramics littered the entire yard surface. However, the presence of a partially quarried mound (BVS 131) across the road from the house may suggest the material was used in construction of the foundation.

4.1.1.1 Layout

There is a notable gap in mound density toward the middle of the BVS zone, where the land narrows due to north, south, and west sloping toward the streams and river (west of BVS-100). Transect survey and GPS mapping resulted in the delineation of two distinct settlement clusters: BVS Cluster 1 and BVS Cluster 2 (Figure 4.3).

The clustering of settlement sites into two distinct zones is likely the product of this narrowing but may also be indicative of two separate communities. A possible form of community represented by such clusters and relevant to discussions of urbanization is that of the neighbourhood (corporate or otherwise): a small area of frequent face-to-face interaction. Smith (2010b: 145-146; 2011) suggests four useful criteria, previously applied in Mesoamerican and Maya studies (Arnauld 2008; Ashmore 1981; Bullard 1960; Lohse and Hudler 1997), for the identification of urban neighbourhoods in preindustrial centres: 1) the bounding of areas by physical features (natural and/or human constructed), 2) the presence of areas of social distinctiveness (evident archaeologically by shared or distinctive material culture patterning), 3) the spatial clustering of buildings or spaces (particularly important with regards to Maya dispersed urban settings), 4) and a general assumption of the existence of neighbourhoods.

I distinguished these settlement clusters using both spatial and topographic criteria. The spatial break observed seems to correlate with distinct topographic features: different alluvial terrace levels, narrowing and drop off of landmasses, etc. I also attempted a more formally demarcated set of boundaries for the sites by drawing a 50 m radius (100 m diameter) around each mound or mound group, based on the method adopted by Yaeger (2000a: 142-143) and is a high-end representation of ethnographic measurements of Maya houselots in the Yucatan (Hutson et al. 2007). This resulted in clusters identical to those I had originally defined. Although formal survey was not conducted east of the Site Access Road, an informal reconnaissance was conducted (along with observations after 2010 ploughing of the area) and no mounded features were located within 100m of the most easterly of the BVS Cluster 1 settlement sites, suggesting the start of another cluster in the Buenavista East Settlement zone.

Following Phase 1, I adopted Smith's criteria 1 and 3 to suggest BVS Clusters 1 and 2 were distinct neighbourhoods in the Buenavista core, and further analysis of one of the clusters would serve as my observed individual "community" or "neighbourhood" within the larger urban entity for the purpose of this research. Criterion 2, the social distinctiveness of cluster members, would be further examined in Phases 2, 3, and 4 and comprise investigations into the knowledge bases represented by individual household remains. The remaining phases of the project focused on the eastern-most of the two clusters, BVS Cluster 1. The mounds of BVS Cluster 2 will hopefully be tested in the near future, as this data will prove most interesting when compared with BVS Cluster 1 and in further understanding urban processes at Buenavista.[6]

4.1.1.2 Mound Arrangements and Densities

Tightly organized mound groups do not appear to be the norm in the BVS zone, based on surface topography categorization. Similar trends are noted elsewhere in the Belize River Valley proper, in particular to the north and northeast of Buenavista (Ashmore et al. 2004; Ford 1991; Ford and Fedick 1992; Peuramaki-Brown and Hoggarth 2009), with the majority of settlement sites occupying the XSS Type I category (Table 4.4).

Settlement site density is greatest on the third alluvial terrace. This is the flattest and highest area of land in the survey zone, situated entirely in the BVS Cluster 1 area, and is in closest proximity to the "downtown" of Buenavista. The sites of this area are "subsequent superficial terrace sites", occurring on or near the alluvial terrace surface and occupied after terrace genesis on a stable surface. Most mounded features are covered by less than 10cm

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[6] Ploughing by land tenants in 2009-2011 caused much damage in the settlement zone, particularly in the northeast, northwest, and southeast zones.

overburden (humus), and BVS-034 represents a Middle-Late Preclassic (ca. 1000B.C.E-300 C.E.) structure at surface. This upper terrace is an area of good soil fertility and offers protection from flooding (Ferring 1992).

There is one small section of the upper alluvial terrace, where GPR testing was focused, that is a somewhat sunken or low-lying spot between BVS-004 and BVS-033. During the rainy season, this area remains quite damp and soils are extremely "clayey". Survey, GPR, and ground-truthing found very little in this zone and it is possible this may be a *bajo*-like feature for the collection of water, or a *rollada*: a sunken zone that was ideal for the growing of cacao plants. The growing and control of cacao may have been a prime factor in the rise of Belize Valley elites in the Classic period (ca. 300-900 C.E.) as they were grown, dried, and traded from this region (Dahlin 1979; Muhs et al. 1985; Powis et al. 2002). Soil samples were collected from all ground-truthing test pits (described below and in Appendix I) and analysis of these samples would be a worthwhile future study to address the use of this area.

Settlement site density drops somewhat as you move to the west of BVS-007, likely due to the start of sloping terrain. As mentioned above, a gap in settlement appears just west of BVS-100 and runs over 100m before BVS Cluster 2 begins. BVS Cluster 2 is located on the lower alluvial terraces of the area (Terraces 1 and 2) and settlement sites occur predominantly in the southwest corner of the BVS zone. This is likely due to the steepness of the terrain in the northwest corner leading down to the North Arroyo.

4.1.1.3 Water

Within the survey zone water sources (the Mopan River, the North Arroyo, and the South Arroyo) were key to settlement, with BVS Cluster 1 focused primarily on the narrowest portion of land between the North and South Arroyo and BVS Cluster 2 focused on the confluence of the river and South Arroyo. A similar cluster/community "water-focus" is noted by Ashmore et al. (2004:318) at the nearby site of Chan Nòohol and within the Baking Pot settlement by Hoggarth (2012), and may be a further potential example of community/neighbourhood formation. Similar suggestions are made for other settlement regions of the ancient Maya world (Barnhart 2006; Brown and Witschey 2003; Reese-Taylor 2000; Smith 2011), and in Chiapas by the noted presence of "water-hole groups" in mid-20th century communities (Vogt 1969:149-154; 1994:178-182).

4.1.1.4 Terraces

A series of man-made terraces (both intact and disturbed) were encountered on the sloped terrain leading down to the North and South Arroyos. Based on Neff's (2008) typology, these features are examples of contour terracing. Most of the disturbed terraces occur on the southern slope and their state of preservation is likely due to the extended use of this area as pasture land (disturbance by cattle, etc.) in recent years, and the presence of a now demolished historic house (portions of a cement foundation and collapsed pillars remain) and various pieces of farm equipment found on the southern slope, indicating heightened historic activity. However, it is also possible that terraces on the north slope were better constructed and maintained as these faced the epicentre, in attempts to "keep up appearances". It is also possible these two areas were simply used differently in ancient times. It is likely these terraced features and associated areas were maintained by local community members (Altschuler 1958:194), particularly those of BVS Cluster 1 around which the majority of the surviving terraces are located.

The lack of terracing encountered in the southwest section may be due to the gradual slope of this area. This is also a current pasture area where limestone material is not readily visible at surface and terracing may in fact exist below surface level. A lack of terracing in the northwest section is likely due to the steep drop in this area down to the North Arroyo, although there is much scattered debris (boulders and cobbles no longer in any architectural form) throughout the area, a likely product of erosion on the steep slope. This is also the case for the extreme southeast corner of the survey zone where a steeper drop leads to the south arroyo. It is likely the terraces were constructed to prevent the general erosion of the land and perhaps were also used for agriculture purposes. Very few settlement sites were located along the northern-sloped area, likely due to the steepness of the terrain, and this observation was confirmed after ploughing of the area in 2010. The terraces were noted to be composed of relatively few large limestone blocks and limited artifact materials as oppose to typical residential remains.

In addition to artificial agricultural/erosion terraces, two possible check-dams or cross-channel terraces were noted in the survey zone. Both occurred at the head of the North Arroyo on its two major feed channels. The North and South Arroyo are seasonal, with only a small amount of water during the dry season at their lower reaches. Similar check-dam observations could not be made along the South Arroyo as its head is currently occupied by a farm/pasture access road. These features were unfortunately destroyed in 2010 ploughing activity.

4.1.1.5 Additional Resources

Across from the historic riverside house along the Main Property Road, a series of soft limestone outcroppings were located. The limestone is similar in texture to that found in the construction of some settlement site structures, such as BVS-006, although may be even softer as some areas of the outcropping appear to be more marl-like (calcium carbonate or lime-rich mud or mudstone; Pettijohn 1957:410). Cut marks and unnatural planar surfaces covered in mosses and lichens do appear on some of the outcroppings, however, firm dating of such marks was not possible. No Precolumbian artifacts were found in association with the outcroppings.

The limestone used to create the masonry structures in the epicentre and most platforms in the settlement zone was likely not found naturally within the Buenavista zone. The site sits atop an alluvial terrace that would only have carried small cobbles of limestone. The river could have been a source of limestone but only for small cobbles, sufficient for many of the settlement sites where structure fill is predominantly composed of alluvial cobbles, not the large blocks used to construct buildings in the site epicentre and some of the larger settlement sites. Buenavista residents would have had to bring this material in from other areas of the valley either through direct procurement or trading partnerships. It is assumed large amounts of limestone was quarried further to the east and south, where large outcroppings are found as one moves out of the main valley and into the Vaca Plateau, although some building-grade limestone can be found in the hills 1-2km southeast of the centre (Yaeger and Robin 2004).

Access to other types of rock such as chert for tool production was likely local, as has been determined for neighbouring centres (Yaeger 2000a; VandenBosch 1999). There is a local source at the southern-most edge of the Buenavista zone near Callar Creek and the river also would have served as a source for chert cobbles (Appendix III). Access to igneous and metamorphic rock materials was likely gained from the collection of large cobbles and boulders from the Macal River roughly 8km east and originating in the Maya Mountains. Local slate carvers in the nearby town of San Jose Succotz (across the river from Xunantunich) still collect material from Blackrock along the Macal (Edwin Camal, personal communication, 2008). Many clay-based soils are found throughout the area and local ceramic manufacture is plausible.

4.1.1.6 Access

Larger insights concerning the overall centre of Buenavista were also gained from the survey, namely, the accessibility of Buenavista. Ball and Taschek (2004:204) have previously noted the poorly defensible situation of Buenavista, referring to it as a "riverside location". This may be true for some areas such as the Buenavista North Settlement zone, and the more open terrain of the East Plaza area of the epicenter, however, the region along the North Arroyo that wraps around to the west side of the epicentre does have potential for defensive purposes. In many areas steep drops exist, over 8m in some locations on the south side of the North Arroyo and even longer drops from the exterior walls of the palace down to the arroyo, allowing high perches to observe areas along the river and North Arroyo, given the area was likely significantly less forested in the past. Access to the epicentre from the southwest approach could also have been controlled, and will be discussed in following chapters with regards to the possible function of BVS-007.

Finally, it is worth noting the "Castillo" at Xunantunich is clearly visible from the settlement study area and should be considered when contemplating the relationship between the two urban centres, particularly with regards to the transition of power during the Late Classic (600-780 C.E.) between Buenavista and Xunantunich (Chapter 8). With a more cleared landscape (less vegetation), it would also have been possible to see Cahal Pech from the north side of the Buenavista epicentre.

4.2 Phase 2 Testing

Following the Phase 1 reconnaissance, a Phase 2 testing was initiated involving two separate programs of enquiry: Operation 350 consisting of the testing of all BVS Cluster 1 mounds, and Operation 353 involving the geophysical investigations and subsequent ground-truthing (Table 4.2).

4.2.1 MVAP Operation 353

While it is accepted here that "households" are social units and thus cannot be completely equated with "house compounds" or "houselots", household activities that produce material refuse are usually evidenced at least minimally within the domestic areas of their performance

(Goldsmith 2006:48). When referring to domestic sites, I therefore use the terms “house compound” or “houselot” and “settlement site” (architecture and surrounding “open space”) synonymously, and refer to activities and identities suggested by the patterning of material at each location as reflective of the associated “household(s)”.

The “empty space” between individual structures and settlement sites were likely part of larger patterns of houselots with activity areas, residential gardens, as well as interstitial infields, the presence of which has been previously investigated at the hinterland site of Guerra through residual soil phosphate analyses (Ball and Kelsay 1992). To investigate these “in between” zones, to better understand “invisible mounds” and intra-mound space, and to further tailor future phases of research, an area of BVS Cluster 1 was subject to geophysical investigations [ground penetrating radar (GPR) and conductivity analysis] and subsequent ground-truthing (see independent reports by Bryan Haley and Bailey Hudacin in Appendix I). The latter involved both artifact recovery and soil chemistry sample collection (MVAP Operation 353). Analyses were conducted in a 2650m^2 area between and encompassing settlement sites BVS-004, BVS-005, BVS-033, and BVS-036 (Figure 4.5). Ground-truthing (shovel test pits spaced every 5m across the GPR grid zone) was employed to investigate any anomalies detected by the GPR survey (Figure 4.6).

Although Haley and Hudacin concluded that geophysical investigations were not successful due to ground surface and soil conditions, the ground-truthing portion of the program provided important information concerning the possible size of houselots. Based on located plastered surfaces and plotted artifact density scatters, houselots appear to extend at a minimum 15 to 20m beyond their external-most mounds (Figure 4.7). This would appear to support the criteria established by the Xunantunich Settlement Survey (Ashmore et al. 1994) that designates mounds as parts of separate houselots/settlement units if they are spaced more than 25m apart, and illustrate similar measurements of discard/toss zones as indicated by ethnoarchaeological studies (Hayden and Cannon 1983) and archaeological studies (Goldsmith 2006; Robin 1999). Testing results also confirmed the presence of single low-lying structures (invisible mounds) in the BVS-033 and BVS-036 areas, and the likelihood of shell working with *Nephronaias sp.* conducted at BVS-005 (Chapter 7 and Appendix I).

4.2.2 MVAP Operation 350

All mounds in BVS Cluster 1 were subject to test excavations (MVAP Operation 350) consisting typically of 2m x 1m suboperations (see Appendix I for clarification of terminology adopted) covering 87.15m^2. Suboperations were placed with the goal of 1) understanding local stratigraphy, 2) providing chronological information of occupation or use from associated on and off structure debris, 3) providing information concerning architectural form and technique that can serve as indicators of function and associated household socio-economic status (Smith 1987), and 4) confirming or negating domestic function.

Test excavations were also used to provide a cursory idea of activities conducted at each site (e.g., non-domestic or domestic chores, craft specialization, religious activities, etc.) and intensity of such activity, although the small sizes of test units and the potential presence of segregated work areas would make this statistically unlikely (Drennan 1976, 2009). Architectural fill was not targeted in this phase, as this initial stage was not concerned with outlining construction dates, but rather focusing on the earliest and latest dates of occupation for each site. All mounded features in BVS Cluster 1 were also subject to rectilinear mapping by crewmembers using a tape and Brunton compass and total station mapping was conducted by Shawn Morton and Jason Yaeger of all test excavations and subsequent extensive excavations.

Test excavations, positioned so as to capture both architectural information and off-structure debris piles, were conducted using natural, cultural, and arbitrary lots (levels), while never exceeding 10cm in overall depth per lot. This was expanded to 20cm during extensive excavations when an understanding of stratigraphy had been gained for each site. Excavation of each test unit was ceased upon reaching sterile soil levels or when excavations were deemed unsuitable or unnecessary to address the aforementioned goals. No soil samples or microartifacts were collected during the Operation 350 Phase 2 testing, unless a special deposit (e.g. Burial 350-B1) was encountered. A plan and profile drawing were made of each suboperation upon completion and photographs were taken of profile and plan views throughout testing. Aluminum tags were incised with information about the excavation and placed at the base of all suboperations prior to back filling.

4.2.2.1 Phase 2 (Operation 350) Results

All mounded features identified in Phase 1 and located within BVS Cluster 1 were subject to test excavations (Table 4.7). Exceptions to this include BVS-006 and BVS-060 where additional mounds were detected after testing. Detailed descriptions of Operation 350 test excavations, along with descriptions of all individual excavation lots and lot groups, are provided in Appendix I. A pile of cobbles, artifacts, and daub originally identified as a problematic single mound (GPS Site/BVS-037) was also tested and partially excavated (Ops 350P, W, AG, and AR). The original report by Christina Dykstra is also presented in Appendix I. A 2m x 2m test excavation was also placed at an enigmatic feature on the southern slope of the BVS Cluster 1 area (GPS Site/BVS-099, Op 350AJ) that proved to be disturbed or fallen material and was subsequently removed from the settlement site lists. Preliminary testing and associated chronologies suggested interesting initial patterns that ultimately proved useful in characterizing the rise and decline of Buenavista from the view of BVS Cluster 1 neighbourhood residents, and also served to direct Phase 3 Excavations.

4.2.2.1.1 Local stratigraphy

The first crucial information gathered from test excavations was a general idea of local stratigraphy in the BVS Cluster 1 area and the degree of preservation/condition of archaeological remains. As this area had been subject to historical pasture activity, this assessment would prove crucial prior to Phase 3 excavations. In general, Precolumbian remains are very shallowly situated in BVS Cluster 1, in particular with regards to settlement sites located on the upper alluvial terrace. BVS-034, a small single mound site, was visible at surface with less than 10cm overburden. What is particularly amazing is that this site dates largely to the Middle and Late Preclassic. This emphasizes the extremely shallow nature of all ancient deposits in this area, and stresses the amount of damage that modern ploughing techniques caused to the area in 2009/2010.

With regard to stratigraphy, typical suboperation profiles exhibited the following series of lot groups: (1) a humus layer above a (2) fall or colluvium layer, overlaying (3) use/ habitation debris up against the architectural feature, atop an (4) artificial terrace surface or directly atop the (5) original occupation horizon [Buried ‘A’, or Loten and Pendergast’s (1984:10) “old land surface”] that was typically characterized as a silty clay of 10YR 5/4 yellowish brown colour throughout the cluster area. Finally, a (6) sterile level was typically encountered 20-40cm below the top of the buried occupation horizon. In various units throughout the zone we made sure to dig well past the sterile point to ensure no deeper cultural strata.

4.2.2.1.2 Chronology of occupation/use

Ceramic data from all test excavations allowed me to chart occupation chronologies for individual settlement sites in the BVS Cluster 1 zone, including initial occupation, length of total occupation, and abandonment of individual sites. This charting made use of ceramic type-variety-mode dating methods commonly applied for the Greater Belize River Valley. The methods and associations of time periods/ceramic phases with diagnostic features and types are based on Gifford's (1976) assessment of Barton Ramie ceramics and LeCount's (1996; LeCount et al. 2002) assessment of Xunantunich and the Lower Mopan Valley ceramics (Table 4.8). All diagnostic ceramics (3079 sherds) from Phase 2 test excavations, no matter the context, were subject to type-variety-mode classification and dating examination (see Appendix II for procedural information).

Based on the dating of ceramic finds, the occupation/use spans of all individual settlement sites were determined for BVS Cluster 1 (Table 4.9). Initial settlement in BVS Cluster 1 occurred as early as the Middle Preclassic (1000-300 B.C.E). One third of the BVS Cluster 1 settlement sites therefore represent Early Established sites/Founding Households. These early sites were positioned on the upper-most alluvial terrace in the BVS Cluster 1 area. By the Early Classic (300-600 C.E.), 87% of settlement sites were occupied/in use, rising to 93% by the early facet of the Late Classic (600-670 C.E.). This boom coincides with the peak of Buenavista epicentral/"downtown" activity (Ball and Taschek 2004). The settlement sites that were not occupied until the later periods of the cluster history, Late Established sites, tend to be positioned on the sloped areas to the south and west of the upper terrace zone. Occupation decline (abandonment of settlement sites) was initiated sometime during the late facet of the Late Classic (670-780 C.E.) and continued into the Terminal Classic (780-890 C.E.). The first settlement sites abandoned were those that were initially occupied late in the settlement history: Late Established sites/households. Settlement sites that continued to be occupied/used into the Terminal Classic (780-890 C.E.) consisted of those first established in the Middle Preclassic

(Early Established sites/Founding Households). No Early or Late Postclassic (post-890 C.E.) occupation is suggested by ceramic finds in Op 350 test excavations.

4.2.2.1.3 Architectural form and technique

A major goal of the Phase 2 research design was to examine the nature of settlement site architecture, in particular the materials from which they were created. Because of the small area exposed by test excavations at each mound the information obtained from the Phase 2 testing program was generally limited. I did place test units so that one face of the tested mound/structure would be exposed for evaluation, a strategy that provided data on the masonry techniques used in substructure construction.

Although the majority of settlement sites are grouped within the XSS Unit Type I, considerable architectural variability exists including quality and type of construction material, overall size and height of substructures, formal paved patio areas, adjoining terraces, etc. Considerably more variables were also noted during Phase 3 excavations and are also incorporated in this discussion.

In general I follow the terminology set down by Loten and Pendergast (1984) for Maya architecture, and therefore I refer to masonry features that retain fill as “core faces” (rough construction pens) and “facings” (finished “coverings” of construction pens) to distinguish them from freestanding “walls”. I treat the terms building and superstructure as synonyms, reserving the term structure to refer to the larger architectural entity that includes a substructure and superstructure.

I recorded four kinds of architectural materials: daub, plaster/stucco, fill, and masonry. I collected the daub and plaster/stucco fragments for later laboratory analysis. Sample collection was clearly not feasible with facings and fills, and instead I recorded these features with detailed descriptions, drawings, and photographs.

Daub. All superstructures of the buildings in BVS Cluster 1 were made at least partially of perishable materials. Although most of the organic material that comprised the walls and roofs of these structures has long since disintegrated, I found abundant evidence of their construction in the form of fragments of clay daub (Figure 4.8) that had once been placed over the stick/wattle walls (*bajareque*) (Appendix V). Willey et al. (1965) found a similar predominance of wattle-and-daub structures at nearby Barton Ramie, as did Yaeger (2000a) at

San Lorenzo, while at Chan Robin (1999) found little evidence of daub use (just pole construction). Wattle-and-daub house styles were also quite common in local Maya villages such as nearby Succotz until fairly recently. Based on a number of smoothed and rounded daub fragments recovered, it is possible the building corners were rounded. A possible fragment of wattle (Figure 4.9; MVAP Op 354O/16-P1, lot group 007-1/23) was also recovered from Phase 3 excavations at BVS-007-1, sealed below the off structure *sascab melt* (lot group 007-1/1). This piece had been burned and has been subject to AMS carbon dating (see below and Appendix VIII).

Plaster. I examined all surfaces and pieces collected and identified as plaster or stucco from test and extensive excavations. Four relatively larger pieces of stucco were recovered from primary and secondary contexts throughout the cluster. The *sascab melt* layer encountered in Ops 350Q, T, V test excavations at BVS-007-1 consisted of the plaster/stucco surfacing of the structure facing that had disintegrated over time. This layer also contained flecks of red/orange pigment, likely from the stuccoed exterior having been painted (Brown and Sheets 2000:18) (Figure 4.10).

Plastered floor surfaces are extremely rare in the BVS zone. Of the 15 settlement sites tested/excavated, only three contained plaster surfaces as part of their architectural remains, the majority of which were found preserved within the multiple phases of construction at BVS-007-1 and BVS-007-2. In the few situations where plaster surfaces survived, they were found in very poor condition and in most cases almost entirely disintegrated or severely disturbed. The overall lack of plaster surfaces in the area is likely due to the limited access to limestone outcropping in the immediate area. It is also most likely a good reflection of socio-economic status in BVS Cluster 1. The majority of architectural surfaces appear to have consisted of a small cobble/pebble ballast capped with a tamped earth surface, or at the very least with an extremely thin cap of plaster that has not withstood the eroding forces of time.

Masonry and construction fill. The architecture exposed in testing, as well as later excavations, in BVS Cluster 1 presented a diversity of masonry techniques and materials. The masonry features exhibited by most settlement site structures can be divided into three primary groups: substructure platforms, bench features located atop substructures, and adjacent terrace and patio features (Figure 4.11).

Each of these features typically consists of construction fills of alluvial cobble rubble or clay, held in place by construction cells (core face) composed of large, compact, unworked limestone or alluvial cobbles and boulders, or of more formal core faces of roughly shaped limestone slabs (Figure 4.12). In more elaborate architecture, in particular that featured at BVS-007, a formal facing was placed to the front of the core face, consisting of nicely hewn (six sided, thin or thick) soft limestone blocks, with an interface fill (backing masonry) sandwiched between the core face and facing. Often times the pillaging of facing and core face materials from structures was encountered in testing (and subsequent excavations), used in later phases or completely different settlement sites. This is particularly true at the small settlement site BVS-077 where a "mishmash" of limestone blocks and boulders was used in core face construction on the small structure (Figure 4.13), determined to have been pillaged from nearby BVS-007-2.

All of the structures identified at BVS Cluster 1 included a substructure with a height of at least one course of stone atop of which sat a building of some form (Figure 4.14). Often these substructures include frontal, rear, and/or side terraces, some of which were likely covered by a perishable roof. Frequently, a surface of small cobbles and pebbles also lies directly beneath the masonry substructure. These are inconsistent surfaces and appear to have been used as a leveling surface located directly atop the occupation horizon. As mentioned above, the fills of these substructures generally consist of various proportions of alluvial cobbles, some type of soil/clay, and refuse materials, including the debitage from stone tool production, ceramic sherds, and old architectural debris. No "wet fill" (rubble solidified using poured plaster or sascab) was encountered in any structure of BVS Cluster 1, although a high amount of white flecks in the F3 and F4 fills of BVS-007-1 may suggest a decomposing or poor wet fill (Phase 3).

The Maya sometimes subdivided the interior space of buildings with low bench features. These consist of a core of fill retained by a masonry facing. Benches found within commoner residential structures are generally 5cm to 20cm tall (as oppose to the 50-60cm tall benches found in elite masonry range structures) and occupy a significant portion of the structure in which they are present. Their function is likely similar to higher benches seen in more monumental architectural forms: serving as elevated sleeping and additional activity areas within the structure. Benches, sometimes referred to as "upper platforms" on substructures, were encountered at most structures in BVS Cluster 1.

As mentioned above, finished plaster floors capped some platforms and interior benches, but most of the structures at BVS Cluster 1 consisted of packed-earth floors. In both cases there appears to be a process of leveling the substructure fill with ever-smaller rocks and artifacts, forming ballast for the floor. Within the fill of some of the larger structures, layers of artifacts, mostly ceramic, marked pauses during the construction process, often at points between the placements of major components. As it is not clear whether such pauses were used as surfaces, even for a short period of time, when detected they are indicated and labeled as separate phases within a structure. As testing did not investigate earlier architectural phases, these layers were encountered only in Phase 3 excavations and are further discussed below. The Maya plastered many of their patio surfaces in addition to their buildings; few instances of either were encountered at BVS Cluster 1. Although this could be due to preservation, the extreme rarity of plastered walls and facings suggests to me that it is in fact a reflection of ancient building practices. Most of the structures tested and excavated at BVS Cluster 1 were small wattle-and-daub buildings sitting atop low platforms faced with unmodified stones, often of alluvial cobbles. These structures required relatively little labour to build, although they probably needed refurbishing relatively often.

Finally, testing in Phase 2 revealed information concerning an additional specialized construction/architectural technique. In Ops 350R and U positioned on the south face of BVS-007-2, and in Ops 350Y and AA positioned on the south side of the formal patio/plaza area, a perfect alignment of medium-sized alluvial cobbles was encountered directly in front of the facings. This feature was not fully understood until large-scale excavations were conducted and revealed the continuation of these alignments (Figure 4.15). These cobbles are known as "trace stones" and are defined by Loten and Pendergast (1984:15) as "a line of stones that sets out the plan configuration of a structure at its base level. The practice of setting out trace stones seems to have been followed when construction was undertaken on rough ground, where a layout line could not very well have been employed". Such "rough ground" would also include sloping surfaces, and the buildings of BVS-007 are at the narrow point in the BVS Cluster 1 landscape, with slopes immediately to the north and south (Chapter 6). This technique may also reflect the use of formal or civic architectural knowledge not found at other settlement sites in the cluster. However, it is also odd that this feature was left in place by the architectural/ construction crew, although the alignment off the north face of BVS-007-1 was capped with limestone blocks and plaster (see outset basal blocks in Figure 4.12). This technique is in contrast to other methods known from ethnohistoric and ethnographic accounts, including the laying out of cords measured according to dimensions intrinsic to the human body (Schele and Mathews 1998:34-36).

4.2.2.1.4 Settlement site and structure functions

Artifacts recovered from the tested settlement sites suggest the BVS Cluster 1 area was home to various ubiquitous domestic activities, including agricultural pursuits (general utility thick bifaces), food preparation and serving (grinding tools, scrapers, and ceramic vessels), craft activities (drills, graver/incisors, shell, slate, spindle whorls, etc.), and ritually focused activities (censer fragments, figurines, quartz crystals, etc.) (Tables 4.10, 4.11). Statistically, little more can be said regarding degree of activity presence from such small samples/excavation volumes (see Table 4.7 for volumes per suboperation). Phase 3 excavations were designed to recover greater deposits of material remains in order to further address activity characterization and location.

Although most settlement sites and structures appear to be domestically oriented, based on architectural formation and associated artifact assemblages, two sites stood out as potentially non-domestic in function.

4.2.2.1.4.1 BVS-034

BVS-034 was located during the 2007 survey and described as a low (<50cm) single mound with a single large limestone boulder visible at surface, but with no full architectural alignments detected. Overall the mounded area (BVS-034-1) of the site covers roughly 5m x 5m (unexcavated) and is designated as an XSS Type I settlement unit. The area coverage of the mound barely meets Ashmore's (1981:47) requirement of 20 m^2 of covered space (assuming the entire structure was roofed) for a house.

Op 350X, AC, AF. These adjoining suboperations were positioned along the east-west (NE-SW) centerline of BVS-034-1 (Figures 4.16, 4.17, 4.18, see Appendix I for illustration legend). The units were oriented based on mound topography and the presence of a large, roughly hewn, compact limestone boulder partially visible at surface (Figure 4.19). It was assumed this boulder represented part of the core face of the construction cell of the substructure, however, its abnormally large size (relative to the mound and to all other construction materials in the BVS Cluster 1 area), comparable only to the possible stela fragment at BVS-007-1 (Phase 3), and odd dimensions make it a possible candidate for some type of once erected monument or perhaps an altar. An unusual limestone macroblade (MVAP LT-040 and LT-041) was found immediately adjacent the limestone boulder (east side) within the humus (Figure 4.19), and may be important to understanding the overall function of the block.

Test excavations began with Op 350X and later expanded into Op 350AC when initial exposure did not detect any alignments of masonry construction materials. A humus layer was removed from all suboperation areas, and was particularly thick to the east of the large limestone boulder in the off-mound area. Removal of this layer on-mound uncovered a cobble ballast in Ops 350AC, the fill of BVS-034-1-1st-A (Late Preclassic, 300 B.C.E.-100 C.E.); this layer "petered out" in the Op 350X on-mound area where humus removal exposed a lower brown sandy clay loam horizon adjacent the large boulder on the west side, the fill of BVS-034-1-1st-B (Middle Preclassic, 1000-300 B.C.E.). This horizon was not found to continue further east past the large boulder and is assumed to be part of the earlier substructure fill.

No additional boulders or blocks were found in alignment with the large limestone boulder at the centre of the excavations, suggesting it is the only piece remaining from the core face cell (if in fact it is part of the face). A "scattering" of cobbles was revealed in the north wall profile of Op 350X, spanning an area to the west and east of the large boulder. This is thought to perhaps be washout from the terminal phase fill, perhaps in the area where this fill is missing above the brown soil horizon, due to the removal of a previously existing masonry face. The removal/ pillaging of architectural materials may have occurred after abandonment of the site for use in other construction projects.

The cobble ballast was removed from Op 350AC, revealing the continuation of the brown soil horizon encountered in the west end of Op 350X, and believed to be a lower fill material representing an earlier construction phase. The removal of the ballast also exposed the top of a complete ceramic vessel (exposed rim), although in pieces, and embedded roughly along the centre line of the platform in the brown soil matrix fill: part of Burial 350-B1 (Figure 4.20). Op 350AF was placed to expose the north side (NW) of the vessel prior to removal. The vessel was found positioned next to a small upright soft limestone slab that may have served as part of a protective enclosure for the vessel. Material from the surrounding cobble fill layer included many *P. indiorum* (*jute*) shells (Table 4.10). Such shells are common finds in Preclassic fill deposits (Healy et al. 1990; Solis 2010).

Burial 350-B1. A profile window was initiated into the brown soil fill on the north side of Op 350X and Op 350AC in order to excavate down and around the complete vessel. The vessel is a shallow red-slipped (interior and exterior except the base) dish with four small pinched-clay feet and is an example of a Gale Creek Red Ware, Hillbank Ceramic Group, Hillbank Red Type vessel (Figure 4.21) that is part of Gifford's (1976:101-104) Barton Creek phase of the Late Preclassic (300 B.C.E.–100 C.E.). This would suggest that Burial 350-B1 is intrusive, as the brown soil fill dates to the Middle Preclassic (1000-300 B.C.E.).

Excavation of the interior matrix of the ceramic vessel was conducted using thin arbitrary lots (2-5cm) and conducted in quadrants (NE, NW, SW, SE). Some artifact material was removed from the vessel, although the nature of this material and the lack of a complete cover over top the vessel allow us to presume the majority of the material is from the overlaying and surrounding fill layer. However, in the bottom lot of the vessel human remains were recovered: extremely fragmented bone, some identifiable as flat bone, and teeth (Table 4.12; Figure 4.22). The matrix encompassing the remains was collected and sifted by hand in lab to recover additional bone and teeth. A soil sample was saved from the matrix and a phytolith sample was also taken from the interior of the vessel (Appendix VIII). The phytolith sample is currently undergoing analysis by Dr. Matthew Boyd and Clarence Surette of the Department of Anthropology, Lakehead University.

Identification and aging of dental remains followed general criteria outlined in Buikstra and Ubelaker's *Standards* (1994, from various sources). Upon assessment of each tooth and the collection as a whole, the individual is suggested to have been roughly four years of age at the time of death (Table 4.12; Figure 4.22). All teeth were recovered from the NE quadrant of the vessel (except one small fragment). Based on the disturbed nature of the burial, little can be said to suggest a positioning or orientation of the individual. Southerly orientations are commonly noted for the Late Classic (600-780 C.E.) at Baking Pot, Barton Ramie, Benque Viejo, and other Upper Belize River Valley sites (Welsh 1988:52-53), as well as at Buenavista in the famous Burial 88B-11 of Structure BV-1 (Jauncy Vase burial) (Taschek and Ball 1992:492).

Many fragments of bone appear to be from flat bones. No long bone fragments were recovered. Although this material is extremely fragmentary, the largest piece measuring no more than a centimetre, the predominance of flat bone and teeth might suggest the presence of a lone skull. The remains of children are particularly difficult to assess in the Maya area, as preservation can be extremely poor, as is the case with Burial 350-B1. However, the limited amount of fragmentary material may suggest that only a skull was placed within the vessel.

Cached bowls with only skull material found within, often remains of infants or children, are known as “skull caches”, “skull burials”, or “pot-skulls”, and are common in many areas of the Maya lowlands during the Late Preclassic (300 B.C.E.-100 C.E.) and Early Classic periods (100-600 C.E.) (Krejci and Culbert 1992; Welsh 1988:64-80). This coincides with numerous other “partial parts” caches throughout the lowlands at this time, and “finger bowls” specifically in the Belize River Valley and neighbouring Vaca Plateau/Maya Mountains (Chase 2004; Chase and Chase 1998; Garber and Awe 2008; Piehl and Awe 2010).

Ultimately, this feature was labeled as a burial based on Welsh’s (1988:15) criteria, although Becker (1992) reminds us that both burials and caches are parts of a continuum rather than a dichotomy that relates to beliefs about appropriate treatment of the dead. If following Welsh’s typology, Burial 350-B1 would fall under the “Simple Grave-simple category: formless grave in construction fill opportunistically made during structural reconstruction” (Welsh 1988:16). A second small, thin limestone slab (in addition to that mentioned above) was found roughly 5cm above the vessel on the northern side (mainly in Op 350AF) of the burial. This may also be part of a protective area around or lid/cover/cap above the burial, perhaps having shifted over time. If this is the case, the grave designation would change to “Cist—haphazard cist: randomly piled or placed stones lying directly on, or haphazardly placed around, corpse; probably so placed in order to separate burial from others around it and thus, although the placing of the stones may appear haphazard, the act of placing them was intentional” (Welsh 1988:17).

When the vessel was removed following excavation, it was found to be resting atop a layer of soft limestone cobbles, restricted to the area of the vessel and continuing into the area of Op 350AF. Excavations did not continue into this level due to time constraints. Additional material recovered from the burial area (lot group 034-1/5) included ceramic material, two jute shells, and lithic material, along with the complete cached vessel (CR-012). The interior base of the vessel was heavily scratched; typical of such deposits (Krejci and Culbert 1992), and current phytolith analysis on soil embedded in the vessel interior might hopefully shed light on why this is the case.

Excavations continued down into the occupation horizon to the east of the large limestone boulder (off-structure) in Op 350X, and were terminated upon reaching a sterile lot. My research design originally intended a return to this site for further extensive excavations in Phase 3, in particular to investigate the limestone surface below the “skull cache”; 2009 ploughing activity completely destroyed this important feature that was extremely shallow in its stratigraphy.

Site conclusions. The mound at BVS-034 is similar to settlement features known as “chich” piles at Komchen, believed to have been residential structures with their facings removed (Moore and Gasco 2009). However, finds at the site are more similar to those criteria outlined by Brown and Sheets (2000) in the identification of ritual structures at Ceren. This example is further discussed in Chapter 6.

The construction and occupation/use of the site appears limited to the Middle Preclassic to Protoclassic periods (1000 B.C.E. – 300 C.E.) based on ceramic dating (much Mars Orange Ware within the assemblage), and as such represents an anomaly within the study area (Table 4.8). All other settlement sites occupied at this time have no associated masonry architecture dated to these early periods.

The visibility of BVS-034-1 at ground level also suggests that Preclassic buildings in this area, in particular on the third and fourth alluvial terraces, have not been disturbed by events such as flooding, as has been noted elsewhere along the Mopan (Holley et al. 2000). The relatively intact nature of the burial that was located very shallowly stratigraphically, also suggests limited surface disturbance in this area historically. However, the lack of a continuous core face/construction cell, in addition to facings, may suggest the removal of materials during Precolumbian times, although the lack of disturbance of the cached material (burial) also suggests this building was of importance to the later occupants of the area, beyond its lifespan, or may represent a loss of social memory with regards to its presence. It is not directly associated with other settlement sites, lying beyond the 25m requirement, although its position on the upper alluvial terrace of the survey zone, surrounded by many of the earliest sites occupied in the area (as well as the longest occupied), ties it to the ideas of the principle of “Primary Occupancy” (McAnany 1995). Perhaps this structure served a shrine-like function, reminding peninsula occupants that this area was colonized early on in Buenavista's history and ties the descendants of its occupants/users to the land. However, it is odd that no material from later periods appeared in Op 350X, AC, AF excavations. This will be further addressed in the following and concluding chapters.

4.2.2.1.5 BVS-007

When first encountered in the 2007 survey, situated on either side of the Main Property Road, BVS-007 was described as consisting of a single mound greater than 2m in height (BVS-007-1) possibly associated with lower mounds located on the south side of the road. During the 2008 survey, a second long, low mound (BVS-007-2) and a shorter mound (BVS-007-3) were found opposite BVS-007-1 to the south. A fourth low mound (BVS-0070-4) was also encountered attached to the west side of BVS-007-1, and may have been disturbed when the Main Property Road was constructed. It is believed this same site configuration is also represented on the MMT map as the large multi- (4) mound site toward the centre of the survey zone (Figure 4.23). However, test excavations (Op 350Y and AA) demonstrated that BVS-007-3 was not in fact a Precolumbian structure, but rather the edge of the formal patio area with modern road/ditch construction debris piled atop (Figure 4.24). Later excavations in Phase 3 confirmed a similar nature for BVS-007-4.

It is now known that BVS-007 covers an area roughly 25 m x 35 m (875 m^2) and consists of two elongated mounds, one on the north side of the site (BVS-007-1) and the other on the south side (BVS-007-2), and a formal paved area (patio) in between. The Main Property Road runs directly through the site in an east-west orientation but did not remove or disturb any preexisting mounds (the patio is confirmed to continue below the road). BVS-007-1 measures approximately 15m x 10m and BVS 001-2 is roughly 15m x 7m. BVS-007-1 is greater than 2m in height, designating the site as an XSS Classification Type VI (Table 4.3).

BVS-007-1: Op 350Q, T, and V. These adjoining suboperations were placed on the north side of the BVS-007-1 mound which is significantly built up as this structure was placed on a natural terrace edge sloping down toward the North Arroyo. The suboperations were oriented based on mound topography, the only visible masonry at surface being fallen material. Test excavations initiated at Op 350Q resulted in mixed contexts due to extreme bioturbation atop the mound from tree growth, anthills, and backdirt from road construction. The suboperation was expanded into Op 350T, producing similar results. Op 350V was then placed further uphill on the mound, where substructure architectural alignments, fill, and fall were finally exposed (Figure 4.25, 4.26).

A bioturbation/modern backdirt layer was removed from the entire length of the adjoining units. This layer was encountered directly above the original humus layer of the mound. The two layers were differentiated based on differing degrees of “looseness” of soil, as well as colour difference. The colour of the bioturbation layer was more similar to that of the modern backdirt encountered at BVS-003 Ops 350A, B, C (Appendix I). The original humus layer was encountered intact beneath the bioturbation/backdirt level and was excavated until fall material was uncovered. The thick fall layer included both small and large alluvial cobble material, and large limestone boulders and thick and thin six-sided hewn stones. The fall extended downhill and rests directly atop the buried occupation horizon in Op 350Q and Op 350T.

Below the fall in Op 350V, the top two courses of the north facing of the substructure were uncovered, along with the top of a *sascab* melt layer immediately north off structure. This layer represents the original plaster/stucco material that coated the exterior face of the structure, now eroded or “melted” into a pile (Brown and Sheets 2000) effectively sealing the lower use debris investigated in Phase 3. The facing was composed of large, rectangular, hewn limestone blocks (Figure 4.27). Atop the *sascab* melt, fallen habitation debris was uncovered including a large ceramic cluster consisting of a near complete jar (MPB-T010, Figure 4.28). This material was likely atop the structure at the time of ultimate collapse, based on the near completeness of the vessel and stratigraphic location. When the wall daub and plaster began to erode at the initiation of the building collapse process, with additional fill and facing materials tumbling downhill, this material likely fell and settled atop the sascab layer. Removal of the *sascab* in Phase 3 revealed the surviving facing of the structure, including some pieces of plaster still adhering to the masonry blocks.

Excavations continued off structure in Op 350Q and into the buried occupation horizon, removing any use debris resting directly atop and compacted into the horizon. Excavations did not continue to sterile during testing but did so during Phase 3. Dated ceramic material from these tests suggests the site of BVS-007-1 was used from the Protoclassic and Early Classic (100-600 C.E.), well into the Terminal Classic Period (780-890 C.E.).

BVS-007-2: Op 350R and U. These adjoining suboperations were positioned on the south side of the BVS-007-2 mound (Figure 4.24). Excavations began with Op 350R and later expanded into Op 350U when initial excavations hit a series of architectural alignments and exposed too little off-structure area (Figure 4.29, 4.30). The units were oriented based on mound topography and visible architectural alignments.

A humus layer was removed from the entire length of the adjoining units until fall material was uncovered. The removal of humus also revealed the top course of the south core face of the substructure, composed of large limestone slabs. A medial blade fragment of green obsidian (MVAP 2008 SP-006) was found within the humus and represents a rare find at Buenavista. Green obsidian is an import from Central Mexico, tied to the site of Teotihuacan in the Early Classic and start of the Late Classic period. This piece has been sourced (EDXRF) to the Pachuca subregion (Appendix III).

A fall layer was then excavated below the humus. This fall included both small cobble material, and larger limestone material. Removal of the fall revealed structure fill consisting primarily of yellowish brown silty clay, similar to that of the buried occupation horizon encountered throughout the BVS Cluster 1 area. This predominantly soil fill would prove to be characteristic of most Early Classic (300-600 C.E.) and early facet Late Classic (600-670 C.E.) architecture throughout the BVS Cluster 1 area as well as in the epicenter.

Additional courses of the substructure core face were exposed with removal of the fall: each consisting of large roughly shaped soft limestone slabs. A terrace face was also thought to have been uncovered at the south end of Op 350R, leading to the expansion in Op 350U. However, the single-course alignment of hewn blocks uncovered to the south of the core face was in fact all that remained of the facing masonry in this area of the structure (clarified in Phase 3) along with a disturbed alignment of cobbles serving as “trace stones” (Loten and Pendergast 1984). Further fallen and/or disturbed material was encountered south of the face in 350U.

Below the fall layer, use debris was recovered off-structure to the south of the facing, and included ceramic, lithic, and daub material, although surprisingly little material overall. Given the size of the structure, and an original assumption it represented a domestic context, this paucity of material in off-structure debris piles was surprising. Excavations continued down through the buried occupation horizon and encountered a grey matrix lens determined to be natural marl. A similar layer was uncovered just downhill to the southwest at BVS-087

(Appendix I). More conclusive excavations were conducted in Phase 3, but all datable materials from test excavations at Op 350R and U suggest the BVS-007-2 area was used beginning in the Protoclassic (100-300 C.E.) and into the early facet of the Late Classic (600-670 C.E.). No later dated material was recovered suggesting use of this area was terminated earlier than other areas of the BVS-007 site.

BVS-007-patio: Op 350Y and AA. During survey, an elongated mound (BVS-007-3) was detected on the south side of the Main Property Road, between BVS-007-1 and BVS-007-2. This mound was of a suspect nature as it ran very parallel to the modern road and was very narrow. Early on it was decided that the mound was likely created from backdirt produced by road construction, but it was mapped and tested regardless. Excavation of test units demonstrated this feature was in fact road/ditch construction backdirt piled atop the south edge of the formal paved area (patio) of the site. Op 350Y and AA were adjoining suboperations placed on the south side of BVS-007-3, oriented based on topography alone (Figure 4.24). Excavations initiated in Op 350Y revealed no architecture therefore the unit was extended one meter to the north in Op 350AA (Figure 4.31, 4.32).

A very thick humus and backdirt layer (20-30cm) was removed from the entire length of both suboperations. A division within this layer was noted, with a brownish yellow matrix atop a dark yellowish brown matrix. The difference within the layer and the high volume of matrix is likely the result of movement of earth due to road and ditch construction, piled atop earlier humus.

A thick fall and/or colluvium layer was encountered beneath the humus. This included both large and small cobble material and artifacts suspended in a yellowish brown matrix. The non-compact nature of the matrix suggested this was not a fill or surface level. We were careful to consider such an option, as some of the fill contexts in BVS-007-2 did contain a significant amount of yellowish-brown silty clay within the matrix. A marl-like material was also found within the fall; however, this may be deteriorated plaster or *sascab* from a surface. If the patio area was regularly cleaned during its lifetime, this area may have been a highly probably discard zone for much sweeping material, particularly after the abandonment of use of BVS-007-2.

The removal of the fall/colluvium exposed a two-course face at the north end of Op 350AA, believed to be the built up south facing of the formal paved area (patio) attached to BVS-007-1. When elevations were compared with the paved surface encountered immediately adjacent BVS-007-1, they were found to be level with the finds in Op 350AA. The bottom course of the facing was composed of the same large hewn limestone blocks encountered at both BVS-007-1 and BVS-007-2, while the upper course consisted of smaller square hewn blocks, also encountered in various locations and phases in BVS-007. This may represent two construction phases of the patio, further addressed in Phase 3 results.

Below the fall, a layer of use debris was encountered and continued into the occupation horizon due to compaction over time. Many large ceramic sherds including nicely incised and painted Late Classic ashwares were recovered. Excavations continued south of the facing into the buried horizon and ended at a sterile level.

Site Conclusions. Excavations at BVS-007 proved insightful for numerous reasons. The distinction of only two separate mounds positioned to either side of a formal patio/paved space differs greatly from the interpretation found on the MMT map and from initial MVAP survey suggestions. The final parallel configuration of the two structures is also interesting, as it is not typical of most multi-structure domestic compounds, typically arranged in L-shape and C-shape configurations. The masonry substructures of BVS-007-1 and BVS-007-2 were also built into hill slopes on the north and south sides of the site, while the patio/formal paved area is left open to the east and west and is situated on the narrow flat surface between the two downward sloping areas.

BVS-007 is also located at the centre of the BVS Cluster 1 area. This overall unique positioning on the landscape and odd configuration of mounds were thought to perhaps indicate a non-domestic function and key to the role it played in the BVS Cluster 1 (Chapter 6). In addition, the extremely large coverage area of this site, relative to all other sites in the cluster, may also suggest its non-domestic function, as do associated artifact assemblages.

Artifacts recovered, including a speleothem and quartz crystal, along with a number of "rare" and "exotic" finds, including green obsidian, materials of non-local cherts, and three thin bifaces (found at no other site during testing), were thought to be suggestive of an atypical function within this settlement zone (Figure 4.33). Finally, the different biography of the two structure sites, with use of BVS-007-2 having been abandoned well before the remainder of the site, is curious. The uniqueness of this site led to further horizontal excavations in Phase 3.

4.3 Phase 3: Excavations

Extensive horizontal and stratigraphic excavations, covering 340.84m² and removing 84.85m^3, were initiated at five settlement sites and one midden feature within BVS Cluster 1 to gain a more detailed record of the "biographies" of these spaces, including construction dates and associated activities. Because the focus of my research originally was concerned primarily with the disintegration of urban centres, a site with occupation/use extending into the Terminal Classic period (780-890 C.E) was randomly chosen from each of the settlement site types represented in the BVS Cluster 1 area (Table 4.13). These are referred to as "Late Abandoned" sites.[7] As BVS-007 is the only site of the Type VI category represented in BVS Cluster 1 and represented a possible non-domestic function, it was automatically selected and excavated as MVAP Operation 354. The complex use-life of this site along with its relatively large size and uniqueness discussed below and in Chapter 6, suggests a possible community-oriented administrative and ritual function. BVS-004 (MVAP Operation 356) was chosen from among the Type I units, while BVS-006 (MVAP Operation 355) represents Type III units. Sites with occupations that did not extend into the Terminal Classic period, known as "Early Abandoned" sites, were also chosen in the same fashion. These included BVS-060 (MVAP Operation 358) a Type III site, and BVS-077 (MVAP Operation 359) a Type I site. In addition to mound site investigations, the excavation of a midden feature (GPS Site/BVS-160, MVAP Operation 357) was also initiated nearby BVS-006.

Excavations primarily targeted the sides and backs of structures, likely locations for habitation or use-oriented debris deposits (intact and/or sealed on floor and associated deposits being rare in this area), and were guided by results from Phase 2 testing (Appendix I). Suboperations were laid out across each site area, generally in north-south and east-west running lines, to provide quick "traverses" of each group providing information concerning architectural layout, activity areas, and to recover additional habitation or use debris. Each suboperation typically measured either 2m $_x$ 2m or 2m $_x$ 1m depending on identified goals. Vertical stratigraphic units were also placed into the fill of substructures, patios, and terrace additions to gain *terminus post quem* construction dates and to profile earlier phases of architecture (see

[7] The reader should be careful not to confuse these designations with the previous terms "Early Established" and "Late Established" sites; they will be merged later in discussion.

Appendix I for details regarding the system employed in labeling architectural sequences), as well as provide potential “early” habitation/use debris deposits if such accumulations were not encountered elsewhere (Aldenderfer 1991; Hayden and Cannon 1983). Both sets of settlement excavations (“Early Abandoned” and “Late Abandoned”) were compared and contrasted to understand the similarities and diversities of house site biographies in association with urbanization experiences (integration and disintegration) through the lenses of the built environment and knowledge bases (Chapters 6, 7, 8).

Excavations were typically conducted using trowels, picks, and ¼ inch mesh screens. Each unit was excavated by one local excavator and assistant, or two students and one excavator, and supervised by student field assistants and myself. In no case did any single lot exceed 20 cm in thickness (typically 10 cm, or finer in the case of features). Flotation samples (4L) were collected from all habitation debris contexts, and any other special features and formal surfaces, and carbon samples were collected when encountered (in habitation debris, fill material, features, etc.). Soil samples were also collected from features and formal surfaces (Appendix VIII).

4.3.1 Ground Coverage

Upon returning to the study area in 2009 to begin Phase 3, ground coverage was found to consist of typical one-year scrub-brush pioneer re-growth. The sites to be excavated were easily cleared in the first few days. However, over the course of the year, a portion of the land on which BVS Cluster 1 is located had been rented to tenants for the purpose of cultivation. Modern Western ploughing techniques were applied to the southeast corner of the survey zone and Cluster 1 leading down to the South Arroyo (Figure 4.34). In addition to the ploughing of the field, the new tenants improved and expanded the Main Property Road. This did cause some damage to the north side of BVS-060-1. Once the tenants realized we were investigating the area they were careful to raise the bulldozer blade when passing over the largest mounds.

A systematic pedestrian re-survey of the 2009 ploughed area confirmed observations from the 2007-2008 Phase 1, consisting of an area with little or no ancient permanent dwellings, although occasionally sparse artifact scatters were noted. An area of scattered daub was located close to the South Arroyo drop-off, but no other building materials were found in its vicinity. The steepness of the area may have deterred the establishment of residential dwellings in this area, however, it is likely that low-strata “invisible” housing was in fact present (not detected in survey) or the area served as an agricultural zone for the long-occupied residential groups immediately north on the upper alluvial terrace. Occasional large, roughly hewn limestone blocks were encountered in the field, likely from artificial terracing in the area. Chert cobbles and even limestone were found eroding from the arroyo cut (head of South Arroyo), and may have served an additional source of lithic and minimal construction material in ancient times.

Upon returning to the study area in 2010 to complete Phase 3, project members were shocked to find the northeast quadrant of the survey area and BVS Cluster 1 to also have been ploughed by the same tenants. The same destructive Modern Western ploughing techniques were applied east of the Site Access Road (not in the survey zone), and to the northern slope of the BVS Cluster 1 survey area, from the Main Property Road up to the East Plaza of the epicentre and west to BVS-007 (not impacting the site). Mounds were not circumvented but ploughed under completely. This is particularly devastating as all structure remains (mounds) in this area were extremely shallow. This occurred due to changes in property lines between owners and the leasing of land to others for cultivation purposes. This was not made known to the archaeologists.

Original plans for the 2010 season included the continued excavations at BVS-007 (Op 354), BVS-006 (Op 355), and BVS-004 (Op 356) and the initiation of extensive excavations at BVS-034, in addition to new excavations at BVS-060 (Op 358), and BVS-077 (Op 359). Due to ploughing, no further excavations took place at BVS-006 or BVS-034, and only limited additional excavations were conducted within the plough zone at BVS-004 to gain further construction data and at a midden (GPS Site/BVS-160, Op 357) confirmed by ploughing. The remainder of excavations took place outside the plough zone. Ground coverage (vegetative) at the remaining sites was minimal, requiring little clearing.

A systematic pedestrian survey of the 2010 ploughed zone confirmed structure/mound and feature observations from 2007-2008 survey. A setback posed by the ploughing was the destruction of the two survey monuments placed within the BVS Cluster 1 settlement zone in 2009 (MNT 2009-01, UTM 0273952/1895810, +/- 3m with handheld GPS, NAD 83; MNT 2009-02, UTM 0273916/1895764, +/- 3m with handheld GPS, NAD 83), although all surveyed points were originally tied into the permanent monuments of the epicentre, so no spatial data was lost.

4.3.2 Phase 3 Results

Results of Phase 3 excavations provided information on the occupation and/or construction histories (Table 4.14), and function of five mounded settlement sites, and one midden, contributing to a reconstruction of their life histories (Chapter 5). All materials from excavations (Table 4.15) were subject to basic assessments (counts, weights, etc.), but only materials from lot groups designated as debris (secondary/*de facto*) or primary deposits associated with the use of specific architectural phases and site life stages were subject to more extensive analysis (Table 4.16). Descriptions of individual lots and lot groups from Phase 3 excavations are presented in Appendix I, and analytical processes followed for each artifact class are also to be found in the appendices. \

All diagnostic ceramics recovered from all Phase 3 contexts (8341 diagnostic sherds, 170,614.61g) were subject to type-variety-mode and dating analysis. To-date, only two carbon samples have been analyzed through radiometric and AMS dating techniques for the Phase 3 finds (Appendix VIII), although additional dating will be conducted in future on many of the key carbon samples collected throughout testing and excavations. Use-debris lot groups consisting of deposits located off the side of structures atop the buried occupation horizon of a settlement site were likely associated with multiple architectural phases. These lot groups can be further broken down into individual stratigraphic components (lots) for further chronological-diachronic analysis in the future.

4.3.2.1 BVS-007 (MVAP Operation 354)

Phase 3 excavations returned to BVS-007 for further assessment of this possible non-domestic settlement site. In 2009 and 2010, excavations and remapping at the site aimed to further understand its history and function within the BVS Cluster 1 settlement area and larger civic entity. In total 37 suboperations were excavated in Operation 354, including 19-2m $_{x}$ 2m units, 13-2m $_{x}$ 1m units, and 5-1m $_{x}$ 1m units (105.50m^2, 43.09m^3) (Figure 4.35).

The site covers the largest area of any settlement site in BVS Cluster 1 and is composed of two elongated masonry substructures with perishable superstructures and low outset terraces facing a formal paved area or patio. BVS-007-4, a mound originally noted on the west side of BVS-007-1, was found to not represent a Precolumbian structure but rather, like BVS-007-3, consisted of road/ditch construction backdirt piled atop the formal patio surface when excavated as part of Op 354A. BVS-007 is located in the narrowest portion of the survey zone, with drop offs to the north and south, and no sites immediately down slope. This placement effectively creates a "control" point, both encouraging and constraining movement through the area. Anyone moving from the high traffic river to the site epicentre would have had to pass through this group in following a path of least resistance (Chapter 6).

Fill materials from both substructures and the patio, in addition to associated debris deposits, have provided chronological information regarding the occupation and construction of the group. All instances confirm initial occupation of the site area during the Protoclassic (100-300 C.E.), with formal masonry construction and use of both buildings (BVS-007-1-4th, BVS-007-2-2nd-D) beginning in the Early Classic (300-600 C.E.) when the civic centre was gaining momentum within the valley. At this time, no formal paved patio/plaza existed. This is not the earliest occupation or construction in the BVS Cluster 1 area, as some house sites were occupied as early as the Middle Preclassic (1000-300 B.C.E.) and masonry architecture appears at BVS-034. Remodeling of BVS-007-2 and the addition of a formal paved patio space occurred during the early facet of the Late Classic (600-670 C.E.), along with a particularly complex series of renovations at BVS-007-1. Both buildings throughout many of their phases have low outset terraces facing on the patio, which may have effectively served as stages for large activities conducted in this area (Chapter 6).

4.3.2.1.1 BVS-007-1.

Extensive excavations at BVS-007-1 aimed to further understand the architectural layout and stratigraphy of the building and to recover associated use debris (Figure 4.36, 4.37, 4.38, 4.39; Table 4.17). Inhibiting excavations in certain areas was a large tree at the mound's summit,[8] fences running along the east-west axis and west side of the mound (crossing the east end of Op 354I), and the modern road immediately to the south of the mound (through the patio space). Excavation units were placed to the west of the central north-south axis so as to avoid having to remove the large tree along the centre line, as well as along the west half of the east-

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[8] This tree was later ripped from the mound in June 2010 by Hurricane Alex, and allowed for more extensive observations of sub-terminal phases in this area.

west axis on the north side of the fence. The structure was composed of soft limestone core faces and facings and an assortment of alluvial cobble fills, and clay fills (see descriptions in Table 4.17). A sunken area, associated with burned limestone and clay and source of the bioturbation noted in Phase 2, was encountered atop the mound in Op 354B and C, but is believed to represent modern disturbances.

The overall building represents of series of distinct substructures and modifications over a span of 900 years. Extensive horizontal stripping began in 2009 to investigate the terminal phase of the structure, while the accumulation of phases was investigated in a series of trenches.

BVS-007-1-1st. Extensive horizontal "stripping" revealed a two phase terminal substructure (BVS-007-1-1st) built atop pre-existing structures and the cobble patio surface, and composed of a mixture of masonry materials (limestone slabs, hewn blocks, boulders, etc.) resulting from the inclusion of earlier architectural elements/alignments, and likely a period of "pillaging" of masonry materials from abandoned buildings. The exterior of this substructure, and possibly its wattle-and-daub superstructure, was coated in a layer of plaster/*sascab* painted red based on the recovered *sascab* melt and daub finds discussed above. The final phase of the structure was built during the late facet of the Late Classic (670-780 C.E.) and used well into the Terminal Classic (780-890 C.E.). AMS dating of burned wood (MVAP 354O/16-P1), possibly from the final phase superstructure, recovered off the north side of the structure (lot group 007-1/23) dates the collapse of the building to 770-900 C.E. and 920-950 (calibrated, 2 sigma) or 780-890 C.E. (calibrated, 1 sigma) (see Appendix VIII for full results).

The north facing (A4) of the terminal structure consists of large, rectangular, hewn limestone blocks with a backing masonry (inter-face fill) immediately south followed by a stacked, large limestone slab core face (A2). Both the facing and core face are part of the earlier BVS-007-1-3rd structure, and were built up over time to accommodate changes in the architectural construction. This same limestone slab core face continues around to the west and north (A3) sides of the terminal building (the top course could be traced through the terminal fill) and contains the F1 fill consisting of a brown clay loam matrix and a high percentage of alluvial cobbles. The facing on the west side of the building is not the same as that of the north face, suggesting expansion of the overall building in a westerly direction over time, and is composed primarily of unshaped limestone boulders positioned in a stepped fashion up the west side. This boulder facing could not be followed around to the south face, however, a bi-level outset terrace

(A8, A9/A10) was located along the centre line of the building, attached to the core face as part of BVS-007-1-1st-A. It is constructed primarily of thin limestone blocks with F1 fill (dark matrix with a high percentage of alluvial cobbles), and represents a poor quality construction as compared to the north face and earlier structures/phases. Finally, the south (A11) and west faces of a bench were exposed atop the terminal substructure.

Debris deposits, sealed beneath a colluvium, fall, and/or *sascab* melt layer, associated with this structure included patio surface and edge materials (BVS-007-patio/6a, 6b, 6c, 7), as well as debris on-structure (lot group 007-1/22a, 22b) and off the west (lot group 2007-1/22c) and south sides (lot group 007-1/22d, 22e, 23).[9] Of note is a debris pile (BVS-007-1 Feature 1, lot groups 007-patio/6c, 7) located atop the patio surface in Op 354P. This consisted of a pile of thin, soft limestone blocks in a circular cone pattern (Figure 4.40). Immediately west of the pile, directly atop the cobble patio surface was a finely flaked chert lenticular biface (LT-272), along with a limestone spindle whorl (SP-029) (the only non-ceramic whorl in BVS Cluster 1), a marine shell bead/pendant (SP-030), and granite mano and metate fragments (GS-061, GS-138). Additional mano and metate fragments were found on the patio just east of this area as well as on the terrace, along with various censer fragments. This pile of blocks may simply represent a discard/abandonment situation, however, its circular configuration is of interest as are the "special finds" located immediately adjacent the feature (Chapter 6). Much artifact material was found immediately off-structure on the west side of the structure, in particular lithic material including Pachuca green obsidian (lot group 007-1/22c).

BVS-007-1-2nd. This structure and its associated phases is located directly beneath BVS-007-1-1st and was investigated within the Op 354E, D, C, Z and Op 354F, G, K, M, AI, Q, X trenches. This structure consists of the same core cell and north facing as BVS-007-1-1st (although shorter) with F2a, F2a-1, F2a-2, and F2c fills. These fills are similar in their yellowish brown clay-loam matrix, although their proportions of alluvial cobble inclusions differ and likely represent task units within the phase construction (Chapter 6). The structure's south facing (A6) is composed of large limestone blocks (BVS-007-1-2nd-B). Attached to the south face is a low terrace of tamped earth (T5, A7) with soft limestone block containing lines (BVS-007-1-2nd-A)

[9] Debris piles off the sides of the structure, resting atop the occupation horizon, are likely additionally associated with earlier structure phases.

built directly atop the pre-existing patio cobble surface (C1, exposed in Op 354A, K, P, X) and directly below the outset terrace of BVS-007-1-1st.

The surface of BVS-007-1-2nd-B is represented on mound by a horizontal layer of debris within the fill (lot group 007-1/24). Use of this structure also would have contributed to off-structure debris piles on the north side of the building, as well as to the west side and on/off the formal paved patio. A large limestone boulder (S1), roughly shaped, is also situated to the east of the outset terrace, against the south facing (Figure 4.41). This abnormally large piece of limestone, comparable only to that at BVS-034, is positioned roughly vertically, with later fill between it and the facing. It is possible this is the remaining fragment of a once positioned stela. No writing/painting was found on the piece.

BVS-007-1-3rd. The third installment of this building is located directly below the previous two structures. This building represents the initiation of the beautifully constructed north facing (A4), with its counterpart on the south side having been removed during later construction phases. The initial construction of this facing included the use of trace stones (A12) and, as previously mentioned, may reflect the use of formal or civic architectural knowledge in the construction of this particular structure as well as BVS-007-2 and the formal patio/plaza area. The vanished south facing is represented by the P1 (BVS-007-1-3rdB/C) and P2 (BVS-007-1-3rd-A) plaster surfaces that lip up to a no longer existing ("ghost") alignment, which would have represented the bottom course of the facing of BVS-007-1-3rd-A, BVS-007-1-3rd-B, and BVS-007-1-3rd-C. This structure is also built atop a tamped surface running beneath the C1 patio surface, and is paved with plaster surfaces immediately adjacent the north facing (P1, P2), atop the substructure (P4), and atop the bench (A5, P3). In the initial phase, BVS-007-1-3rd-C, these surfaces are simply of tamped earth (T2, T3). BVS-007-1-3rd-C consists of F3 fill, while the other two phases consist of F2b fill.

Debris deposits associated with this structure include material off the north face. However, an on-floor deposit (lot group 007-1/25) was also found directly atop the P3 and P4 plaster surfaces of BVS-007-1-3rd-C, continuing west on the same surfaces (time constraints prohibited further exposure). These two plaster surfaces exhibited localized burning in, perhaps from the placement of censers. The on-floor deposit (Table 4.18; Figure 4.42, 4.43; deposit was mapped but no particular spatial pattern was detected) did not contain burned materials; therefore these represent two separate events. The deposit consisted of some typical debris material, along with many special finds rare or unique to the BVS Cluster 1 area, including a Pachuca obsidian thin biface (sourced using EDXRF, see Appendix III). Of the ceramic materials, few pieces could be refit. It is possible this deposit is associated with the termination of BVS-007-1-3rd, prior to "birth" of BVS-007-1-2nd construction, and may represent the placement of activity related debris from surrounding deposits, onto the plastered surfaces. A particularly important find associated with this deposit is a portion of a vase with painted hieroglyphs (CR-035), discussed further in Chapter 6 and in an independent report by Christophe Helmke (Appendix II). A flotation sample from this deposit also uncovered numerous child phalanges from the microartifact sample, along with burned copal resin (Chapter 6).

BVS-007-1-4th. The initial structure at the BVS-007-1 site, BVS-007-1-4th constructed during the Early Classic (300-600 C.E.), represents the beginning of the A2 south core face, which at this time likely served additionally as the outer facing. Its partner is the A1 limestone block alignment found on the south side. These two alignments contain the F4 fill that sits directly atop the sloped occupation horizon (excavated to sterile in lot groups 007-1/26, 27a). Debris deposits associated with this structure might be materials found in the backing masonry (inter-face fill) of BVS-007-1-3rd, as well as deposits off the north side of the structure.

4.3.2.1.2 BVS-007-2

Extensive excavations at BVS-007-2 aimed to further understand the architectural layout and stratigraphy of the building and to recover associated use debris (Figure 4.44, 4.45, 4.46, 4.47; Table 4.19). Inhibiting excavations in certain areas was an east-west running line of larger trees and a fence along the north side of the mound. Excavation units were placed along the central north-south axis as well as along the west half of the east-west axis on the south side of the fence. The substructure is composed of soft limestone core faces and facings and predominantly clay-based fills with few inclusions.

The overall substructure represents two distinct substructures associated with a series of modifications that span from the Early Classic to early facet of the Late Classic (300-670 C.E.), although initial use of the area may have occurred in the Protoclassic (100-300 C.E.) based on debris findings beneath the building (lot group 007-2/18). Extensive horizontal stripping occurred in 2010 to investigate the terminal phase of the structure, while the accumulation of phases was investigated in two “phone booth” units.

BVS-007-2-1st. Extensive horizontal “stripping” revealed a two phase terminal substructure (BVS-007-2-1st-A and BVS-007-2-1st-B) built atop a pre-existing substructure, and composed of three primary types of masonry materials: limestone slabs, and thin and thick hewn blocks. Unlike its sister structure at BVS-007-1, the exterior of BVS-007-2-1st does not appear to have been coated in plaster, although a wattle-and-daub superstructure did exist based on daub finds in the humus, fall, and habitation debris layers. BVS-007-2-1st-B was constructed during the early facet of the Late Classic (600-670 C.E.) and consists of core faces of limestone slab (A1, A6), identical to those at BVS-007-1, holding in a yellowish brown silty clay fill with few alluvial cobble inclusions (F2). These core faces were fronted by large hewn limestone block facings (A2, A8), similar to those at BVS-007-1, and once again trace stones (A3) were used in this placement/construction. Later in the same facet (600-670 C.E.), a terrace feature was attached onto the north face of the substructure (BVS-007-2-1st-A) and consists of a very different fill from the rest of the structure, more similar to that of F1 in BVS-007-1 (dark brown matrix with many alluvial cobble inclusions).

In the areas of Op 354W and AG, significant disturbance to the terminal architecture was observed. This consisted of the removal of the south facing in Op 354W, as well as the removal of the core face, facing, and trace stones in Op 354AG. This disturbance was determined to be Precolumbian, based on the overlying stratigraphy. Further investigations within the “phone booth” of Op 354V confirmed this disturbance continued into the fill of the buildings, although in such areas, material (masonry and perhaps artifacts) appears to have been removed although the matrix of the fill was replaced. A large piling of thin soft limestone blocks atop the terminal architecture in Op 354AA may be result of this disturbance, as it does not appear to conform to existing architectural styles. However, the general disturbed nature of possible superstructure architecture/masonry means the presence of a bench(es) cannot be ruled out. The in-fill disturbance is further discussed below. Evidence of pillaging of masonry materials from this building might be suggested from BVS-077, a small single mound settlement site, constructed after the abandonment of BVS-007-2, and incorporating a wide array of masonry materials, including large hewn limestone blocks. Further disturbance was noted on the west side of the terminal structure, where continued alignments of the core face and facing were not uncovered; also subject to pillaging activity.

Debris deposits, sealed beneath a fall layer, associated with BVS-007-2-1st-A and B, included materials off the south side of the building (lot groups 007-2-/12, 007-2-/13). In considering the size of the BVS-007-2 area and the large area exposed of the terminal architecture, including the off-structure areas, a general lack of significant use refuse, typical domestic or ritually-oriented assemblages, is noted for the building and might suggest a possible administrative function to this building (Chapter 6). Administrative tasks are typically associated with range-like mounds, BVS-007-2 being a long low mound with possible interior bench features, and lack of occupation materials. However, the early abandonment of this building, along with the stripping of its architectural materials, likely also affected the nature of remaining artifact assemblages.

BVS-007-2-2nd. The earlier structure represented at BVS-007-2 is someone more enigmatic than that just described. Little is known of the north and south sides of the structure, due to limited vertical excavation in these areas, although a series of surfaces were uncovered in the Op 354V profile window. BVS-007-2-2nd-A was represented by a surviving tamped (T1) silt-clay fill (F1) surface at the north end of the sub-unit, with numerous soft limestone pieces (fragments of thin limestone blocks, similar to those found atop the terminal structure in Op 354AA) and horizontally laying ceramic sherds (lot group 007-2/14). Based on the fill of this surface (lot group 007-2/8), this phase dates to the early facet of the Late Classic (600-670 C.E.), as do the sherds found atop the surface.

Approximately 15cm below the T1 surface, a disturbed plaster surface (P1) was encountered, surviving more fully in the north end of the sub-unit. This is part of BVS-007-2-2nd-B (lot group 007-2/9) and was found in association with additional horizontally laying ceramics (lot group 007-2/15). Although all materials from these contexts date to the early facet of the Late Classic (600-670 C.E.), a single sherd of codex-style ceramic (Christopher Helmke and Jaime Awe, personal communication, 2010) was found within the associated material (Figure 4.48; a full description/report by C. Helmke can be found in Appendix II). This sherd features a symbol known as the “Grapes of Cahuac”, representative of stone (Stone and Zender 2011:169), and likely originates from the Central Karst Altiplano in Northern Guatemala and dates to 672-751 AD (Reents-Budet et al. 2010). Such sherds are extremely rare in Belize and its recovery amid solid Early Classic and early facet Late Classic material is likely related to the aforementioned disturbance of the mound in Precolumbian times, reaffirmed in Op 354V vertical excavations by the disturbed T1 and P1 surface (Chapter 6).

Below the plaster surface, a limestone cobble surface was encountered (C1), reminiscent of that encountered below Burial 350-B1 at BVS-034 (described above). Unlike the aforementioned tamped and plastered surfaces, this surface was not disturbed, suggesting Precolumbian excavations did not continue into this level. Ceramics from the fill of this surface (lot group 007-2/10) dated the BVS-007-2-2nd-C phase, once again, to the early facet of the Late Classic (600-670 C.E.). Material recovered atop the surface (lot group 007-2/16) also dates to the early facet of the Late Classic. Below the cobble surface, another tamped silty clay fill surface (lot group 007-2-/11) was encountered, with horizontally laying debris atop (lot group 007-2/17). Material from both lot groups also dates the BVS-007-2-2nd-D phase to the early facet of the Late Classic.

Finally, material was recovered from the occupation surface beneath the series of structures (lot group 007-2/18), and dates initial use of the site to the Protoclassic and/or Early Classic (100-600 C.E.). A large carbon sample was also recovered from this layer and will be dated in the near future to verify this assessment.

4.3.2.1.3 Site function

The difference in structure occupation between BVS-007-1 and BVS-007-2 is noteworthy and may reflect a difference in function within the group and community. The overall appearance of the site at the start of the civic "boom" period (Early Classic) should also be considered. The location of the group at the centre of the BVS Cluster 1 community is also of note, as is the odd configuration of the group. A higher percentage of elite and ritually-oriented material within the use debris and fill deposits within the group, including a higher number of serving vessels, censer body fragments, lids, solid clay cones from three-pronged censers (although domestic functions to such artifacts cannot easily be dismissed; Ball and Taschek 2007), copal resin and burned infant/child human phalanges, a drum fragment, whistle, figurine fragments, a large finely flaked lenticular biface, quartz crystals, unaltered and carved marine shell, personal adornments of exotic materials, Pachuca and other rare-source obsidian, and rare ceramic sherds with iconographic and hieroglyphic inscriptions, might suggest a more ritually and/or administrative function to this group. This is further investigated in Chapter 6.

4.3.2.2 BVS-006 (MVAP Operation 355)

This settlement site was surveyed, mapped, and tested in 2007, and in 2009 excavations aimed to understand the layout, occupation, and function of the group as a whole. The site consists of three orthogonally arranged mounds, BVS-006-1, BVS-006-2, and BVS-006-3 (the latter two were not tested during Phase 2 as they were noted too late in the 2008 season), arranged around a formal patio area; a Type III settlement site. In total 19 suboperations were excavated: 11-2m x 2m and 8-2m x 1m units ($60m^2$, $15.75m^3$) (Figure 4.49). Excavation units were placed across the north-south and the east-west axes of the site/group, traversing mounded areas, inter-mound space, and off-mound areas (Figures 4.50, 4.51, 4.52, 4.53; Table 4.20). A thin humus layer was removed from all suboperations, although thicker in sloped, off-mound areas, along with either a fall (off mound) or colluvium (on mound/patio) layer.

4.3.2.2.1 BVS-006-1

Ops. 355A, B, C, D and S were positioned in order to better understand the architectural layout of BVS-006-1 and to recover associated habitation debris. The structure, and associated phases, represented by this mound is believed to have served as the principle residence of the site based on its height above all others in the group and multiple construction phases.

BVS-006-1-1st. The terminal phase of the building (BVS-006-1-1st-A) consists of a masonry substructure platform, represented by roughly hewn limestone block faces containing a dark brown soil matrix with a high percentage of alluvial cobbles (F1), and a raised bench area atop the substructure and a terrace extension on its north side (both of F1 fill). Each of these features (platform, bench, terrace) date to the Terminal Classic period (780-890 C.E.) based on ceramic finds within fill deposits (lot group 006-1/5), making it one of the latest construction episodes in BVS Cluster 1. The terrace of this terminal phase sits directly atop a pre-existing cobble surface patio area to the north (BVS-006-patio-1st). Habitation debris associated with this phase includes material recovered off the south side of the structure in Op 355S (lot group 006-1/8d), horizontally laying material found on the structure bench (lot group 006-1/8a), on the north terrace (lot group 006-1/8b), and off the west face recovered in Phase 2 (lot group 006-1/8c). Habitation debris collected from on-structure areas could not be securely separated from fill material (mixed contexts) due to the lack of formal paved/sealed terminal surfaces.

Additional on-patio debris deposits, including those associated with Features 1, 2, and 3, are associated with this terminal phase (discussed below).

A 1m$_x$1m stratigraphic sub-unit (profile window) was placed in Op 355C to understand earlier phases of the building and to recover potential earlier use debris deposits. The profile window uncovered a penultimate tamped fill (T1) surface and architectural alignment (A9) consisting of a single course of thinly hewn soft limestone below the terminal fill of the building. This alignment is believed to represent the face of the BVS-006-1-1st-B substructure or on-structure bench, and the A4 alignment serving as a north terrace face (or substructure face) at this time. This phase dates to the late facet of the Late Classic (670-780 C.E.), based on ceramics recovered from the T1 fill (lot group 006-1/6). At the time of initial construction, there was likely no formal patio area or BVS-006-2 or BVS-006-3 (based on stratigraphic assessment), however, the patio surface was put in place sometime before the terminal BVS-006-1-1st-A was constructed, as was BVS-006-2-1st-B and BVS-006-3-1st. The penultimate fill (F1a) contained the same dark brown soil matrix although less cobble-sized material as compared with the terminal (F1) fill. Debris deposits associated with the BVS-006-1-1st-B phase includes aforementioned material off the south and west sides of the structure.

Below the BVS-006-1-1st-B surface, a second tamped (T2) fill surface was encountered running beneath the A9 alignment: BVS-006-1-1st-C. The fill (F2) of this phase, predominantly yellowish brown silt clay with some alluvial pebble and cobble material, dates to the Early Classic/early facet of the Late Classic (300-670 C.E.) (lot group 006-1/7), and is likely contained by the basal course of the A4 alignment. The overall form of the substructure platform from this earliest phase remains unknown, and the only debris deposits that may be associated with its use are those off-structure to the south and west. Finally, below this phase the buried 'A' occupation horizon was uncovered along with an associated debris deposit (lot group 006-1/9). The profile window was excavated to sterile.

4.3.2.2.2 BVS-006-2

BVS-006-2 was investigated in Op 355H, I, and J and found to consist of a dual phased structure initiated in the late facet of the Late Classic (670-780 C.E.). A 1m$_x$1m profile window was initiated as part of Op 355H to determine construction date and to detect earlier phases or structures.

BVS-006-2-1st-A. The terminal substructure, dating to the Terminal Classic (780-890 C.E.) based on ceramic deposits within the fill (lot group 006-2/4), was built into the side of a natural slope, with the north face built up to level with the south. The north, east, and south faces (A7, A8) of BVS-006-2-1st-A were exposed and documented as composed of roughly hewn (mostly one to three sided) soft limestone blocks and some unshaped limestone boulders, and of at least two courses in height (based on the east facing). More courses are known to have existed, as many hewn blocks were found in the fall of Op 355J. The terminal fill (F1) consisted of a dark brown soil matrix with many alluvial cobble inclusions. Habitation debris was recovered from the off-structure area to the north (lot group 006-2/6c) and east (lot group 006-2/6b), as well as between the south face of the substructure and north face of the formal patio area (lot group 006-2/6a).

BVS-006-2-1st-B. A thin penultimate fill (F2) was encountered below the terminal fill, consisting of yellowish-brown silty clay and few alluvial cobble inclusions. This fill (lot group 006-2/5), representing the BVS-006-2-1st-B phase, dates to the late facet of the Late Classic (670-780 C.E.). I believe this structure was built separate from the patio and BVS-006-3-1st, based on the fact that the latter two are attached, while BVS-006-2 remains separated from the formal patio borders. Below this fill a debris deposit (lot group 006-2/6d), consisting primarily of ceramics, was recovered as a solid layer sitting directly atop the buried occupation horizon. Material from this layer dates from the Middle Preclassic through to the late facet of the Late Classic (1000 B.C.E. – 780 C.E.).

This extremely dense concentration of debris, approximately 40cm thick, had little earthen matrix within and had the appearance of lying in situ. It is very similar to a description by Willey et al. (1965) concerning a house site at Barton Ramie in the Upper Belize River Valley. In house mound BR-1 between occupational levels, identified by plaster floors, they found a 50cm thick level of non-occupational use that included alignments of stones, without clearly associated floors. There were two discrete episodes or levels of burned clay, ash and charcoal as thick as 5cm dating to the Late Classic period. Also in this provenience were "…two large pockets or clusters of sherds that were found in an extremely dense concentration… with so little earth fill among them that it would appear that the sherds had been dumped all at once from some large container" (Willey et al. 1965: 45-47). This also fits patterns associated with Features 1, 2, and 3 mentioned below. This deposit is further discussed in Chapter 7.

4.3.2.2.3 BVS-006-3

The third minimally mounded area in BVS-006, located on the west side of the group, was investigated in Ops. 355M, N, P, and Q. A vertical sub-unit (profile window) was placed in the west end of Op 355N to investigate potential earlier phases/structures.

BVS-006-3-1st. BVS-006-3 consists of a single-phased structure: BVS-006-3-1st. The masonry substructure, likely constructed at the same time as the terminal patio as it is directly attached (unlike BVS-006-2), dates to the late facet of the Late Classic (670-780 C.E.) based on vertical sub-unit excavations in Op 355N (lot group 006-3/4). The structure consists of an upper and lower platform area (substructure and upper bench feature), directly abutting the formal patio, and built up on the west side to likely accommodate its perch on a natural hill slope (similar to BVS-006-2). Each associated architectural alignment, containing F1 fill, consists of at least two courses and ranges from roughly hewn to nicely hewn soft limestone, as well as rough limestone boulders, particularly along the west face. Habitation debris was recovered from the western off-structure area in Op 355Q (lot group 006-3/5).

4.3.2.2.4 BVS-006-patio

Portions of the formal patio area were investigated in Ops. 355E, F, G, K, L, O, and R. The formal outlined patio area and associated terminal fill (lot group 006-patio/3), labeled BVS-006-patio-1st, identical to the terminal phase (F1) fills of BVS-006-1, 2, and 3, dates to the late facet of the Late Classic period (670-780 C.E.). Associated with the terminal surface are three important features: a possible firing feature (Feature 1), a daub feature (Feature 2), and a carbonized wood feature (Feature 3). Additional associated debris deposits include those on the patio surface near BVS-006-1 (lot group 006-patio/4a), near BVS-006-2 (lot group 006-patio/4b), and near BVS-006-3 (lot group 006-patio/4e). One penultimate feature, a filled posthole (Feature 4), was encountered in the profile window of Op 355E.

BVS-006 Feature 1. This is a possible firing feature, excavated primarily in Op 355F (lot group 006-patio/4c consisting of debris immediately surrounding the feature, and lot group 006-patio/5 consisting of debris from within the feature, all of which was subject to floatation). The feature consists of a raised cobble circle on the patio surface, although it is not clear as to whether it was purely associated with the terminal surface as it may have been continuously built up over time, initiated within the occupation horizon below the terminal/formal patio surface.[10] The interior of the circle is a pit/sunken circle, filled with a mixture of soil, carbon, and small daub pieces and pebbles/rock chunks. The south half of the interior of the pit was excavated in 5cm lots, with all removed matrix subject to flotation. The pit is roughly 65cm in diameter north-south, 90cm in diameter east-west, 40cm deep, and is partially lined with cobbles and continues into the buried 'A' horizon (Figure 4.54).

To the immediate southwest of the hearth, crossing a portion of the elevated circle, is an alignment of upright stones (thin soft limestone blocks) embedded in the patio in the southwest corner of Op 355F. This alignment is almost below the patio surface and is not paired with any other architectural alignment within the group. It is possible this line is associated with penultimate activity or with activity focused on the use of Feature 1. The line may also be associated with a cobble-filled posthole found within the Op 355E profile window (Feature 4).

The feature was initially thought to be a hearth, however, the lack of typical ash layers and its significant depth argue against an oxidized firing feature/atmosphere. It is now believed this may be the basal portion of an earth oven or *pibnal* used in food production, similar to the pit-hearths and patio-hearths of Nohmul (Pyburn 1989:336), or possibly a smudge pit for smoking hides (Binford 1967), or a firing feature for pottery manufacture (Potter and King 1995) that was continually cleaned out (when covered with soil, charcoal remains and ash are not produced). Charred cohune nuts found in the top levels of the feature may be key to understanding its use: cohune nuts were a common food among the ancient Maya and cohune palms could be used for fuel in features such as smudging pits. However, the possibility of ceramic manufacture using this feature is quite strong, particularly when considered alongside the pile of ceramic sherds beneath BVS-006-2 (lot group 006-2/6d). This is discussed further in Chapter 7.

Feature 2. This feature consists of a large concentration of daub, unlike that from typical perishable superstructures, immediately to the east of the firing feature (lot group 006-patio/6). The accumulation is over 20cm thick in some areas and was found resting directly atop the patio surface immediately east of the Feature 1 pit; the patio cobbles were found to continue beneath the feature once removed. The southwest quarter of each daub concentration was excavated in

[10] This was to be further investigated in 2010, but ploughing destroyed the area.

order to view profiles and all removed matrix was subject to floatation. During excavation of the first concentration area (western), a number of curved pieces of daub were recovered (e.g. 355O/6-P2, P5; Figure 4.55). These pieces are of the correct curvature to either have been from the inside of the Feature 1 pit-hearth, or to have been part of a superstructure for the feature.

Feature 3. This feature consists of a concentration of carbon and charred wood located directly north of Feature 2 (lot group 006-patio/7). Large pieces of carbonized wood/logs were found in direct association with the cobble patio surface, and the daub concentrations of Feature 2. No burning was found in the humus layer above this area, so it is likely not the result of modern burning of a tree/roots. It is odd that complete, large pieces of charred wood would survive in this type of context archaeologically. The direct association of the pieces with the terminal cobble surface (the surface was found to continue uninterrupted beneath the feature) and their direct proximity with the daub and firing feature is noteworthy (Chapter 7).

Feature 4. The final feature was found when a 1m $_x$ 1m profile window was placed in the northwest corner of Op 355E to gain patio fill material for the purpose of dating. The base of the patio fill was reached, but it was found to continue in an isolated, circular area at the centre of the window. Excavations followed down around the "tube" of fill (lot group 006-patio/8), which ended in the sterile buried occupation horizon. It cannot be confirmed as to whether this hole, possibly created from the placement of a post within the buried horizon, is from an earlier phase of construction or if it was placed through the patio at some point in time and later on removed and in-filled.

4.3.2.3 BVS-004 (MVAP Operation 356)

During the 2007 field season, a single mound site was located during survey at BVS-004, and subsequently mapped and tested (Op 350D, E and G). In 2009 and 2010, excavations at the site aimed to understand the layout, occupation, and function of the location. In total 18 suboperations were excavated: 7-2m$_x$2m, 5-2m$_x$1m, and 6– 2m$_x$1m units (44m^2, 12.02m^3) (Figure 4.56). Excavation units were placed across the north-south and the east-west axes of the mounded site (Figure 4.57, 4.58, 4.59, 4.60; Table 4.21). Placement of the units was slightly inhibited by a large palm growing out from the centre of the mound, and a large anthill atop the mound caused additional disturbance. Ground truth test pitting by Hudacin (Appendix I for the full report) in the off-mound areas around BVS-004 suggest the associated houselot extended 15 m to 20 m beyond the mound/structure, and recovered an area of eroded plaster to the west of the mound not captured in Phase 3 excavations.

4.3.2.3.1 BVS-004-1

This is a single structure site with adjoining terraces to the west, east, north, and south. Associated phases represent an architectural accumulation of 600 years (Early Classic to Terminal Classic, 300 -890 C.E.), with use of the site beginning prior to masonry construction.

BVS-004-1-1st. The majority of the site is represented by a rather large conglomeration of a masonry substructure and adjoined terraces. Many alignments of soft limestone blocks (roughly hewn) were encountered during “stripping” excavations, particularly along the west and south sides of the structure, and serving as containing cells for a fill of brown soil matrix with a high percentage of alluvial cobble inclusions (F1). Initially this appeared as quite a “mess” of blocks and alignments, but careful mapping and profiling of the building assisted in determining more specific patterning.

Alignments A3 and A6 are believed to represent terminal structure facings, with A2 serving as a small step up onto the substructure. A north-south running alignment (A4) was uncovered atop the terminal substructure, beginning in Op 356D and extending through to Op 356J, representing the west face of an upper bench feature, with A5 functioning as the east face. Both are connected by an east-west alignment running through Op 356D, E, and F. This substructure and bench represents BVS-004-1-1st-B, and is dated to the late facet of the Late Classic (670-780 C.E.) based on ceramics from fill contexts (lot group 004-1/8).

The single course alignments of A1a and A1b contain two low terraces off the west side of the substructure, with a third that continues beyond the western boundary of Op 356 excavations. These terraces, part of BVS-004-1-1st-C, are older than the terminal substructure, constructed during the early facet of the Late Classic (600-670 C.E.). A limited amount of habitation debris was recovered from atop these terraces as part of lot group 004-1/14.

An odd cell-like formation of alignments was uncovered on the south side of the structure, but limited time did not allow for further investigation.[11] However, a terrace was also encountered along the south side of the substructure in Ops. 356 D, E, F, and H. An eastern

[11] This was to be investigated during the 2010 season, however, ploughing of the mound destroyed the terminal features of the structure.

terrace area was also first identified during the 2007 testing and explored further in Op 355G and F. Both the south and east terraces date to the Terminal Classic (780-890 C.E.), based on ceramic dating of fill deposits (lot groups 004-1/6 and 7) and represent the final phase of construction: BVS-004-1-1st-A. Habitation debris deposits were recovered from these terraces along the edges of the substructure (lot groups 004-1/11 and 12), including an area of multiple metate fragments (lot group 004-1/13) uncovered on the south end of the east terrace continuing around to the south side terrace, and potentially indicating a special activity area (Chapter 7). A flotation sample was collected from this area.

The terrace off the north side of the terminal substructure was first encountered during Phase 2 excavations, and re-examined in Op 356K. Additional debris deposits (lot group 004-1/10) were recovered from this surface, and ceramics recovered from the terrace fill (lot group 004-1/5) date its construction to the Early Classic (300-600 C.E.). The north terrace forms part of the initial masonry construction phase at the site (BVS-004-1-1st-D).

In 2010 we returned to the site, following ploughing in the area, to gain further chronological information. Stratigraphic excavations in suboperations 356M, N, O, P, Q, R confirmed initial occupation at the site beginning in the Middle Preclassic (1000-300 B.C.) based on debris recovered from the occupation horizon beneath the masonry architecture (lot groups 004-1/15, 17, and 18), with subsequent masonry construction of the first substructure platform during the Early Classic (300-600 C.E., lot group 004-1/9): also part of the BVS-004-1-1st-D phase. A large organic-rich lens was encountered below the occupation horizon and is similar to low-level clay-rich soils in the nearby area of BVS-033 (Appendix I). Soil samples were collected from this lens and the dark grey-brown horizon further down. Excavations continued below the point of sterility to ensure no additional cultural materials were to be found in deeper strata.

4.3.2.4 Site 160-Midden (MVAP Operation 357)

During the 2007 transect survey, various “scatters” of ceramic material were noted on the north slope of the BVS Cluster 1 area. GPS points were taken and notes made of associated material. Following ploughing of the area, a new scatter was discovered (UTM 0273887/1895803, NAD83) just to the north and down slope from BVS-006, and determined to be a potential inter-site midden (Figure 4.61, 4.62). A 1m x 1m excavation unit (Op 357A) was placed at the centre of the feature and excavated in arbitrary levels to recover a large sample of the assemblage in addition to stratigraphy and chronological information. The feature was determined to have a radius of 3.8m (determined for "dog-leash" surface collection, Op 357B) and maintained density roughly 50cm below surface, with the plough zone extending only 10 to 15cm below surface in this sloped area.

Excavations confirmed the presence of a sloping landscape in Precolumbian times, and large sherds (>5% diameter) dominate the assemblage throughout the deposit. Materials removed from 1.06m^3 were found to be predominantly ceramic, with a total sherd count of 2439 (42312.1g) and a maximum vessel frequency of 245 (based on 281 rim fragments, although this number is extremely tentative). Open forms dominated the assemblage representing 56% (50% of which are ashwares). Other materials included 66 (1711.8g) bulk lithics, 8 (146.2g) bulk daub, 1 (51.4g) figurine fragment, 1 (102.0g) metate fragment, 1 (492.0g) mano fragment, and 5 (952.5g) thick chert biface fragments. The high number of open forms may suggest a special function assemblage, although chronological assessment of the ceramics (lot groups 160-1/1 to 5) dates the deposit to the early facet of the Late Classic through to the Terminal Classic period (600-890 C.E.). Excavations continued below sterile to ensure no other materials were to be recovered at deeper strata.

4.3.2.5 BVS-060 (MVAP Operation 358)

This settlement site was originally thought to be composed of only two mounds in an L-shape configuration on a supporting patio platform. However, Phase 3 excavations in 2010 revealed three mounds (BVS-060-1, BVS-060-2, BVS-060-3), the third of which was extremely low lying, arranged orthogonally in a C-shaped configuration around a central patio area. Operation 358 suboperations (Figure 4.63) were laid out to cover the site in north-south and east-west traverses, as well as to capture information concerning individual structure layout and to recover debris deposits both on and off the mounded areas (Figure 4.64, 4.65, 4.66, 4.67; Table 4.22). Enigmatic colluvium/fill material above architectural alignments uncovered in the Phase 2 test excavation at Op 350AB was determined to be in-situ terminal fill. In Precolumbian times, the masonry faces of the terminal structures at the site were pillaged, causing a "spill over" appearance of terminal fill that is not uncommon to many terminal phases of house mounds elsewhere in the valley, such as at Baking Pot and other areas where limestone resources are scarce (Julie Hoggarth, personal communication, 2010). This supports aforementioned inference of the prevalence of material "pillaging" in the BVS Cluster 1 area, particularly during the late facet of the Late Classic (670-780 C.E.) and later, likely due in large part to the general scarcity of limestone construction material in the immediate surroundings, and a significant decrease in architectural complexity and quality over time perhaps due to the loss of access to previously available limestone resources.

4.3.2.5.1 BVS-060-1

The tallest mound, BVS-060-1, is located on the north side of the site, consists of three distinct architectural structures spanning the Late Classic period (600-780 C.E.), and is believed to have functioned as the principal residence of the group. The north half of the mound was disturbed by recent road maintenance in 2009; a bulldozer having shaved off the outer most face/fill. Because of this disturbance, investigations of the mound focused on the east, west, and south sides only: Ops. 358A, B, C, D, I, Q, U, V, W, Y, Z, and AA. A thin humus layer was removed from the entire area, along with a thin colluvium layer that did not appear in the profile mapping, and a small amount of fallen material was removed from the south face of the terminal structure. Few definite habitation debris deposits were located at this site and may be the result of post-abandonment activity in the area: this settlement site having been abandoned before the Terminal Classic.

BVS-060-1-1st. The terminal structure was found in direct association with the final phase of the patio (BVS-060-patio-1st-A), and dates to the late facet of the Late Classic (670-780 C.E.) based on dating of ceramic materials from the fill (lot group 060-1/4). As mentioned above, this structure consists of numerous alignments of now missing limestone block/slab/boulder faces, the most intact of which was the south face of the substructure (A4), and would have served to contain the F1 platform fill, consisting of a brown soil matrix with much alluvial cobble and artifact debris. A very high percentage of artifact debris was also noted for this fill as compared to other sites in the BVS Cluster 1 area (Chapter 7).

No habitation debris deposits were found in direct association with this structure and it is presumed much associated debris would have been located off the north side (back) of the building.

BVS-060-1-2nd. The penultimate structure of the BVS-060-1 mound consists of a low substructure and associated penultimate patio surface (BVS-060-patio-1st-B), which may in fact simply be a terrace area off the south side of the substructure and not represent a full patio surface. This feature was represented by a tamped fill (F2, lighter brown to yellowish brown soil matrix with alluvial cobbles) surface below the terminal patio fill that continued below the BVS-060-1-1st south face (A4) and into a penultimate alignment of thin, roughly hewn, soft limestone blocks (A7), uncovered in Op 358D sub-unit excavations. The tamped surface (T1) continued higher up on the north side of the A7 alignment as the substructure surface, although it was interrupted partway through the Op 358C area.

Horizontally lain debris was found atop this surface and was recovered as two separate lot groups: 060-1/8 collected from south of the disturbed area and 060-1/9 from north of the disturbance. This material, capped by the aforementioned terminal fill, dates to the early facet of the Late Classic (600-670 C.E.) as does ceramic material from within the T1 surface fill (lot group 060-1/5).

BVS-060-1-3rd. The initial structure in the BVS-060-1 area is the most complex and labour intensive of the three, and can be divided into two separate phases: BVS-060-1-3rd-A and BVS-060-1-3rd-B. The terminal phase, BVS-060-1-3rd-A, consists of a substructure south facing (A6) that contains F3 backing masonry and sub-floor fill (yellowish brown silt-clay matrix with alluvial cobbles) dating to the early facet of the Late Classic (600-670 C.E., lot group 060-1/6), and an earlier core face (A5) composed of many courses of shaped limestone blocks. This core face is the original substructure face from BVS-060-1-3rd-B and contains the F4 fill of yellowish brown silt-clay with few inclusions and dates to the Early Classic to early facet of the Late Classic transition (300-670 C.E., lot group 060-1/7).

BVS-060-1-3rd-A is also represented by two plastered surfaces: one atop the substructure (P1) and one atop the south terrace (P2). The P1 surface was found to be disturbed in the same area as the overlaying T1 surface. This disturbance may be reflected in the F3 fill, as well as in the on-floor material recovered from the P1 surface (lot group 060-1/10) and material from the lower T2 and T3 surfaces (lot group 060-1/11) that contained all ceramics attributable to the Early Classic and early facet of the Late Classic, except for sherds from a single Montego Polychrome-like ashware vase (CR-048, 49, 50) that dates to the late facet of the Late Classic and into the Terminal Classic (670-890 C.E.; Jaime Awe and Christophe Helmke, personal communication, 2010) (Figure 4.68). This suggests disturbance into the mound after its abandonment and the placing of later material into these early fills (Chapter 5).

4.3.2.5.2 BVS-060-patio

The patio area of BVS-060 was investigated in Ops. 358E, F, J, K, L, N, and T. As previously mentioned, the majority of the patio area between the three structures consists of a single phase, BVS-060-patio-1st-A, and dates to the late facet of the Late Classic. A second phase, BVS-060-patio-1st-B, was detected in profile window excavations off the south side of BVS-060-1, and may actually represent an attached terrace. In the rest of the patio area, below the terminal F1 fill, the occupation horizon was encountered.

In the surface of the terminal fill, a depressed area was located in the area of Op 358E. This was investigated through removal of matrix in the depression, but was found to not consist of any special feature. However, in the area of Op 358F, below the terminal fill within the occupation horizon, a small in-filled pit was exposed (BVS-060 Feature 1).

Feature 1. Excavations of a stratigraphic unit into the patio fill in Op 358F uncovered a small depressed area in the underlying occupation horizon, which may have been a firing feature associated with penultimate and antepenultimate phases of the group. Only burned chert cobbles and ceramics were removed as macroartifacts from the small circular feature, which measured 40 cm x 35 cm at its widest points and no deeper than 10cm. All matrix removed from the feature was floated and included tiny fragments of carbon, resin (copal), and bone (unknown source) (Op 358F/9, lot group 060-patio/5; see Appendix VIII for microartifact tallies). This feature may have served a utilitarian and/or ritual function for the early household, and its location at the centre of the patio area between all three structures is similar to that of Feature 1 at BVS-006.

4.3.2.5.3 BVS-060-2

BVS-060-2 is a single, low substructure and was investigated in Phase 2 (Op 350AD, AE) and Phase 3 (Op 358O, P, and S). Like the terminal phase of BVS-060-1, most masonry blocks/boulders of the face were pillaged in Precolumbian times. The shallow structure dates to the Early Classic (300-600 C.E.) based on ceramics recovered from fill contexts (lot group 060-2/3) and may be the earliest masonry construction at the site. Its eastern position in the group may associate it with ritual activity; however, this is not reflected in the use assemblage.

Habitation/use debris associated with this structure was recovered off its east side (lot group 060-2/4) and ranges in dates from the Early Classic through the early facet of the Late Classic. This debris and associated masonry material piles is further described in Phase 2 excavation descriptions for Op 350AD and AE (Appendix I).

4.3.2.5.4 BVS-060-3

The final mound at the site, investigated in Ops. 358G, H, J, K, R, and AB, consisted of two structure construction phases of minimal, single course facings of roughly hewn, thin limestone slabs: a terminal phase (lot group 060-3/3) dating to the late facet of the Late Classic (BVS-060-3-1st-A) and the penultimate phase (uncovered below the terminal fill in Ops 358F, J, K, and AB), consisting of the original substructure (F2 fill) and attached south terrace (lot groups 060-3/4 and 5), dating to the early facet of the Late Classic (BVS-060-3-1st-B). The penultimate phase was in place before the terminal formal patio cobble surface, and the terminal phase was likely put in place at the same time as the terminal patio surface based on the continuous nature of both fills. Once again, much of the masonry material associated with the terminal phase was pillaged in Precolumbian times.

BVS-060 Feature 2. Off the south side of BVS-060-3, a depression in an adjoined terrace area surface was encountered. Surrounding this depression was a layer/scattering of ceramic sherds (lot group 060-3/70), consisting of primarily open forms and dating to the early facet of the Late Classic. The depressed area was excavated (lot group 060-3/6) and all material floated; however, the terrace fill was found to continue at the bottom of the humus filled depression. It is possible the ceramics surrounding the depression were used in association with a large, possibly heavy, item that was placed in/caused the depression in the terrace. Ethnographically, bowls or jars have been found placed in patio/terrace surfaces near buildings for the purpose of water collection and storage, and are often associated with maize washing and cooking areas that are out of the way of high traffic zones (Smyth 1989). This may be an example of such activity.

4.3.2.6 BVS-077 (MVAP Operation 359)

The final settlement site investigated is a small, single mound site (Type I) noted in survey and tested in 2008 (Op 350Z). Phase 3 excavations, Operation 359, aimed to further understand the overall layout of the site, gain further information regarding occupation and construction dates, and to recover additional use debris deposits. A large tree at the centre of the mound prohibited excavation along the north-south centre line, so suboperations were arranged primarily along the west side of the mound, although crossing over to the east side roughly along the east-west centre line (Figure 4.69). These excavations exposed a single-phase structure making up the mounded area and recovered off-structure use debris (Figures 4.70, 4.71, 4.72).\

4.3.2.6.1 BVS-077-1

This masonry substructure was constructed sometime during the early facet to late facet transition of the Late Classic period, based on ceramics recovered from F1 fill contexts (lot group 077-1/3) excavated in the Op 359E profile window. Excavations exposed roughly half the terminal structure, BVS-077-1-1st, and found a single construction platform built atop the occupation horizon, represented by core faces of limestone blocks (thick and thin) and boulders (A1 and A4). This substructure supported an upper platform or bench (A2 and A3). The substructure of the building was in excellent condition along its north and west faces, its perishable superstructure inferred from the daub recovered in all excavations, while the west and south faces have suffered some disturbance. The better preservation on the north and west sides is likely due to the flat terrain on which they were built, with significant humus overlaying the architectural alignments in this area (effectively sealing them in place), as oppose to the south and east sides that were significantly built up to level the building on a sloped terrain.

Based on the types of masonry materials used in cell construction, namely the presence of a combination of small and large nicely hewn limestone blocks as well as more poorly hewn blocks and rough boulders, in addition to late construction time of the building, I believe the masonry materials were pillaged from the nearby BVS-007-2 mound where facings were removed from the terminal architecture sometime during or after its early facet Late Classic abandonment.

Although occupation of the BVS-077 site may have begun as early as the Early Classic (based on off-mound and sub-mound debris), it did not extend beyond the late facet of the Late Classic. This may explain the paucity of habitation debris recovered (lot groups 077-1/4a, 4b, 4c, 5). BVS-077 appears to be a low intensity, short-lived household site.

4.4 Phase 4 Analysis

Initial artifact analysis consisted of preliminary identification of all materials collected from all phases of investigation. Laboratory procedures for MVAP involved the division of artifacts and ecofacts into several categories for analytical and storage purposes. Most categories are based on the raw material of objects, while other categories were distinguished by technological attributes.

I conducted preliminary identification with initial assistance provided by J. Yaeger. Ceramic analysis followed sequences and terminology established by Gifford (1976), LeCount (1996), LeCount et al. (2002), and Sabloff (1975), further discussed in Appendix II. Additional ceramic identification assistance was provided at various times by L. LeCount (2007), K. Brown (2007-2010), L. Kosakowski (2008), L. Sullivan (2008), C. Helmke (2010), and J. Awe (2010). Lithic identification assistance was also provided on occasion by J. Stemp (2010) and N. Hearth (2009). Faunal and osteological identification assistance was provided by C. Freiwald (2007-2010) and N. Stanchly (2009). Groundstone analysis assistance was provided by S. Batty (2010). Explanation of individual artifact class analysis procedures can be found in the attached appendices. All contexts were subject to ceramic dating (including humus layers that often contain important traces of terminal activity at settlement sites) and all artifact materials were subject to a minimum of basic identification and counts/weights. Although all analysis results are not presented in this dissertation, they will factor into future publications.

Formal analysis of spatial patterning, architectural remains and features, as well as artifacts recovered from all phases of investigation (discussed throughout the following chapters), focused on issues of domestic-community-urban identity, integration, and knowledge through production and consumption patterns integral to such concepts. This involved close analysis of all artifact classes, particularly those from habitation/use debris contexts, and encompassed the following issues: identifying type-varieties for information concerning chronology and socio-economic status; the analysis of debris/debitage to determine manufacturing presence, stages, and degree of household independence; a study of form to determine function/activities and occupation of household members; identifying local materials versus tradewares/“exotics”, based on existing literature, to identify degree of involvement in regional and inter-regional economies; life cycle analysis to determine expediency, reuse, recycling, etc. of materials, that may signify changes in household activity, abandonment processes, and networking, etc., and; identification of specialized forms, such as adornments and eccentrics, indicative of various identities and occupations.

All analysis and interpretation, presented throughout the remaining chapters and appendices, has benefitted from comparative ethnographic, ethnohistoric, and additional archaeological datasets. Results were also contrasted with previous excavations in the Buenavista epicenter, as well as from nearby hinterland and rural communities.

Phase	Name	Description	Dates
1	Reconnaissance	Transect survey of the Buenavista South (BVS) settlement zone	06/2007 06-07/2008
2	Testing	Test excavation program of all mounds in BVS Cluster 1 (Op 350); GPR and ground-truthing of inter-mound area (Op 353)	06/2007 06-07/2008 06/2009
3	Excavation	Extensive vertical and horizontal excavation of five settlement sites and one midden in BVS Cluster 1 (Ops 354, 355, 356, 357, 358, 359)	06/2009 06-07/2010
4	Analysis	Laboratory analysis of material assemblage (described in appendices)	07-12/2009 08-12/2010

Table 4.1: BVS research design phases and descriptions.

Operation	Year	Description	Total Area (m^2)	Total Volume (m^3)
350	3 months 2007-2008	Phase 2 testing: 1m x 2m test units on mounds	87.15	31.58
353	2 months 2008-2009	Phase 2 GPR/ground-truthing: GPR and conductivity + shovel test pits	2650.00	9.73
354	2.5 months 2009-2010	Phase 3 excavations BVS-007	105.50	43.09
355	1 month 2009	Phase 3 excavations BVS-006	60.00	15.75
356	1.5 months 2009-2010	Phase 3 excavations BVS-004	44.00	12.02
357	1 week 2010	Phase 3 excavations GPS Site 160 (midden)	45.34	1.06
358	1.5 months 2010	Phase 3 excavations BVS-060	62.00	7.45
359	3 weeks 2010	Phase 3 excavations BVS-077	24.00	5.48
		Total with Op 353	3077.99	126.17
		Total without Op 353	**427.99**	**116.44**

Table 4.2: BVS operations and descriptions.

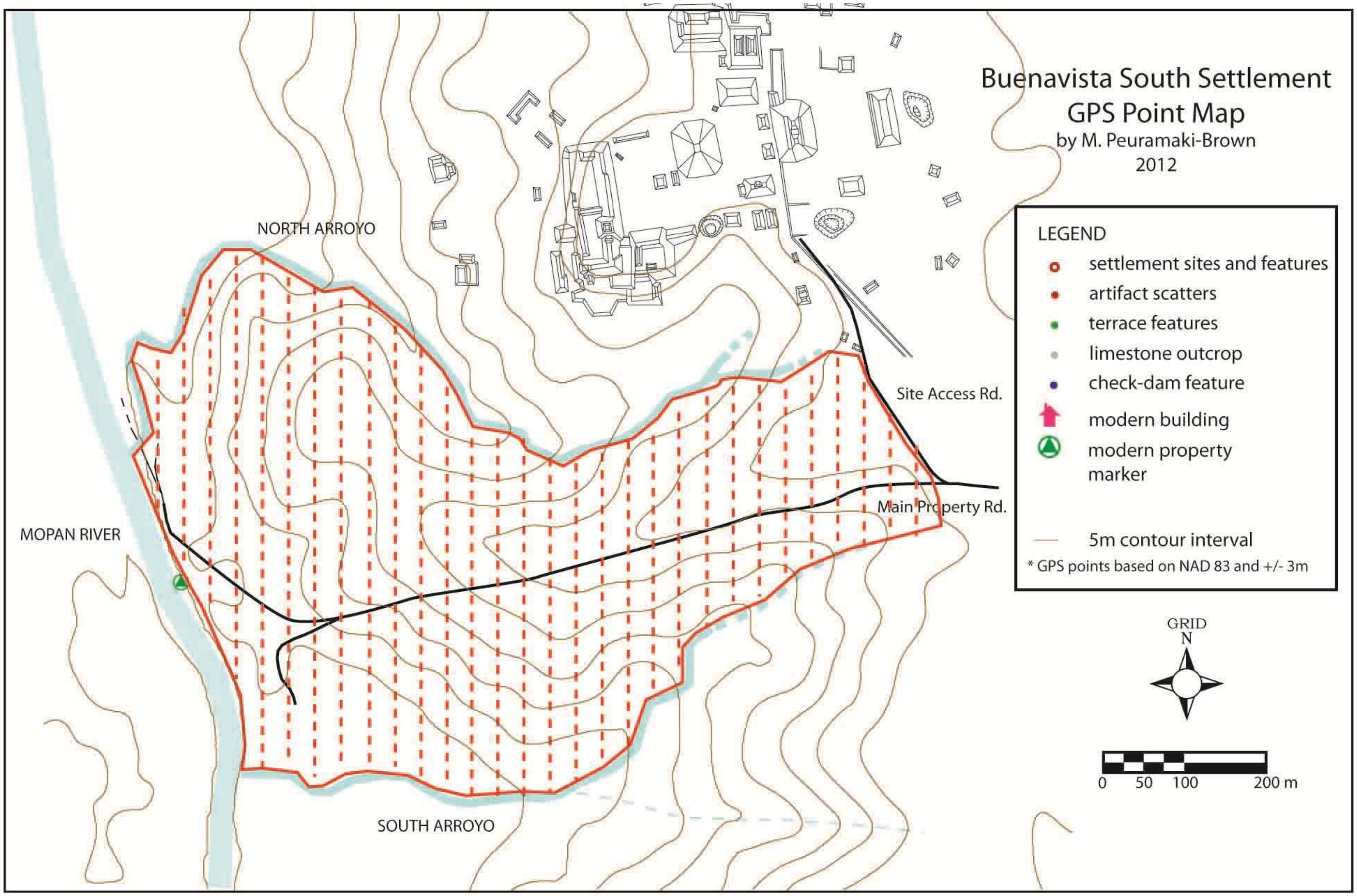


Figure 4. 1: BVS formal survey zone, indicated in red, covering approximately 0.35km^2.

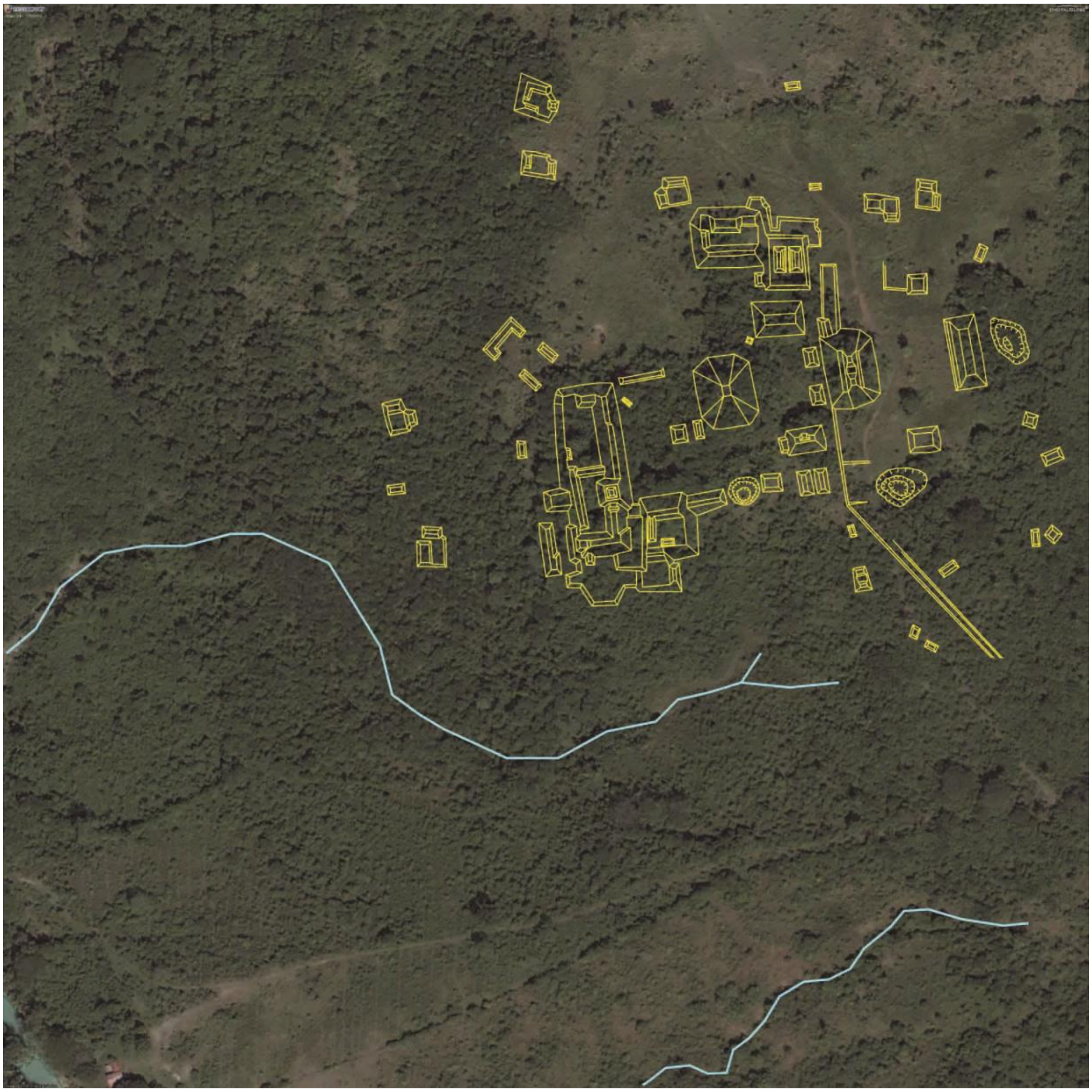


Figure 4. 2: Satellite image (November 2008) of BVS zone with visible survey transects (summer 2008) in lower left corner. North and South Arroyos indicated by blue lines and epicentral buildings are outlined in yellow (photo courtesy of Archer Geographic).

Unit Type	Description
I	Isolated mound less than 2 m high.
II	2-4 mounds, informally arranged, all less than 2m high.
III	2-4 mounds, orthogonally arranged, all less than 2m high.
IV	5 or more mounds, informally arranged, all less than 2m high.
V	5 or more mounds, at least 2 arranged orthogonally, all less than 2 m high.
VI	1 or more mounds, at least 1 being 2-5m high.
VII	1 or more mounds, at least 1 being higher than 5m.
* Designations based on initial survey data and assumption of domestic nature only.	

Table 4.3: Xunantunich Settlement Survey Unit Classification (Ashmore et al. 1994).

Settlement Unit Type	BVS Sites	Total in BVS	% of Total
I: isolated mound (less than 2 m high)	003, 004, 033, 034, 035, 036, 077, 086, 087, 100, 109, 111, 112, 114, 122, 123, 137, 139, 152	19	68%
II: 2-4 mounds (informally arranged; all less than 2m high)	131, 143, 156	3	11%
III: 2-4 mounds (orthogonally arranged; all less than 2m high)	005, 006, 060, 091	4	14%
IV: 5 or more mounds (informally arranged; all less than 2m high)		0	0%
V: 5 or more mounds (at least 2 arranged orthogonally; all less than 2 m high)		0	0%
VI: 1 or more mounds (at least 1 being 2-5m high)	007, 105	2	7%
VII: 1 or more mounds (at least 1 being higher than 5m)		0	0%
TOTAL		**28**	**100%**

Table 4.4: BVS settlement sites listed by XSS unit classification.

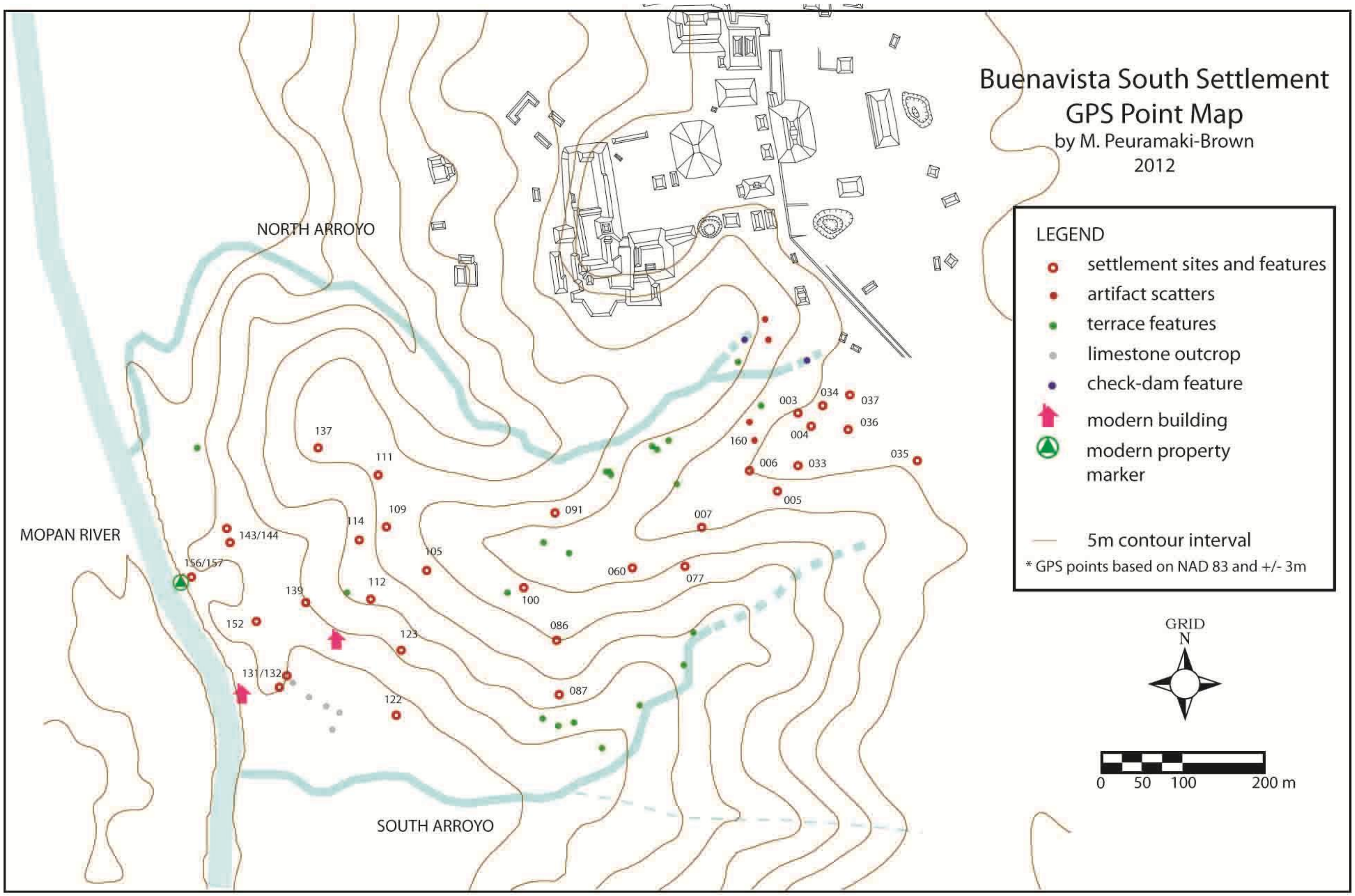


Figure 4.3: GPS point map of BVS showing all sites/features located by UTM coordinates (mounded sites numbered).

Table 4.5: Settlement sites/features located in BVS Cluster 1.

BVS Site	Desc.	Type	North. (UTM_ NAD83)	East. (UTM_ NAD83)	Test excavation Operations and Suboperations	Testing Area (m^2)	Testing Vol. (m^3)	Excav. Area (m^2)	Excav. Vol. (m^3)	unit overlap area (m^2)	unit overlap vol. (m^3)	Total Area (m^2)	Total Vol. (m^3)
003	mound	Type I	0273921	1895841	350A, B, C	6	1.466					**6**	**1.466**
004	mound	Type I	0273937	1895825	350D, E, G; 356	3	0.956	44	12.023			**47**	**12.979**
033	mound	Type I	0273921	1895777	350F	4	0.584					**4**	**0.584**
034	mound	Type I	0273951	1895850	350X, AC, AF	3.15	1.104					**3.15**	**1.104**
035	mound	Type I	0274066	1895783	350O	2	1.236					**2**	**1.236**
036	mound	Type I	0273982	1895821	350M, N, S	5	1.446					**5**	**1.446**
077	mound	Type I	0273784	1895655	350Z; 359	2	0.635	24	5.479	0.92	0.429	**25.08**	**5.685**
086	mound	Type I	0273628	1895565	350AH, AK	3	1.568					**3**	**1.568**
087	mound	Type I	0273631	1895499	350AI	2	1.007					**2**	**1.007**
100	mound	Type I	0273588	1895629	350AL, AO	3	0.931					**3**	**0.931**
005	mound	Type III	0273896	1895746	350H, I, J	6	1.199					**6**	**1.199**
006	mound	Type III	0273862	1895771	350K, L; 355	4	0.958	60	15.754			**64**	**16.712**
060	mound	Type III	0273720	1895653	350AB, AD, AE; 358	6	2.49	62	7.452			**68**	**9.942**
091	mound	Type III	0273626	1895720	350AM, AN, AP, AQ	7	1.646					**7**	**1.646**
007	mound	Type VI	0273804	1895702	350Q,R, T, U, V, Y, AA; 354	11	7.166	105.5	43.089	2.61	1.521	**113.89**	**48.734**
037	feature	NA	0273984	1895863	350P, W, AG, AR	14	6.511					**14**	**6.511**
160	midden	NA	0273887	1895803	357			45.34	1.056			**45.34**	**1.056**
099	enigmatic	NA	0273582	1895531	350AJ	4	0.616					**4**	**0.616**
161	scatter	NA	0273901	1895837									
162	scatter	NA	0273973	1895724									
043	scatter	NA	0273862	1895830									
044	terrace	NA	0273876	1895850									
050	terrace	NA	0273774	1895755									
052	terrace	NA	0273764	1895808									
056	terrace	NA	0273750	1895797									
061	terrace	NA	0273744	1895801									

065	terrace	NA	0273692	1895770									
066	terrace	NA	0273694	1895766									
067	terrace	NA	0273688	1895770									
068	terrace	NA	0273649	1895465									
073	terrace	NA	0273799	1895568									
076	terrace	NA	0273788	1895533									
079	terrace	NA	0273729	1895486									
082	terrace	NA	0273683	1895434									
085	terrace	NA	0273643	1895671									
088	terrace	NA	0273630	1895461									
092	terrace	NA	0273611	1895470									
093	terrace	NA	0273612	1895684									
						85.15	**31.519**	**340.84**	**84.853**	**3.53**	**1.95**	**422.46**	**114.422**

BVS Site	Description	Type	North. (UTM_NAD83)	East. (UTM_NAD83)	Cluster/Area
109	mound	Type I	0273421	1895703	BVS Cluster 2
111	mound	Type I	0273411	1895766	BVS Cluster 2
112	mound	Type I	0273402	1895615	BVS Cluster 2
114	mound	Type I	0273388	1895687	BVS Cluster 2
122	mound	Type I	0273433	1895474	BVS Cluster 2
123	mound	Type I	0273439	1895553	BVS Cluster 2
137	mound	Type I	0273338	1895799	BVS Cluster 2
139	mound	Type I	0273323	1895611	BVS Cluster 2
152	mound	Type I	0273263	1895588	BVS Cluster 2
131/132	mound	Type II	0273300/ 0273291	1895522/ 1895508	BVS Cluster 2
143/144	mound	Type II	0273227/ 0273231	1895701/ 1895684	BVS Cluster 2
156/157	mound	Type II	0273184/ 0273173	1895642/ 1895642	BVS Cluster 2
105	mound	Type VI	0273470	1895650	BVS Cluster 2
115	terrace	NA	0273373	1895623	BVS Cluster 2
117	modern building	NA	0273360	1895565	BVS Cluster 2
119	limestone/ marl outcrop	NA	0273307	1895513	BVS Cluster 2
120	limestone/ marl outcrop	NA	0273355	1895456	BVS Cluster 2
121	limestone/ marl outcrop	NA	0273364	1895477	BVS Cluster 2
124	terrace	NA	0273568	1895530	BVS Cluster 2
129	limestone/ marl outcrop	NA	0273348	1895485	BVS Cluster 2
130	limestone/ marl outcrop	NA	0273327	1895496	BVS Cluster 2
135	modern building	NA	0273245	1895499	BVS Cluster 2
145	terrace	NA	0273191	1895799	BVS Cluster 2
158	modern feature	NA	0273172	1895636	BVS Cluster 2
040	mound	Type I	0273934	1895970	N. Arroyo
038	mound	Type II	0273957	1895905	N. Arroyo
039	cross-channel terrace/ check-dam	NA	0273932	1895905	N. Arroyo
041	artifact scatter	NA	0273881	1895955	N. Arroyo
042	artifact scatter	NA	0273885	1895930	N. Arroyo
045	terrace	NA	0273848	1895903	N. Arroyo
046	cross-channel terrace/ check-dam	NA	0273856	1895930	N. Arroyo

Table 4.6: Settlement sites/features located in BVS Cluster 2 and additional reconnaissance areas.

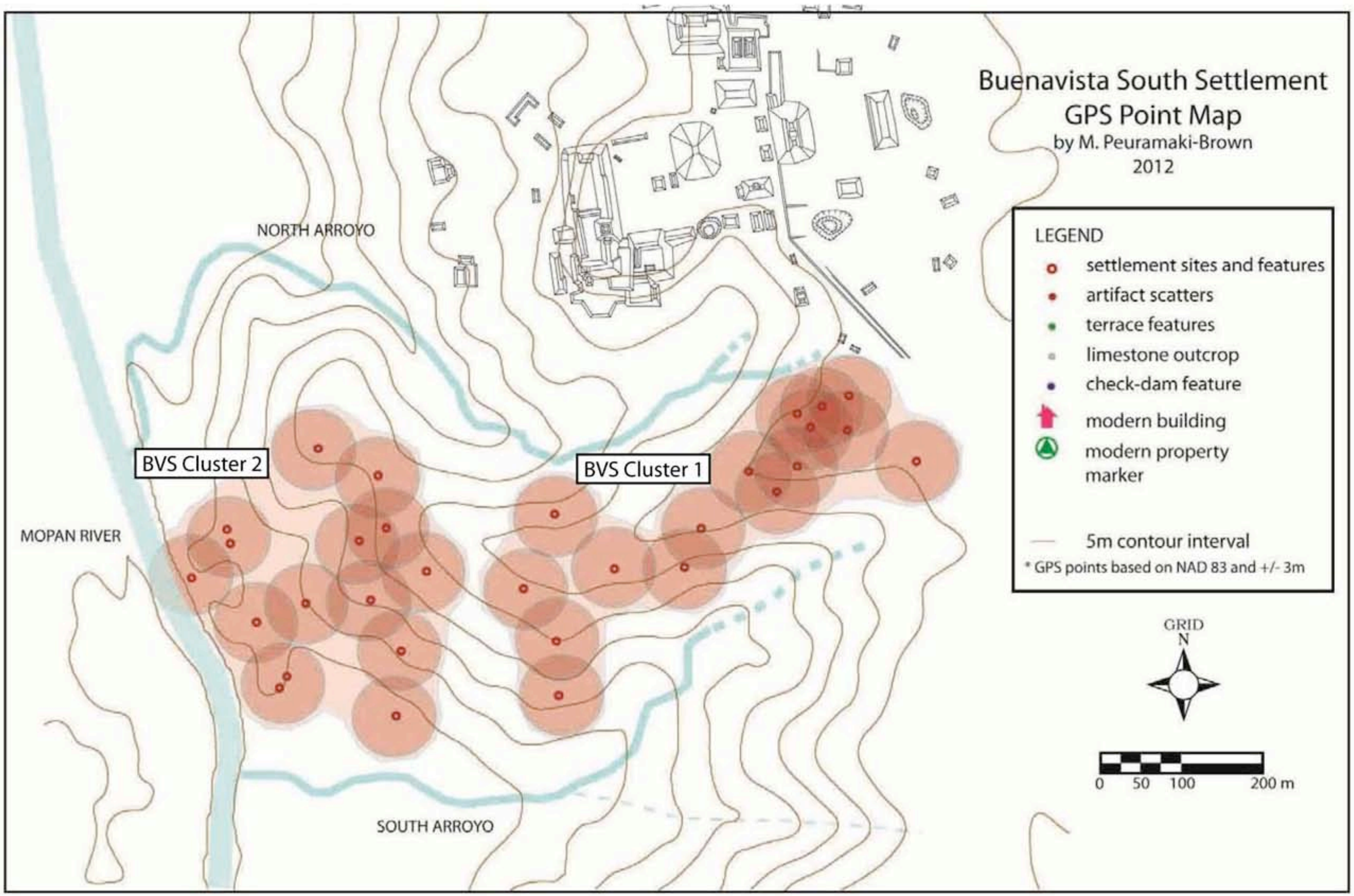


Figure 4. 4: Clustering of BVS sites showing 50m radii representative of hypothetical houselot boundaries, around mounded groups.

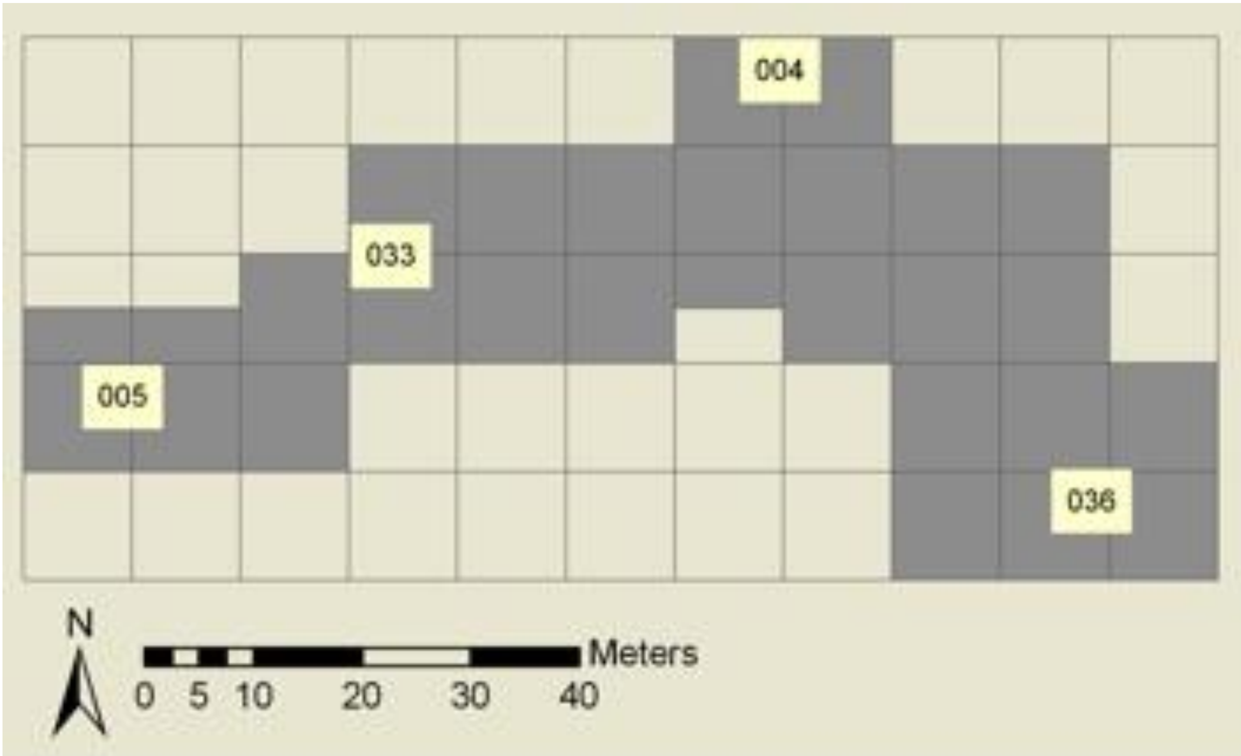


Figure 4.5: The location of the 2008 geophysical surveys of the BVS zone. The approximate locations of mound groups are shown with numbers (by B. Haley).

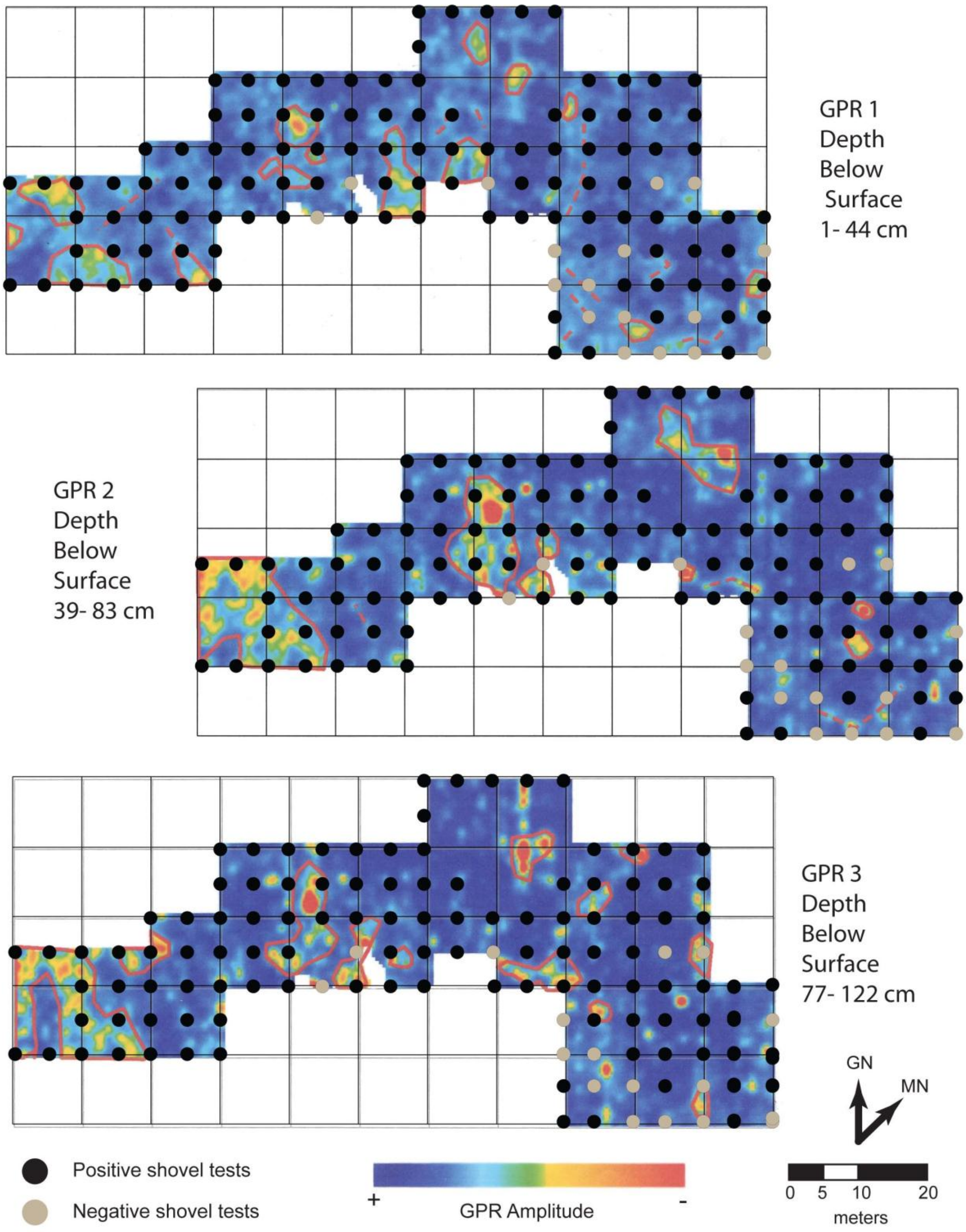


Figure 4.6: Correlation of positive and negative ground-truthing shovel test pits and GPR anomalies (by B. Hudacin).

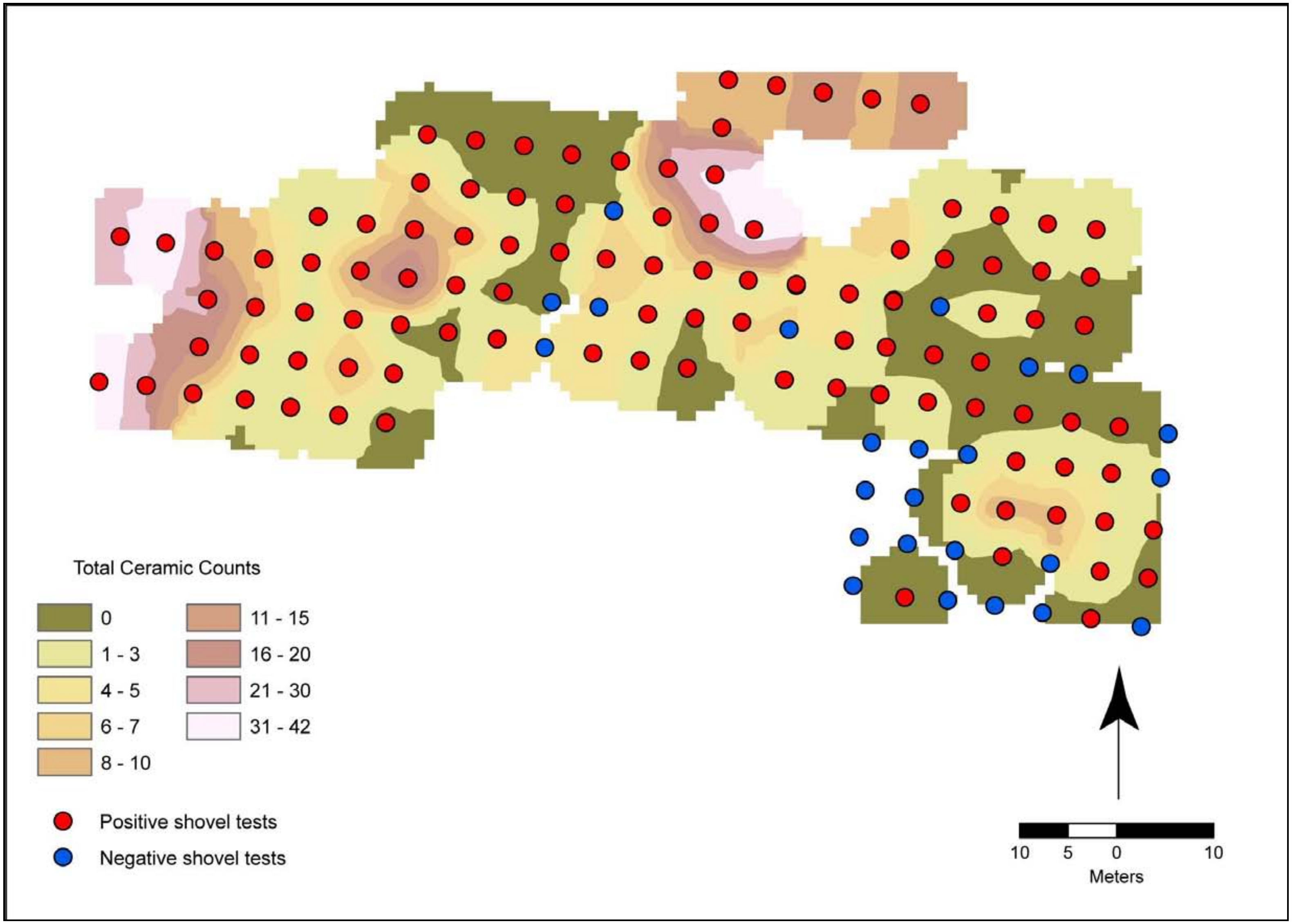


Figure 4. 7: Ceramic density map for positive ground-truthing shovel tests at Op353. Density extrapolations made using Kriging Interpolation in ArcGIS (by B. Hudacin)

Operation	BVS Site-Mound	SubopID	l (m)	w (m)	orientation	vol (m^3)
MVAP2007-350	003-1	350A	1	2	25E of Mag. N.	0.482
MVAP2007-350	003-1	350B	1	2	40E	0.05
MVAP2007-350	003-1	350C	1	2	16W	0.996
MVAP2007-350	004-1	350D	1	2	12W	0.696
MVAP2007-350	004-1	350E	1	2	1E	0.184
MVAP2007-350	004-1	350G	1	1	1E	0.076
MVAP2007-350	005-1	350H	1	2	28W	0.072
MVAP2007-350	005-1	350J	1	2	28W	0.243
MVAP2007-350	005-2	350I	1	2	33W	0.884
MVAP2007-350	006-1	350K	1	2	12W	0.092
MVAP2008-350	006-1	350L	1	2	12W	0.866
MVAP2008-350	007-1	350Q	1	2	6W	1.698
MVAP2008-350	007-1	350T	1	1	6W	0.448
MVAP2008-350	007-1	350V	1	2	6W	1.5
MVAP2008-350	007-2	350R	1	2	35W	0.66
MVAP2008-350	007-2	350U	1	1	35W	0.564
MVAP2008-350	007-patio	350AA	1	1	19W	1.006
MVAP2007-350	007-patio	350Y	1	2	19W	1.29
MVAP2008-350	033-1	350F	2	2	12W	0.584
MVAP2008-350	034-1	350AC	1	1	45W	0.24
MVAP2008-350	034-1	350AF	0.3	0.5	45W	0.03
MVAP2008-350	034-1	350X	1	2	45W	0.834
MVAP2008-350	035-1	350O	1	2	14W	1.236
MVAP2008-350	036-1	350M	1	2	16W	0.209
MVAP2008-350	036-1	350N	1	2	34W	0.9
MVAP2008-350	036-1	350S	1	1	16W	0.337
MVAP2008-350	037-1	350AG	2	2	22W	1.556
MVAP2008-350	037-1	350AR	1	2	22W	0.124
MVAP2008-350	037-1	350P	2	2	22W	2.173
MVAP2008-350	037-1	350W	2	2	22W	2.658
MVAP2008-350	060-1	350AB	1	2	9E	0.974
MVAP2008-350	060-2	350AD	1	2	12W	0.349
MVAP2008-350	060-2	350AE	1	2	12W	1.167
MVAP2008-350	077-1	350Z	1	2	7E	0.635
MVAP2008-350	086-1	350AH	1	2	6E	1.002
MVAP2008-350	086-1	350AK	1	1	6E	0.566
MVAP2008-350	087-1	350AI	1	2	18W	1.007
MVAP2008-350	091-1	350AM	1	2	12W	0.594
MVAP2008-350	091-1	350AN	1	2	12W	0.644
MVAP2008-350	091-2	350AP	1	2	12W	0.232
MVAP2008-350	091-patio	350AQ	1	1	12W	0.176
MVAP2008-350	099	350AJ	2	2	2E	0.616
MVAP2008-350	100-1	350AL	1	2	12W	0.665
MVAP2008-350	100-1	350AO	1	1	12W	0.266
						31.581

Table 4. 7: MVAP Operation 350 suboperation details

Table 4. 8: Ceramic diagnostic features and types by time period.

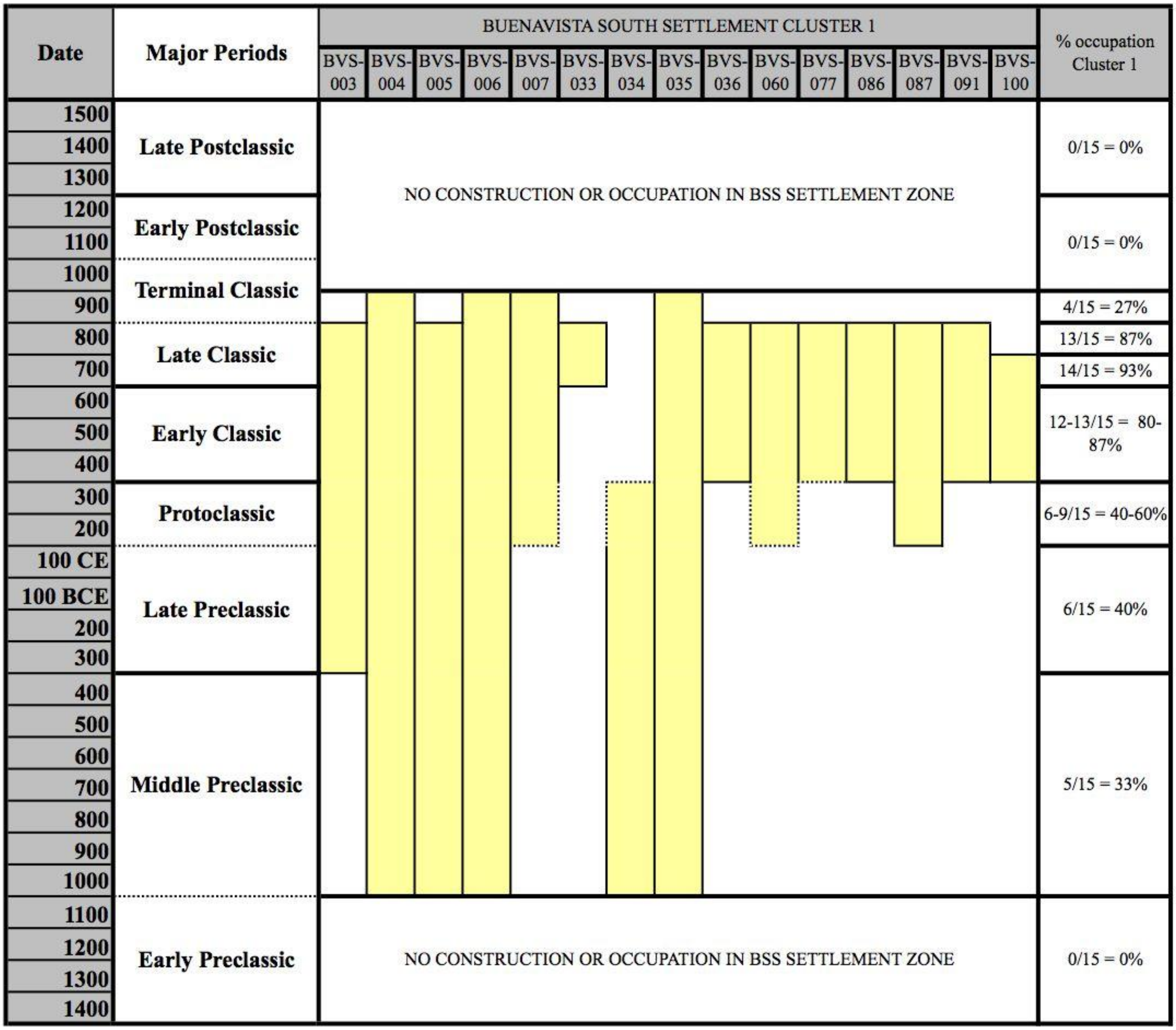
Time Period	Diagnostic Features and Types
Middle Preclassic (1000-300 B.C.E.)	orange-brown ashy, chalk-like pastes (e.g. Mars/Savana Orange)
Late Preclassic (300 B.C.E.-100 C.E.)	dull waxy red and cream slips (e.g. Sierra Red, Flor Cream)
	groove incising, incising, appliqué, punctation
	no polychromes
	ashy orange pastes extend back to Middle Preclassic (e.g. Mars, Joventud)
	medial flanged bowls
	outcurving buckets/bowls, dishes
Protoclassic (100-300 C.E.)	mammiform tetrapods
	orange calcite pastes
	Z-angle shoulders
Early Classic (300-600 C.E.)	orange glossier slipped pottery
	glossy black slips
	bowls with basal flanges
	bowls with Z-angle shoulders
	polychrome slips (black-and-red-on-orange)
	ring bases
	arrowhead rim jars
	cauldron forms
	no volcanic ash temper
	red-slipped grooved bowls, continue into LCI
Late Classic I (600-670 C.E.)	Mt Maloney incurving bowl: vertical face with smoothed edges and little evidence of tooling to form lip (well rounded lips)
	Mt Maloney jar and other jar forms: pinch or simple rounded lip with nearly vertical constricted neck
	slips: yellowish/cream (Julep Cream polychromes, Sibyl buff types); brown (Sotero red-brown types); smudged black to brown (Sotero red-brown types)
	cream slipped calcite polychromes (e.g. Saxche)
	lateral-ridged plate/dish/bowl (vestige of basal flange-done)
	fluting and composite (continue into LCII)

	texturing and punctate-incised (Platon-punctate incised)
	notching on basal angle of calcite forms (Silver Creek Type)
	rim curve is simple silhouette
	Opaque Carbonate Ware - Chial (distinctive clinking noise, continue into LCII)
	anthropomorphic/modeled head censers (into LCII)
	highest frequencies of Dolphin Head Group, Sotero Group, Petén Gloss
	Silver Creek Red, Platon Punctated Incised-BH Ash, Benque and Vinaceous Tawny polychromes
Late Classic II (670-780 C.E.)	Mt Maloney incurving bowl: lip bevel upward (45º) and elaborate grooved faces and pinched upper and lower edges (lip edges often sharply defined/tooled and flattened - extensive tooling)
	Mt Maloney jars and other jar forms: outcurved constricted neck, squared lip
	sturdy calcite wares (Dolphin and Chial Red-orange)
	large flaring plates, dishes, bowls
	most diagnostic: cylinder and barrel-shaped vase forms
	tripod dishes, hollow oven feet, basal angles
	pseudo glyphs
	highest diversity but all diagnostics shared with before or after
	tooling/fluting, gouge-incised, plano-relief carving (simple representation or abstract on ash)
	ashware polychromes
	black slips on ash
	Opaque Carbonate (Chial): jars, tecomate, brandy snifter, drum, shallow groove-incised geometric designs
	Macaw Bank: restricted jar, censer, small bowl
	painting: Petén Gloss, Chunhuitz, slipped ash
	Alexander-style jar: large square, vertical faces and incised/notched décor and numerous lip styles
	Cayo group: open-mouthed unslipped jar, closed olla, lids, lip-to-lip, large flaring hemispherical bowls, handled plate/comal
	serving vessels: Belize Red and Chunhuitz orange
	some closed jars with incised lines near rim
	motifs: abstract, kin signs, pseudo glyph bands
	gouged incised designs: Martin’s Incise and Big Falls

Terminal Classic (780-890 C.E.)	Mt Maloney incurving bowl: high variety (less skill?) with some tooling but square, flat and horizontal lip with irregular orifice
	Mt Maloney Constricted bowl: recurved, everted rim
	Mt Maloney jars: vertical then everted neck - overhanging angled profiles
	rim curvature: rounded, incurving
	motifs: almost complete loss; still complex figural scenes and glyphs in model carving; stepped geographic band
	rare: plates, dishes, cylinder vases, polychromes
	less ashware (except Belize Red)
	model-carving (Pabellon model-carved, imported from Central Petén or local imitation)
	notched and incised basal aprons (e.g. McRae Impressed dish with oven feet)
	specific Platon-Punctate Incised: small rimmed bowl with incising and punctation along rim/shoulder
	lack tooling, punctuating, pattern impressing
	spiked Miseria Appliqué incensarios (*)
	jars with piecrust rims and/or dramatic flaring lip
	Macaw Bank Group (micaceous ware)
	calcite polychromes (Palmas)
	fewer plates/dishes, more jars/bowls
General Late Classic	volcanic ash temper
	nubbin feet (late to terminal)
	ridged plates
	orange and cream polychromes in bowl, barrel, cylinder forms
	red slip ashwares (e.g. Belize Red)
	large unslipped jars
Postclassic (Post-890 C.E.)	tripod bowls with hollow scroll feet
	incensarios
	basal aprons (continue from Terminal McRae Impressed)

*spiked censers (Miseria Appliqué: representative of Bayal Complex at Seibal, Sabloff 1975) are thought to represent ceiba/world trees. Likely those in the Lower Mopan were of a locally-produced simple style (LeCount 1996)

Table 4. 9: Occupation/use lengths for individual settlement sites, based on ceramic dating.



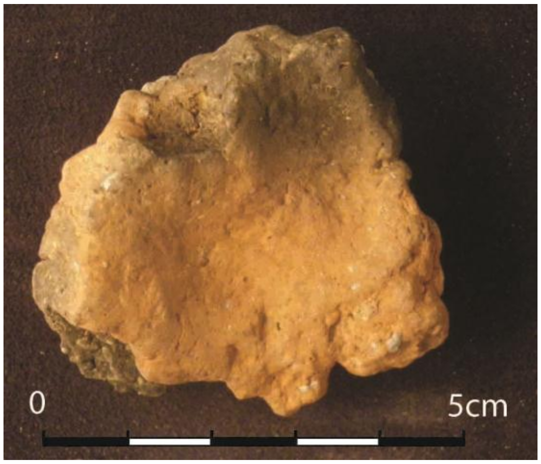


Figure 4. 8: Sample of daub from a perishable superstructure, recovered from test excavation suboperation lot Op 350Y/6

Figure 4. 9: Possible piece of wattle from the perishable superstructure at BVS-007-1, recovered from excavation suboperation lot Op 354O/16.

Figure 4. 10: Piece of superstructure daub with plaster-stucco and tiny amount of red pigment still adhered to the surface, recovered from excavation suboperation lot Op 354A/6.

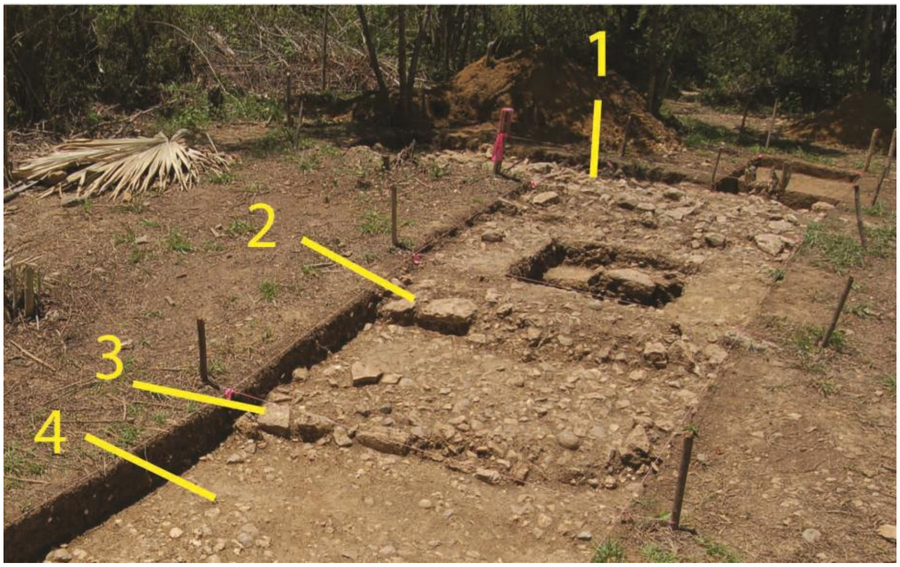


Figure 4. 11: Example of typical architectural features: 1) bench, 2) substructure face, 3) terrace surface and face, 4) formal patio surface (BVS-006-1, Operation 355 excavations).

Figure 4. 12: Example of substructure 1) fill, 2) core face of soft limestone slabs, and 3) facing of hewn limestone blocks (BVS-006-1, Operation 355 excavations).

Figure 4. 13: BVS-077-1 showing a "mishmash" of 1) slab limestone and hewn blocks composing its north face, and 2) a south face of compact limestone and alluvial boulders (Operation 359).

Figure 4. 14: An "invisible" structure at BVS-033 consisting of a very short core face and shallow interior fill (Suboperation 350F).

Figure 4. 15: Alignment of trace stones directly in front of the south facing of BVS-007-2 (Operation 354).

Site	bulk ceramic		bulk lithic		bulk daub		bulk slate		jute/nephronaias	
	count	wgt (g)	count	wgt (g)	count	wgt (g)	count	wgt (g)	count	wgt (g)
BVS-003	658	4443.6	745	3070	250	1115.2	1	0.6	0	0
BVS-004	2875	18792.1	1015	10229.9	263	1344.6	2	1.1	2	1.1
BVS-005	2264	16205.7	599	7104.2	85	893.2	3	4.5	20	46.8
BVS-006	2181	12097.9	653	5731.7	175	1619.6	1	0.2	3	7.9
BVS-007	4839	56398.1	1807	16605.4	393	2928.7	1	22.3	20	43.2
BVS-033	1672	10934.1	679	7939.1	54	448.5	7	21.7	1	5.7
BVS-034	1137	6361.2	581	7760.5	48	178.5	3	3.4	54	115.7
BVS-035	1895	12371.5	639	6912.9	215	1193.7	2	50	2	12.2
BVS-036	1245	8007.5	716	4210.6	74	595.1	0	0	0	0
BVS-037	634	2381.2	541	9546.7	16869	195572.5	3	42.3	0	0
BVS-060	7121	39243.9	1659	17551.1	183	821.6	4	17.3	5	13.7
BVS-077	410	3147.2	99	1797.3	10	76.1	0	0	0	0
BVS-086	1572	14819.2	236	2515.4	74	364	1	9.4	6	46.4
BVS-087	1331	11391.8	211	1577.5	9	28.4	0	0	1	1.4
BVS-091	5158	40324.4	956	17927	78	496.9	2	91.6	3	21.7
BVS-099	21	181.2	14	97.1	3	14.7	0	0	0	0
BVS-100	2164	26432.3	66	1782.6	184	1389.1	4	170.5	2	14.1
	37177	**283532.9**	**11216**	**122359**	**18967**	**209080.4**	**34**	**434.9**	**119**	**329.9**

Table 4. 10: Operation 350 bulk artifact counts by settlement site.

Table 4. 11: Operation 350 small finds by settlement site.

Site	Small Find	Cat#	count	wgt (g)
BVS-003	spindle whorl	CR-004	1	5.9
	mano fragment	GS-001	1	540.3
	metate fragment	GS-015	1	38.9
	El Chayal obsidian blade	OB-001	1	0.71
BVS-004	mano fragment	GS-002	1	413.9
	mano fragment	GS-004	1	439.9
	incised slate fragment	GS-018	1	0.2
	thick biface fragment	LT-018	1	105.1
	thick biface fragment	LT-238	1	96.9
	obsidian blade/flake	OB-780	1	0.3
	obsidian blade	OB-002	1	1.4
	obsidian blade	OB-016	1	0.4
	obsidian blade	OB-004	1	0.5
	obsidian blade	OB-005	1	0.9
	obsidian blade	OB-007	1	0.1
	El Chayal obsidian blade	OB-017	1	0.3
	El Chayal obsidian blade	OB-006	1	0.9
	ironstone?	OT-014	1	15.5
	speleothem	OT-013	1	24.9
	quartz crystal	OT-027	1	6.8
	quartz crystal	OT-006	1	0.2
BVS-005	mano fragment	GS-003	1	820.2
	mano fragment	GS-006	1	193.6
	mano fragment	GS-009	1	141.1
	hammer/smoothing stone	GS-012	1	78
	smoothing stone	GS-014	1	1.8
	chopper	LT-015	1	523.9
	thick biface fragment	LT-017	1	46.2
	thick biface fragment	LT-002	1	108.7
	thick biface fragment	LT-012	1	233.3
	thick biface fragment	LT-014	1	177.8
	thick biface fragment	LT-016	1	152.6
	chisel fragment	LT-008	1	53.9
	drill/scraper/graver	LT-243	1	12.6
	modified marine shell	MS-001	1	6.6
	obsidian blade	OB-003	1	0.2
	obsidian blade	OB-011	1	1.12
	El Chayal obsidian blade	OB-014	1	1.04
	El Chayal obsidian blade	OB-015	1	0.6
	El Chayal obsidian blade	OB-009	1	0.5
	El Chayal obsidian blade	OB-010	1	2.13
	El Chayal obsidian blade	OB-013	1	1.09
	Ixtepeque obsidian blade	OB-012	1	0.88
	quartz crystal	OT-009	1	13.1
	quartz crystal	OT-002	1	10.2
	bead - marine shell	SP-002	1	0.3
BVS-006	ceramic appliqué (censer?)	CR-003	1	23.7
	ceramic appliqué (censer?)	CR-002	1	20.2
	mano fragment	GS-005	1	321.5

	mano fragment	GS-007	1	479.2
	mano fragment	GS-011	1	68.8
	metate fragment	GS-017	2	63.1
	slate plaque	GS-020	1	189.5
	thick biface fragment	LT-019	1	191.7
	thick biface fragment	LT-005	1	30.7
	thick biface fragment	LT-011	1	28.4
	thick biface fragment	LT-241	1	2.8
	graver/incisor	LT-244	1	20.8
	unknown marine shell fragment	MS-003	2	0.8
	obsidian blade	OB-021	1	1.07
	obsidian blade	OB-022	1	0.75
	obsidian blade	OB-008	1	0.35
	obsidian blade	OB-018	1	1.15
	obsidian blade	OB-019	1	0.59
	obsidian blade	OB-020	1	1.5
	quartz crystal	OT-010	1	0.4
	quartz crystal	OT-011	1	1.3
	quartz crystal	OT-005	1	0.6
	speleothem	OT-016	1	15.0
	adorno (bird) - unknown shell	SP-003	1	0.2
BVS-007	spindle whorl/ pendant?	CR-009	1	2.5
	hammerstone	GS-068	1	317.4
	mano fragment	GS-045	1	665
	mano fragment	GS-050	1	35.9
	polishing stone?	GS-038	1	61.6
	thin biface frag. - non-local chert	LT-034	1	15.2
	thin biface frag. - non-local chert	LT-042	1	68.6
	thin biface	LT-050	1	43
	thick biface	LT-037	1	173.1
	thick biface fragment	LT-251	1	14.8
	thick biface fragment	LT-253	1	50
	scraper	LT-062	1	14.4
	obsidian undetermined	OB-464	1	0.29
	obsidian blade	OB-407	1	0.5
	obsidian blade	OB-463	1	0.75
	obsidian blade	OB-421	1	1.07
	El Chayal obsidian blade	OB-408	1	0.48
	Pachuca obsidian blade	SP-006	1	0.6
	quartz crystal	OT-028	1	1.6
	speleothem	OT-023	1	255.3
	celt - slate?	SP-015	1	0.3
	adorno (flower) - marine shell	SP-007	1	1.5
BVS-033	chisel fragment	LT-057	1	5
	drill/graver	LT-239	1	55.6
	graver/incisor	LT-240	1	10.4
	recycled thin biface	LT-242	1	10.9
BVS-034	complete vessel	CR-012	1	698.3
	human teeth/skull	350-B1		
	metate fragment	GS-060	1	406.8
	metate fragment	GS-061	1	6.3
	mano fragment	GS-074	1	328.8
	obsidian blade	OB-476	1	0.36

	obsidian blade	OB-478	1	0.95
	San Martin obsidian blade	OB-428	1	0.64
	El Chayal obsidian blade	OB-333	1	0.47
	macroblade	LT-040/041	2	142.2
	quartz crystal	OT-031	1	0.8
BVS-035	worked sherd/ pendant?	CR-005	1	6.2
	worked sherd/ disk	CR-045	1	51.4
	spindle whorl	GS-025	1	307.3
	metate fragment	GS-033	1	1234
	hammerstone/ pestle?	GS-035	1	1045.1
	smoothing stone	GS-037	1	55
	smoothing stone	GS-041	1	173.6
	thick biface fragment	LT-020	1	197.3
	thick biface	LT-022	1	202
	thick biface	LT-047	1	185.1
	thick biface	LT-048	1	82
	drill/graver	LT-049	1	83.3
	recycled biface	LT-358	1	58.3
	graver/incisor	LT-359	1	23.9
	olivella tinkler	MS-009	1	0.4
	celt - slate?	SP-005	1	40.1
	quartz crystal	OT-019	1	23.8
	schist?	OT-017	1	178.7
BVS-036	metate fragment	GS-024	1	533.2
	metate fragment	GS-032	1	234.6
	metate fragment	GS-028	1	693.1
	graver/incisor	LT-252	1	23.1
	quartz crystal	OT-022	1	4.2
	El Chayal obsidian blade	OB-184	1	1.22
BVS-037	polishing stone	GS-013	1	23.5
	polishing stone	GS-019	1	94.2
	anvil?/metate	GS-021	1	2494.8
	metate fragment	GS-022	1	21.6
	metate fragment	GS-079	1	1085.9
	metate fragment	GS-080	1	1173.0
	metate fragment	GS-064	1	344.8
	metate fragment	GS-046	1	545.0
	raw granite	GS-044	1	3.2
	thick biface fragment	LT-231	1	128.6
	thick biface fragment	LT-232	1	157.2
	thick biface fragment	LT-233	1	65.6
	El Chayal obsidian blade	OB-325	1	1.7
	Pachuca obsidian blade	SP-012	1	0.5
	quartz crystal	OT-029	1	3.4
BVS-060	miniature vessel	CR-042	1	8.6
	hammer/smoothing stone	GS-063	1	159.1
	thick biface fragment	LT-035	1	25.0
	thick biface	LT-036	1	373.1
	thick biface fragment	LT-250	1	33.1
	drill/graver	LT-021	1	4.1
	graver/incisor	LT-254	1	9.5
	quartz crystal	OT-030	1	8.5
	pendant - nephronaias	SP-014	1	1.6

	obsidian blade	OB-477	1	1.5
	obsidian blade	OB-412	1	0.6
	obsidian blade	OB-435	1	0.6
	obsidian blade	OB-479	1	0.2
BVS-077	thick biface fragment	LT-060	1	45.0
	thick biface fragment	LT-063	1	2.2
	thick biface fragment	LT-249	1	21.7
BVS-086	mano fragment/hammerstone	GS-072	1	453.4
	thick biface fragment	LT-059	1	74.6
	El Chayal obsidian blade	OB-330	1	0.54
	El Chayal obsidian blade	OB-426	1	0.99
BVS-087	recycled biface/ scraper	LT-248	1	16.2
	obsidian blade	OB-462	1	1.46
	Ixtepeque obsidian blade	OB-427	1	0.24
BVS-091	perforated sherd	CR-008	1	19.5
	zoomorphic appliqué	CR-011	1	13.3
	"colander" sherd (censer frag.?)	CR-010	1	7.1
	slate disk	GS-059	1	205.3
	mano	GS-071	1	670
	metate fragment	GS-076	1	130.5
	metate fragment	GS-077	1	743
	mano fragment	GS-075	1	362
	metate fragment	GS-067	1	1196
	recycled biface	LT-051	1	102.9
	drill	LT-064	1	3.4
	thick biface fragment	LT-245	1	81.8
	thick biface fragment	LT-038	1	16.9
	thick biface fragment	LT-039	1	150.6
	thick biface	LT-043	1	312.1
	obsidian blade	OB-445	1	0.61
	obsidian blade	OB-446	1	0.09
	El Chayal obsidian blade	OB-422	1	0.86
	El Chayal obsidian blade	OB-418	1	1.11
	El Chayal obsidian blade	OB-420	1	0.45
BVS-099	no small finds		0	0
BVS-100	figurine/ocarina fragment	CR-006	1	12.6
	pestle?	GS-066	1	91.8
	mano fragment	GS-069	1	832
	mano fragment	GS-070	1	297.7
	metate fragment	GS-073	1	133.9
	thick biface fragment	LT-044	1	133.3
	thick biface fragment	LT-045	1	109.7
	thick biface	LT-046	1	273.1
	thick biface fragment	LT-061	1	83.8
	thick biface fragment	LT-247	1	13.8
	uniface	LT-058	1	166.6
	graver/incisor	LT-246	1	51.1
			201	**28169.58**

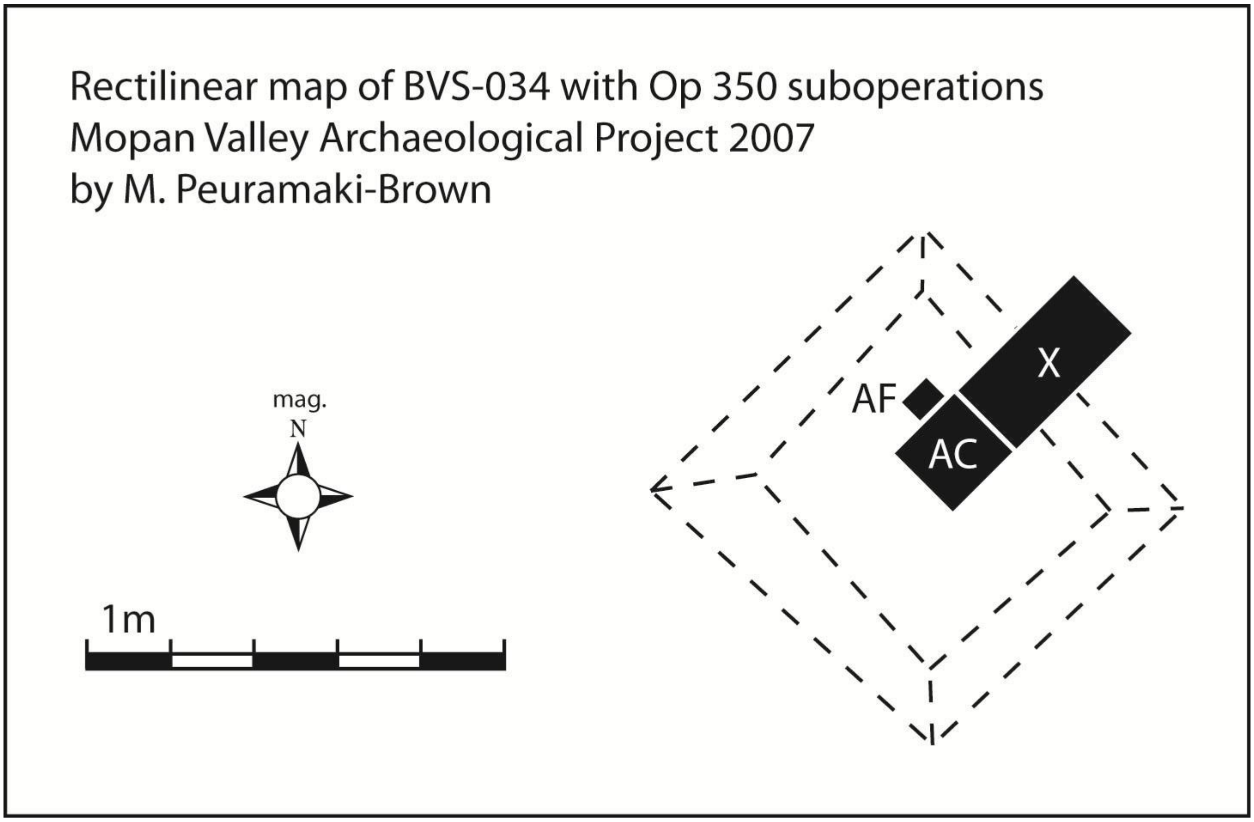


Figure 4. 16: Rectilinear map of BVS-034 mound and test suboperation locations.

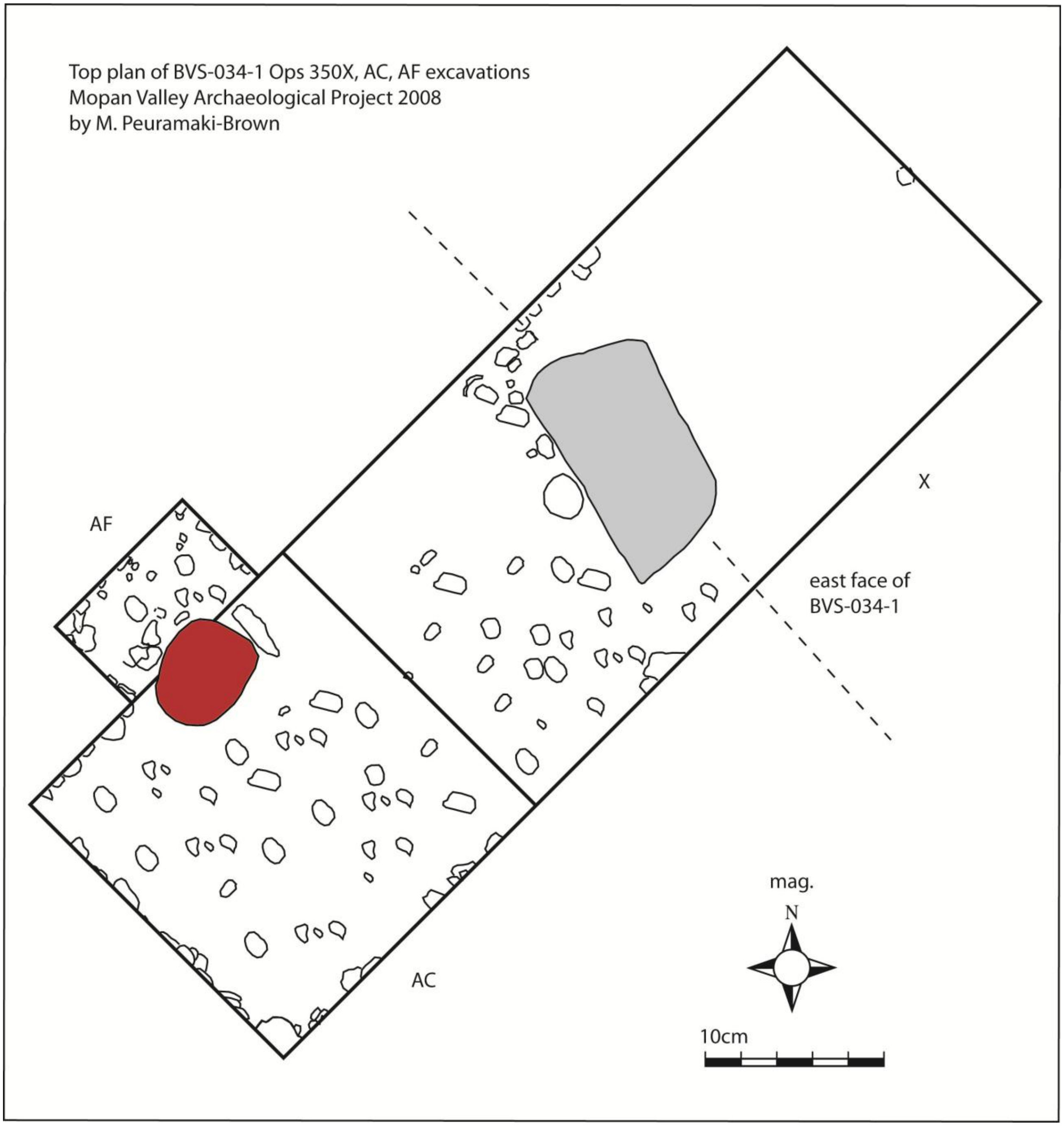


Figure 4. 17: Top plan of Ops 350X, AC, and AF at BVS-034-1 indicating terminal architecture. Area of Burial 350-B1 in substructure fill is indicated in red.

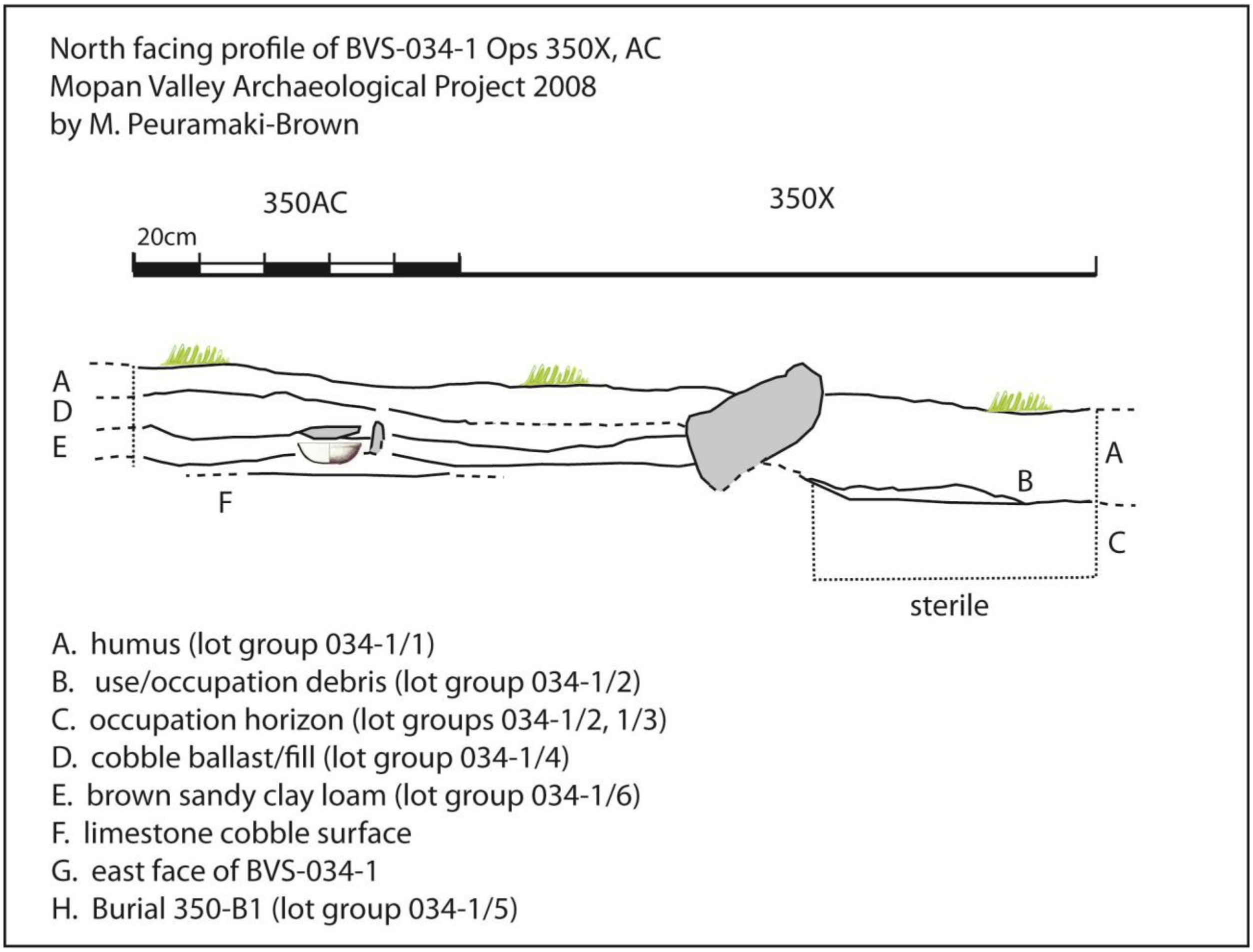


Figure 4. 18: Profile of Ops 350X, AC, and AF at BVS-034-1.

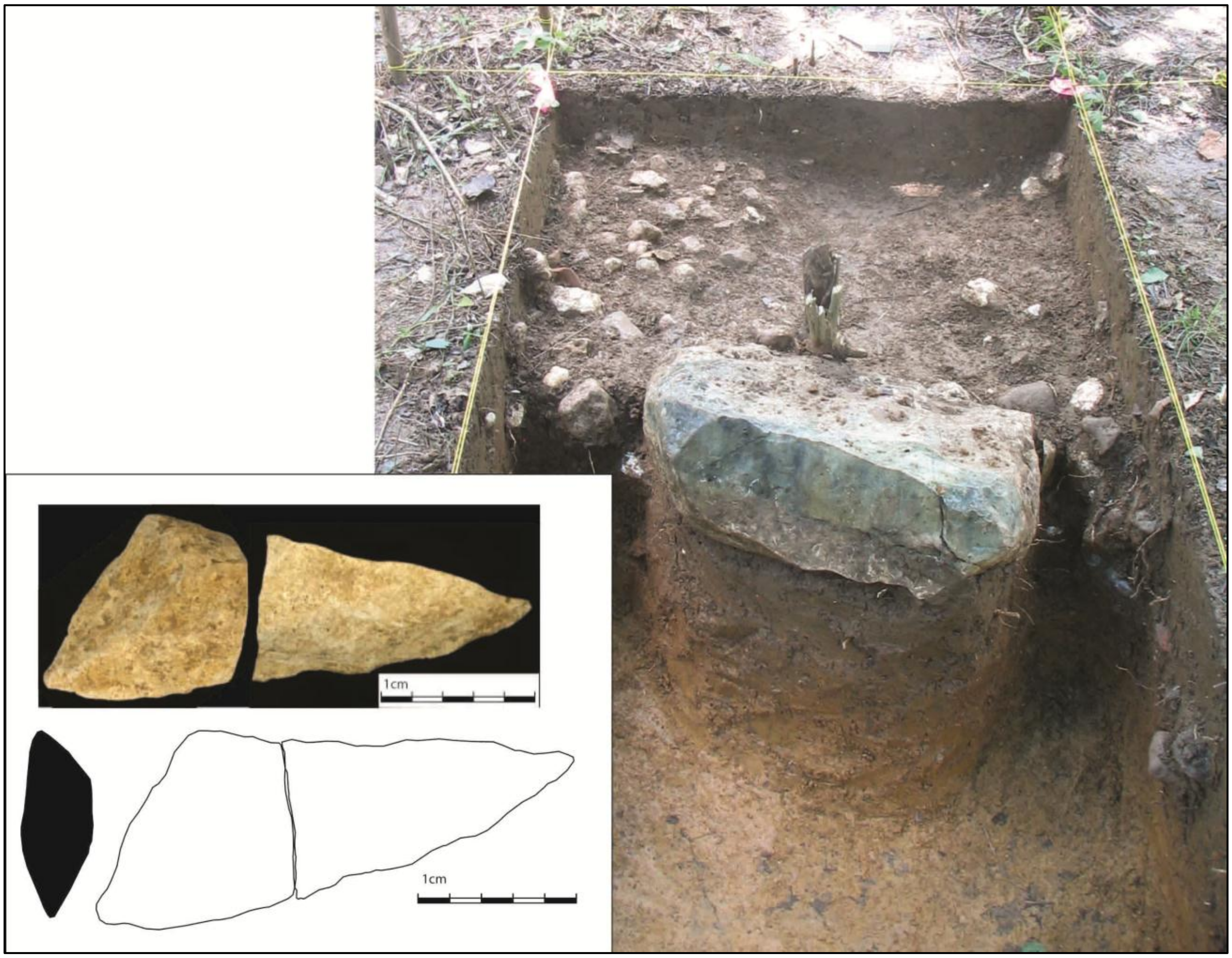


Figure 4. 19: Op 350X facing southwest with large, roughly hewn limestone boulder at centre, and inset image of limestone macroblade (MVAP 2008 LT-040/041) found next to the boulder.

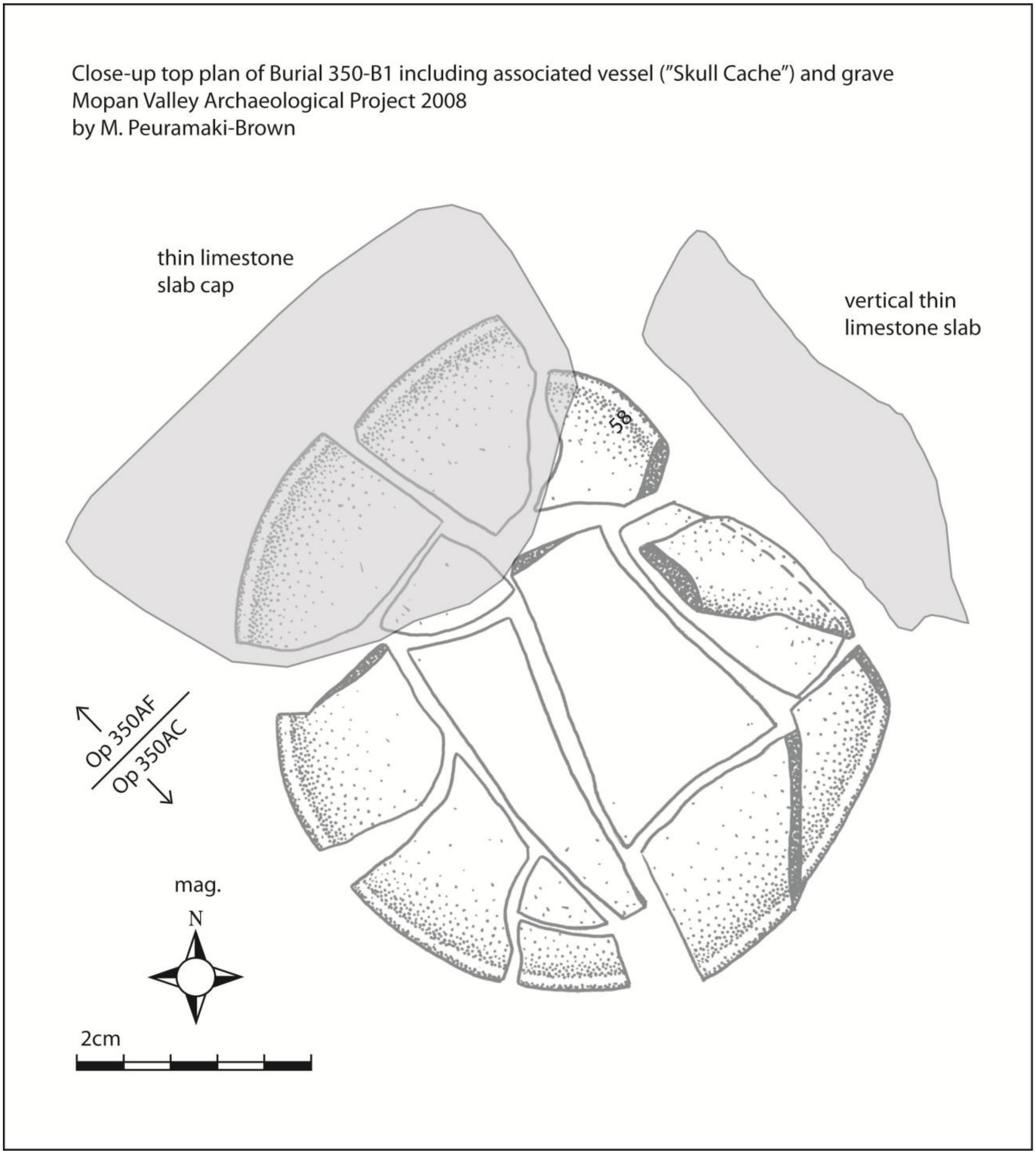


Figure 4. 20: Close-up top plan of Burial 350-B1 at BVS-034-1 including associated vessel and grave.

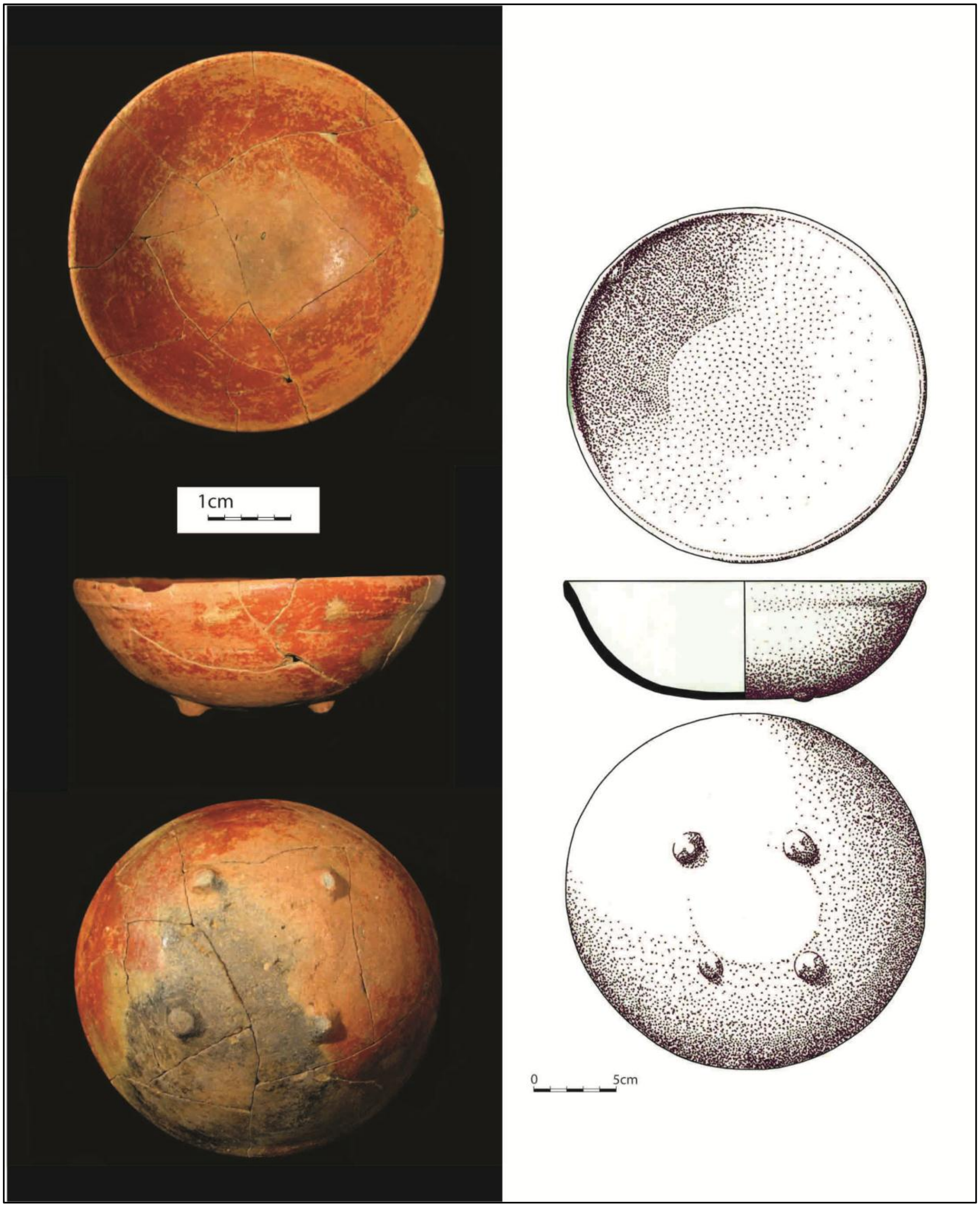


Figure 4. 21: Composite photo (by M. Peuramaki-Brown, 2012) and illustration (by Shawn G. Morton, 2010) of vessel MVAP 2008 CR-012.

Material	Count	Weight (g)	ID	Comment	Age	Location
HUMAN TOOTH	1	0.1	ND	tiny tooth fragment	ND	SW quarter
HUMAN TOOTH	1	0.2	I1	shovel shaped; Crown and neck fully formed; root partially formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.4	I1	shovel shaped; Crown and neck fully formed; root partially formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.2	I2	lower incisor; Crown fully formed; neck partially formed; root not formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.1	I2	upper(?) incisor; Crown fully formed; neck partially formed; root not formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.1	I2	upper(?) incisor; Crown fully formed; neck partially formed; root not formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.4	C1	upper canine; Crown fully formed; neck partially formed; root not formed	5 yrs +/- 16 months	NE quarter
HUMAN TOOTH	1	0.2	C1	upper canine; Crown fully formed; neck partially formed; root not formed	5 yrs +/- 16 months	NE quarter
HUMAN TOOTH	1	0.2	PM1	lower premolar: Crown fully formed; neck not formed/or partially; root not formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.2	PM1	lower premolar: Crown fully formed; neck not formed/or partially; root not formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.1	PM1	upper premolar: Crown fully formed; neck not formed/or partially; root not formed	4 yrs +/- 12 months	NE quarter
HUMAN TOOTH	1	0.2	M1	upper molar (square—4 cusps): Crown fully formed; neck partially formed; root not formed	4 yrs +/- 12 months	NE quarter
BONE		10.0	ND	tiny fragments and dust	ND	NW quarter
BONE		49.5	ND	tiny fragments and dust	ND	NE quarter
BONE		14.4	ND	tiny fragments and dust	ND	SW quarter

Table 4. 12: Human remains recovered from Burial 350-B1 (Op 350AC/7, AC/8).

Figure 4. 22: Close-up on teeth recovered from Burial 350-B1.

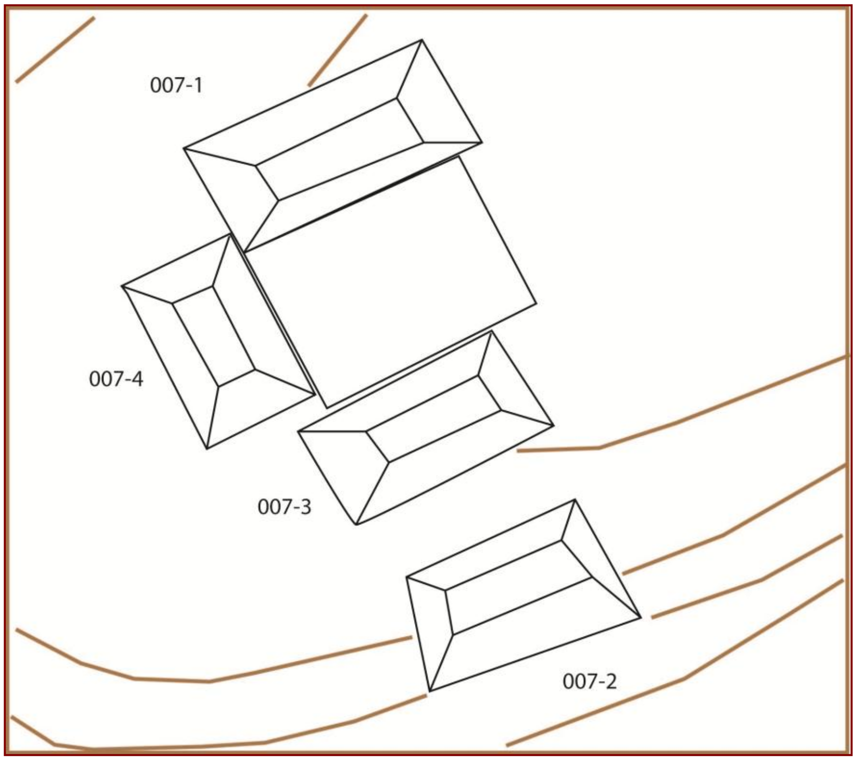


Figure 4. 23: Close-up on MMT surveyed settlement site, believed to be BVS-007, with surrounding elevational contours (redrawn from MMT settlement map, grid north at top of page).

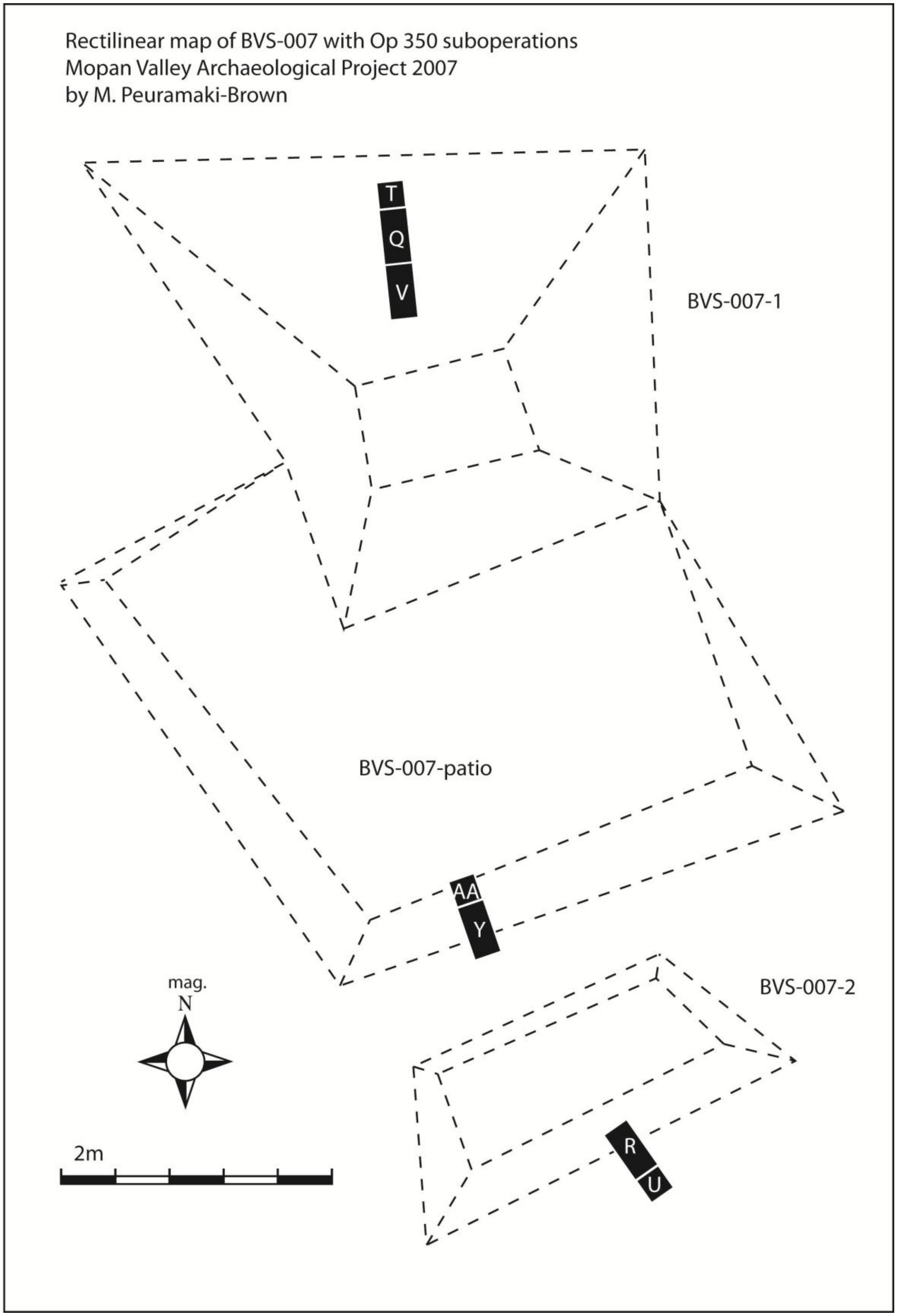


Figure 4. 24: Rectilinear map of BVS-007 with Op 350 test suboperation locations.

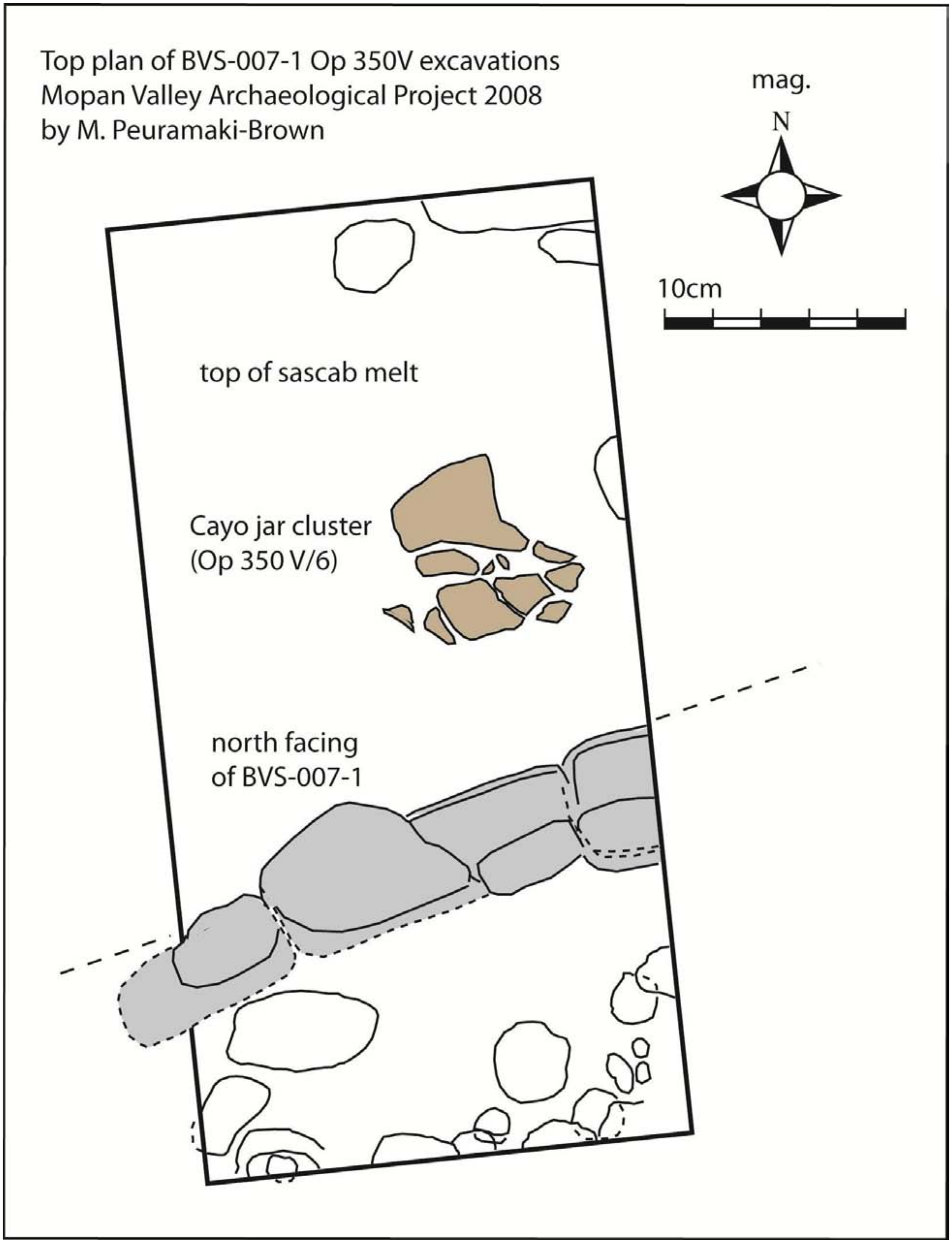


Figure 4. 25: Top plan of BVS-007-1 Op 350V, end of excavations.

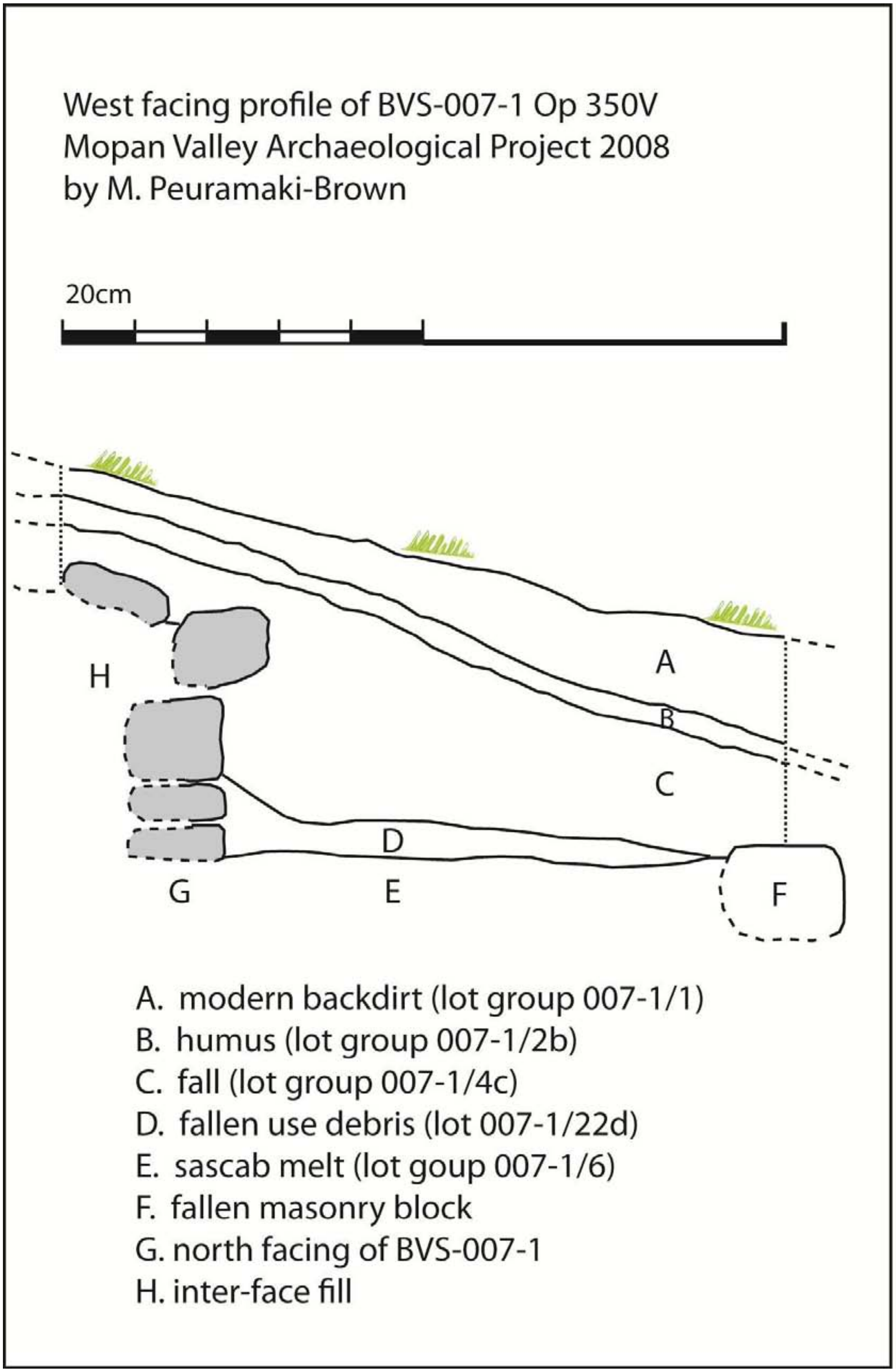


Figure 4. 26: Profile of BVS-007-1 Op 350V.

Figure 4. 27: Example of hewn limestone block recovered from the north facing of BVS-007-1 substructure.

Figure 4. 28: Partial jar (MVAP 2008 MPB-T010) found atop the *sascab* melt layer in Op 350V at BVS-007-1.

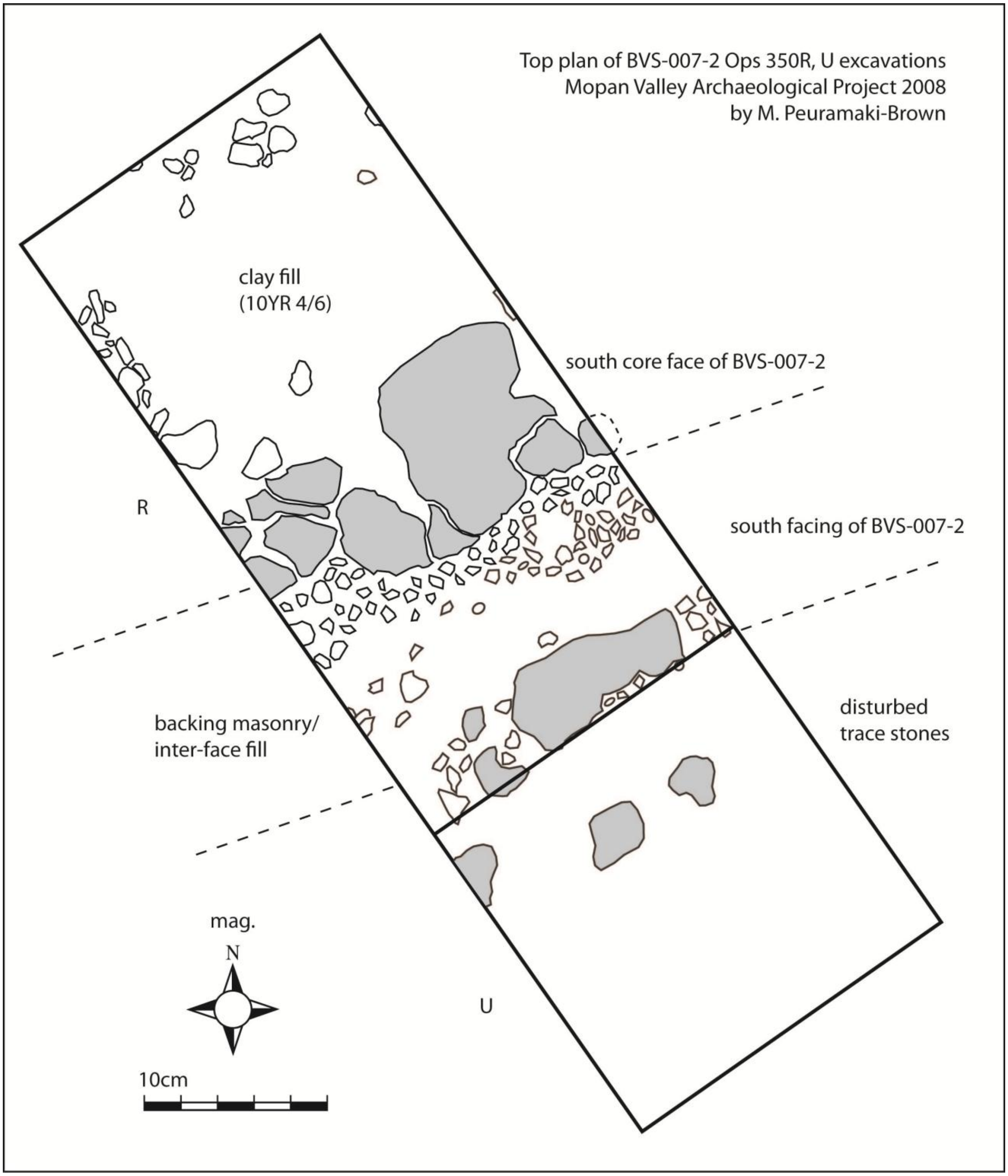


Figure 4. 29: Top plan of BVS-007-2 Ops 350R and U, terminal architecture.

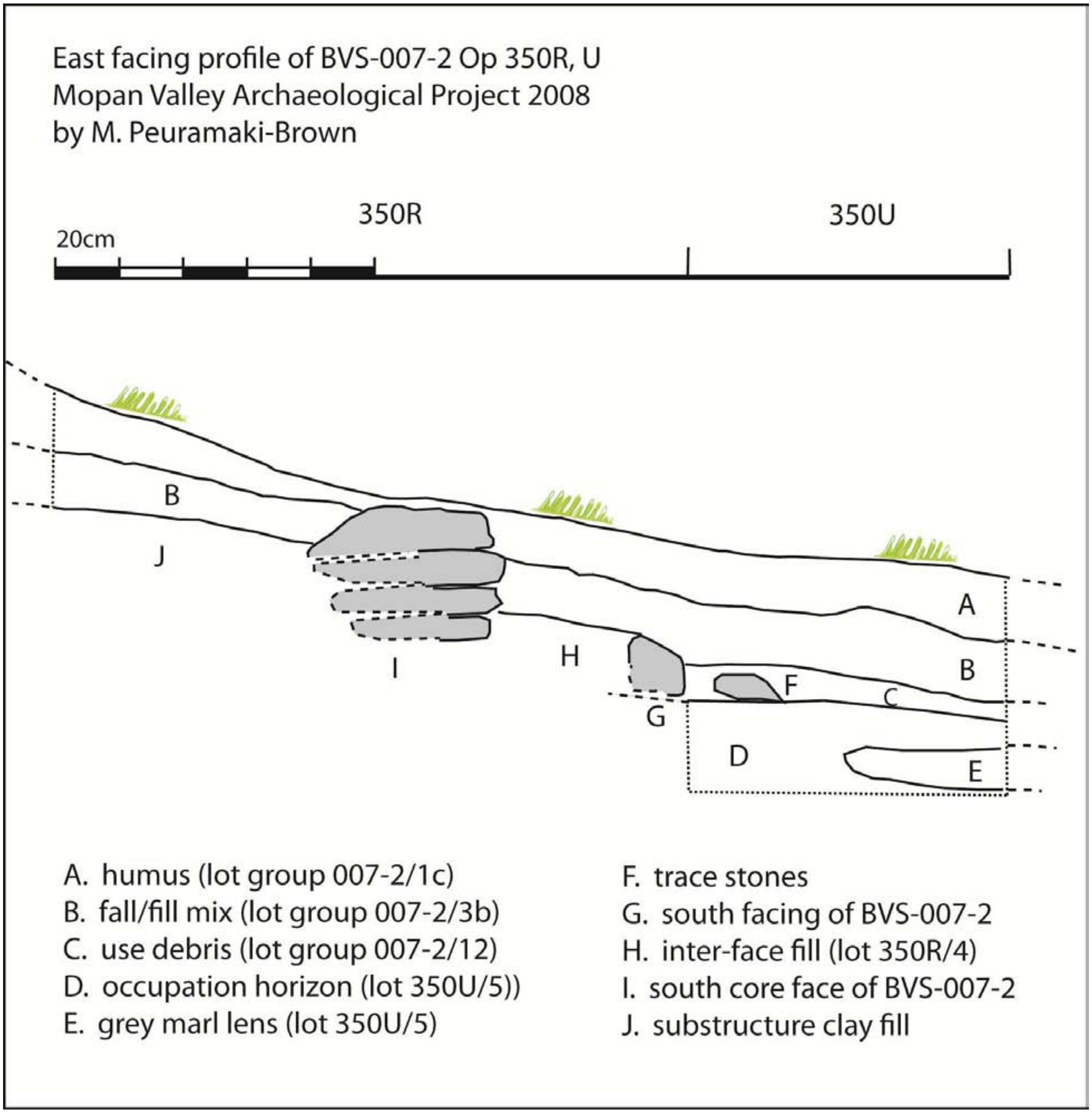


Figure 4. 30: Profile of BVS-007-2 Ops 350R and U.

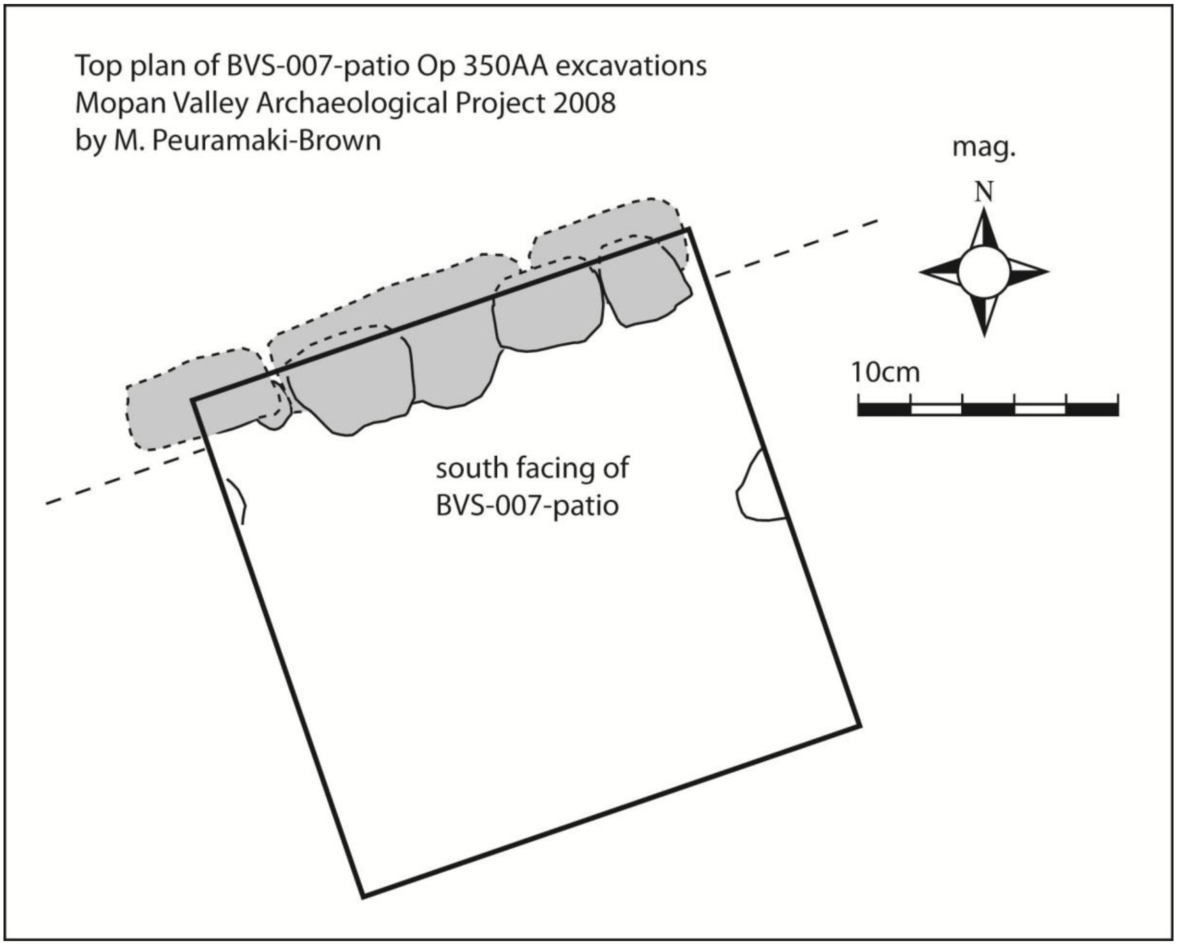


Figure 4. 31: Top plan of BVS-007-patio Op 350AA, terminal architecture.

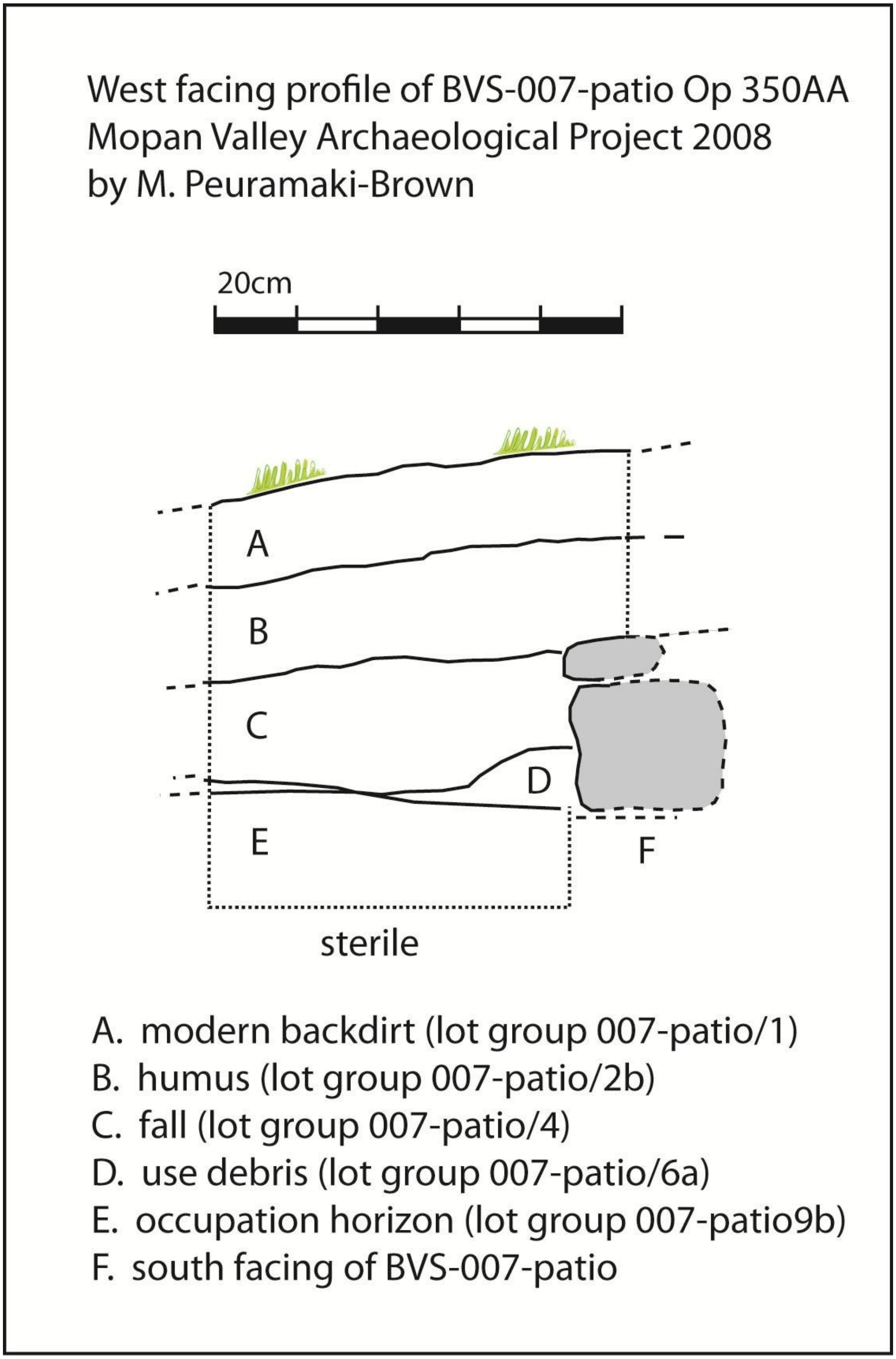


Figure 4. 32: Profile of BVS-007-patio Op 350AA.

Figure 4. 33: Sample of small finds recovered from BVS-007 Op 350 test excavations: a & b) thin walled open forms (bowl/vase) Puhui-zibal composite: Puhui zibal variety (Spanish Lookout Ceramic Complex, Gifford 1976), c) finely flaked thin chert biface, d) thin biface (knife?) fragment of non-local chert, e) finely flaked thin biface fragment of non-local chert, f) speleothem, g) quartz crystal, h) marine shell adorno, i) unknown slate adze/celt.

BVS Site	Early Established	Late Established	Early Abandoned	Late Abandoned	XSS classification
003		X	X		**I**
004	X			X	**I**
005	X		X		**III**
006	X			X	**III**
007		X		X	**VI**
033		X	X		**I**
034	X		X		**I**
035	X			X	**I**
036		X	X		**I**
060		X	X		**III**
077		X	X		**I**
086		X	X		**I**
087		X	X		**I**
091		X	X		**III**
100		X	X		**I**

(yellow)	Late Established and Early Abandoned
(green)	Early Established and Late Abandoned
(pink)	Other

Table 4. 13: Correlation of Established and Abandoned status of individual BVS sites, including associated XSS classification type.

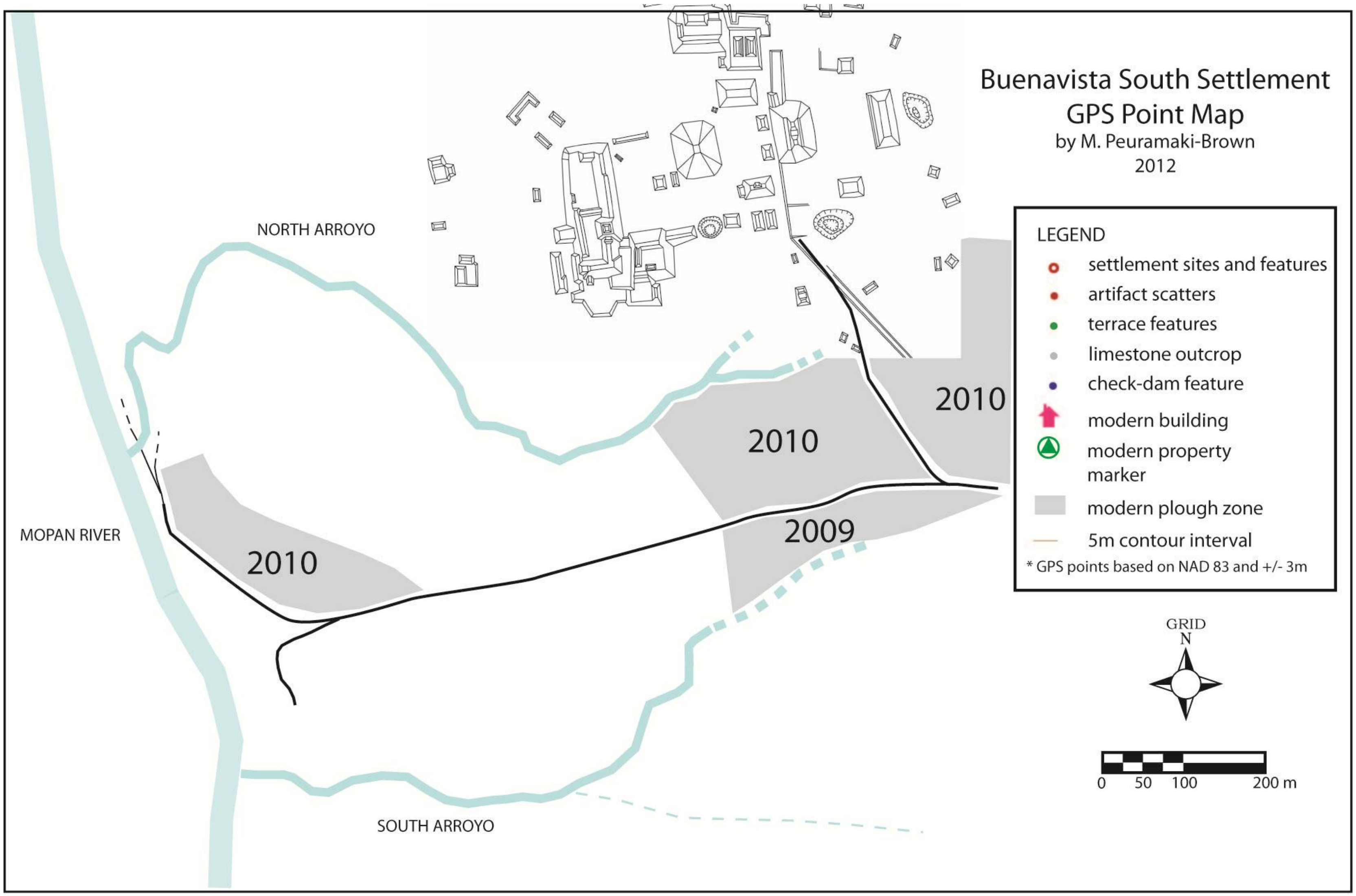


Figure 4. 34: Location of 2009 and 2010 modern ploughing activity in BVS zone.

Table 4. 14: Occupation and construction histories of each settlement site and associated structures in BVS Cluster 1 as determined following Phase 2 and 3 excavations.

Site	Structure	Phase	Ceramic Dates construction	Ceramic Dates occupation
BVS-003				**LP-LCII**
	BVS-003-1	--	--	
BVS-004				**MP-TC**
	BVS-004-1	1st-A (south & east terrace)	TC	
		1st-B (substructure)	LCI/LCII	
		1st-C (west terrace)	LCI	
		1st-D (substructure & north terrace)	EC	
BVS-005				**MP-LCII**
	BVS-005-1	--	--	
	BVS-005- 2	1st+	LCI?	
	BVS-005-patio	--	--	
BVS-006				**MP-TC**
	BVS-006-1	1st-A	TC	
		1st-B	LCII	
		1st-C*	EC/LC1	
	BVS-006-2	1st-A	TC	
		1st-B*	LCII	
	BVS-006-3	1st+	LCII	
	BVS-006-patio	1st*	LCII	
BVS-007				**PP?, EC-TC**
	BVS-007-1	1st-A	LCII/TC	
		1st-B	LCII	
		2nd-A	LCI	
		2nd-B	LCI	
		3rd-A	LCI	
		3rd-B/C	EC/LCI	
		4th*	EC	
	BVS-007-2	1st-A	LCI	
		1st-B	LCI	
		2nd-A	LCI	no use beyond LCI
		2nd-B	LCI	
		2nd-C	LCI	
		2nd-D*	EC	
	BVS-007-patio	1st*	LCI	
BVS-033				**LCI-LCII**
	BVS-033-1	1st*	LCI?	
BVS-034				**MP-PP**
	BVS-034-1	1st-A	LP	
		1st-B*	MP	
BVS-035				**MP-TC**
	BVS-035-1	Str. 1-1st-A	LCII	
		Str. 1-1st-B+	LCI/LCII?	

	BVS-035-patio	--	--	
BVS-036				**EC-LCII**
	BVS-036-1	Str. 1-1st+	LCII	
BVS-060				**PP?, EC-LCII**
	BVS-060-1	1st	LCII	
		2nd	LCI	
		3rd-A	LCI	
		3rd-B*	EC/LCI	
	BVS-060-2	1st*	EC	
	BVS-060-3	1st-A	LCII	
		1st-B* (substructure & south terrace)	LCI	
	BVS-060-patio	1st-A	LCII	
		1st-B* (actually BVS-060-1 south terrace)	LCI	
BVS-077				**EC/LCI-LCII**
	BVS-077-1	1st*	LCI/LCII	
BVS-086				**EC-LCII**
	BVS-086-1	1st-A	LCII	
		1st-B+	EC/LCI?	
BVS-087				**PP-LCII**
	BVS-087-1	1st+	EC/LCI?	
BVS-091				**EC-LCII**
	BVS-091-1	1st*	EC/LCI	
	BVS-091-2	1st*	EC/LCI	
	BVS-091-patio	1st*	EC/LCI	
BVS-100				**EC-LCI**
	BVS-100-1	1st+	LCI	
+ earlier phases possible		? tentative date		
* earlier phases unlikely		-- unknown date		

Table 4. 15: Artifact tallies for all Phase 3 investigated sites (including all contexts and associated Phase 2 materials)

Material	BVS-004	%	BVS-006	%	BVS-007	%	BVS-060	%	BVS-077	%	BVS-160	%	TOTAL	%
ceramic	17679	76.3%	38277	82.6%	51433	80.0%	25974	78.1%	3944	84.9%	2439	96.8%	**139746**	**80.22%**
daub	1466	6.3%	2595	5.6%	1712	2.7%	665	2.0%	119	2.6%	8	0.3%	**6565**	**3.77%**
lithic	3939	17.0%	5296	11.4%	10594	16.5%	6493	19.5%	557	12.0%	71	2.8%	**26950**	**15.47%**
obsidian	23	0.1%	63	0.1%	145	0.2%	28	0.1%	6	0.1%	0	0.0%	**265**	**0.15%**
grd.stone	48	0.2%	69	0.1%	134	0.2%	47	0.1%	13	0.3%	2	0.1%	**313**	**0.18%**
faunal	24	0.1%	16	0.0%	276	0.4%	37	0.1%	6	0.1%	0	0.0%	**359**	**0.21%**
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	**0.00%**
TOTAL	**23179**		**46316**		**64294**		**33244**		**4645**		**2520**		**174198**	
%	*13.31%*		*26.59%*		*36.91%*		*19.08%*		*2.67%*		*1.45%*			
Vol. exc. (m^3)	*12.98*		*16.71*		*48.73*		*9.94*		*5.69*		*1.06*		***95.11***	
Vol. exc. use debris lots (m^3)	*2.26*		*4.33*		*5.61*		*0.65*		*1.67*		*1.06*		***15.57***	***16.37%***

*all contexts from Phase 2 and Phase 3
*counts do not include microartifacts

Table 4. 16: Artifact tallies for individual use debris lot groups (further broken down in Chapter 7).

BVS- 004	1-10	%	1-11	%	1-12	%	1-13	%	1-14	%	1-15	%	1-17	%	1-18	%	TOTAL	%
ceramic	995	68.6%	389	72.3%	455	70.0%	1107	73.6%	118	80.3%	27	67.5%	422	77.3%	8	50.0%	**3521**	**71.97%**
daub	115	7.9%	23	4.3%	51	7.8%	53	3.5%	1	0.7%	0	0.0%	48	8.8%	0	0.0%	**291**	**5.95%**
lithic	335	23.1%	124	23.0%	143	22.0%	334	22.2%	28	19.0%	13	32.5%	72	13.2%	8	50.0%	**1057**	**21.61%**
obsidian	2	0.1%	0	0.0%	0	0.0%	2	0.1%	0	0.0%	0	0.0%	1	0.2%	0	0.0%	**5**	**0.10%**
ord.stone	2	0.1%	2	0.4%	1	0.2%	8	0.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**13**	**0.27%**
faunal	1	0.1%	0	0.0%	0	0.0%	1	0.1%	0	0.0%	0	0.0%	3	0.5%	0	0.0%	**5**	**0.10%**
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	**0.00%**
TOTAL	**1450**		**538**		**650**		**1505**		**147**		**40**		**546**		**16**		**4892**	

BVS- 006	1-8a	%	1-8b	%	1-8c	%	1-8d	%	1-9	%	2-6a	%	2-6b	%	2-6c	%
ceramic	2098	89.1%	187	77.9%	413	71.5%	265	75.3%	5	45.5%	378	90.4%	1439	85.2%	1903	83.4%
daub	75	3.2%	13	5.4%	47	8.1%	51	14.5%	1	9.1%	16	3.8%	59	3.5%	35	1.5%
lithic	174	7.4%	39	16.3%	112	19.4%	35	9.9%	5	45.5%	23	5.5%	181	10.7%	337	14.8%
obsidian	3	0.1%	0	0.0%	2	0.3%	0	0.0%	0	0.0%	0	0.0%	4	0.2%	2	0.1%
ord.stone	4	0.2%	1	0.4%	2	0.3%	1	0.3%	0	0.0%	1	0.2%	3	0.2%	5	0.2%
faunal	0	0.0%	0	0.0%	2	0.3%	0	0.0%	0	0.0%	0	0.0%	2	0.1%	1	0.0%
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
TOTAL	**2354**		**240**		**578**		**352**		**11**		**418**		**1688**		**2283**	

BVS- 006	2-6d	%	3-5	%	p-4a	%	p-4b	%	p-4c	%	p-4d	%	p-4e	%	TOTAL	%
ceramic	1433	87.4%	862	82.3%	319	90.1%	431	91.3%	77	72.0%	220	66.5%	131	94.2%	**10161**	**84.57%**
daub	85	5.2%	75	7.2%	10	2.8%	19	4.0%	9	8.4%	88	26.6%	6	4.3%	**589**	**4.90%**
lithic	117	7.1%	110	10.5%	24	6.8%	21	4.4%	21	19.6%	23	6.9%	2	1.4%	**1224**	**10.19%**
obsidian	0	0.0%	1	0.1%	1	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**13**	**0.11%**
ord.stone	5	0.3%	0	0.0%	0	0.0%	1	0.2%	0	0.0%	0	0.0%	0	0.0%	**23**	**0.19%**
faunal	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**5**	**0.04%**
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	**0.00%**
TOTAL	**1640**		**1048**		**354**		**472**		**107**		**331**		**139**		**12015**	

BVS- 007	1-22a	%	1-22b	%	1-22c	%	1-22d	%	1-22e	%	1-23	%	1-24	%	1-25	%	p-6a	%
ceramic	301	95.9%	231	91.7%	718	90.5%	104	96.3%	928	80.7%	1	100.0%	110	65.5%	1624	81.6%	270	79.2%
daub	3	1.0%	1	0.4%	8	1.0%	0	0.0%	60	5.2%	0	0.0%	12	7.1%	32	1.6%	5	1.5%
lithic	10	3.2%	20	7.9%	60	7.6%	4	3.7%	152	13.2%	0	0.0%	45	26.8%	306	15.4%	65	19.1%
obsidian	0	0.0%	0	0.0%	5	0.6%	0	0.0%	2	0.2%	0	0.0%	0	0.0%	3	0.2%	1	0.3%
ord.stone	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.2%	0	0.0%	0	0.0%	15	0.8%	0	0.0%
faunal	0	0.0%	0	0.0%	2	0.3%	0	0.0%	6	0.5%	0	0.0%	1	0.6%	10	0.5%	0	0.0%
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
TOTAL	**314**		**252**		**793**		**108**		**1150**		**1**		**168**		**1990**		**341**	

BVS- 007	p-6b	%	p-6c	%	p-7	%	2-12	%	2-14	%	2-15	%	2-16	%	2-17	%	2-18	%	TOTAL	%
ceramic	1236	86.4%	242	95.7%	66	80.5%	692	86.1%	426	98.8%	10	100.0%	5	100.0%	21	95.5%	23	92.0%	**7008**	**85.68%**
daub	23	1.6%	2	0.8%	1	1.2%	15	1.9%	1	0.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**163**	**1.99%**
lithic	159	11.1%	5	2.0%	14	17.1%	97	12.1%	0	0.0%	0	0.0%	0	0.0%	1	4.5%	2	8.0%	**940**	**11.49%**
obsidian	3	0.2%	0	0.0%	0	0.0%	0	0.0%	3	0.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**17**	**0.21%**
ord.stone	4	0.3%	3	1.2%	1	1.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**25**	**0.31%**
faunal	5	0.3%	1	0.4%	0	0.0%	0	0.0%	1	0.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**26**	**0.32%**
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	**0.00%**
TOTAL	**1430**		**253**		**82**		**804**		**431**		**10**		**5**		**22**		**25**		**8179**	

BVS- 060	1-8	%	1-9	%	1-10	%	1-11	%	2-4	%	3-6	%	3-7	%	TOTAL	%
ceramic	94	96.9%	46	100.0%	166	89.2%	210	83.7%	1586	75.9%	15	68.2%	280	93.0%	**2397**	**80.1%**
daub	0	0.0%	0	0.0%	0	0.0%	1	0.4%	42	2.0%	0	0.0%	1	0.3%	**44**	**1.5%**
lithic	3	3.1%	0	0.0%	20	10.8%	37	14.7%	459	22.0%	6	27.3%	20	6.6%	**545**	**18.2%**
obsidian	0	0.0%	0	0.0%	0	0.0%	2	0.8%	0	0.0%	1	4.5%	0	0.0%	**3**	**0.1%**
ord.stone	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.0%	0	0.0%	0	0.0%	**1**	**0.0%**
faunal	0	0.0%	0	0.0%	0	0.0%	1	0.4%	2	0.1%	0	0.0%	0	0.0%	**3**	**0.1%**
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	**0.0%**
TOTAL	**97**		**46**		**186**		**251**		**2090**		**22**		**301**		**2993**	

BVS- 077	1-4a	%	1-4b	%	1-4c	%	1-5	%	TOTAL	%
ceramic	260	88.1%	350	82.9%	133	72.7%	11	91.7%	**754**	**82.7%**
daub	7	2.4%	8	1.9%	21	11.5%	0	0.0%	**36**	**3.9%**
lithic	26	8.8%	59	14.0%	28	15.3%	1	8.3%	**114**	**12.5%**
obsidian	1	0.3%	2	0.5%	0	0.0%	0	0.0%	**3**	**0.3%**
ord.stone	0	0.0%	1	0.2%	1	0.5%	0	0.0%	**2**	**0.2%**
faunal	1	0.3%	2	0.5%	0	0.0%	0	0.0%	**3**	**0.3%**
human	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	**0.0%**
TOTAL	**295**		**422**		**183**		**12**		**912**	

*microartifacts not included
*no find on 060 patio

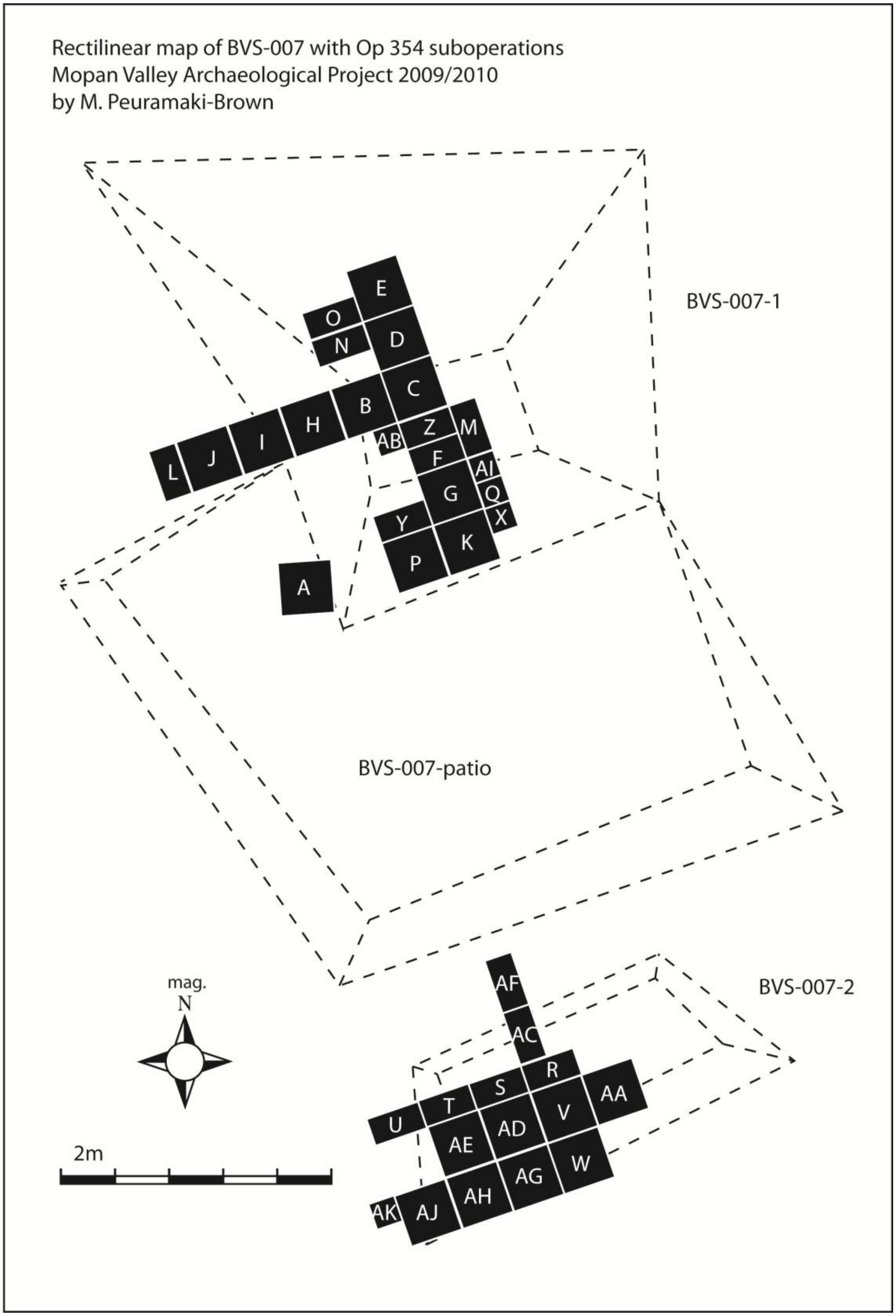


Figure 4. 35: Rectilinear map of BVS-007 with Op 354 suboperation locations.

Figure 4. 36: Top plan of BVS-007-1 Operation 354 excavations, terminal architecture (legend in Table 4.17).

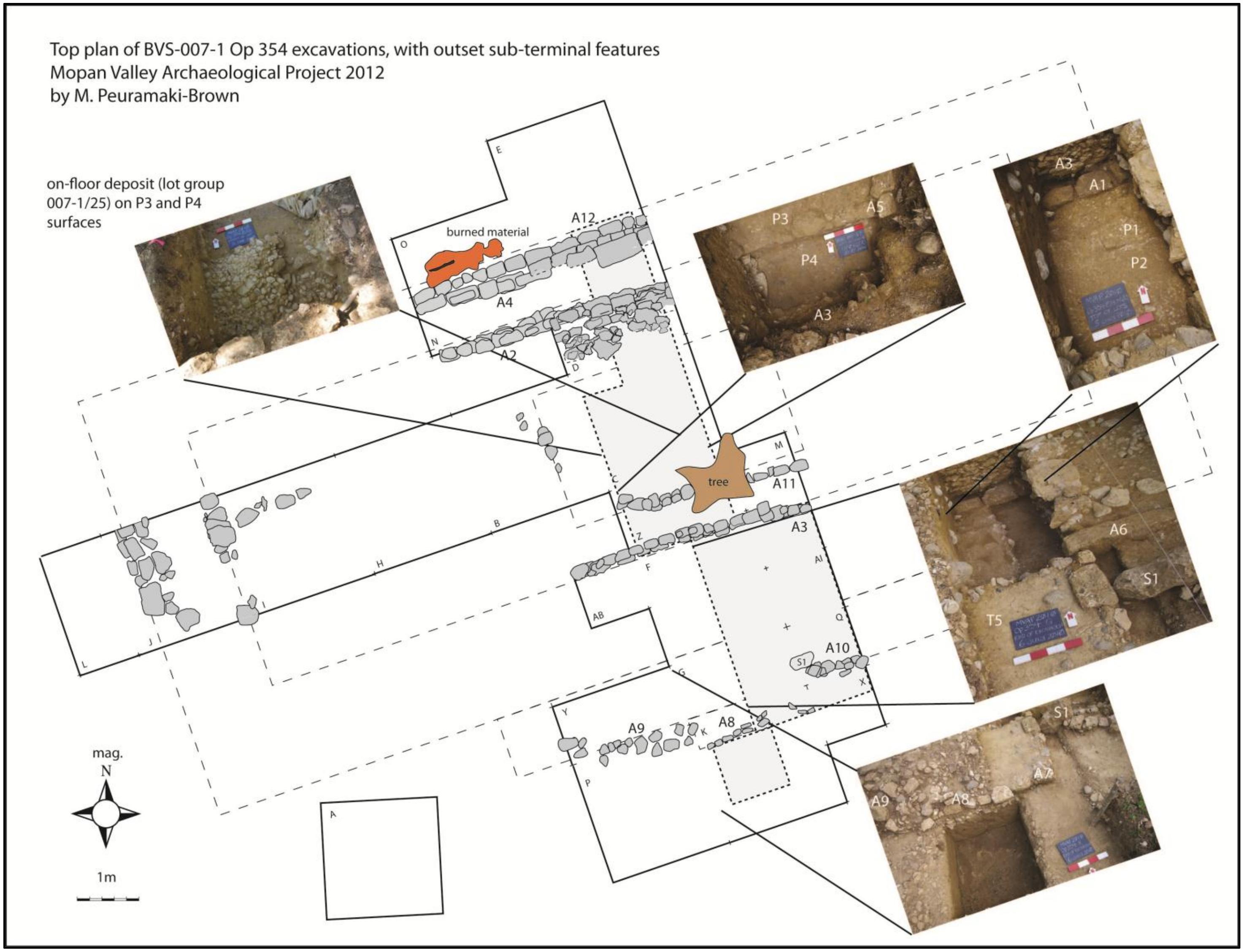


Figure 4. 37: Top plan of BVS-007-1 Operation 354 excavations, sub-terminal features in outsets (legend in Table 4.17).

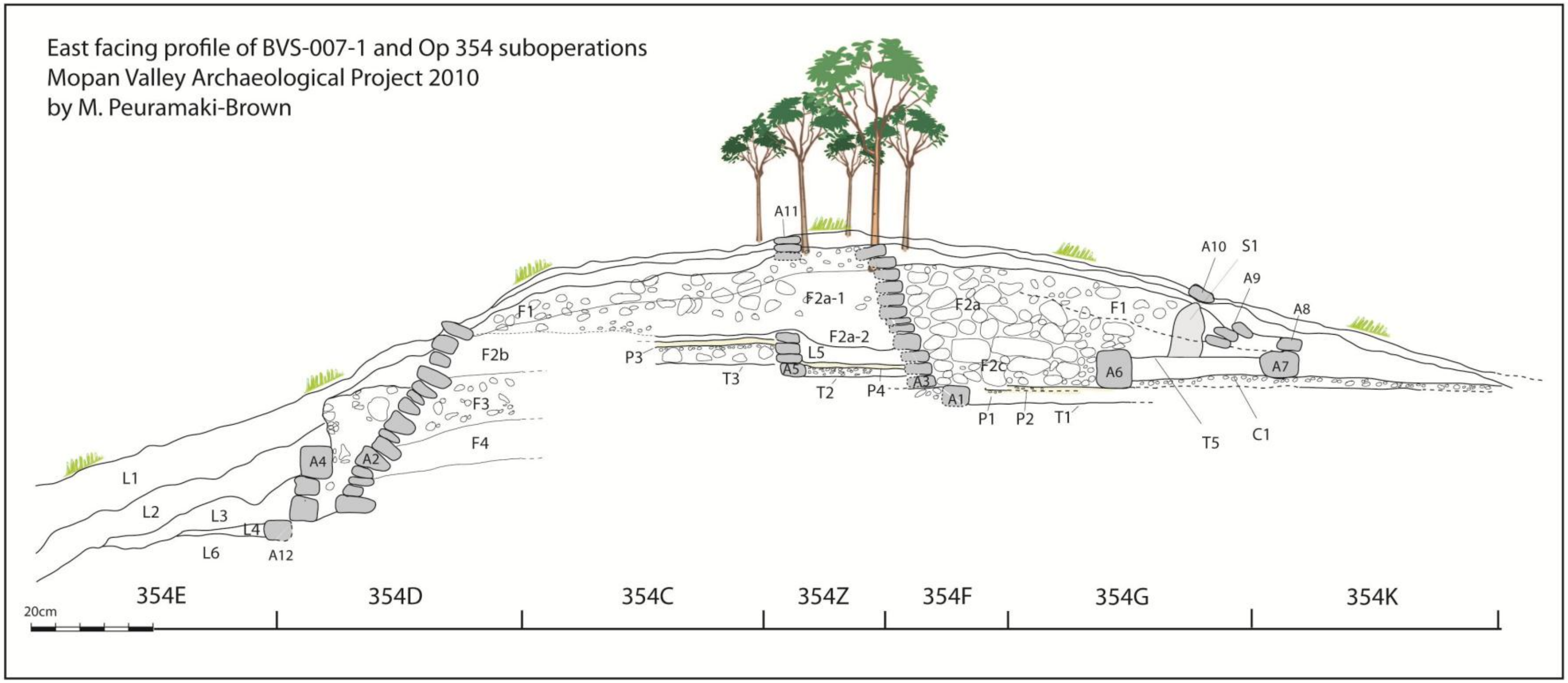


Figure 4. 38: East facing profile of BVS-007-1 and Op 354 suboperations (legend in Table 4.17)

L1: humus/backdirt
L2: fall
L3: sascab melt
L4: use debris
L5: on-floor deposit
L6: brownish yellow silt clay occupation horizon with white marl inclusions/banding

F1: brown clay loam with alluvial cobbles (terminal) (lot group 007-1/7a, 7b, 7c)
F2a: yellowish brown clay loam with large cobble/small boulder inclusions (lot group 007-1/8a, 8b)
F2b: yellowish brown clay loam; few rock inclusions in matrix (lot group 007-1/11)
F2c: yellowish brown clay loam; boulder inclusions (lot group 007-1/8c)
F3: brownish yellow and yellowish brown sandy clay loam with alluvial cobbles (lot group 007-1/18)
F4: yellowish brown silty clay loam with many carbon pieces and artifact inclusions (lot group 007-1/20)

A1: south facing of BVS-007-1-4th; hewn limestone block
A2: north facing of BVS-007-1-4th; core face of BVS-007-1-3rd-C to BVS-007-1-1st-A; limestone slab
A3: south core face of BVS-007-1-3rd-C to BVS-007-1-1st-A; limestone slab
A4: north facing of BVS-007-1-3rd-C to BVS-007-1-1st-A; hewn limestone block
A5: south face of bench of BVS-007-1-3rd-B to BVS-007-1-3rd-A; thin hewn limestone block
A6: south facing of BVS-007-1-2nd-B and BVS-007-1-2nd-A; hewn limestone block
A7: south face of terrace of BVS-007-1-2nd-A; hewn limestone block
A8: south face of terrace of BVS-007-1-1st-B and BVS-007-1-1st-A; thin hewn limestone block
A9: slumped south step of terrace of BVS-007-1-1st-A; thin hewn limestone block
A10: south step of terrace of BVS-007-1-1st-A; thin hewn limestone block
A11: south face of bench of BVS-007-1-1st-A; thin hewn limestone block
A12: alignment of alluvial cobble trace stones capped by plaster/limestone.

T1: tamped clay construction surface running beneath A1
T2: tamped marl construction surface running under A5
T3: tamped clay construction surface running out from top of bottom course of A5
T4: tamped clay construction surface running beneath A6
T5: tamped clay surface of terrace of BVS-007-1-2nd-A
C1: cobble ballast surface of formal paved patio, running beneath A7
S1: possible stela fragment associated with BVS-007-1-2nd-A

P1: plaster surface with ballast; lips up at north end (missing south facing of BVS-007-1-3rd-C/B); well preserved; 5cm thick
P2: plaster surface with ballast; no lipping; well preserved; 5cm thick
P3: poorly preserved plaster surface and ballast; burning on west side and near A5; disappears as move north (disturbed); lips up to 2nd course from top of A5
P4: burned plaster surface and ballast; lips up to top of bottom course of A5 and runs into A3; 4 cm thick

Table 4. 17: Legend of features indicated on BVS-007-1 profiles and top plans.

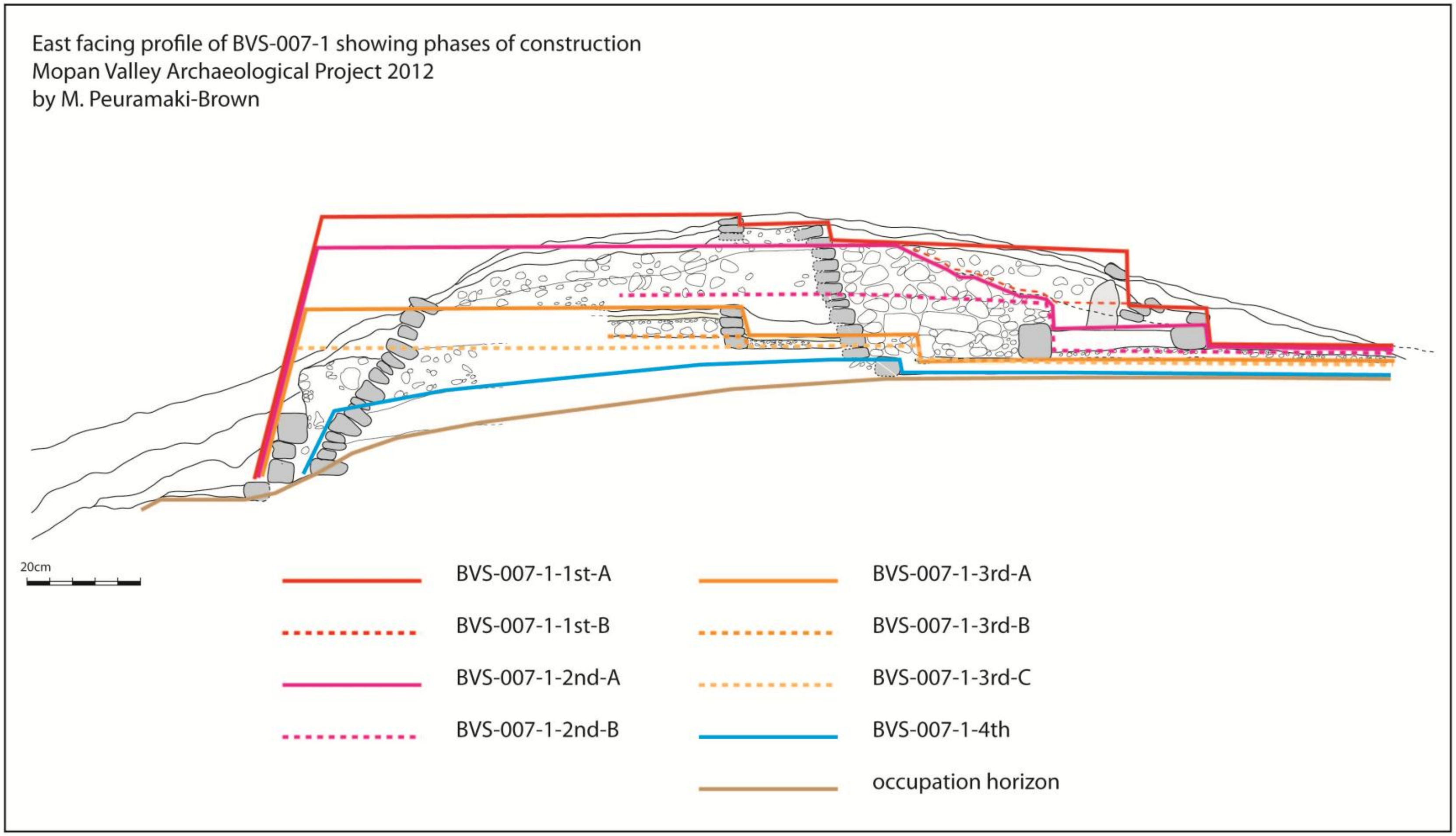


Figure 4. 39: East facing profile of BVS-007-1 showing structures and phases of construction.

Figure 4. 40: BVS-007-1 Feature 1 (lot groups 007-patio/6c/7) with close up and associated small finds in outsets.

Figure 4. 41: Possible stela fragment (S1) associated with BVS-007-1-2nd.

Figure 4. 42: On-floor deposit (lot group 007-1/25) atop plaster floors P3 and P4. Part of BVS-007-1-3rd-A.

CERAMIC	diagnostics						body
	utilitarian	serving	ceremonial	disk/lid	unknown calcite	unknown ash	
1624	107	35	9	1	56	0	1416

CHIPPED LITHIC	primary	secondary	tertiary	BRF	cores	util cores	uk flake	blocky	thermal	utlized flakes	thin biface	scraper	graver/ incisor
306	32	69	26	4	4	5	56	69	32	2	2	4	1

GROUND STONE	unknown worked piece	mano	metate	hammer stone	unused cobble	quartz crystal
15	3	1	2	1	6	2

HUMAN REMAINS	1st phalange	partial	unknown/ epiphyses
27	11	4	12

RESIN	copal
20	20

SHELL	*Pachychilus*	*Strombus*
10	4	6

OBSIDIAN	second series	third series
3	2	1

* resin and human remains from flotation sample microartifacts (354Z/20-F1)
* a sample of resin was burned to confirm copal

Table 4. 18: Assemblage list for lot group 007-1/25, on-floor deposit.

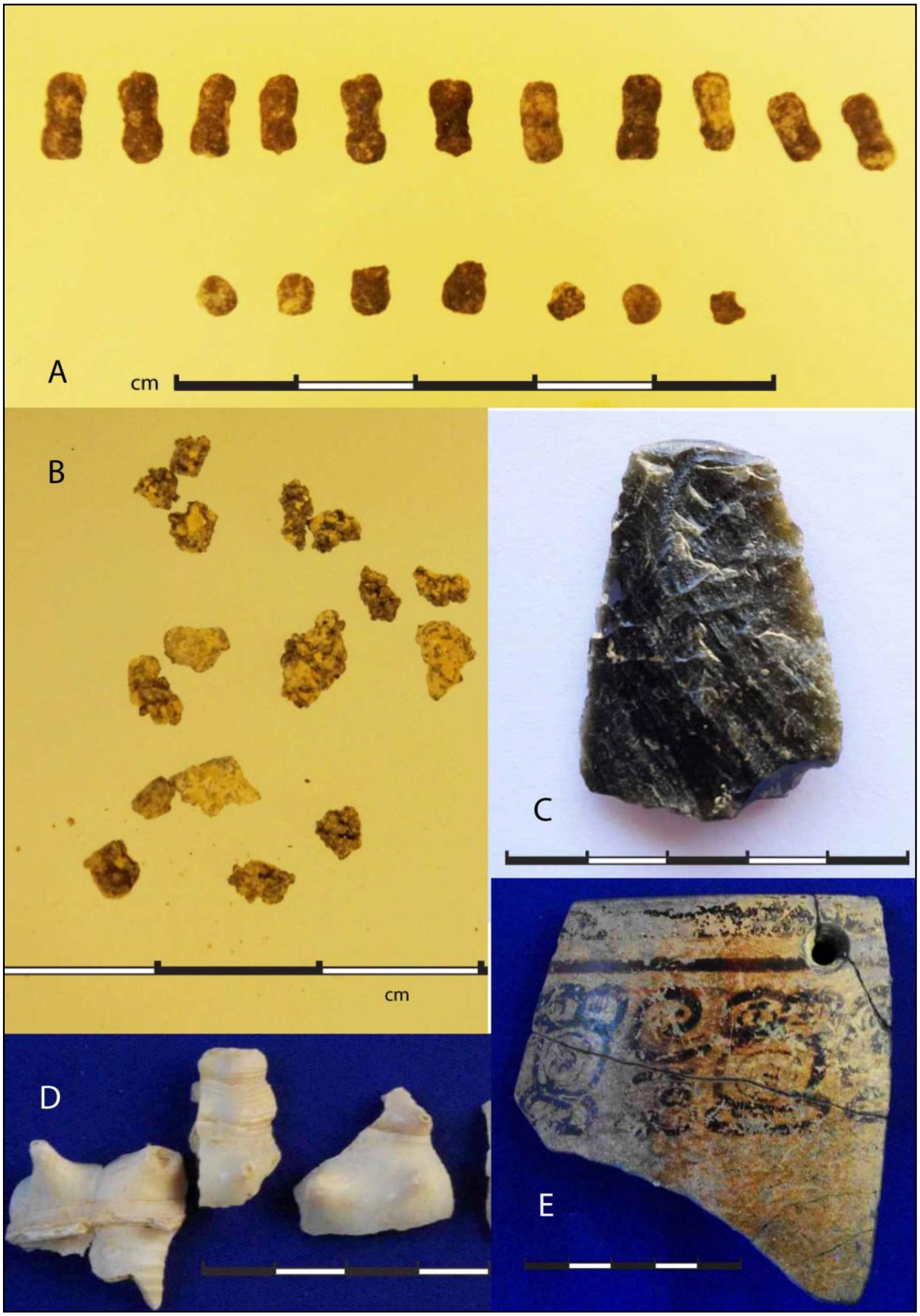


Figure 4. 43: Artifacts from the lot group 007-1/25 on-floor assemblage, A) phalanges, B) copal resin, C) Pachuca thin biface (OB-783), D) conch fragments (MS-021, 029, 030), E) Saxche Orange-polychrome hemispherical bowl (CR-035).

Figure 4. 44: Top plan of BVS-007-2 Operation 354 excavations, terminal architecture (legend in Table 4.19).

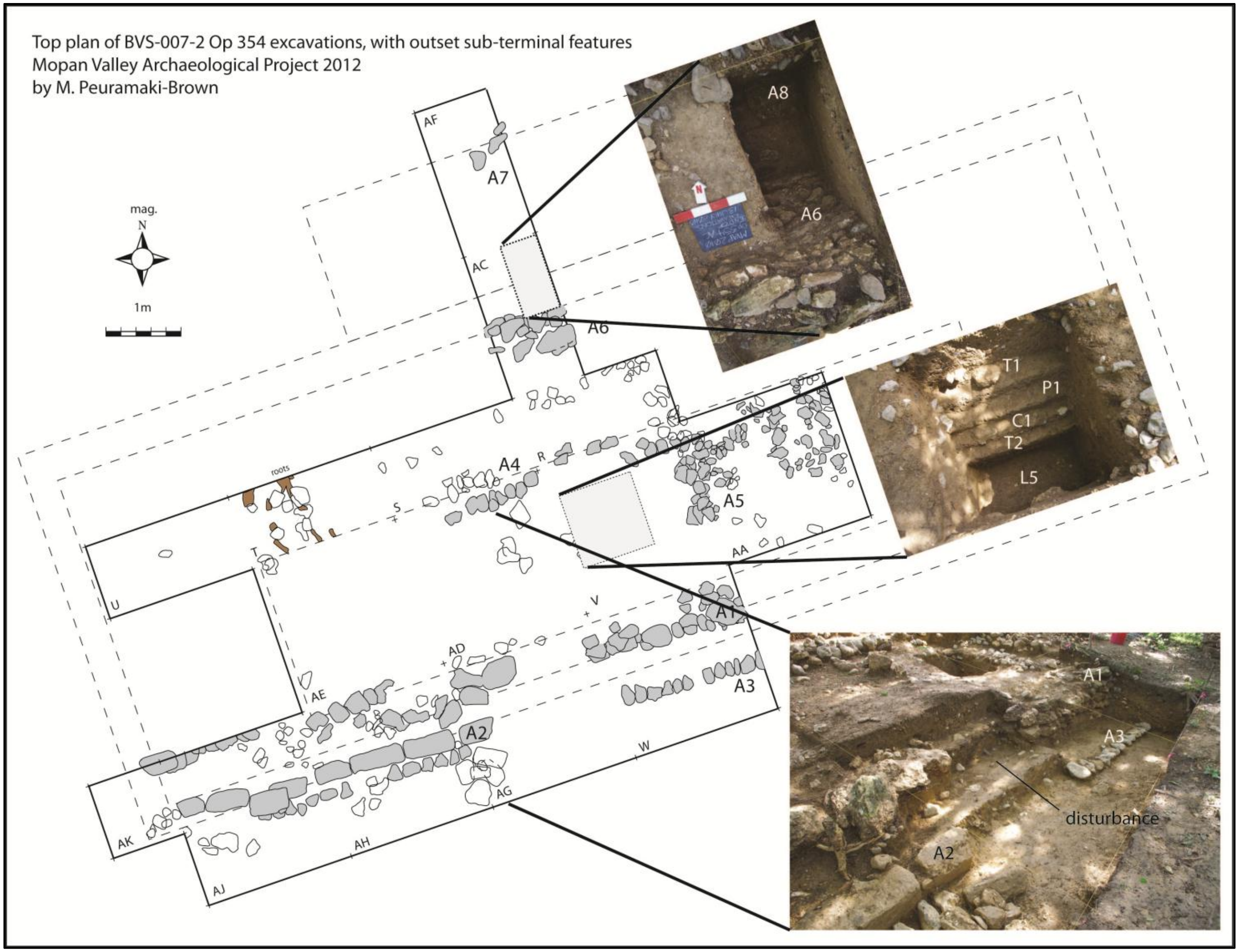


Figure 4. 45: Top plan of BVS-007-2 Operation 354 excavations, terminal and sub-terminal features in outsets (legend in Table 4.19).

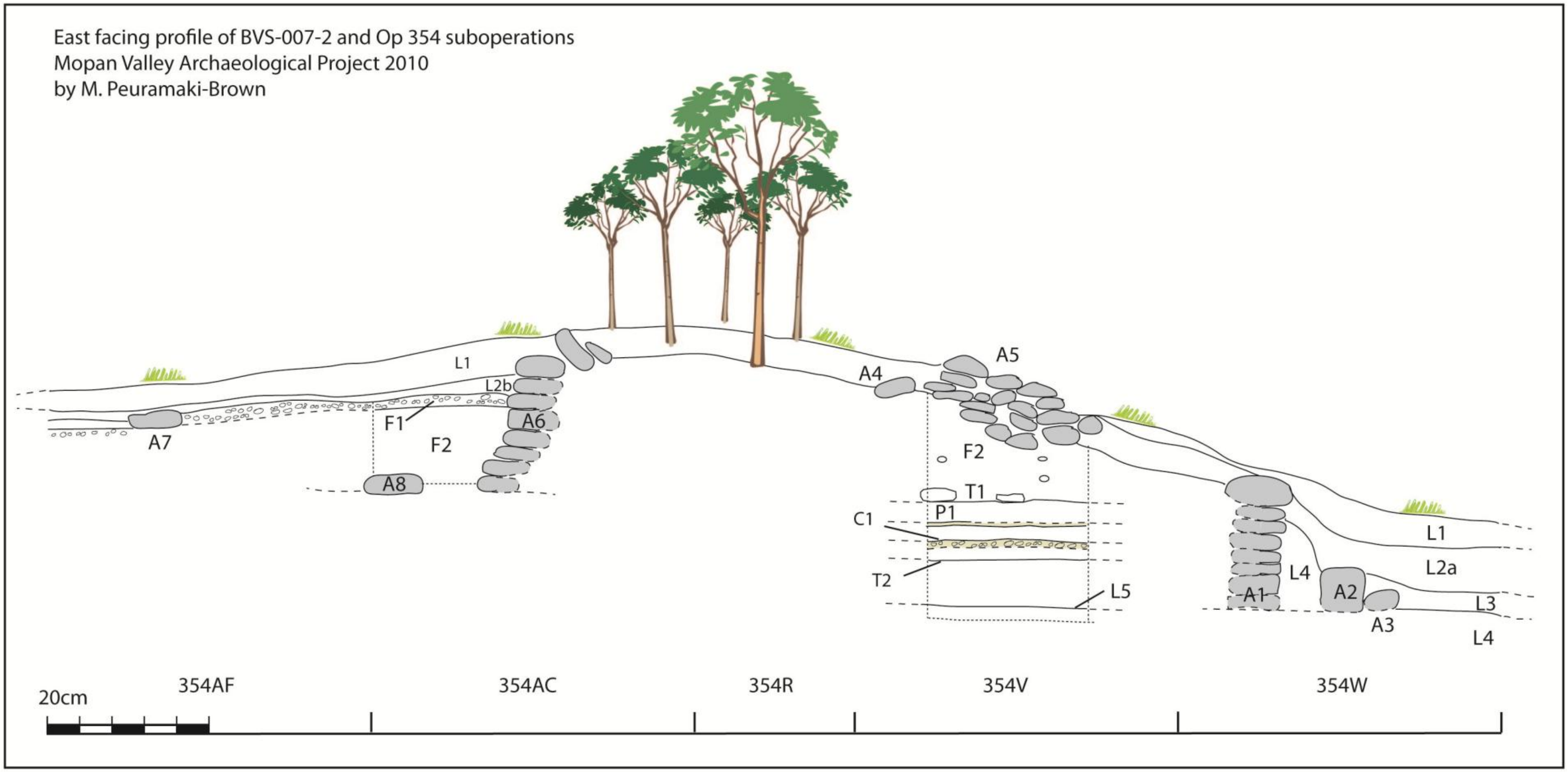


Figure 4. 46: East facing profile of BVS-007-2 and Op 354 suboperations (legend in Table 4.19)

L1: humus
L2a: fall
L2b: colluvium
L3: use debris
L4: backing masonry/inter-face fill (primarily silt-clay)
L5: occupation horizon; debris on surface beneath structure

F1: brown clay loam with alluvial cobbles
F2: yellowish brown silty clay fill, few alluvial cobbles

A1: south core face of large limestone slabs (BVS-007-2-1st)
A2: south facing of large limestone blocks (BVS-007-2-1st)
A3: tracing stones as architectural guide (BVS-007-2-1st)
A4: north face of bench (BVS-007-2-1st)
A5: N/S pile or alignment of blocks on east side of mound. May be from precolumbian disturbance.
A6: north core face of large limestone slabs (BVS-007-2-1st)
A7: north face of outset terrace (BVS-007-2-1st)
A8: north facing of large limestone blocks (BVS-007-2-1st); may be associated with BVS-007-2-2nd)

T1: tamped surface with soft limestone pieces and horizontal ceramics (BVS-007-2-2nd)
P1: disturbed plaster surface and horizontal ceramics (BVS-007-2-2nd)
C1: limestone cobble surface (like BVS-034) and horizontal ceramics (BVS-007-2-2nd)
T2: tamped surface with horizontal ceramics (BVS-007-2-2nd)

Table 4. 19: Legend of features indicated on BVS-007-2 profiles and top plans.

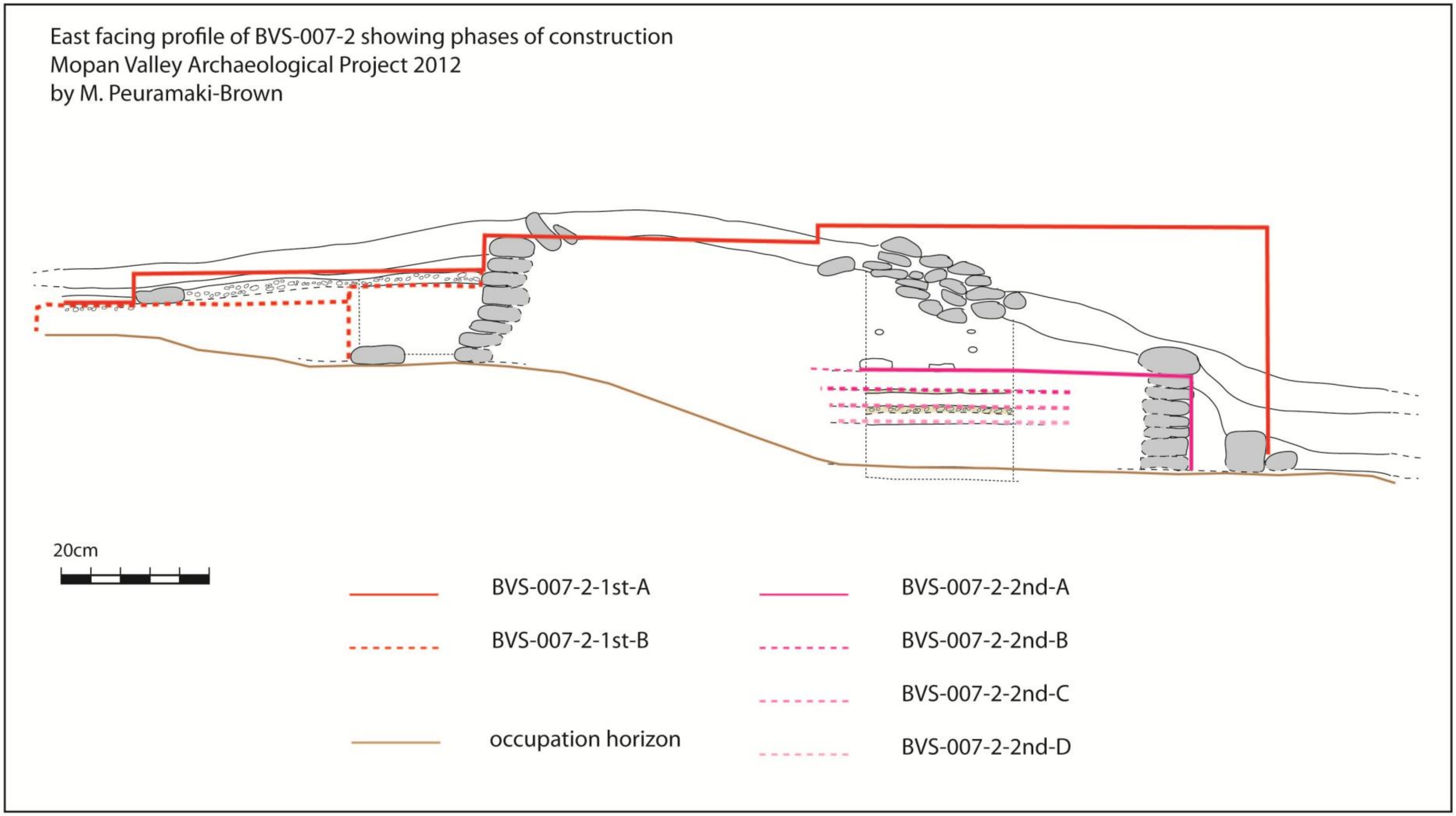


Figure 4. 47: East facing profile of BVS-007-2 showing structures and phases of construction.

Figure 4. 48: Sherd of codex-style ceramic found at BVS-007-2.

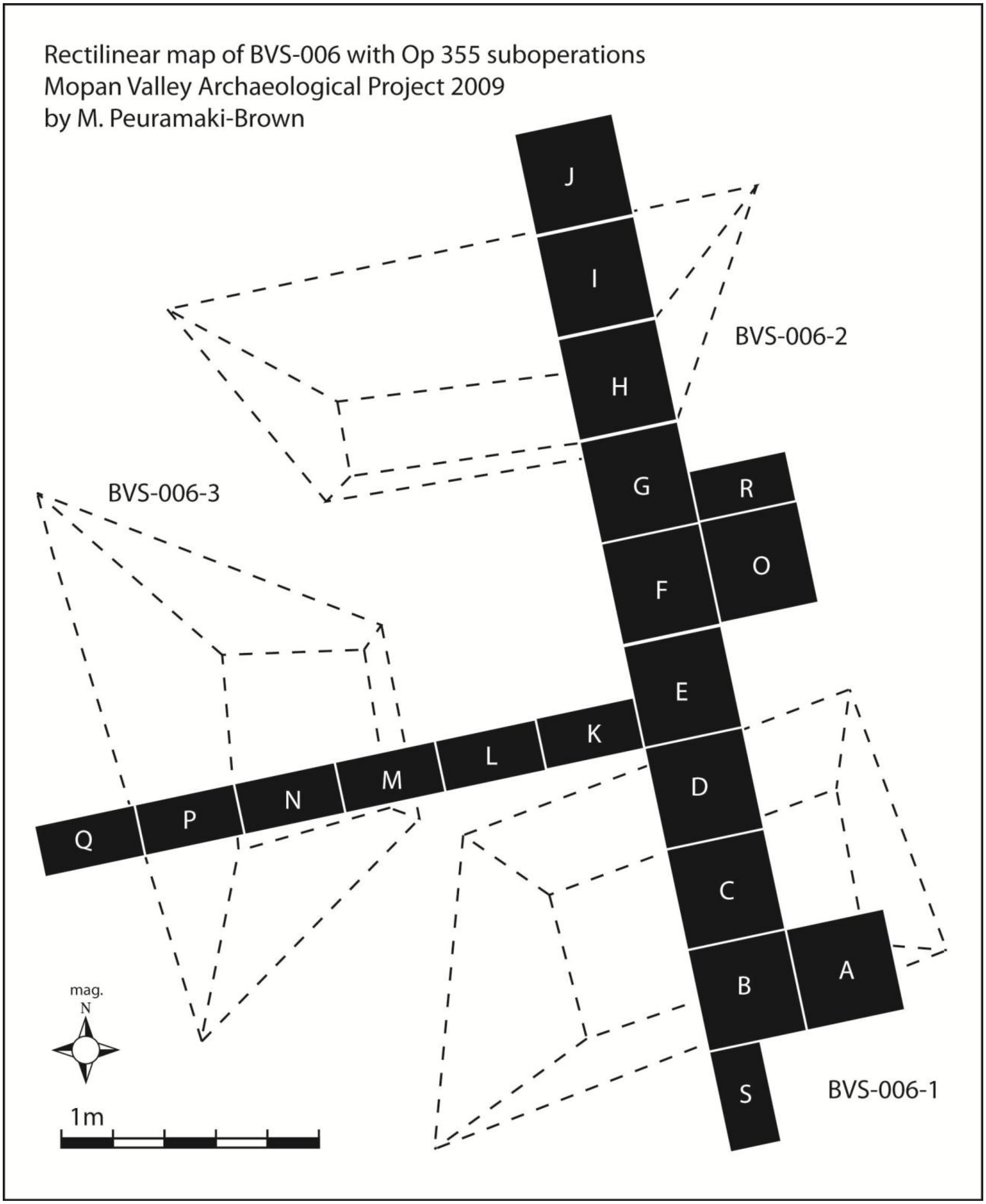


Figure 4. 49: Rectilinear map of BVS-006 with Op 355 suboperation locations.

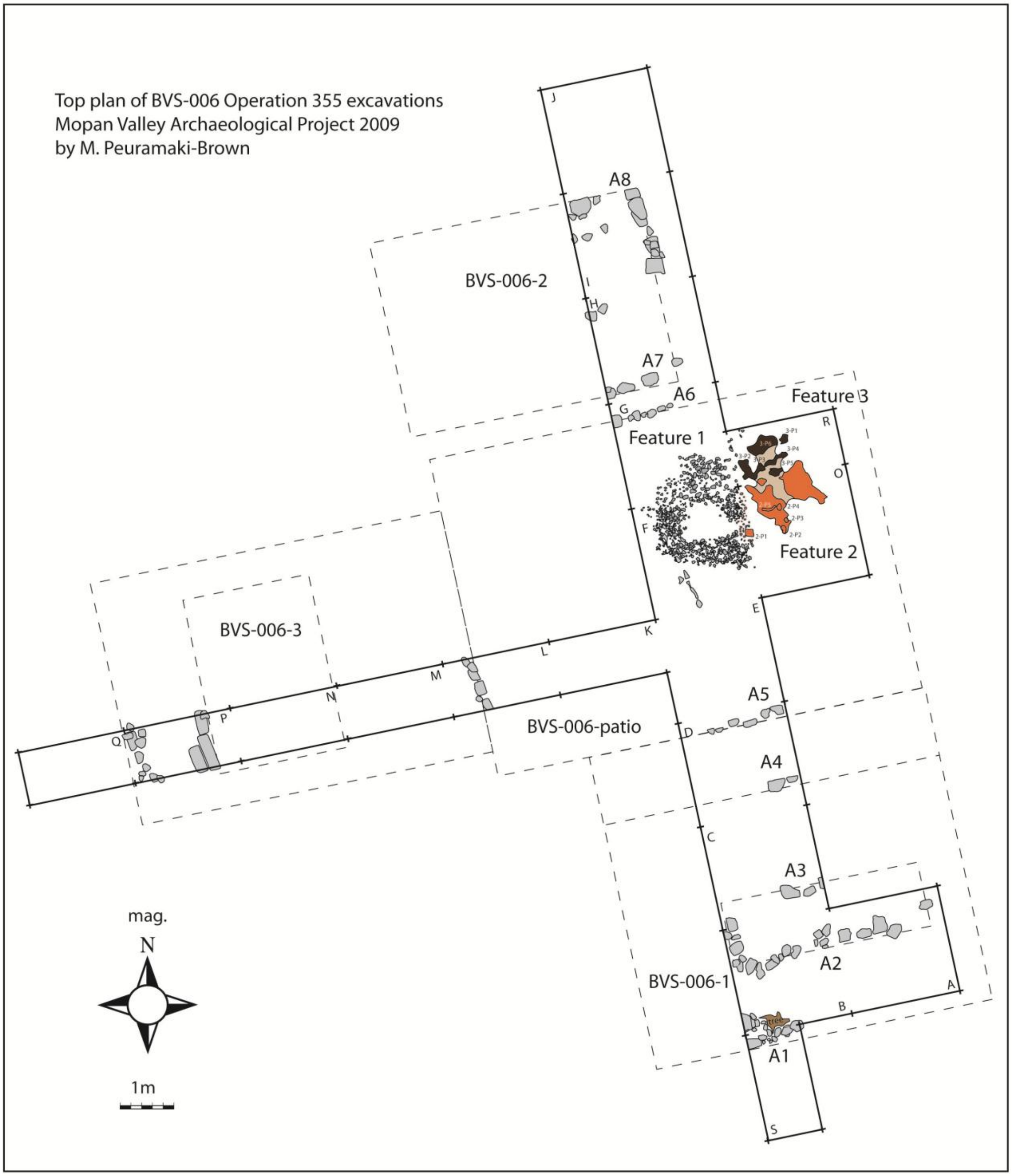


Figure 4. 50: Top plan of BVS-006 Operation 355 excavations, terminal architecture (legend in Table 4.20).

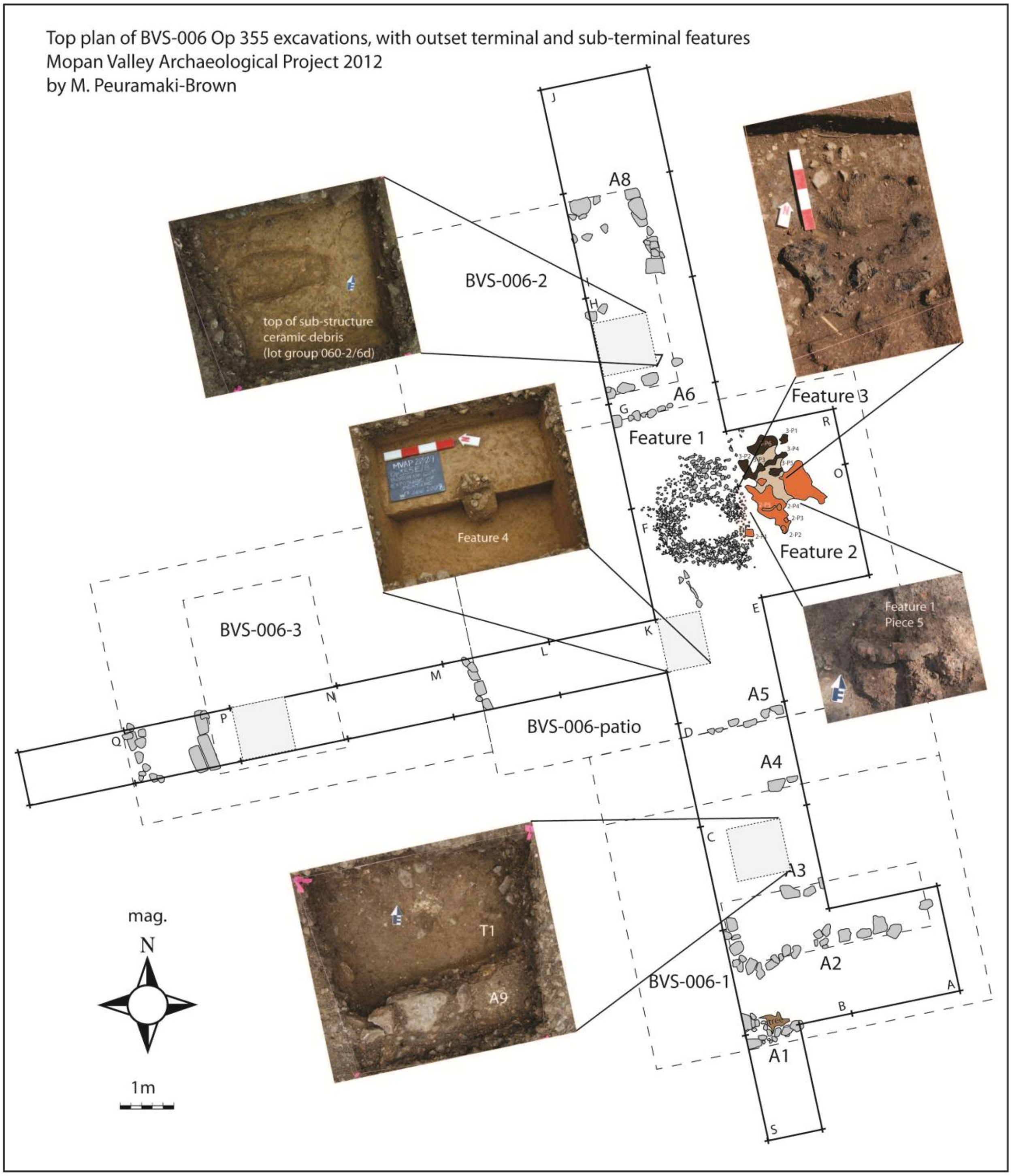


Figure 4. 51: Top plan of BVS-006 Operation 355 excavations, terminal and sub-terminal features in outsets (legend in Table 4.20).

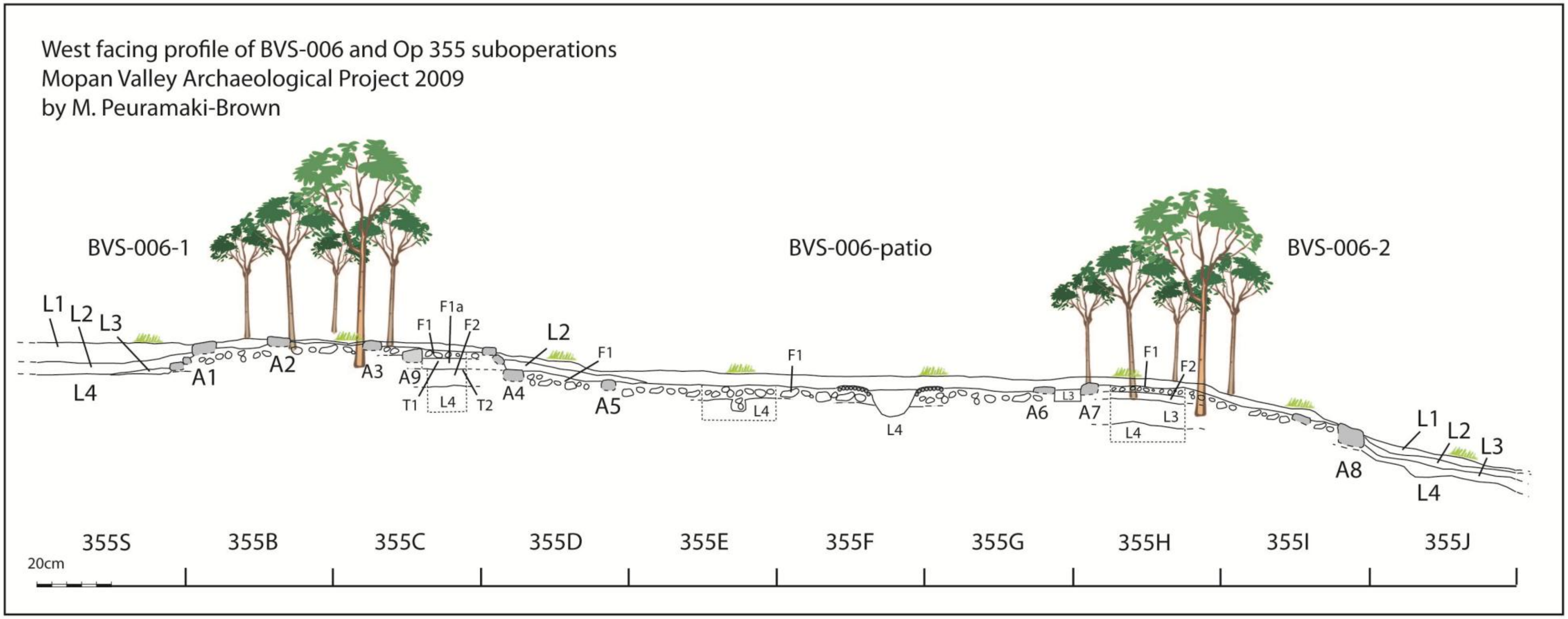


Figure 4. 52: West facing profile of BVS-006 and Op 355 suboperations (legend in Table 4.20).

L1: humus
L2: fall
L3: habitation debris
L4: occupation horizon

T1: tamped surface (BVS-006-1-2nd)
T2: tamped surface(BVS-006-1-3rd)

A1: south face of BVS-006-1
A2: south face of bench
A3: north face of bench
A4: north face of BVS-006-1
A5: north face of terrace
A6: north face of patio
A7: south face of BVS-006-2
A8: north face of BVS-006-2
A9: penultimate north face of bench (BVS-006-1-1st-B)

F1: fill with dark brown matrix and high percentage of alluvial cobbles
F1a: same fill as F1 but with a tamped upper surface
F2: fill with yellowish brown silt clay and low percentage of alluvial cobbles

Table 4. 20: Legend of features indicated on BVS-006 profiles and top plans.

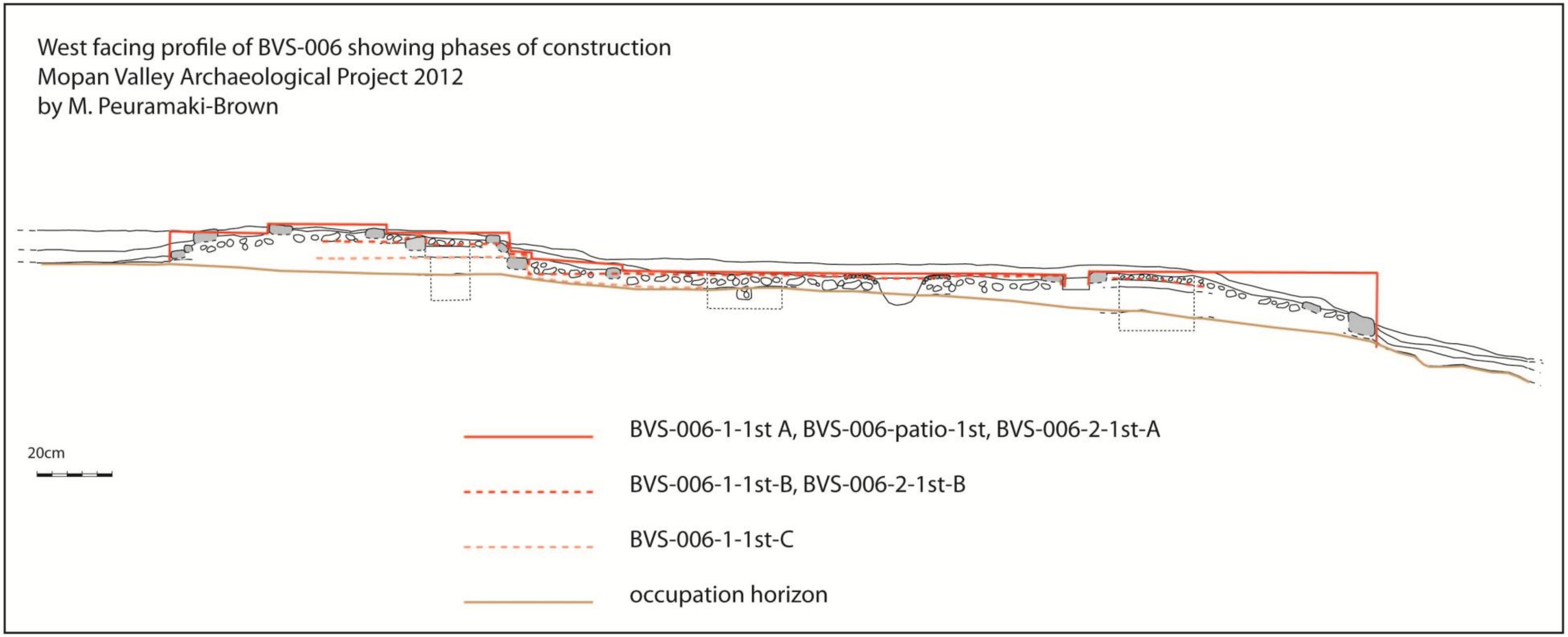


Figure 4. 53: West facing profile of BVS-006 showing structures and phases of construction.

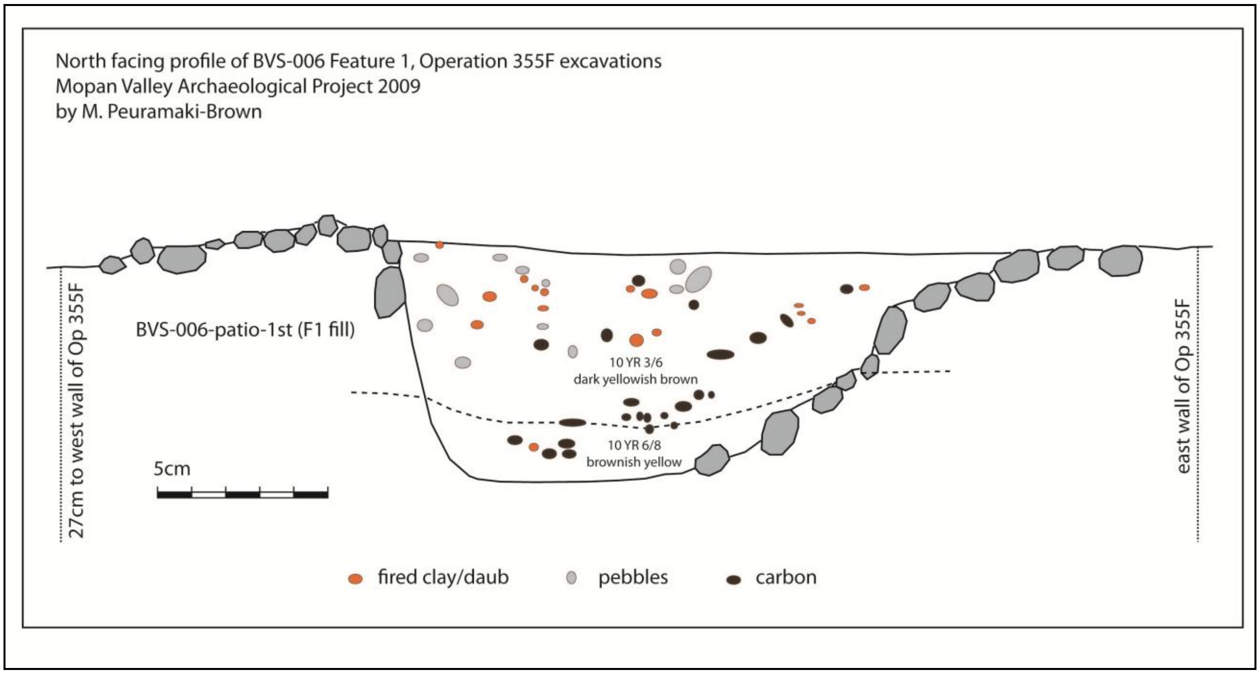


Figure 4. 54: North facing profile of BVS-006 Feature 1.

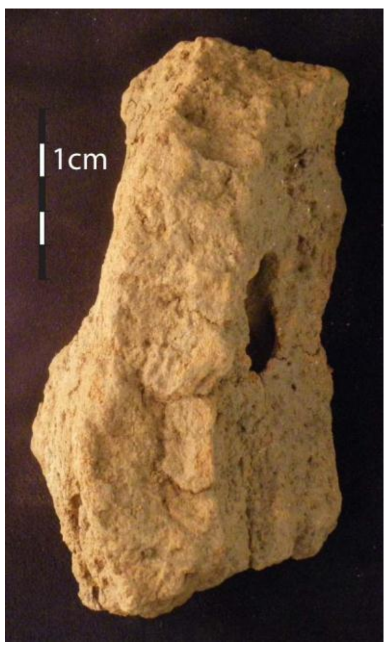


Figure 4. 55: Piece of curving daub recovered from BVS-006 Feature 2 (Op 355O/6-P2).

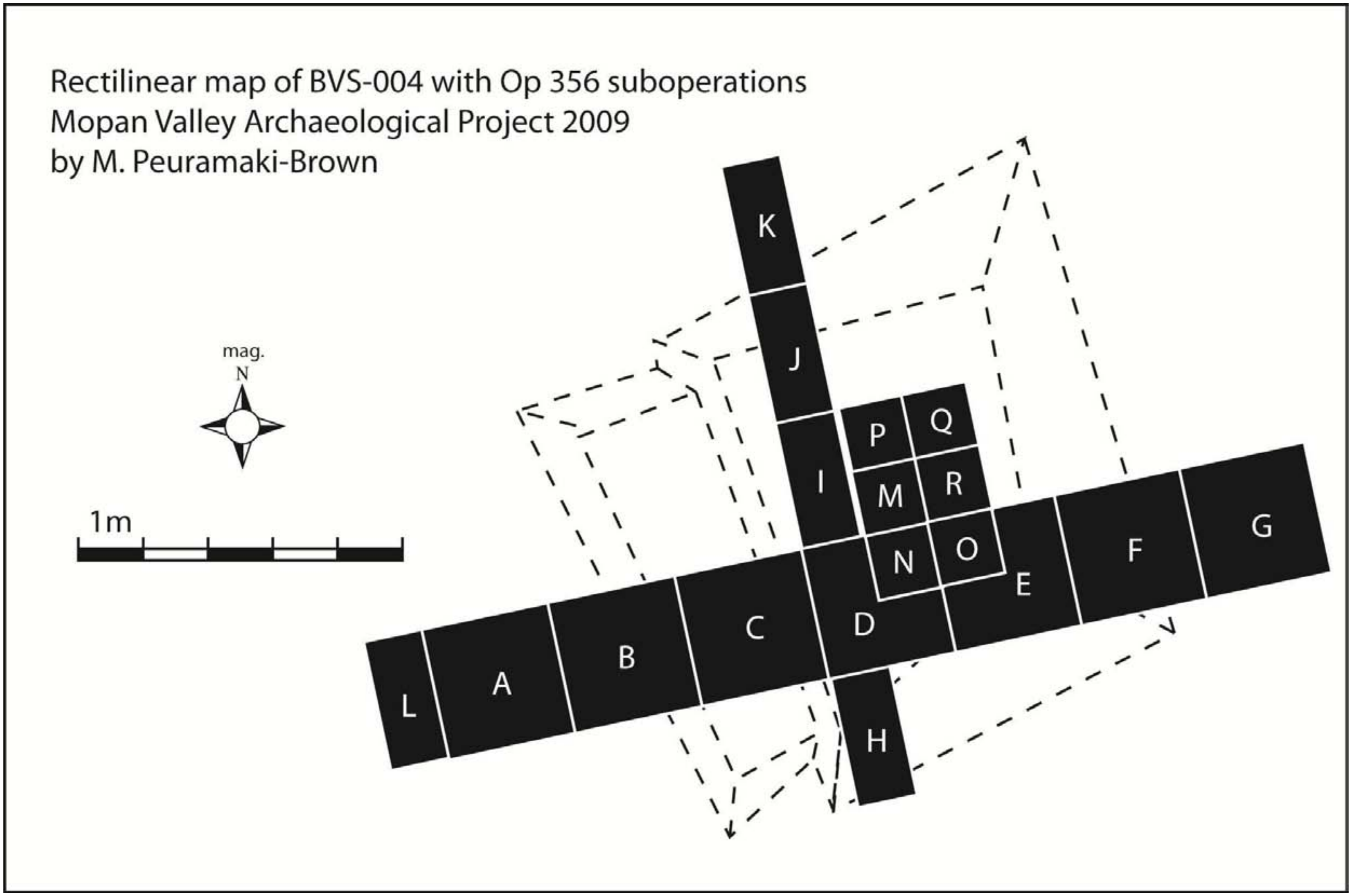


Figure 4. 56: Rectilinear map of BVS-004 with Op 356 suboperation locations.

Figure 4. 57: Top plan of BVS-004 Operation 356 excavations, terminal architecture (legend in Table 4.21).

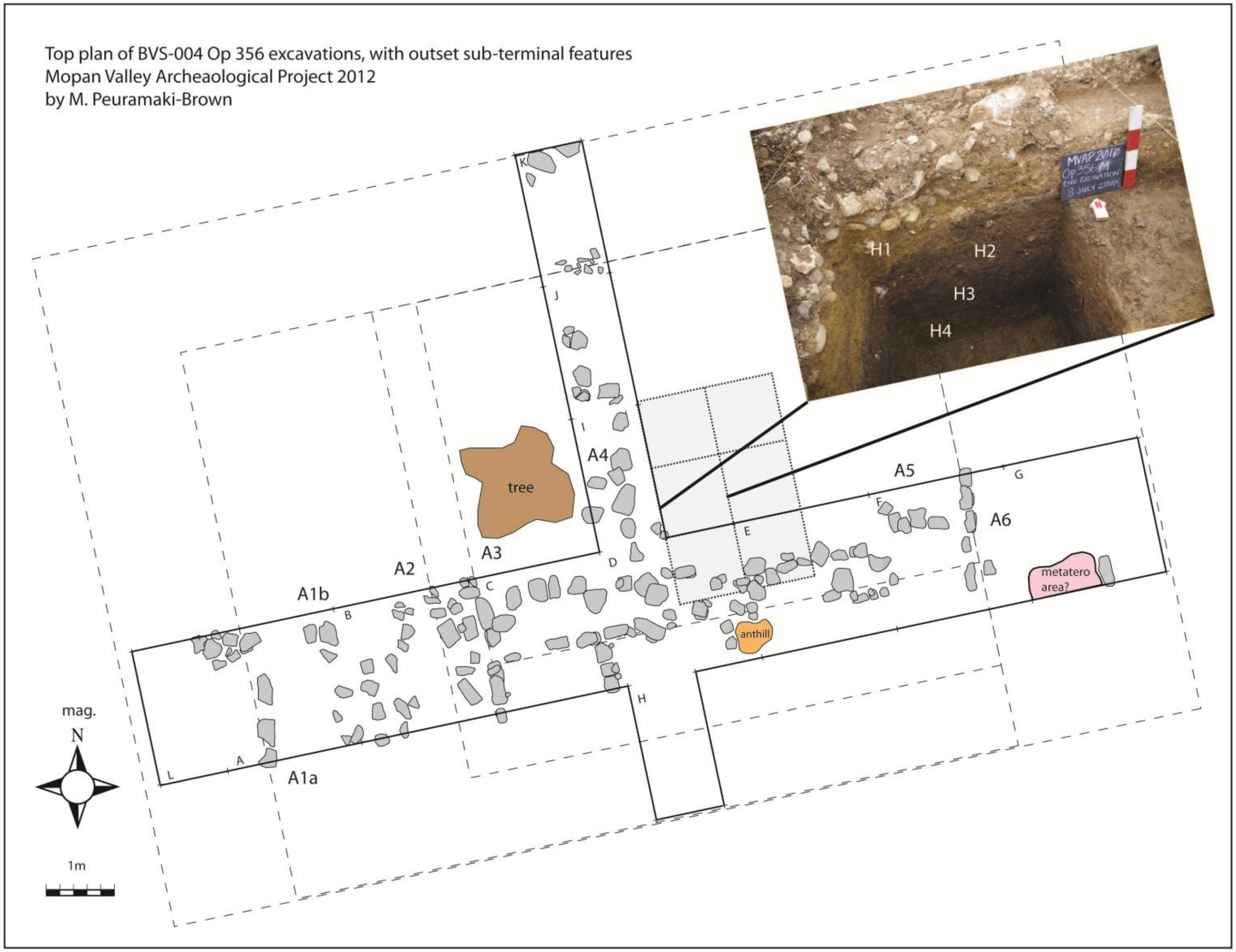


Figure 4. 58: Top plan of BVS-004 Operation 356 excavations, sub-terminal features in outset (legend in Table 4.21).

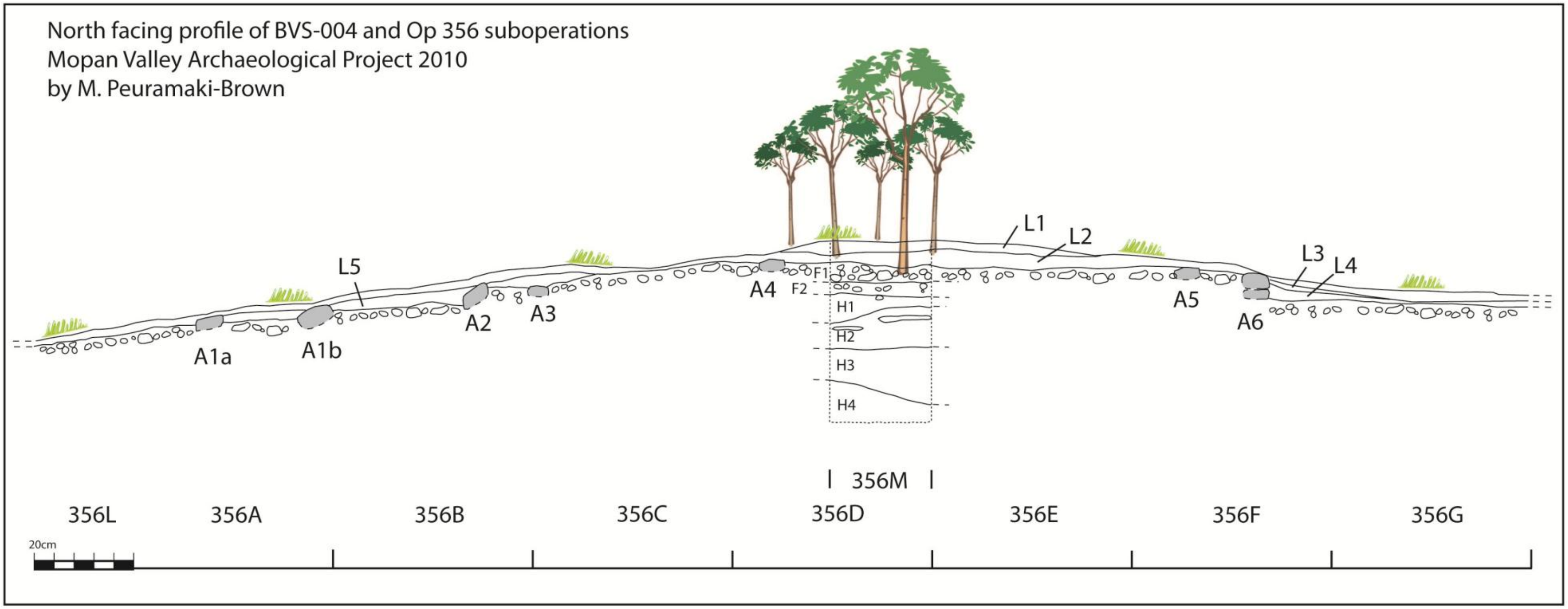


Figure 4. 59: North facing profile of BVS-004 and Op 356 suboperations (legend in Table 4.21).

L1: anthill
L2: humus
L3: colluvium
L4: habitation debris
L5: fall

F1: terminal fill (brown matrix with alluvial cobbles)
F2: penultimate tamped surface (yellowish brown silt clay with alluvial cobbles)

H1: brownish yellow silt clay occupation horizon
H2: organic rich horizon (red-brown lens) with dark banding and small ceramics
H3: dark grey-brown clay horizon
H4: yellow clay horizon (sterile)

A1a: west terrace step
A1b: west terrace step
A2: west step of terminal substructure
A3: west face of terminal substructure
A4: west face of bench
A5: east face of bench
A6: east face of terminal substructure

Table 4. 21: Legend of features indicated on BVS-004 profiles and top plans.

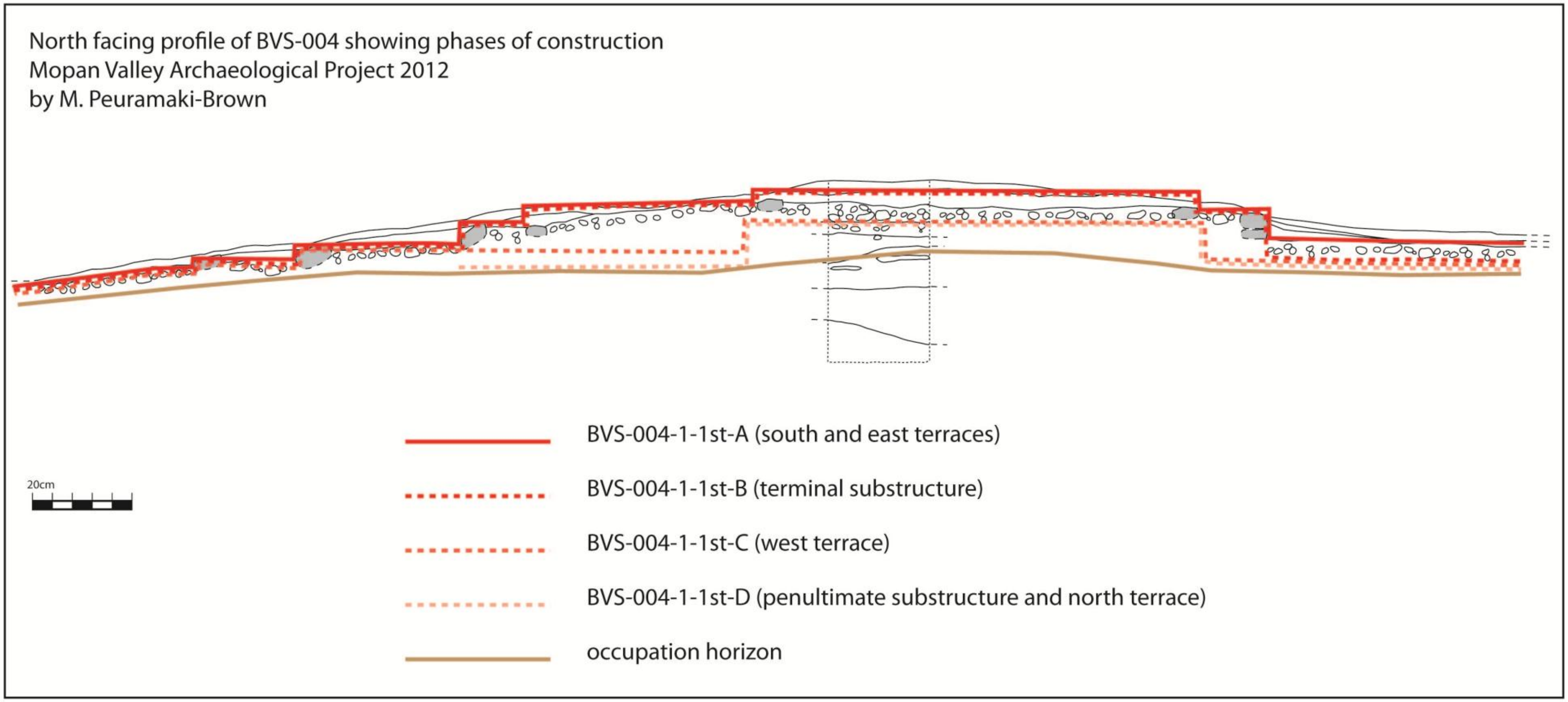


Figure 4. 60: North facing profile of BVS-004 showing structures and phases of construction.

Figure 4. 61: Site 160 midden area with Op 357A suboperation.

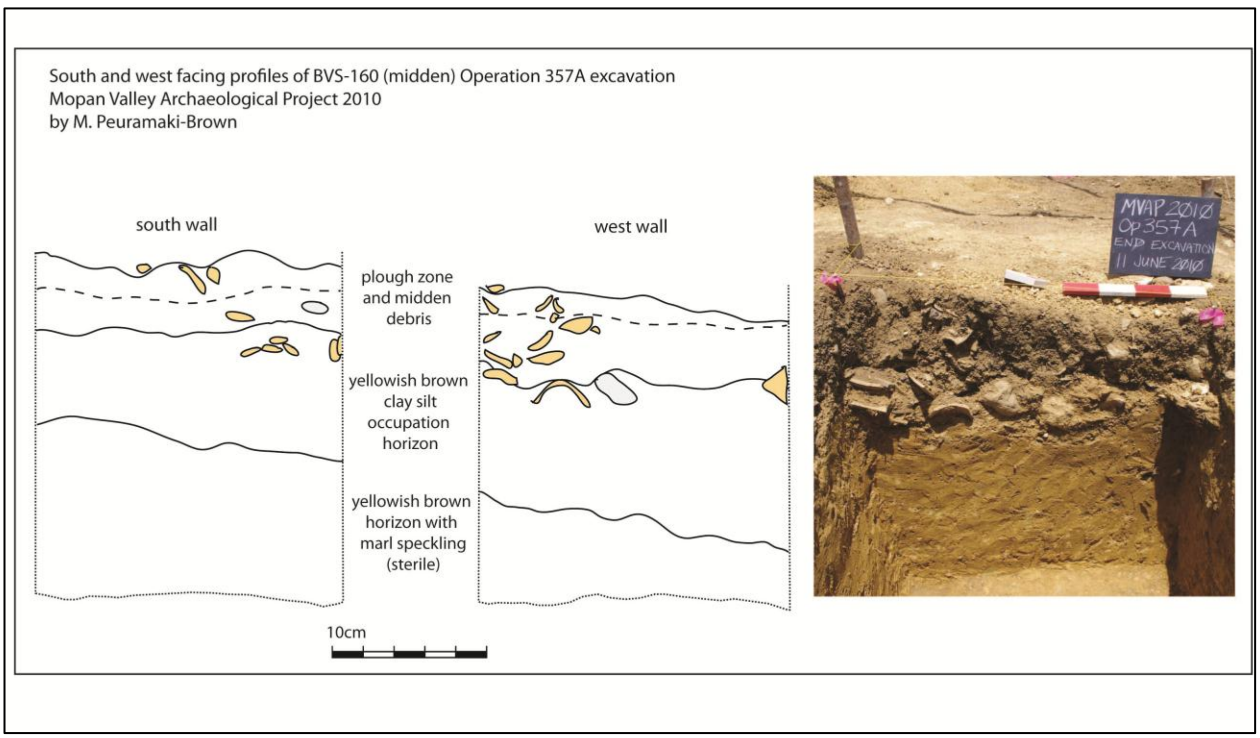


Figure 4. 62: Profiles of Site 160 Op 357A excavations.

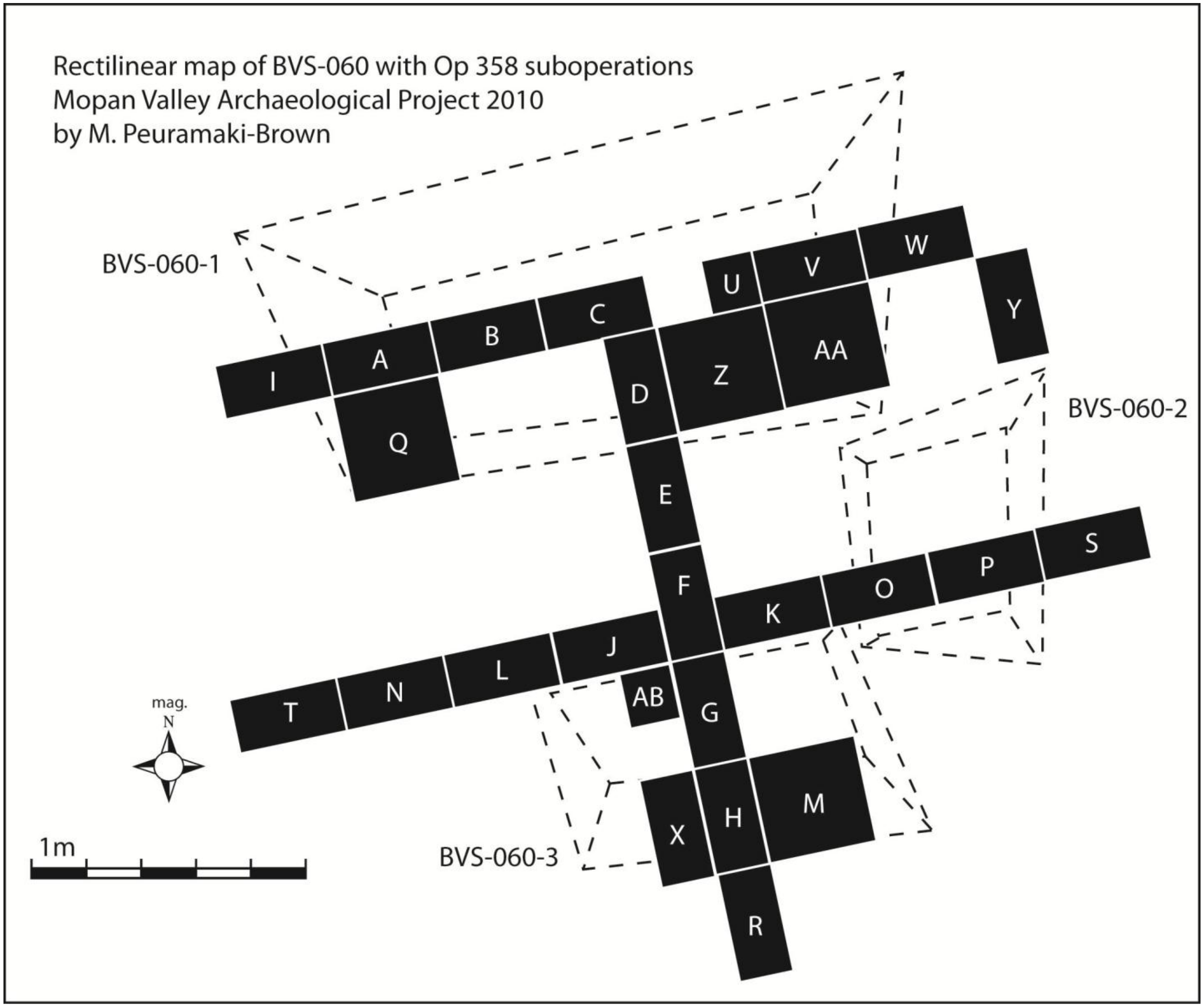


Figure 4. 63: Rectilinear map of BVS-060 with Op 358 suboperation locations.

Figure 4. 64: Top plan of BVS-060 Operation 358 excavations, terminal architecture (legend in Table 4.22).

Figure 4. 65: Top plan of BVS-060 Operation 358 excavations, terminal and sub-terminal features in outsets (legend in Table 4.22).

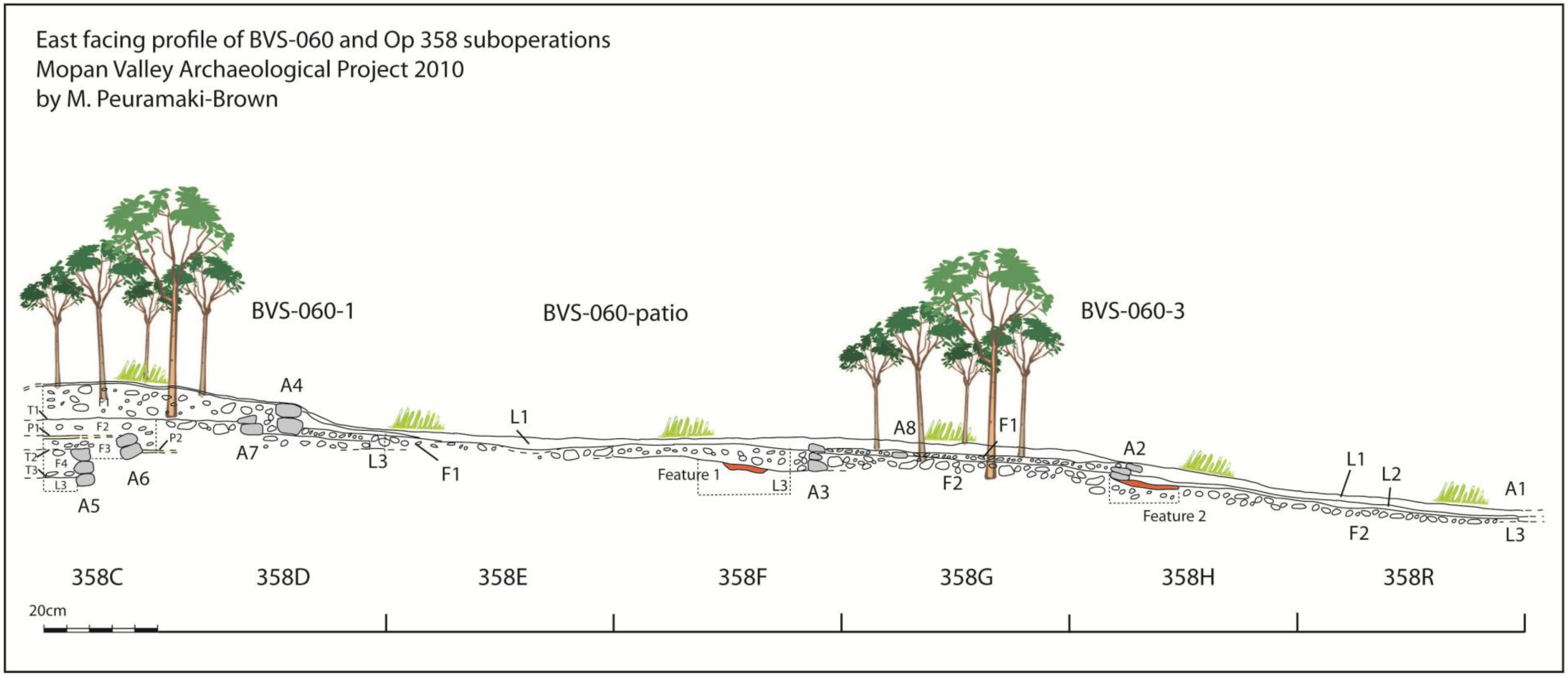


Figure 4. 66: East facing profile of BVS-060 and Op 358 suboperations (legend in Table 4.22).

L1: humus
L2: colluvium
L3: occupation horizon

F1: brown soil matrix fill with much alluvial cobbles and artifact debris
F2: lighter brown to yellowish brown soil matrix with alluvial cobbles
F3: yellowish brown silt-clay matrix with alluvial cobbles
F4: yellowish brown silt-clay with few inclusions

A1: south extent of BVS-060-3 terrace
A2: south face of BVS-060-3
A3: north face of BVS-060-3
A4: south face of BVS-060-1-1st
A5: south core face of BVS-060-1-3rd-A, south face of BVS-060-1-3rd-B
A6: south facing of BVS-060-1-3rd-A
A7: south face of BVS-060-1-2nd
A8: north face of bench, BVS-060-3-1st-B

T1: tamped surface with horizontal debris (BVS-060-1-2nd)
T2: tamped, disturbed surface (BVS-060-1-3rd-B)
T3: tamped occupation horizon
P1: disturbed plaster surface (BVS-060-1-3rd-A)
P2: plaster terrace surface (BVS-060-1-3rd-A)

Table 4. 22: Legend of features indicated on BVS-060 profiles and top plans.

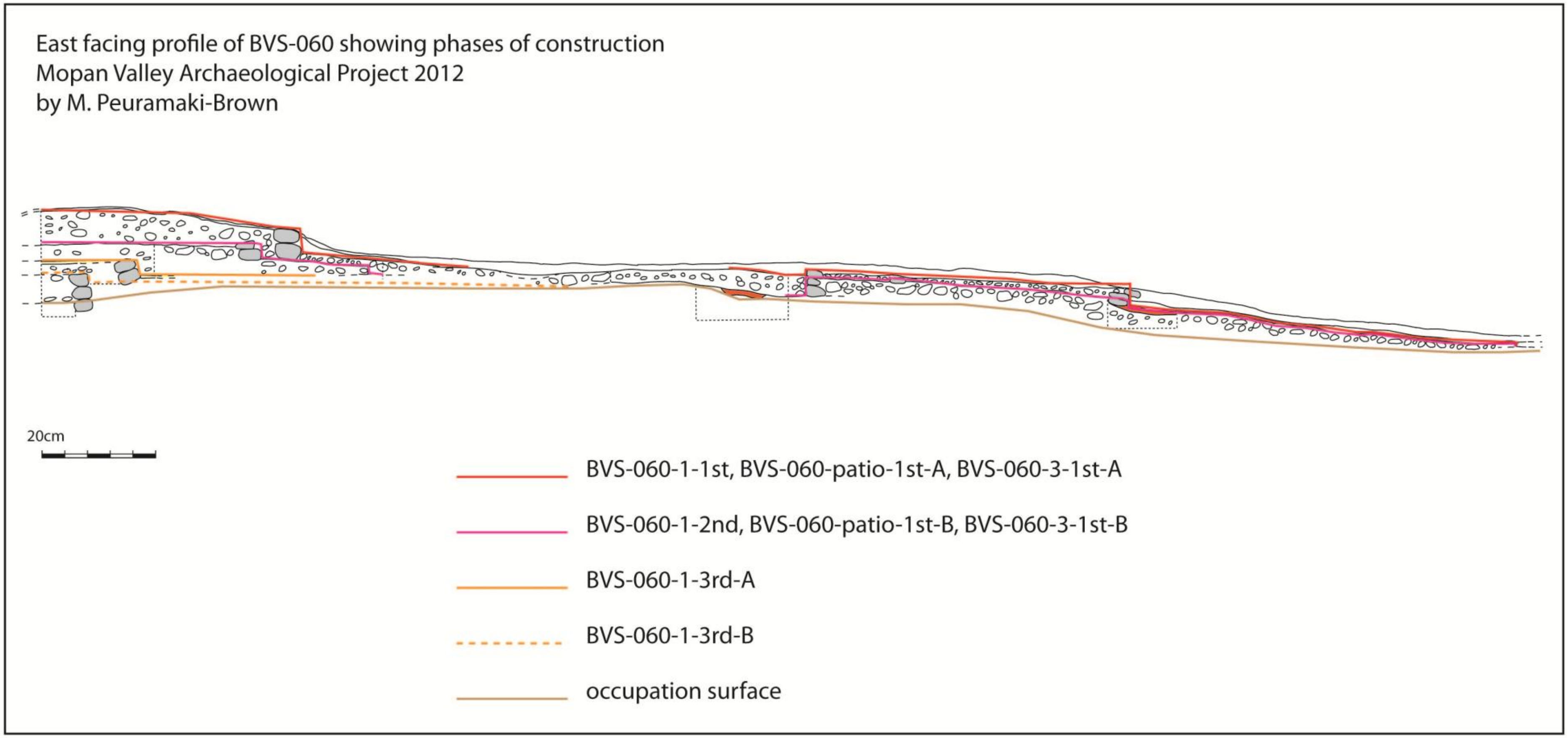


Figure 4. 67: East facing profile of BVS-060 showing structures and phases of construction.

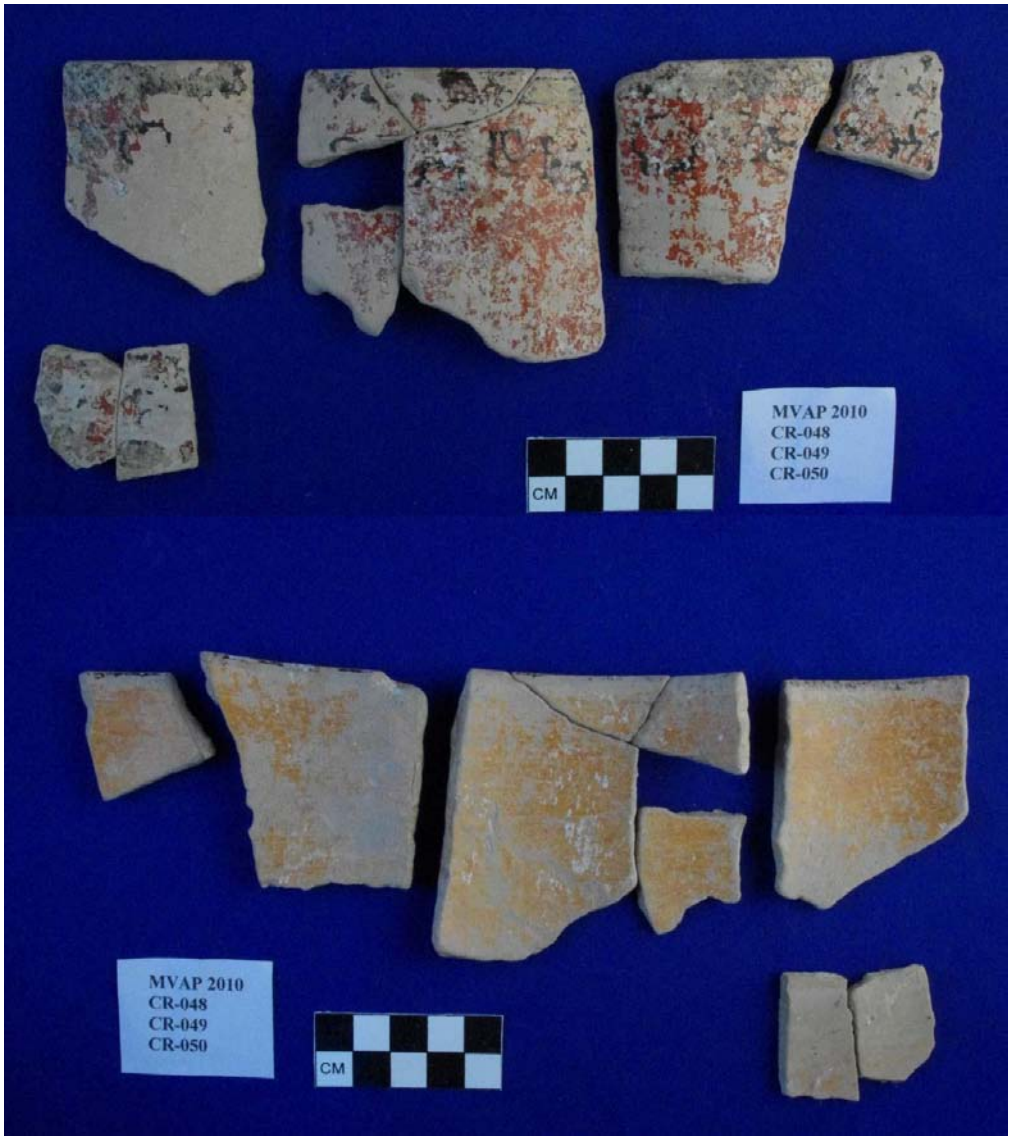


Figure 4. 68: Montego Polychrome-like vase with pseudo-glyph band (CR-048, 049, 050, exterior and interior views).

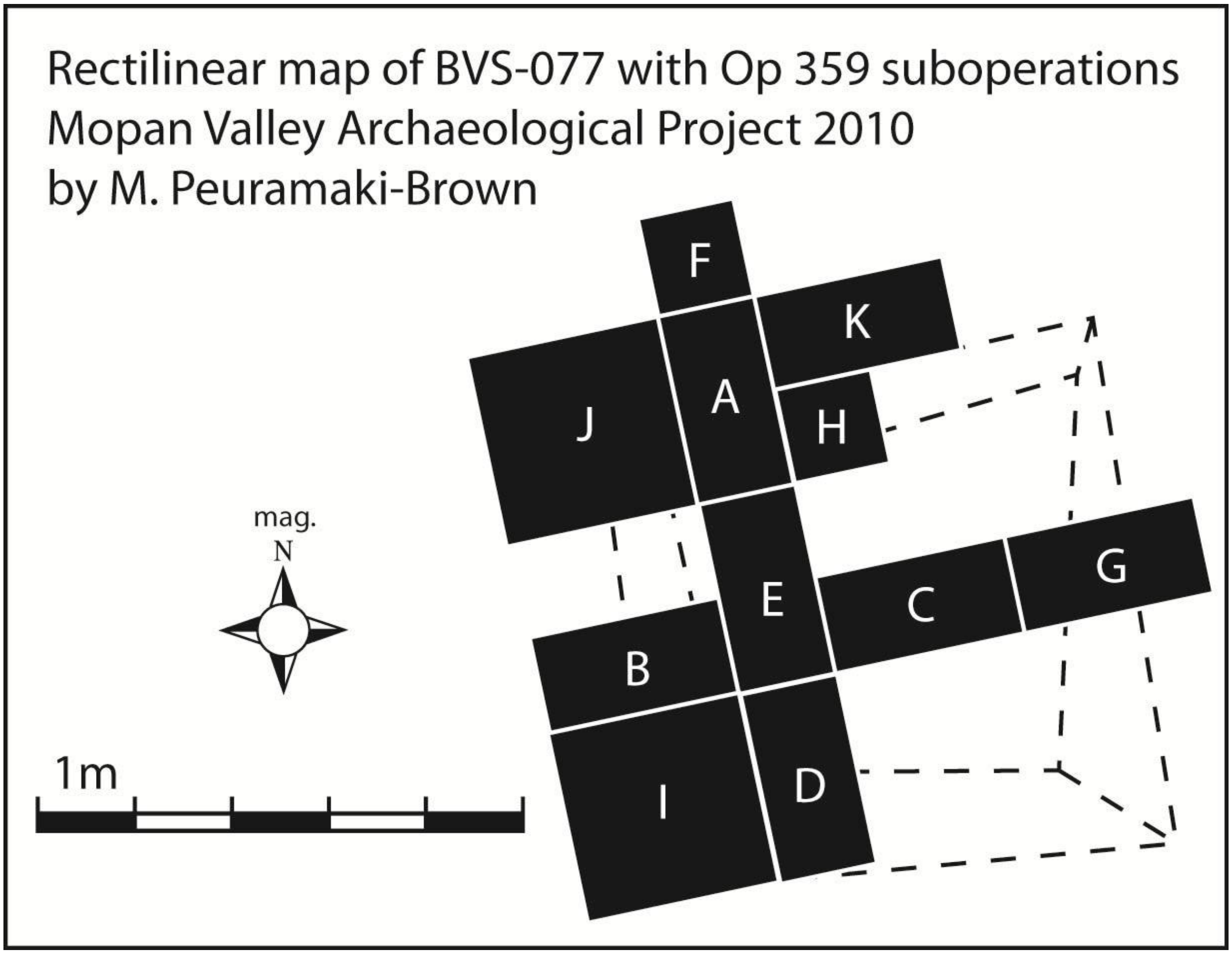


Figure 4. 69: Rectilinear map of BVS-077 with Op 359 suboperation locations.

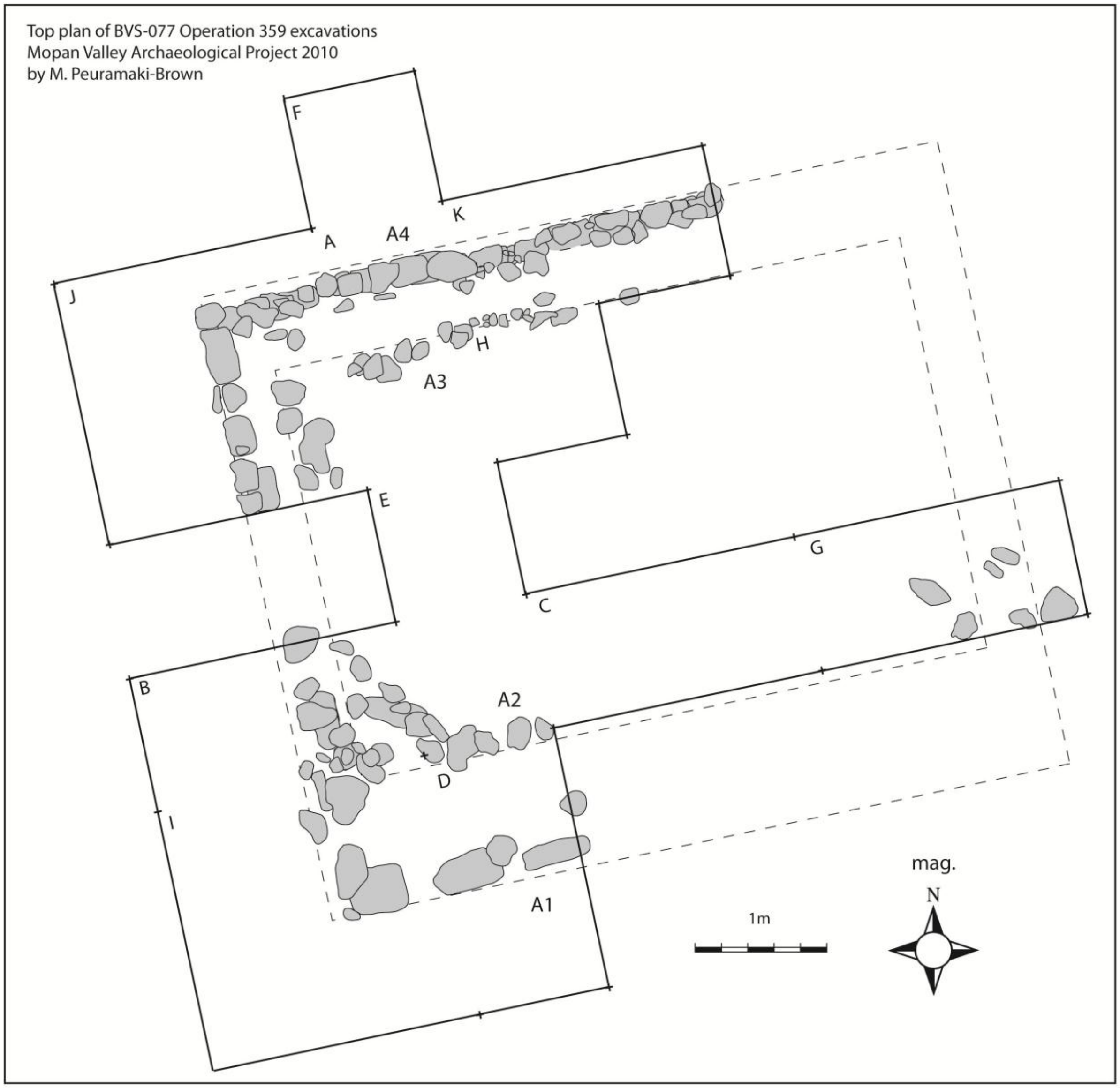


Figure 4. 70: Top plan of BVS-077 Operation 359 excavations, terminal architecture (legend on Figure 4.71).

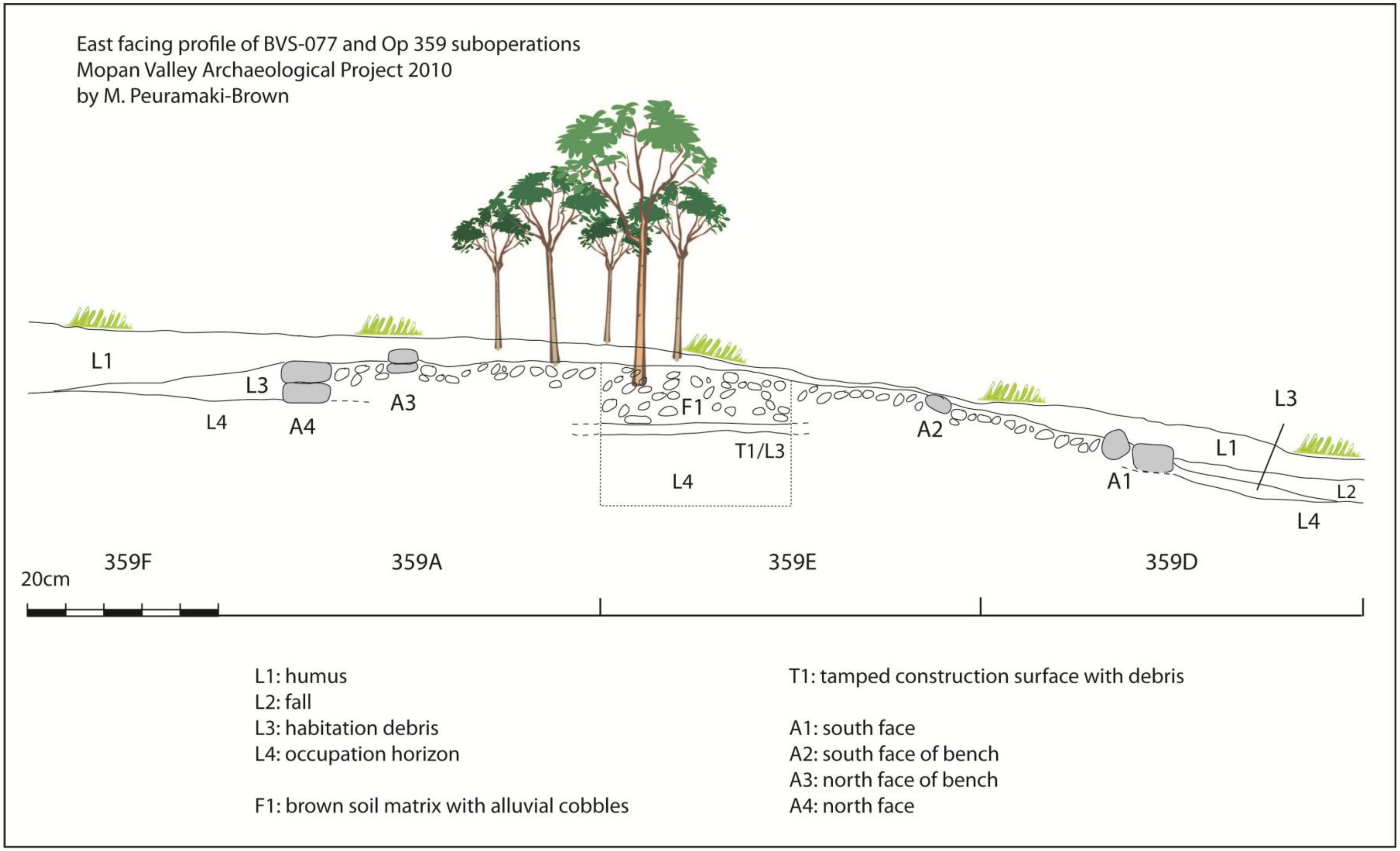


Figure 4. 71: East facing profile of BVS-077 and Op 359 suboperations.

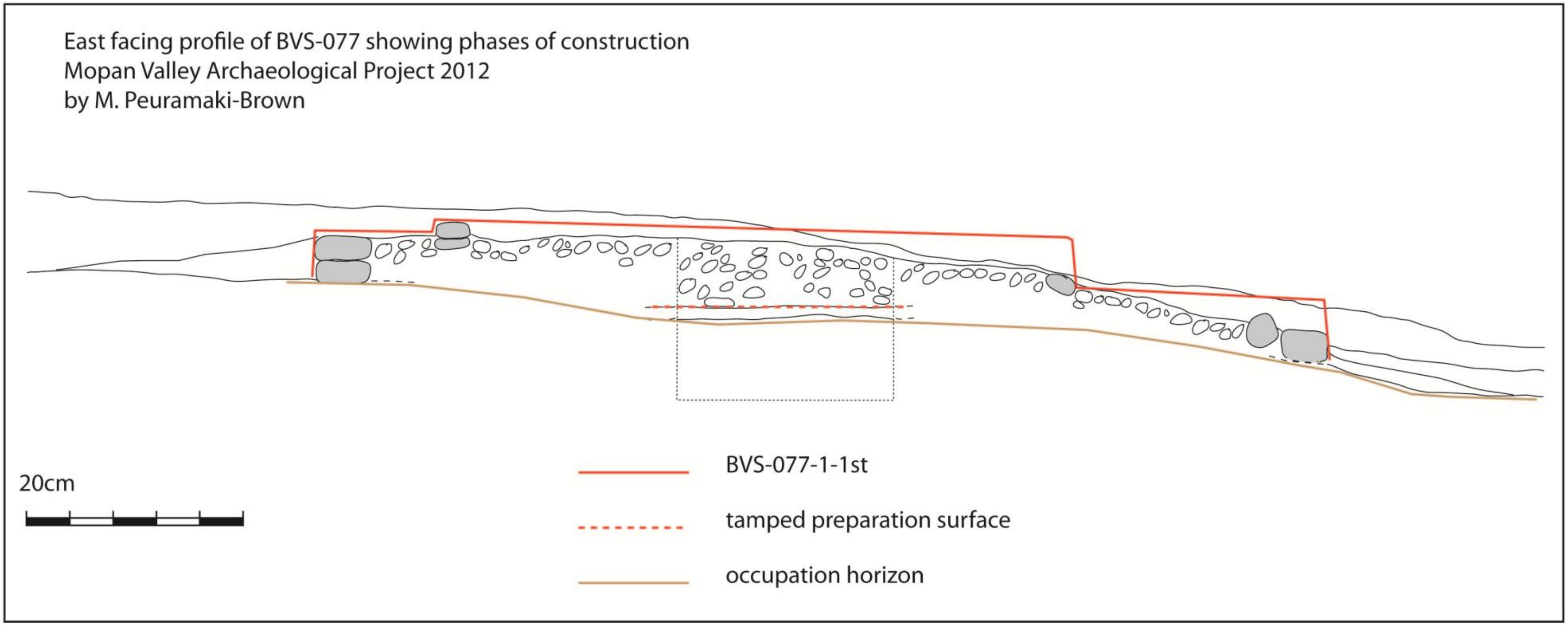


Figure 4. 72: East facing profile of BVS-077 showing structures and phases of construction

Chapter Five: The Life Histories of the BVS Cluster 1 Community

Based on the results of Phases 1, 2, and 3 survey, testing, and excavations (presented in Chapter 4 and Appendix I), I am able to outline a series of object biographies for the individual settlement sites of BVS Cluster 1, assumed to represent the activities of individual households within the neighbourhood, as well as provide a more generalized life history for the cluster community as a whole. These life histories/biographies will serve to shape the upcoming discussions on urban integration and disintegration as addressed through the lenses of the built environment and knowledge bases, featured in Chapters 6 and 7, as well as contributing to the overall Buenavista urbanization life history presented in Chapter 8.

In this chapter I outline the object biographies of individual settlement sites investigated during the Phase 3 extensive excavations through a series of "Life Stages" delineated in terms of the "birth" to "abandonment" of these landscape locations. These are then folded into a larger life history for the neighbourhood as a whole, addressed in terms of the possible arrival and departure of individual households within the zone over time.

5.1 The Biographies of Individual Settlement Sites.

5.1.1 BVS-004

Life Stage 1. This site is initially occupied on the upper alluvial terrace, neighbouring BVS-034, during the Middle Preclassic Period (1000-3000 B.C.E.).

Life Stage 2. The first surviving masonry architecture appears during the Early Classic (300-600 C.E.) with BVS-004-1-1st-D, and includes a main substructure platform with a tamped earth surface and an attached north terrace area represented by a small cobble ballast surface. This early platform phase consists of the same predominantly yellowish-brown clay fill as seen in the early phases of architecture at BVS-007. Roughly hewn limestone blocks are used in the core face/facings of the building. The north terrace area is used as an activity area, with eleven scrapers recovered from this surface (Chapter 7).

Life Stage 3. During the early facet of the Late Classic (600-670 C.E.), another terrace (or series of small terraces) is attached to the west side of the platform, BVS-004- 1-1st-C. A plaster surface is also located directly west of this terrace, as noted during Phase 2 ground-truthing, and may be another formal “outside” space that is part of the BVS-004 houselot. The nearby activity area, BVS-037 (Appendix I) is active at this time, and may have been utilized by the BVS-004 household for the purpose of lithic heat-treating or other activities requiring a firing feature.

Life Stage 4. During the early to late face transition of the Late Classic (600-670/670-780 C.E.), the main platform was refurbished (built up) as BVS-004-1-1st-B. This renovation involved a new type of fill, more similar to the latest phases of BVS-007-1 consisting of many alluvial cobbles within a dark brown soil matrix. An upper platform, or bench feature, is also added at this time.

Life Stage 5. Finally, during the Terminal Classic (780-890 C.E.), both an east and south terrace are added to the structure, BVS-004-1-1st-A. These features represent a busy activity area, including the possible location of metate manufacture (Chapter 7).

Life Stage 6. Sometime during the Terminal Classic this site area is abandoned. The departure of the associated household occurs beyond the point of civic decline, identifying them as some of the “surviving” members of the BVS Cluster 1 community.

Life Stage 7. Taphonomic processes are initiated, including the growth of a large palm at the summit of the mound and the development of a large anthill on the south side of the mound. Both processes caused much damage to terminal architectural alignments.

Life Stage 8. In 2007 the area is subject to wild fire. In 2008, testing and excavation is initiated by MVAP.

5.1.2 BVS-006

Life Stage 1. The first occupants of this site arrive during the Middle Preclassic period (1000-300 B.C.E), settling on the upper alluvial terrace of the BVS Cluster 1 area along the edge of the north slope leading down to the North Arroyo. For this early stage, no masonry architecture is detected, however perishable buildings are inferred from daub within use-debris deposits from this early life stage, and a filled in post hole (Feature 4) recovered during patio excavations may be from early architectural features that were dismantled prior to masonry construction.

Life Stage 2. By the Early Classic to early facet of the Late Classic transition (300-600 C.E./600-670 C.E.), construction of BVS-006-1 begins with a small substructure platform, BVS-

006-1-3rd at the top of the northern slope. The structure is represented by a tamped earth surface in profile window excavations, consisting of the same yellowish brown clay fill typical of the Early Classic period architecture in the settlement zone. Debris deposits off the north slope, below the later BVS-006-2, continues to accumulate at this time and may be associated with early ceramic manufacture at this location (Chapter 7).

Life Stage 3. During the late facet of the Late Classic (670-780 C.E.), much construction activity occurs at the site. A new structure is erected atop BVS-006-1 (BVS-006-1-2nd), consisting of alluvial cobbles and a darker clay matrix. Two new architectural locales are initiated on the north and west sides of the site. BVS-006-2-1st-B, on the south side of the site, consists of a tamped earth surface with yellowish brown clay fill, and BVS-006- 3-1st on the west side, consists of a predominantly alluvial cobble fill with a cobble ballast surface and roughly shaped limestone facings/core face and a set of steps leading down slope on the west side of the site.

A formal, delineated, cobble surfaced patio area connects the three active buildings. Associated with the patio area are activities represented by a firing feature (Feature 1) and a daub feature (Feature 2). These two features and associated debris piles are thought to represent remains from ceramic manufacture (firing furniture and debris) at the site (Chapter 7). Feature 3, the pile of carbonized wood located next to the daub pile, may also be linked to patio activity, however radiocarbon dates place it within historic times (Chapter 7; Appendix VIII). This late date is confusing as the remains were located below the modern ground surface and directly atop the continuous patio surface. This material will be retested in the future. At this time, the nearby midden at Site 160 (Operation 357) is in use, and may also be linked to ceramic manufacture at BVS-006.

Life Stage 4. During the Terminal Classic (780-890 C.E.), new structures were erected at both BVS-006-1 and BVS-006-2. BVS-006-1-1st includes a main substructure platform, an upper platform (bench), and a northern terrace atop the late facet Late Classic patio surface. The platform and bench are typical of late phase architecture in the BVS Cluster 1: fill consisting of many alluvial cobbles suspended in a dark brown soil matrix with a small cobble ballast surface and facings/core faces consist of roughly hewn limestone blocks. BVS-006-2-1st-A contains similar fill and facings, and is built up significantly on its north side to create a level surface slightly above the patio. Large debris deposits were recovered from the north and east sides of the building and may be tied in to ceramic manufacture activity (Chapter 7).

Life Stage 5. Sometime during the Terminal Classic period, the site area is abandoned. The departure of the associated household occurs beyond the point of civic decline, identifying them as some of the "surviving" members of the BVS Cluster 1 community.

Life Stage 6. Taphonomic processes are initiated, including the growth of small trees throughout the site (although they do not appear to have caused significant damage).

Life Stage 7. In 2007, testing and excavation is initiated by MVAP

5.1.3 BVS-007

Life Stage 1. Toward the end of the Protoclassic (100-300 C.E.) and start of the Early Classic (300-600 C.E.), initial use of the site likely occurred as evidenced by ceramic materials on the buried occupation horizon located beneath BVS-007-2. The central location of the site within the Cluster 1 area, and the physical division it creates between the "Founding" ("Early Established") settlement sites and the majority of "Late Established" settlement sites, may suggest its focus on and use by residents of the cluster area (Chapter 6).

Life Stage 2. During the Early Classic (300-600 C.E.), when all but two settlement sites are occupied, the first detectable construction phases of the two buildings that make up the mounded portions of the site are erected: BVS-007-1-4th and BVS-007-2-2nd-D. Both are built into the sloping terrain (north and south) that creates the narrowing of land at this area of the survey zone. These early buildings are represented by simple single level substructure platforms with tamped earthen floors, and consisting of fills primarily of silty clay loam material (yellowish brown) with tiny carbon pieces and some artifact inclusions. The fill materials are contained by core faces/facings of roughly hewn limestone slabs. A deposit of material is associated with the surface of BVS-007-2-2nd-D. A tamped surface is located between the two buildings, serving as a precursor to the formal paved patio/plaza area.

Life Stage 3. Toward the end of the Early Classic and start of the early facet of the Late Classic, a second structure is built overtop BVS-007-1-4th. This is BVS-007-1-3rd, phases B and C. This structure continued to build upon the north core face established in the previous structure, inset and built up with an inward sloping tendency, using similar roughly hewn limestone slabs in its construction. This style of core face is a more formal architectural style and technique, the stepped inset and sloping nature to core faces, and is typical of larger elite and polity-sponsored architecture in the epicentre. In BVS-007-1-3rd-C, the back (north) face was built up to the level of an inset row placed atop the earlier platform along the south face of the building: creating the main platform consisting of a tamped marl surface (T1 on profile). The inset row of limestone slabs along the south face serves as the base of the southern core face of later phases, of the same construction style and technique as the north core face. Fill of this building consisted of brownish yellow and yellowish brown sandy clay loam with some alluvial cobbles (F3 fill on profile). A paved (plaster) surface (P1 on profile) was added above the previous tamped surface off the south side of the building, continuing maintenance of this off-structure area that is a precursor to the more formal patio.

BVS-007-1-3rd-B saw the addition of a formal facing and interface fill to the north side of the substructure,[12] with large, nicely hewn limestone blocks used in its construction. An upper platform or bench consisting of a tamped earth surface (T2 on profile) was also added during this phase, requiring further buildup of the north core face. This created a dual level platform, or main platform and south adjacent terrace, configuration to the structure. An attached terrace feature on the south face of the structure is a pattern that continues throughout the building history.

The use of trace stones, a formal architectural technique adopted when constructing on sloping surfaces (Loten and Pendergast 1984:15), is initiated during facing construction at this time and is also adopted in later phases of BVS-007-2 and the formal patio/plaza boundaries. The adoption of this technique in the BVS-007 site construction may also reflect the use of more formal, esoteric, polity knowledge as contrasted with more "vernacular" practices at remaining settlement sites (further addressed in Chapter 6).

Life Stage 4. Throughout the early facet of the Late Classic (600-670 C.E.), both buildings and the space between buildings undergo a series of renovations: BVS-007-1-3rd-A, 2nd-B, and 2nd-A, BVS-007-2-2nd-C, 2nd-B, 2nd-A, 1st-B, and 1st-A. The patio/plaza area (BVS-007-patio-1st) is also formally bounded and paved at this time, associated with BVS-007-1-2nd-B and continuing up until the point of abandonment, and associated with debris deposits off the south edge of the formal paved area. The prolific nature and high quality of construction at this

[12] As vertical excavations did not continue to the eastern and western edges of the substructure, it is unknown if this feature continues on the east and west sides.

time coincides with the greatest period of occupation within BVS Cluster 1 and increased activity in the epicentre. This is the time of urban life "boom" at Buenavista.

All associated fills consist predominantly of clay loams, varying in their percentage of alluvial cobble and artifact inclusions. The uneven distributions of such inclusions within the fills suggest distinct task units in the construction process: perhaps representing contributions by individual community members (Chapter 6). Fill of BVS-007- 2-2nd-C is also capped by a limestone cobble surface from which debris deposits were recovered.

Of particular importance in terms of deposits associated with architectural phases of this Life Stage, is that of lot group BVS-007-1-25 (Chapter 4). This assemblage is associated with the paved platform and southern terrace surface of BVS-007-1-3rd-A and possibly represents a portion of a termination ritual deposit for this structure (prior to BVS-007-1-2nd construction), consisting of hundreds of pieces of broken pottery, lithic fragments, obsidian, marine shell, etc. The plastered floors from which this material was recovered were covered with areas of localized burning, possibly from continual censer use suggestive of a ritual function to the building (see Chapter 5), while only some of the material that made up the assemblage appeared burned, suggesting the deposit to be separate from previous events. A microartifact sample from the deposit revealed the only other human remains found in BVS Cluster 1 to-date (the first set being from Burial 350-B1 at BVS-034; Chapter 4). These remains consisted of the 1st phalanges of a child and were located in a restricted area of the deposit, and not associated with specific ceramic vessels as is typical of "finger bowl" deposits in the Belize River Valley. This may suggest they were included in the deposit, perhaps within a bundle as an offering. Of the area studied, no particular pattern of deposition was noted; typical of many termination deposits in the Maya area (Stanton et al. 2008), and few pieces of ceramic vessels could be refit.

Life Stage 5. At some point before the start of the late facet of the Late Classic (670-780 C.E.), BVS-007-2 is no longer in use, coinciding what may be an increased degree of centralization in urban organization (Chapter 6 and 8). Soon after its abandonment, the structure was subject to Precolumbian disturbance involving the removal of blocks from the terminal facings (large six-sided limestone blocks) and core faces (thin, shaped, limestone slabs). Disturbance may have also continued into the predominantly soil fill, suggested by disturbance of the clay fill, odd pilings of small limestone blocks on the surface of the final phase of the structure, a disturbed plaster surface (BVS-007-2-2nd-B), and a late-dated codex-style sherd within the fill (Chapter 4 and 6). Similar stones as those removed from the building were found in the construction of nearby BVS-077-1.

Life Stage 6. Although use of BVS-007-2 was abandoned, activity continued at BVS-007-1. During the late facet of the Late Classic (670-789 C.E.), BVS-007-1-1st-B is erected resulting in a dual level main platform (or platform with mounted bench) and attached southern terrace. The fill of this new structure consists of predominantly alluvial cobbles suspended in brown clay loam. The north core face and facing initiated in earlier phases are continued within this structure, as is the core face on the south side of the building. Construction of this phase (and subsequent) is of significantly lesser quality than previous structure phases. This might reflect the withdrawal of polity-urban sponsorship at this time (Chapter 6), leaving the responsibility and cost of refurbishment to community members alone.

Life Stage 7. A final architectural phase, BVS-007-1-1st-A, is added to BVS-007-1 during the late facet of the Late Classic (670-780 C.E.) or early part of the Terminal Classic (780-890 C.E.), beyond the point of civic decline. The construction character and quality is similar to that of the preceding phase, and the addition is limited to the south terrace area of the structure, including a rough outset staircase.

Life Stage 8. Sometime toward the end of the Terminal Classic, BVS-007-1 is no longer in use. This coincides with full abandonment of all remaining BVS Cluster 1 settlement sites.

Life Stage 9. Taphonomic processes are initiated, including the burning of the superstructure and "melting" of an exterior *sascab* wash on the north face. This is followed by the collapse of the upper half of the north facing and core face. This process is evidenced by burned material recovered atop habitation debris, below the sascab melt and building fall. The burned material is AMS dated to 780-890 C.E. (1 Sigma calibrated, Appendix VIII). A series of large trees emerge along the summits of both structures, and a large possible rodent den is dug atop BVS-007-1.

Life Stage 10. During historic times two fences are placed running east-west atop both mounds. Road construction of the Main Property Road results in some disturbance of the patio/plaza area and the mounding of "bulldozer push" in various areas of the site, including along the south border of the patio/plaza area, and at the southwest corner of BVS-007-1. In 2008, testing and excavation is initiated by MVAP, and in 2009 maintenance and widening of the road results in further disturbance of the patio/plaza area.

5.1.4 BVS-060

Life Stage 1. This site is first occupied during the Protoclassic (100-300 C.E.), or more likely the Early Classic (300- 600 C.E.), as evidenced by early debris deposits and early architectural phases. During the Early Classic, BVS-060-1-3rd and BVS-060-2-1st are erected, the former on the north side of the site and the latter on the east. These substructure platforms consist of predominantly yellowish brown clay fill with small, roughly shaped limestone blocks used for construction of core faces/facings, and BVS-006-1-3rd is capped with a plaster surface. Also associated with this life stage is a pit (Feature 1) within the occupation horizon beneath the later patio surface, containing a variety of burned substances recovered from flotation (Appendix VIII, Sample 358F/9-F1).

Life Stage 2. During the early facet of the Late Classic (600-670 C.E.), two phases of a new structure are erected at location BVS-060-1: BVS-060-1-2nd-B and 2nd-A. These consist of predominantly yellowish-brown clay fill and larger roughly shaped limestone blocks and some unshaped boulders. A new building is constructed on the south side of the site, BVS-060-3-1st-B and includes a main platform and attached south terrace. The platform and terrace consist of a clay fill with small cobble ballast surfaces. A depressed area (Feature 2) on the south terrace, surrounded by broken ceramic material, may be a special activity location within the houselot (Chapter 7). Finally, a formal patio surface is laid down at this time, BVS-060-patio-1st-B, with a small cobble ballast surface.

Life Stage 3. During the final phase of occupation, the late facet of the Late Classic (670-780 C.E.), BVS-060-1-1st is erected, as is BVS-060-3-1st-B and BVS-060-patio-1st-A. All are composed of fills containing large amounts of artifact debris and alluvial cobbles within a dark brown soil matrix (typical of late phases in the BVS Cluster 1 area). The unusually high artifact content within the fill is discussed further in Chapter 7.

Life Stage 4. Sometime during the late facet of the Late Classic, the site and its buildings are abandoned. After this, the site is subject to scavenging, including the removal of terminal facing stones. An intrusive pit, possibly ritual in nature, is also excavated into BVS-060-1 as evidenced by a disturbed internal plaster surface and terminal classic sherds from a Montego Polychrome cylinder vase with a pseudo-glyph band (Small Find # CR-048, CR-049, CR-050;

see Gifford 1976:267) recovered from multiple phases of the building during profile window excavations.

Life Stage 5. At this point, taphonomic processes begin with some smaller trees erupting throughout the site.

Life Stage 6. Road construction during historic times and again in 2009 has caused damage to the north side of BVS-060-1. MVAP testing/excavation was initiated in 2008.

5.1.5 BVS-077

Life Stage 1. The first occupants of this site arrive late in the history of the BVS Cluster 1 community, during the Early Classic (300-600 C.E.) to early facet of the Late Classic (600-670 C.E.) transition, and situated themselves at the west end of the cluster on the southern slope. No masonry architecture is present at this time, although architecture is suggested by daub pieces in the earliest habitation debris levels.

Life Stage 2. Occupation of wholly perishable structures continues until the early to late facet of the Late Classic transition when a masonry substructure platform is constructed at the site, BVS-077-1-1st. This single phase construction consisted of an alluvial cobble and brown clay loam fill, contained by a core face composed of blocks pillaged from nearby previously abandoned structures, particularly BVS-007-2. This results in a masonry platform facing composed of diverse building materials, including alluvial cobbles, compact limestone boulders, roughly hewn limestone slabs, and nicely hewn limestone blocks.

Life Stage 3. The site is abandoned sometime during the late facet of the Late Classic, around the time of urban decline, and likely subject to scavenging activities by surviving households.

Life Stage 4. At this point, taphonomic processes begin including the collapse of the built up south face of the structure, and the emergence of a large tree on the east side of the mound.

Life Stage 5. A fence, the same one running across BVS-007-2, is constructed along the north end of the settlement site. MVAP testing/excavation is initiated in 2008.

5.2 The Biography of the BVS Cluster 1 Neighbourhood

Life Stage 1. The Founding Households of the BVS Cluster 1 area arrived at some point during the Middle Preclassic Period (1000-300 B.C.E.). The settlement sites first occupied are BVS-004, BVS-005, BVS-006, BVS-034, and BVS-035, each located on the upper alluvial terrace area of the cluster, the flattest terrain. This initial occupation and establishment of the earliest households occurs at the same time as initial occupation in the epicentre, prior to any monumental construction. Early occupation is evidenced at each of the settlement sites by datable ceramic material remains far down in habitation/use debris deposits, as well as below later architectural sequences, along with daub that is believed to be all that remains of the earliest architecture at most sites. BVS-034 has the only identified/surviving masonry architecture from this early period [and subsequent Late Preclassic (300 B.C.E. – 100 C.E.)], consisting of a small masonry substructure platform with a perishable superstructure evidenced by daub found within the associated material assemblage (Chapter 4).

The location of this Preclassic structure is significant. Its presence on the upper alluvial terrace of the survey zone, surrounded by all of the earliest settlement sites occupied in the area (as well as the longest occupied), ties it to ideas of the principle of "Primary Occupancy" (McAnany 1995, 1998). Perhaps this structure served a ritual/shrine function, reminding peninsula occupants that this area was colonized early on in Buenavista's history and ties the descendants of the Founding Households to the land. It is possible this was an important building as it had a masonry substructure, which many of the domestic buildings from the same period likely did not possess. The presence of the only burial within the BVS Cluster 1 area within this building is also significant. Some Maya today regard children as "substitutes" or "replacements" for deceased relatives whose souls the ancestral gods have reincarnated in the newborn (Vogt 1969:272-273). "As keepers of the land and givers of life…ancestors fuse local affinities and generational continuity to the very landscape itself" (Watanabe 1990:139).

If this structure was important to the founding of the area, it is unclear as to why later phases were not built over top the structure and use debris dates only as late as the Protoclassic (although this may be due to the limited area tested). However, other than removal of some facing materials, the mound was left undisturbed throughout the entire history of the BVS Cluster 1 community, despite being continually surrounded by activity. It is also worth noting that around the time of its abandonment, BVS-007 was first used, perhaps replacing and expanding a ritual role within the community. BVS-007 has the only other human remains recovered in BVS Cluster 1: a child's finger bones from a possible building termination deposit (Chapter 4 and 6).

Also further characterizing this life stage of the community are results of isotopic analysis of a tooth from the child, performed by Carolyn Freiwald (2011a, 2011b; see Appendix VI for the full report). Strontium isotope values ($^{87}Sr/^{86}Sr$) sampled for the tooth enamel of the child had a value lower than any baseline samples identified along the Belize River. While this may represent in-migration to the region, it more likely reflects isotopic variability that has not yet been identified in the region; however, the main food source(s) for this child clearly differed from sources for the individuals later interred in the site epicentre. At Xunantunich, slightly lower values are in some cases associated with a western burial orientation. Interpreted with contextual and iconographic evidence, this may represent population movement from the Central Petén. The burial orientation of the child's skull is still enigmatic although may further support a non-local origin, so the low value might also indicate movement from the west.

Life Stage 2. By the Late Preclassic (300 B.C.E.-100 C.E.) BVS-003 is occupied on the upper terrace, although right at the edge of the northern slope, while all Founding Households (descendents) continue to occupy the cluster. In the epicentre, monumental construction is initiated including the first ballcourt that may have served a formal entrance and boundary of the urban zone at this time (Chapter 6 and 8).

Life Stage 3. Sometime during the Protoclassic (100-300 C.E.), likely closer to the start of the Early Classic period (300-600 C.E.), "Late Established" households begin to arrive in the area. These include households represented by BVS-060 and BVS-087. It is not certain whether these represent completely new groups of people (households), immigrating into the area from elsewhere, or if they are "off-shoot" households, such as the children of previously established families. These new settlement sites are established further down on the slope toward the lower terraces in the western portion of the cluster, suggesting land "up top" is in full use or being controlled by the Founding Households, or that land on lower terraces may be more productive at this time. This distance from the Founding Households might also suggest they are not "off-shoots", but rather "newcomers" to the area.

Also first employed at this time is the non-domestic site of BVS-007 (Chapter 6), creating a physical divide within the cluster between the area of "old households" and "new households".

This site may also represent the beginning of formal demarcation of urban boundaries beyond the epicentre, as monumental construction continues in the "downtown", and the initial integration of the BVS Cluster 1 "neighbourhood" within the urban organization (Chapter 6). As previously mentioned, sometime during this stage BVS-034 is abandoned in terms of habitation/obvious use.

Life Stage 4. During the Early Classic period (300-600 C.E.) is when occupation of settlement sites jump from 60% to 87%, increasing to 93% in the subsequent early facet of the Late Classic (600-670 C.E.). The newly occupied sites include BVS-036, BVS-077, BVS-086, BVS-091, and BVS-100. Only BVS-036 is established among the "Early Established" settlement sites of the upper terrace, perhaps suggesting it represents an "off-shoot" household. All other settlement sites are established to the west of BVS-007 on the more sloped terrain, and may represent actual immigrant households based on their segregation from the Founding Households (Chapter 7). Settlement sites throughout the Buenavista zone increase in number at this time and monumental construction within the epicentre is significantly expanded and elaborated (Chapter 8).

Life Stage 5. The early facet of the Late Classic (600-670 C.E.) ultimately represents the denouement, or climax, of the BVS Cluster 1 life history. At this time, all settlement sites (except the previously abandoned BVS-034) are occupied including BVS-033 that may be another "off-shoot" household located on the upper terrace. Another boom occurs in the epicentre, with monumental construction continuing, including the first formal surfacing and use of the East Plaza and associated marketplace (Cap 2013). Sometime before the subsequent late facet of the Late Classic (670-780 C.E.), household members occupying BVS-100 abandon the site, marking the beginning of settlement decline. At the same time, BVS-007-2 is no longer used, possibly reflecting shifting strategies in urban integration and marking of boundaries at this time (Chapter 6 and 8).

Life Stage 6. During the late facet of the Late Classic (670-780 C.E.), settlement occupation continues at all sites except BVS-034 and BVS-100. Monumental construction continues in the epicentre, including the initiation of formal causeway construction (Chapter 6). However, at some point prior to the Terminal Classic (780-890 C.E.), many of these monumental projects are abandoned and many settlement sites are also forsaken, particularly the "Late Established" sites of the western half of the cluster. These abandoned sites include BVS-003,

BVS-033, BVS-036, BVS-060, BVS-077, BVS-086, BVS-087, and BVS-091. One Early Established site is also abandoned, BVS-005, although a few sherds of Terminal Classic ceramic material were recovered from the humus layer, perhaps indicating a brief continued occupation. The departure of all Late Established households at the same time as decline in the epicentre is occurring is of particular significance to this research (Chapter 7, 8).

Life Stage 7. Following the initial decline of the urban centre, only four settlement sites continued to be occupied (in use) into the Terminal Classic. These include three of the five Founding Households (Early Established sites) and BVS-007-1. In the epicentre, only habitation use is occurring, as no more monumental constructions are pursued. At some point during the Terminal Classic, all settlement sites in BVS Cluster 1 are abandoned.

Life Stage 8. By the Early Postclassic (post-890 C.E.), there is no activity in the BVS Cluster 1 settlement zone. Some possible habitation use continues in the epicentre, although this evidence is scant. By this point, the "Great Collapse" is well underway in the Belize River Valley. The initiation of taphonomic processes occurs at all settlement sites.

Chapter Six: Urbanization and the Built Environment

As discussed in Chapter 2, the application of New Urban Design Theory principles and assumptions to a study of the process of urbanization allows us to examine this integrative and disintegrative process of settlement through the lens of the built environment: the "places" that make up community over time. Talen (1999) suggests a set of criteria for evaluating the integrative nature and potential of built environments within dispersed urban settings, including: (1) the fostering of association with well-defined spatial communities and boundaries, (2) the provision of accessibility, control, and security to aid in maintaining boundaries, promoting membership, and personal investment, (3) providing architecture and design that engages public interaction and generates traffic, (4) creating a sense of place through close attention to landscape, design, and placement, group conformity, and the environmental and social cognition of residents, (5) providing a counter pressure to private life and serving a symbolic "heart" for a community, and (6) promoting mixed land use. These criteria serve to improve social interaction and join communities within and beyond.

As part of the urban landscape, the built environment is an expression of identity and also shapes the identity of those who live within it (Hall 2006; Lefebvre 1991; Soja 1989). Built environments are "complex processes of construction and decay, celebrations of depreciation that render urban environments complex palimpsests in history" (Hall 2006:196). The urban landscape is therefore recursive. It is shaped by expressions of identity and, in turn, shapes the formation of identity. As such, these cultural landscapes are inseparable from their political and economic contexts. Spaces, buildings, and other objects that are monumentalized thus offer "each member of a society an image of that membership, and image of his or her social visage" (Lefebvre 1991:220).

Through location, architecture, and activity, the built environment can stir emotions and promote solidarity horizontally, while at the same time concentrating authority vertically (dialectics of power). In one sense they can serve as a form of symbolic egalitarianism- homogenizing mechanisms used to integrate (Chase and Chase 2009) - while at the same time differentiating between people. Symbolic egalitarianism (Pfeffer 1994) involves "the use of symbols to minimize differences and increase cooperation and collaboration among different people working towards a common purpose" (Chase and Chase 2009:17). Physical space, and therefore public spaces and buildings, can be integrative forces. People do not necessarily congregate at such spaces for a specific activity performed within (although it may be the base reason), but rather because they provide an area and event where many can be together. This creates an atmosphere, a sense of a larger group identity, and might serve to ease the pressures of daily urban life (Inomata 2006a, 2006b). A retreat from forms of symbolic egalitarianism could therefore present a key feature of decline and collapse, representing an increase in autocracy (centralization) with a decrease in symbolic egalitarianism and recognition of the "local" (Chase and Chase 2009:18).

Social space is political, in that it is the "province of antagonistic class relations" (Meyers and Carlson 2002:225). The history of political struggle has been one based on the attempt to control significant sites of assembly and spaces of discourse. As such, domination and resistance is constantly negotiated in such space (Foucault 1977; Giddens 1984; Scott 1990) making it a crucial focus of analysis in the integration and disintegration of urban entities.

In this chapter, I test the integrative potential of three built environment features at Buenavista against Talen's criteria: (1) the enigmatic site of BVS-007 encountered in Phase 1 reconnaissance and tested/excavated in Phases 2 and 3 (Chapter 4 and Appendix I), (2) the large open East Plaza of the Buenavista "downtown", excavated by Bernadette Cap from 2007-2010 (Cap 2011, 2013), and (3) a formal causeway mapped and tested by the Mopan-Macal Triangle Project (Ball and Taschek 2004) (Figure 6.1). I then chart the life histories of these features over time in Chapter 8, and compare their development and eventual fall into disuse with overall centre rise, denouement, and decline, including the associated community settlement biography outlined in Chapter 5, to understand the potential function of these "places" within the urbanization process of Buenavista.

6.1 Integrative Built Environment #1: BVS-007

As outlined in Chapter 4 two settlement clusters, discrete aggregates of settlement sites, were defined in the Buenavista South (BVS) settlement zone. At the centre of BVS Cluster 1 was the single Type VI settlement site of BVS-007, where Phase 2 and 3 testing and excavation results (location, configuration, style of architectural elements, associated debris deposits, etc.) led me to propose a non-domestic function for the group. This Type VI site, defined as a settlement site consisting of a formal patio (paved) group with one or more mounds, one being at least 2-5m in height (Ashmore et al. 1994:266), is the first potential integrative built environment examined in this study.

6.1.1 Criterion 1: Community association

The central location of BVS-007 in BVS Cluster 1, as discussed in Chapter 4, may provide a clue regarding its role within the neighbourhood. The location of integrative buildings within a centralized setting is crucial toward achieving overall amalgamating functions. However, the physical situation of BVS-007 is a little apart from most "Early Established" or "Primary Occupancy" groups, with only a couple "Late Established" household compounds in proximity. In fact, the overall location of BVS-007 creates somewhat of a dividing line between Early Established settlement sites (located to the east atop the upper alluvial terrace), and the majority of Late Established settlement sites located to the southwest.

This positioning slightly away from the majority of compounds is reminiscent of many settlement cluster ritual buildings, discussed below, in the ethnographic record. On the other hand, the general proximity of the BVS-007 structures to surrounding cluster settlement sites may also represent and reinforce the alliance between urban administration and the associated sought after "labour force" represented by the BVS Cluster 1 households. The location of the two associated structures within the cluster of households meant there was no need to leave the area to experience possible urban-oriented ritual and administration, if this site was indeed an administration-sponsored area, effectively tying households to the land eventually encompassed by the urban zone. In many ways, this can effectively sever ties to any outside communities, or perhaps to nearby competing urban administrations in search of subordinate populations (Meyers and Carlson 2002: 237).

The site also covers the largest area of any in the cluster, consisting of two elongated masonry substructures (platforms) with perishable superstructures (based on recovered daub material and a burned wooden pole off the north side of BVS-007-1), and low outset terraces facing a formal paved area. The site consists of an extremely odd configuration: two long-low mounds in a parallel configuration, similar to a ballcourt arrangement. This is not typical of residential compounds that tend to be arranged in "L-shaped" or "C-shaped" configurations when multiple buildings are present. Structure BVS-007-1 (the north range structure) also sits higher than BVS-007-2 (the south range structure), unlike ballcourt configurations of two parallel, closely arranged, range structures of similar height.

6.1.2 Criterion 2: Accessibility, control, and security

Not only is BVS-007 centrally located within BVS Cluster 1, it is also positioned at the narrowest point of the overall survey zone, with sloping drop offs to the north and south, and few sites (only BVS-091) down slope in either direction. BVS-007-1 is built into the north-facing slope, while BVS-007-2 is built into the south-facing slope. This placement effectively creates a "control" point, both encouraging and constraining movement through the area. Anyone moving from the high traffic river to the urban "downtown" would have to pass through this group, if seeking the path of least cost/resistance (following the most flat-footed of paths, as does the current Main Property Road). This might suggest BVS-007 served as a formal entry point or boundary marker for Buenavista. Its location at a physically controllable section of the southern settlement zone is important due to the Mopan River immediately west: an important trade and transportation corridor connecting this region with the Central Petén and Caribbean. BVS Cluster 1 is also located immediately south and west of a formal *sacbe* and is easily visible from the large palace compound of the epicentre, immediately north of the settlement site. As mentioned in Chapter 4, "El Castillo" at Xunantunich can also be viewed from this position. At the time when Xunantunich was flourishing, BVS-007-2 was already abandoned, allowing a possible clear line of sight (provided the perishable superstructure was dismantled) from BVS-007-1 to El Castillo (Chapter 8).

6.1.3 Criterion 3: Engaging architecture and design

The large and imposing nature of the architecture in terms of area and height (relative to surrounding settlement construction), and the degree of symmetry represented in construction, may reflect a degree of control of social space (Meyers and Carlson 2002: 233,236). The buildings are both physically and symbolically elevated: literally "looking down" on those in the surrounding the area.

Methods and styles of construction at the site reflect potential community and civic identities, as well as more "esoteric knowledge" ties it to the greater administration. The predominance of yellowish brown silt clay fills in many of the phases of both buildings is reminiscent of the majority of monumental construction in the epicentre (Rieth 2003). Although this type of construction may be a chronological indicator, associated with Early Classic (300-600 C.E.) and some early facet Late Classic (600-670 C.E.) fills, it is a relatively rare occurrence in the settlement zone where fills are predominantly alluvial cobble based. The consistent use of large, nicely hewn limestone blocks in most phases of both structures and the facings of the built up patio area is also rare in this part of Buenavista, once again found predominantly in epicentral monumental construction. These compose the formal facings of the buildings, while roughly hewn slabs, although much larger and nicer than those used at any other building in the settlement or even at the Xunantunich hinterland cluster of San Lorenzo (Jason Yaeger, personal communication, 2009), are used in core face constructions. The recovery of stucco (on daub, on masonry, and in the *sascab* melt layer), including pieces painted red, is reminiscent of façades uncovered in the monumental epicentre at the heart of the Buenavista urban zone (Rieth 2003: 17). Finally, the use of trace stones in construction, discussed in Chapter 4, may reflect the use of more formal, esoteric, construction and measuring (architectural) knowledge not evident at other settlement sites in the cluster.

The recognition of potential task units, reflected in fill materials of similar soil matrix but different inclusions within the same construction phases (e.g. the different F2 fills in BVS-007-1), suggests the involvement of multiple people and a potentially larger group involvement in the construction of the BVS-007 buildings (Abrams 1999). In addition, both buildings have low, attached, outset terraces, maintained throughout the various phases of construction. These terraces face the large formal patio/plaza area and may have effectively served as stages for activities conducted at the site, with groups of individuals permitted to observe from the open space between buildings (Inomata 2006a, 2006b; Schele and Miller 1986).

6.1.4 Criteria 4 & 5: Sense of place and Counter pressure

Ceramic materials from BVS-007-1 and BVS-007-2 construction fills, in addition to use-related debris, have provided us with chronological information regarding the construction history of the site. In the case of both building sites, use and construction began in the Early Classic (300-600 C.E.) when the civic centre was gaining momentum within the valley, on the heels of Actuncan (LeCount et al. 2011). This is not the earliest use of or earliest construction at a site in the BVS Cluster 1 area, as other settlement sites are occupied as early as the Middle Preclassic (1000-300 B.C.E.) and are involved in masonry construction as well (BVS-034-1).

Significant remodeling of both BVS-007 buildings, and the addition of a formal paved space, occur during the early facet of the Late Classic (600-670 C.E.), with a particularly complex series of renovations at BVS-007-1, suggestive of the importance of place associated with these buildings (Gillespie 2000b). Among the ancient Maya, the vertical accretion of building construction over time and the burial of ancestors within such structures can be crucial components in the "creation of place" (McAnany 1999). This is linked to the important principle of "replication" (Vogt 1965:342) acknowledged in Maya communities today. In the case of BVS-007, no burials were found along the centre lines of the buildings (typical placement location in the Belize Valley), and fill was removed to the level, and below, of the sloping occupation surface (silt clay horizon) beneath each building.

The only human remains recovered were a burned set of distal phalanges, likely those of a child, from a possible termination ritual context (Chapter 4). These phalanges were found within one of the microartifact flotation samples (354Z/20-F1, Appendix VIII) taken from a specific area of the deposit (NE corner). This suggests their location within a limited area, particularly as no other remains were identified throughout excavation and from additional flotation samples. They were also not associated with "finger bowls", as is the norm in the Belize Valley and neighbouring Vaca Plateau region (Chase and Chase 1998; Piehl and Awe 2010), although they are in association with numerous ceramic sherds, many of high quality, but with few refits. Their proximity to each other might therefore suggest they were part of a now disintegrated bundle offering within the deposit. The bundling of remains served an important ritual function throughout Precolumbian Mesoamerica (Headrick 1999). Such offerings of human phalanges are typically found within cached vessels in residential areas. At Caracol, they are found predominantly in or to the front of eastern shrine constructions within residential groups, usually associated with house platform interments, and may be linked to the veneration of these buried ancestors (Chase and Chase 1998: 319). Finger and hand bloodletting is also commonly depicted in iconographic representations from the Classic period throughout Mesoamerica (Colas et al. 2000; Demarest and Woodfill 2012; Schele and Miller 1986).

Another contrivance adopted by the Maya in the "creation of place" is the erection of stone stelae: large monoliths ranging from two to six meters tall, sometimes as much as one meter square at the base, and commonly covered in relief sculpture and text on various sides, although in Belize such monuments are rarely carved (Andrews 1975:51). The majority of stelae are placed before the stairways of temples or palace structures, though they may appear in other locations as well, marking the entrances to plazas or along causeways. In general, stelae and altars are located in places where one would expect to see a large number of people gathering (Satterthwaite 1958). Such “markers” are also typically stopping nodes along ritual circuits, often associated with the maintenance of boundaries (Morton 2007:106, 2012; Reese-Taylor 2002; Vogt 1969:391).

No such items were encountered associated with the terminal phase of BVS-007; however, leaning against the south face of BVS-007-1-2nd-A, adjacent the east face of the outset terrace was a large roughly shaped limestone boulder (Chapter 4). It was not embedded into a surface, but rather resting atop the buried clay occupation surface. No engraving or painted surface was detected and the stone was surrounded by the later BVS-007-1-1st-A fill. However, the placement of such an odd, large, piece of limestone in this location seems beyond use as fill and may have represented a portion of a marker previously erected at the site, and later possibly cached in the terminal fill (e.g. Naachtun Stela 26, Morton 2007:107).

Toward the end of the early facet of the Late Classic (600-670 C.E.), BVS-007-2 ceases to be used, as reflected in a lack of chronologically later-dated materials and the pillaging of limestone construction materials from its facings and core faces. A poor refurbishing of the south terrace of BVS-007-1 (BVS-007-1-1st-A) occurs during the late facet of the Late Classic or into the early Terminal Classic, with use of the structure continuing beyond the point of initial civic decline. This difference in building use chronology may be related to their possible different functions: BVS-007-1 being more ritually oriented and associated with local, horizontal, community identity, versus BVS-007-2 serving a secondary administrative, or vertical function (although together functioning as a means of civic integration). Because relations of dominance are concurrently relations of resistance, subordinates are likely to create and protect social spaces that foster their “hidden transcripts” or critiques of the current power structure (Meyers and Carlson 2002:226; Scott 1990:4). This might explain the continued use of BVS-007-1 beyond the use-life of BVS-007-2 and beyond the point of urban decline. Although both may be initially tied to civic administration through a number of means, the continued use of the BVS-007-1 building, most associated with horizontal identity, may suggest undertones of resistance from more informal, local community cluster power relations (Chapter 7). This issue will be futher investigated in future publications.

6.1.5 Criterion 6: Mixed land use

If the aforementioned features are considered in conjunction with artifact assemblages recovered from use-oriented deposits at both structures in addition to on and around the patio area (Chapter 4 and 7), I suggest both administrative and ritual functions persisted at the site, along with a number of daily domestic-oriented tasks typical of community-oriented sites.

The on-floor artifact deposit associated with the BVS-007-1-3rd-B plaster surfaces exhibiting localized burning and consists of a *problematic deposit*, a deposit of ritual and non-ritual objects or waste products in what is otherwise considered a ceremonial context (Kunen et al. 2002; Moholy-Nagy 1997; Stanton et al. 2008), in addition to use debris contexts throughout occupation levels and within fill deposits, consist of assemblages suggestive of non-domestic activities. These include: a higher number of serving vessels, censer body fragments and solid clay cones (censer “plugs” or parts of three-pronged censers, Ball and Taschek 2007), burned copal resin (used as incense with censers), musical instruments including a drum fragment (at BVS-007-2), a large, finely flaked, ornamental lenticular biface, quartz crystals (important healing and ritual paraphernalia, Salazar 1985), ceramic disks and slate plaque fragments (perhaps serving as mirror backs, Blainey 2007; Healy and Blainey 2011; Healy et al. 2011), unused pecked celts of basaltic rock (rare and exotic material, nearest known sources are the Pacific Highlands, found in limited contexts in the Belize Valley, Abramiuk and Meurer 2006; Hayden 1987; Sidrys 1983; Turuk 2007:13; Yaeger 2000a:1096), unaltered and carved marine shell, speleothems, personal adornments of exotic materials such as greenstone, carnelian, Pachuca and other rare-source obsidian, and part of an almost exhausted polyhedral core (one of only two cores found in the settlement zone) (Table 6.1).

One of the most interesting finds with regards to community integration is Small Find # CR-035, from the BVS-007-1-3rd-B plaster surface deposit (Chapter 4: Fig. 4.43E). Christophe Helmke examined this sherd in detail (full report in Appendix II), and R. Bishop took a sample for future INAA analysis. The sherd represents the remains of three glyph blocks that are preserved along the rim of a hemispherical Saxche Orange-polychrome bowl assigned to the Tiger Run ceramic complex of the early facet of the Late Classic (600-670 C.E.) (Gifford 1976;

LeCount 1996; LeCount et al. 2002). The size of the glyphs and their placement along the rim suggest that these once formed part of a Primary Standard Sequence. The elements that can be tentatively identified all form part of what might be expected to be found in a nomino-titular section of a text, possibly referencing a local individual's title either in exclusive use at Buenavista or at several sites in the vicinity.

A significant quantity of chipped stone debris was also encountered in debris deposits off the west and north sides of BVS-007-1. The "wrapping around" of the patio surface to the west side of the building, ending approximately halfway, may suggest a special activity area. Although the presence of lithic debris may seem related to "mundane" domestic activities, the creation of lithic debris within community-oriented ritual contexts has been noted in ethnographic situations among the Lacandon (Boremanse 1998:28), and is also found directly above many tomb burial contexts in the Belize Valley.

Numerous groundstone metate fragments were also located within debris deposits and higher fall and humus layers on the terminal south terrace of the structure and adjacent patio area. Metates are common finds associated with ancient Maya ritual, particularly within cave contexts, possibly associated with the preparation and presentation of ritual foods (Bassie-Sweet 1996; Brady and Peterson 2008; Morehart and Butler 2010). For the ancient Maya, grinding stones were not only symbolic of their creation (Tedlock 1985:163-164), but also factored into rituals that symbolized renewal and termination, confirmed by various archaeological finds (Conlon and Powis 2004; Garber et al. 2004; Moholy-Nagy 2003; Sheets 2000, 2004).

As previously mentioned, much ritually significant material was recovered from off-structure debris piles and fill that can be explained by examining other ceremonial or ritual contexts where earlier "used up" ritual materials are pushed to the side when new rituals are conducted and used in the fill of later architectural phases (Kunen et al. 2002:200; Walker 1995:75). This can be observed in re-entry scenarios in tombs, as well as in modern cemetery activity. Most of the debris deposits encountered at BVS-007-1, in addition to the materials recovered from the BVS-007-1-3rd-A plaster surface deposit, might be considered "ceremonial trash" as opposed to sacrificial or kratophanous deposits from intentional destruction or termination of powerful ritual objects and their disposal in specialized contexts (Walker 1995:75). Rarely were complete objects (even refits) found within use debris deposits and *problematic* deposits at BVS-007-1. Many items consisted of broken, unusual, exotic, and ritually oriented items. However, studies of ritual activity are increasingly identifying the potential of ritual circuits involving the deposition of partial artifacts at important nodes along such circuits, particularly in cave contexts (Morton 2012; Reese-Taylor 2002). Such a circuit and deposition of items may present a possible scenario for activity at BVS-007-1, based on ethnographic information (below) and the condition of artifact assemblages presented here. An argument against the materials on the BVS-007-1-3r-A plaster surface being merely "ceremonial trash" might be based on its location at the axial centre line of the building (Pendergast 1998; Vogt 1993).

Additionally, on the terminal patio surface immediately to the front of BVS-007-1, an unusual pile of soft limestone blocks was encountered in association with the large lenticular biface (Chapter 4: Fig. 4.40). The pile was excavated although little was found inside among the stones. However, this pile is reminiscent of rock altars and piles of stones in the ethnographic record found as nearby as San Jose Succotz in recent times (Gillespie 2000b; Gann 1925) and discussions of rock trail shrines or cairns throughout Mesoamerica in modern and ancient times (Jett 1994). Related to such shrines may be the miniature houses mentioned in the highlands (although bigger than the BVS-007 pile). In the 1960s N. Hopkins (post on Aztlan message board, 2011), while doing a dialect survey of Chuj in the northwest corner of Guatemala (northern Huehuetenango), saw quite a few open-sided thatch- roofed structures, the size of a small room, called "God houses" in the middle of Chuj settlements. There were always remains of fires where offerings had been made, but there were no permanent "idols" left there. The remains of fires might then be visible in BVS-007-1 on the plaster surfaces exhibiting localized burning potentially from the placement of censers.

In his discussion of miniature masonry shrines of the Yucatan Peninsula of the Late Postclassic, Lorenzen (2003:26-27) suggested such shrines most likely were once palm thatched and resembled residential houses. Depictions of miniature shrines in the codices show us house-like structures for deities to dwell in. The depicted deities may also have been idols such as ceramic effigy censers. In front of some structures, the early Spaniards saw deer antlers and hunters made sacrifices at such places. Petitions to deities who controlled game and fish may thus have been one reason for using the structures**.** Lorenzen (2003:XIII) also "posit[s] that Late Postclassic miniature shrines were the focus of perpetual subsistence rites intimately tied to ancestral deity veneration…[and] focused on increasing rain, agriculture and game". The appearance of a possible small shrine atop the patio at BVS-007-1 during the Terminal Classic could be related to drought activity suggested for this time (Moyes et al. 2009).

BVS-007-2 excavations, by contrast, revealed a paucity of off-structure refuse materials and typical domestic or ritual assemblages, possibly suggestive of an administrative function (Seibert 2007). Administrative tasks, including meeting areas and council houses, are typically associated with range-like mounds based on ethnohistoric analogies of the colonial period (Carmack 1981; de Montmollin 1995; Roys 1957). BVS-007-2 is a long mound, slightly lower in height than BVS-007-1, with possible interior bench-like features (although due to disturbance this is hard to determine) and a lack of significant occupation/use materials. It was enigmatically abandoned prior to the urban *denouement* at Buenavista, and subject to Precolumbian disturbance. Upon neglect, construction materials were removed from both the south facing and core face, possibly used in later phases of BVS-007-1 and at the nearby site of BVS-077 where large, finely hewn, limestone blocks were found as part of the facings of the small domestic structure. Disturbance may have also continued into the clay fill of the structure, suggested by disturbed fills and the presence of damaged earlier surfaces (see Chapter 4).

Associated with the early plaster surface of BVS-007-2 was a sherd of codex-style ceramic amid definite Early Classic (300-600 C.E.) and early facet Late Classic (600-670 C.E.) ceramic fill material. Small Find # CR-051 (Chapter 4: Fig. 4.48), analyzed by Helmke (Appendix II), is an exceptional find at Buenavista del Cayo. The reason for this is that it is a sherd of a late facet Late Classic Codex-style vase, attributable to the Zacatel ceramic group: cream-ground Codex-style type produced in the Mirador Basin and elsewhere in the Central Karst Altiplano (Reents-Budet et al. 2010). Only a small portion of the vessel's original iconography is preserved, depicting the lower portion of an anthropomorphic figure shown seated cross-legged on a "groundline". Below the groundline is a series of circlets arranged in a triangular configuration over three rows, a depiction nicknamed the "Grapes of Cahuac" and serving as the logogram for "tun" or "stone" (Stone and Zender 2011). If this vessel represents the product of gifting then it may well suggest some kind of connection between Buenavista and the lords of the so-called Snake kingdom, centered on Calakmul in the Calakmul Basin (Central Karst Altiplano), or via Naranjo (Chapter 8). Another similar, although highly weathered sherd, Small Find # CR-054, may originally have belonged to the same vessel, forming the rim of the vase but was found off the north side of BVS-007-1 amidst fall material dated to the late facet of the Late Classic (670-780 C.E.).

This exotic item may be an example of an offering to the abandoned and pillaged building, providing a sherd broken neatly around the symbol for stone in exchange for stone removed from the building. June Nash (1970) in her ethnographic work among the Maya of highland Guatemala notes pits dug into houses and "trash" dumped into these pits serving a ritual purpose. Single abandoned structures within house compounds are also frequently used as loci for trash deposits, although the ritual nature of such deposits is contested (Harrison 1999; Inomata and Stiver 1998; Inomata and Webb 2003; Pendergast 1979).

6.1.6 Comparative archaeology

The existing archaeological record can provide us with examples of similar potential integrative built environments as that of BVS-007. Two examples from the Lower Mopan Valley and the neighbouring Vaca Plateau areas are of considerable comparative use.

At the Classic Period centre of Minanha in the Vaca Plateau, Group R and nearby Mound 70 (Figure 6.2) have been tentatively ascribed a secondary administrative purpose due to its range-like structures and lack of domestic or ritual-oriented debris (Prince 2000; Prince and Jamotte 2001). Its location within the site core along a possible intra-site and intra-valley transportation path, suggests an ideal function as way station or checkpoint locale for administrative purposes, effectively integrating this area of the core with the epicentre.

At the rural settlement site of San Lorenzo, a hamlet of Xunantunich, Site SL-13 (Figure 6.3) is identified as a potential community ritual focus point for the integration of this cluster-community with the urban core (Yaeger 2000a: 259-272). It is comprised of two patios, the south assuming a more domestic function, although Yaeger is currently in doubt of such a nature (personal communication, 2011), and the north more ritual. The sponsored and community distinction accorded by Yaeger is based on unique architecture, unique placement in the settlement zone, structures longer and narrower than most residential buildings, large frontal terraces ideal for ritual stage performance, a formal paved area for gatherings of large groups, and an artifact assemblage remarkably similar to BVS-007. Yaeger concludes this site was built by a group larger than a single cluster membership, and notes a greater amount of labour requirement. Finally, construction of SL-13 coincides with the rise of power of the Xunantunich urban centre, suggesting a strategy to integrate this part of the Mopan and successfully institutionalize tribute, through the sharing of ceremonies at a community focused locale by community members and Xunantunich leaders.

Further afield at the Classic period village of Cerén, El Salvador, a civic structure and two ritual structures were identified by Brown and Sheets (2000). Household 1 is associated with the latter structures, and the larger community plaza is in association with the former. Brown and Sheets lay out a series of criteria to distinguish ritual buildings from residential/domestic remains, including: unique directionality and orientation (further discussed in Chapter 7), unique building plan, elevated subplatform height, unique artifact assemblages, increasing floor elevation, and elaborate construction technique.

The site and structures of BVS-007 satisfy each of Brown and Sheets' criteria, save one. These structures are much larger than the ritual buildings at Cerén. However, the civic structure of the village, positioned on the plaza, is much larger and more comparable to BVS-007-1 and BVS-007-2. Also, I would argue these structures present not only elaborate construction techniques, but also unique as compared to the rest of the settlement zone, and more similar to those patterns observed in epicentral, civic, construction.

Just to the north at the centre of Las Canoas in western Honduras, Stockett (2007) identified a possible ritual building associated with many censers and figurines found on mound, within structure fill and fall, on associated surfaces, and within use debris contexts. Structure 1 at the site bore numerous fragments of complex censers, including crushed vessels, on the ancient ground surface of the associated plaza and along the centre line of the building (Stockett 2007:99). Incensario fragments were found atop the BVS-007-1 terminal structures, as well as within debris and fill deposits.

Incensarios, a diverse class of ceramic objects, appear throughout central Mexico down into lower Central America and broadly reflect ritual traditions shared across Mesoamerica from Preclassic to modern times (Borhegyi 1959; Rice 1999). These containers, usually made of clay and typically found in ritual association, are used to burn various kinds of aromatic resins. During the Classic period, they have been linked with rituals involving the “censing of buildings” (Stuart 1998: 394) and held offerings of food and drink for ancestors and deities. Copal incense, or *pom*, was the principle foodstuff presented to the gods (McGee 1990:44). Incensarios and the burning of incense has been associated with the defining of ritual bounded space and practice. Typically this is found within monumental architectural contexts associated with elite material assemblages and closely tied to rites of kingship (Rice 1999:42). Modeled censers, large, hollow ceramic containers often sculpted with anthropomorphic visages and decorated with appliqué, are associated with public ceremonialism in the Southeastern Mesoamerican zone (Schortman 1993; Stockett 2007:98). Pronged bowl-and-support censers, consisting of a ceramic basal support with three vertical prongs to rest a bowl, have primarily been identified with the burning of incense in the Maya lowlands (Rice 1999) but also functioning as domestic braziers in some contexts (Ball and Taschek 2007). Scored censer lids are also found in potential ritual contexts. These are large, round, flat ceramic plates with attached handles, serving as lids for complex censers.

6.1.7 Ethnographic analogy

There are a number of ethnographic and ethnohistoric sources available to create analogies for the observations made at BVS-007, both in terms of community ritual spaces/places (BVS-007-1 and the patio) and potential administrative/check point locales (BVS-007-2). In terms of understanding civic integration through the built environment, I examine cases from the northern Yucatan, Chiapas, Belize, and Highland Guatemala. Most of these examples will be further referenced in the Chapter 7 discussion of individual households and community knowledge bases.

6.1.7.1 Northern Yucatan

Coe (1965) describes ritual processions from peripheral areas of towns to central zones, based on ethnohistorical accounts by Bishop Diego de Landa (Tozzer 1941:135-150) during the conquest in the 16th century and the *Book of Chilam Balam of Chumayel* (Roys 1933) from the 17th and 18th centuries in northern Yucatan. Similar descriptions come from ethnographic observations by Vogt (1969, 1988, 1994) and Gossen (1974) in the municipalities of Zinacantan and Chamula in Chiapas. Coe addresses such ritual processions through an analysis of Uayeb (New Year) Rites, suggesting such circuits served as mechanisms to strengthen integration and social solidarity within towns or villages comprised of dispersed settlements, as well as forming integral aspects of civic centre design that emphasize the relationship between public performances and the spatial arrangement of urban forms (Reese-Taylor 2002).

Coe (1965:100-107) relates Landa's description of every town in Yucatan having had "two heaps of stone facing each other" at each of the four entrances to the town, placed according to the cardinal directions. This description is reminiscent of the possible role of ballcourts as formal entrances and boundary markers in Precolumbian times (Fox 1993), providing "funnels" in urban movement and serving as liminal spaces on the urban landscape. From the centre of the town, hollow clay images of gods of the Uayeb days (likely anthropomorphically modeled censers) were circuitously processed to the appropriate entrance and placed on one of the stone heaps. On the facing heap sat the Uayeb god of the previous year's ceremony (ritual "trash"). These circuits involved participation by both administrative nobles and commoners alike and were integrated with associated residential ceremonies. Participating parties would gather at the house of the "ceremony official" and process to each entrance on special roads prepared for the occasion (paths and formal causeways): four roads in total creating a quadripartite division of civic space. Such divisions are also noted for Postclassic Puuc polities, Chichen Itza, Mayapan, and Tayasal (Roys 1933, 1957; Thompson 1951). Before the god depictions at each entrance, various ritual acts were carried out under the direction of a priest (similar rituals are depicted in the Madrid Codex pages 34-37 and the Dresden Codex pages 25-28). The images were censed with *pom* and fed ground up maize, and provided with a bird sacrifice. Finally, the idols were placed on a "standard" representing one of the world direction trees. The Uayeb god was then carried back to the house of the official.

Coe (1965:112) examines the Uayeb Rites to propose a model for community organization that is relevant to the problem of how centres with an unusually dispersed settlement pattern might have maintained its social and political cohesion. In dispersed urban settlement, the tendency would have been for distant or isolated communities to break off and become independent or perhaps affiliated to adjacent centers. Therefore there must have been very strong, centripetal forces that allowed cohesion between a centre and its supporting populations. The rotation of ceremonial power among localized communities (cargo) and the circuitous procession to outlying neighbourhoods served such integrative functions within urban zones.

6.1.7.2 Chiapas

Boremanse (1998), while conducting ethnographic research among the Northern Lacandon of Chiapas, including observations from pre-1979, noted that when going to neighbouring clusters or different settlements altogether, the Lacandon adopted highly formal "visiting" behaviour. He also noted that people hardly spoke to people from other household clusters if they met informally in the bush or in town, regardless of kinship. In fact, the spatial distance determined the formality of any meeting or visit. The closer one lived the less formal visiting behaviour and vice versa, regardless of familial ties (Boremanse 1998:18). Boremanse also suggests this ritual activity associated with intra-household/cluster/settlement visiting was likely a product of the dispersed and at times isolated nature of Northern Lacandon settlement.

Within his descriptions, Boremanse (1998:23) discusses Lacandon ritual ceremony as taking place at a settlement cluster's "temple", where food goods are offered to the gods. The household overseeing a particular ritual, "owners of the ceremony", would blow a conch shell not only to inform the gods that they were to be fed but also serving a social function informing neighbours of the upcoming ritual to which they were invited to attend. These neighbours included households from the same or nearby settlement clusters, demonstrating integration potential beyond a lone household or cluster, taking part in the consumption of food and drink. Incense burners, clay bowls with modeled anthropomorphic heads representing deities, were placed in the temple with food on the lower lip of the figure as offering.

Clusters among the Northern Lacandon are the primary unit of residence, consisting of a cluster of households incorporating several nuclear or joining (polygynous) families. Often, though not exclusively, these clusters consist of the families of an older man and his sons and son-in-laws (Boremanse 1998:27). This is similar to Vogt's (1969) description of the *sna* in Zinacantan, that vary in size from those containing one localized patrilineage (only four or five houses and less than fifteen people) to large ones with seven patrilineages and over one hundred and fifty people living in more than forty houses. Each *sna* maintains a series of local shrines that define them as a social community but also as a physically bounded unit on the landscape (Vogt 1969:141).

Reasons for nucleation (Boremanse 1998:31) within a cluster among the Lacandon include the maintaining of knowledge (Chapter 7)-myths, rituals, incantation, and leadership (older father is the ritual leaders and children make use of his paraphernalia, such as censers), the encroachment of others on lands, and the exchange of women through marriage. Ecological and cultural changes also support nucleation. Reasons for fission often include personal conflicts and a spirit of independence noted among the Lacandon. However, in times of great difficulty or great profit, an individual household may be forced or choose to leave the cluster.

Household clusters, defined not only by spatial and at times kinship relations, are also defined by the sharing of the products of hunting and fishing and other foodstuffs among the families of the same clusters. In fact, there is no specific term for cluster. Rather, individuals refer to the place where someone lives as that person's *kahal* or "dwelling space". In terms of spatial organization, every cluster has four paths leading to and from the area, roughly aligned with the cardinal directions. Trails also allow for residents to walk through the cluster area without having to walk across the space of other households. Finally, no public square or centre is associated with these clusters; however, the ritual temples function in a similar integrative manner.

A temple is a thatched hut without walls where "men can meet, share ceremonial food, teach and learn therapeutic incantations, *knap flints to make arrowheads,* chat, laugh, or even discuss or exchange news" (Boremanse 1998:28; emphasis is my own). Women seldom approach the temple, however they do meet up and chat while preparing ceremonial food in the temple's kitchen. Symbolically "the temple is a neutral place, meeting there implied no loss of prestige for either side". This "equalizing ability" (symbolic egalitarianism) is similar to other ritual locales, such as sweat lodges and saunas, throughout the world (Chase and Chase 2009; Houston 1996; Kailo 2005; Trigger 2003:521). Men of the associated cluster also cooperate in any work related to temple maintenance (repairs, trail clearing, etc.).

6.1.7.3 Belize

In the early 1990s Fox and Cook (1996) visited the Yucatec Maya village of Ox Mul along the Macal River of west-central Belize. Ox Mul consists of roughly 800 people clustered around three municipal buildings and a Catholic church. 91% of households are located within major lineages in four neighbourhoods/settlement clusters (Fox and Cook 1996:815). Minimal lineages tend to be arranged in a household patio group or linear formation, consisting of a primary couple and their sons' families. Spatial distribution between house clusters/lineages reflects genealogical distance. Male outsiders will often marry into the village, initiating a new minimal lineage, and lineage segmentation through relocation can occur when younger men feel their aspirations are thwarted by a senior generation. This is also common if land is available elsewhere.

Within their work Fox and Cook note the presence of numerous churches that simultaneously bond and divide the community: essentially representing village factionalism and competing lineages. These churches are found within individual settlement clusters. Individuals who construct such "cluster churches" enlist the support of co-generational kin, similar to the construction of temples among the Lacandon and Quiche.

6.1.7.4 Guatemalan Highlands

Fox and Cook (1996; Cook 2000) and Hill and Monaghan (1987) describe the conquest, colonial, and present-day (1960s) Quiche municipality of Momostenango of the Guatemalan highlands. They portray Maya communities as made up of "intermarrying patrilineages that shared a patron deity and replicated this pattern within successively larger aggregations" (Fox and Cook 1996:811): the aforementioned principle of "replication". Modern *amak* communities can be equated with colonial hamlets: small rural communities extending from a fortified central town (*tinamit*) though unified as a single body (Ximenez 1929). *Amaks* typically consist of two or more minimal or principal lineages and perhaps several later established family households. As such, these *amaks* may be composed of joint *chinamits* or *parcialidades*: local minimal lineages linked by marriage with a communal plot of land, and often named after the dominant lineage (Fox et al. 1996: 798). Alliances within and among *chinamits* fluctuate over time and space, resulting in fission and fusion cycling, key to community dynamism, often involving the division of minimal lineages and relocation at short distances. *Chinamit* external affairs are typically guided by the ascendant lineage that speaks for the co-residential in-law lineages under a "gloss of reciprocity" (Fox and Cook 1996: 812).

Due to fissioning of communities, lineages can extend over several *amaks*, also noted by Boremanse (1998) among the Lacandon. Rural *amaks* were originally settled by "little segments" (lineages, or Founding Households), setting up local competition and power bases that were to be dealt with or controlled by an urban administrative level (the *mētis*-esoteric knowledge divide is discussed further in Chapter 7). The leaders of individual *amaks* (rural and central) would convene at the centre, again invoking the idea of movement from periphery to centre referring to territorial outlining.

Amaks typically maintain shared lands as well as a temple or shrine complex. Among the Quiche such complexes include a temple and "lineage house". The temple, or *warabal ja* "sleeping house", is often situated on a hill top and represents an altar associated with a patron god, containing a wooden or stone image of the god (McAnany 2010:72). They are typically masonry structures covered in lime plaster. Lineage houses, *nim ja*, consist of enclosed structures with benches (similar to the range structures of antiquity). Such structures might be similar to the *popol na* of colonial Yucatan, where community members/counselors would assemble to discuss public affairs and to learn to dance for town festivals (Fash et al. 1992; Roys 1940:40). This complex of temple (ritual) and lineage house (administrative) is part of the community-ritual integration of Momostenango, in addition to serving a location for ceremonies such as marriages and the settling of disputes.

Community segments are tied through kinship to other bodies, also noted by Coe, Landa, and Roys concerning the linking of civic quarters (neighbourhoods) to the ruling administration, and as such owe allegiance to the capital and larger state (Fox and Cook 1996:811). Community segments are also tied together through ritual. Hill and Monaghan (1987) describe shamanic ritual as a critical factor in the integration of various levels of the community. Such integration begins with the "mother/father of the lineage", also known as a lineage priest or *chuch kajaw*, who mediates between ancestors and the living at the *warabal ja*. Ritual then passes through the *tinamit* level with the *chuch kajaw re ri aldea* who performs rituals, and then on to a pair of ritualists, two *whuch kajawyub re ri tinamit* who render offerings on behalf of the municipality at the four sacred mountains or cardinal boundary points.

Finally, Fox and Cook (1996:814-815) describe the centralizing process of Momostenango as represented in the movement of thirteen patron god images previously kept/maintained in separate rural clusters (*societas* - a segmentary urban landscape) and occasionally processed to the central *tinamit*. By the 1920s, all images were brought in from the rural lineage god-houses to a central cathedral, representing a movement toward a more centralized urban (and religious) landscape (*civitas*). Below and in Chapter 8, I argue such a centralizing tendency at Buenavista represented through the life history of the three built environments investigated.

6.1.8 The built environment and ritual

One manner in which identities -the concept of self and other based on practice and experience- is materially expressed and reinforced is through practices involving interaction between individuals (Bourdieu 1977; Inomata 2006a, 2006b). Ritual, repetitive practices under certain circumstances and particular contexts, have the power to generate sentiments of affiliation underlying identities, binding performers with communities, and providing venues of simultaneous expressions of separation and integration (Geertz 1973:90). Authority is therefore inherent within esoteric knowledge-based power, exemplified by the performance of ritual (Potter 2000:295; Inomata 2006a, 2006b).

Turner (1974) and Ringle (1999) stress that ritual emphasizes hierarchy and heredity, elite manipulation of ideology being a key factor in the development of civilization and urban society (Joyce and Winter 1996), while on the other hand highlights values shared by all members of community (symbolic egalitarianism), making it a powerful yet precarious tool promoting horizontal solidarity and vertical division (Chase and Chase 2009). Ritual symbol is therefore a primary factor in community dynamics, referring to groups, relationships, values, norms, and beliefs (Turner 1967:546). It is through ritual, and through the individual's participation in it, that the ordinary citizen makes the crucial emotional bond with the otherwise unthinkably huge and often impersonal state (Lewellen 2003:69). This emphasizes Williams' (1976; see also Harris 2012, Joyce and Winter 1996) assertion that ideology/religion, and therefore community, is both a positive and negative force, both emphasizing and minimizing social differences and capable of masking imbalance.

Identity is often captured and expressed through the physical built environment and associated activities, and "the values, traditions, and identities of a community are not timeless, transcendent entities but anchored in the tangible images and acts that each individual can directly sense" (Inomata 2006a: 805). Lohse and Gonlin (2007) address the role of monumental architecture in the creation of community sentiment and identity, primarily through the bringing together of commoners and elite in the construction of such projects. Ritual events reinforce the full articulation of public places and spaces (Hall 2006:193; Lefebvre 1991: 220). Public spaces and sumptuary signifiers of status come together in major ceremonies, providing a system of spaces encoded with power on a landscape. This system of spaces in turn serves to articulate expected public behaviour, directed by social identities such as status and gender. These projects and contexts are then visible on a daily basis, persisting beyond an individual's lifetime, and provide a reminder to support populations of elite administration (horizontal and vertical integration), thus serving an important link between elite and non-elite, or urban administration and support population, suggesting both system-serving and self-serving potential for such features. Identifying such locales of inherent contradictions is an effective way of digging down beneath the surface of the illusion created by the administration and associated elite ideologies (Hall 2006:207).

Such a locale can be argued for BVS-007. From a review of archaeological evidence (Chapter 4), archaeological comparative material, as well as ethnographic and ethnohistoric analogies, I suggest BVS-007 served a number of functions over its life-history. These include, foremost, a (1) community-focused ritual location associated with BVS Cluster 1 households, (2) a secondary administrative function (a site potentially linked to tribute collection, dispute settlement, etc.) also linked to activities in the BVS Cluster 1 zone, (3) a possible boundary marker for the Buenavista urban zone particularly during the Early Classic and early facet of the Late Classic (300-670 C.E.), and (4) a possible way station or checkpoint linked to transportation activity on the Mopan River and coming into Buenavista proper.

6.2 Integrative Built Environment #2: The East Plaza

The second built environment examined is the East Plaza in the "downtown" of Buenavista. As I did not personally conduct excavations at this locale, I will summarize the work of both Bernadette Cap (2011, 2013), who conducted her dissertation research in the area from 2007 to 2009, and the Mopan-Macal Triangle Project (MMT) that also conducted intensive testing and excavation in the plaza and at surrounding mounds/structures. In this section I will incorporate comparative archaeological data and analogous ethnohistorical and ethnographic material within the subsections corresponding to Talen's criteria, as opposed to separated out at the end of the discussion as done with BVS-007.

6.2.1 Criterion 1: Community association

The most striking feature of any large lowland site is its epicentral precinct, or "downtown", generally distinguished from surrounding settlement by its large aggregate of monumental architecture, including "palace" structures, temples, ballcourts, reservoirs, fortifications, and *sacbeob* (see below), a higher elevation in relation to surrounding settlement, and a tendency to be delimited by structures circumscribing a natural acropolis or central precinct (Awe et al. 1991:27). Located within the downtown are also typically a number of plazas: vast acreages of paved open spaces serving as the bases for surrounding temples and other symbolically charged buildings that marked the epicentre of every Maya city (Adams and Jones 1981: 303; Inomata 2006a: 810; Low 2000). These are larger versions of courtyards and patios, more closely linked to private or semi-private residential functions. It is within such spaces that mass events, activities, performances, and spectacles took place within ancient Maya urban centres, involving large audiences likely consisting of the ruling elite and supporting populations from the surrounding areas.

The East Plaza's accessibility (discussed below) and location amidst the large residential compounds and palace of the epicentre, in addition to serving as the end point of two *sacbeob*, one terminating at the south side of the plaza and another at the north end[13], ties this plaza area both to the main epicentre community as well as adjacent outlying settlement communities (clusters), and potentially beyond.

6.2.2 Criteria 2 & 3: Accessibility, control, security, and Engaging architecture and design

Awe et al. (1991) have established a typology of plaza configuration patterns typical of most epicentres: (1) open to semi-restricted access plazas, and (2) restricted access plazas. Semi-restricted access plazas are those that are bounded, but not enclosed, by structures and other features, allowing access between surrounding structures and through formal large, indiscrete entrances. Likely the flow of traffic into a centre's epicentre was purposely channeled through and into such plazas (Meier 2002; Healy 1992). Restricted access plazas on the other hand are

[13] The northern *sacbe* was located during 2012 investigations at the site and has yet to be added to Buenavista maps.

entirely bounded on all sides by structures and other features. Access to such plazas is typically obtained only by climbing up and through structures (if possible) or through discrete doorways and narrow staircases. Such differences in plazas have been attributed to degree of privacy: the former potentially allowing greater access and of a lesser degree of privacy, while the latter suggests a greater degree of privacy and limited access, suggestive of a degree of exclusivity and "eliteness" (Freidel 1981:375).

The Buenavista "downtown", or epicentre, is set up in a similar fashion to that of its downriver neighbour Cahal Pech, consisting of a predominantly east-west orientation (Awe et al. 1991), as oppose to the north-south orientation of its upriver neighbour Xunantunich (Ashmore and Sabloff 2002). The east half of the epicentre consists of possible semi-restricted or open access areas, including large plazas and courtyards, and is situated at a lower elevation as compared with the west half. By contrast, the patios and courtyards of the western half of the epicentre are much more restricted in terms of access, and include areas of the "palace" and elite residential compounds. Both sites also have special *audiencia* buildings that controlled access to the private west areas.

The East Plaza is therefore an example of Awe et al.'s (1991) open or "semi-restricted access" plazas. Of the three major plazas in the epicentre it is the largest and least restricted in terms of access. Accessibility could be achieved directly from the surrounding landscape through wide gaps between the structures that form the plaza's perimeter. The area surrounding the plaza is also relatively flat, in contrast to the steeper terrain of the area surrounding the west side of the epicentre (Chapter 4), that would have hindered access to these areas. The causeway (*sacbe*) running from the plaza's southwest corner out into the surrounding settlement was also a potential formal point of entry (as well as a northern *sacbe* yet to be placed on maps), in addition to a Preclassic ballcourt on its southwest corner: ballcourts are recognized as possible formal ritual entry points and boundary markers for many Maya cities (Fox 1993; Healy 1992; Meier 2002).

6.2.3 Criteria 4 & 5: Sense of place and Counter pressure

Recent research in the East Plaza by Cap (2013) and previous research by MMT has provided a chronological sequence (based primarily on ceramic phase dating) to outline the life-history of this large area of the Buenavista "downtown".

Initial use of the area, as well as other areas of the epicentre, began in the Middle Preclassic (1000-300 B.C.E.) although few associated features exist for this period (Ball and Taschek 2004). A structure was located in the southern portion of the plaza during excavations, south of Structure 3 (large temple-pyramid on the west side of the East Plaza) and east of Structure 17 (on the south side of the East Plaza), and found to have been constructed during the Early Clssic (300-600 C.E.). The platform was made of cut stones, and numerous “cauldrons” (Appendix II) and jars were uncovered immediately off its edge. In the northern portion of the plaza, another platform was built beginning in the Early Classic (300-600 C.E.) and used into the late facet of the Late Classic (670-780 C.E.), later abandoned or intentionally covered over. During testing, Ball and Taschek also uncovered evidence of Early Classic period constructions in the plaza, referred to as a “plaza surface”, although this has not been verified through larger excavations (Bernadette Cap, personal communication, 2011). Cap (2011, 2013) argues the space at this time was not dedicated to larger community integrative tasks. At this time it was most likely elite-focused, and possibly ritually-oriented, based on finds including a granite ear flare, a whole jade bead, a whole expended obsidian core, and a piece of Pachuca obsidian. Evidence for only a single construction phase exists but the area was used up until the Terminal Classic (780-890 C.E.). Another enigmatic construction feature, either a plaza surface or platform, was located at the centre of the East Plaza.

According to Ball and Taschek (2004:155) the formal paved East Plaza was created during the late facet of the Late Classic (670-780 C.E.). All structures north of the plaza centreline were tested by MMT and found initial constructions dating, based on ceramic dating, to the Paloverde phase (ca. 740/760-820/840), or late facet Late Classic to the Terminal Classic (670-890 C.E.), and continued to be used through the Sacbalam phase (ca. 820-950+ C.E.), or late Terminal Classic and possibly into the Early Postclassic (Bernadette Cap, personal communication, 2010). Based on Cap’s (2013) excavations, the last plaza surfacing and/or platform constructions date to the Late Classic, with the majority of use isolated to the early and late facets. The last surfacing represents the initiation of marketplace activity in the plaza (discussed below). Cap found no Postclassic (post-890 C.E.) materials in her investigations, and believes that by the end of the Terminal Classic the plaza was no longer in use as a large public venue.

Finally, Ball and Taschek located two plain but plastered and red painted stelae along the east-west centreline of the plaza, set during the Gadsden phase (ca. A.D. 540/550 ~ 660/680), or roughly the early facet of the Late Classic. These monuments are now buried for preservation purposes (Bernadette Cap, personal communication, 2007). Grube (1992; also Morton 2007, 2012) suggests the presence of numerous stelae in plazas served to commemorate the event and location of large public ceremonies that took place in these locales, serving as permanent reminders on the landscape and the aforementioned creation of "place", and adding to the function of public plazas serving as the "heart" of a given urban community beyond individual homes and settlement clusters. The necessity of large numbers of labourers, likely from surrounding settlement zones, to construct such monumental spaces is also crucial to the development of a sense of community, and by so doing "pride", encouraged by the generation of such tasks.

6.2.4 Criterion 6: Mixed land use

Plazas in ancient Maya centres appear as large empty spaces in settlement studies but these locales were intentionally created as part of a dynamic urban built environment, filled with people and activity in the distant past. Ethnohistoric sources indicate activities taking place in plaza spaces were related to political, religious, and economic pursuits (Barrera Vasquez 1965; Tozzer 1941; Low 2000; Oviedo y Valdes 1851; Restall 1997; Shaw 2012; Ximenez 1929). This "mixed use" likely included events such as sacrifice and tribute offerings to the gods or rulers, accession ceremonies of rulers, period-ending events, feasting, marketplaces, dances, musical events, recitation of texts, etc.

Activities of the Classic period are suggested from iconographic depictions found on murals (e.g. the Calakmul "market place" murals and the Bonampak murals; Boucher and Quiñones 2007), and from images on ceramics and even stelae. Within the Bonampak murals, elaborate scenes of war captive presentations and elaborate dances and rituals are depicted taking place on a wide stairway identified as attached to a large plaza area at the site (Inomata 2006a: 811; Schele and Miller 1986). During public ceremonies and activities, plazas may have been used in a number of ways, involving the erection of temporary scaffolds and "stalls", the circulation and placement of movable thrones and palanquins, etc., all of which impact the number of participants and degree and nature of their movement within these spaces (Inomata

2006a: 810). Finally, the greatest discussion concerning the nature of activities conducted within large plaza areas of the Classic period is that of ritual and marketplace activity (Becker 2003, 2004; Carballo 2012; Jones 1996; Shaw 2012; Smith 1982; Staller and Carrasco 2009). Direct evidence for behaviours linked to marketplace activity has been difficult to obtain but recent empirical studies, including that of Cap (2011, 2013) conducted at Buenavista, have produced promising results (Dahlin 2003; Dahlin and Ardren 2002; Dahlin et al. 2007; Dahlin et al. 2010; Jones et al. 1983; Looper 2001; Wells 2004; Wurtzburg 1991).

Still today, plazas remain dynamic and diverse activity locales, most famously exemplified by the main plaza (*zocalo*) of Chichicastenango, Guatemala. Formal roads lead into the square from the cardinal directions (open access). People conduct administrative tasks at the *audiencia* at the edge of the square, and can purchase items within the marketplace set up within the plaza. Attendees (producers and consumers alike) can grab a bite to eat from temporary vendors within the plaza or from more formal shops surrounding the area, and can also observe or take part in rituals conducted on the stairs of and inside the bordering Catholic church (temple).

6.2.5 The built environment and large public events

In his study of ancient Maya theatrics through the adoption of a "Theory of Performance", Inomata (2006a: 805, 2006b) argues that the development of large centralized polities would have been impossible in any historical context without a heavy reliance on public events. These spectacles, like the smaller ritual acts discussed above, function as both unifying (horizontal) and potentially divisive (vertical) productions in urban integration. Large public events in centralized venues (central to the entity on which the event is focused – household, neighbourhood, city, polity-region, etc.) physically join numerous individuals and allow them to sense the presence of others and to share an experience, forming an "interactive community". According to Farriss (1984:332) "fiestas [and other events] were the one occasion in which the entire population was certain to gather in the centre, where all members could see themselves as a community and reaffirm social bonds outside the family circle".

A large public performance or activity therefore "grounds the constitution of a community that exceeds the range of daily face-to-face interaction in the physical reality made up of its members" (Inomata 2006a: 808). The Buenavista open access East Plaza is therefore a venue that allows populations beyond daily face-to-face interaction communities (households and neighbourhoods) to congregate both in terms of its construction and participation in associated activities.

6.3 Integrative Built Environment #3: The *sacbeob*

The final built environment is Structure 46 at the perimeter of the Buenavista epicentre: the unfinished *sacbe*. As mentioned above, a second causeway was discovered during 2012 investigations, running a few hundred meters from the north side of the East Plaza out toward the core settlement zone in the north/northeast (Jason Yaeger, personal communication, 2012). As previously noted, I will not address this new *sacbe* as it has not yet been placed on the Buenavista epicenter map, although it is considered in the spatial assessment addressed at the end of this chapter.

The function of *sacbeob* constructions in the maintenance of power and integrative potential of ancient cities has been relatively little explored by archaeologists. *Sacbeob* (*sakbih*), or “white roads”, are raised causeways found throughout the Maya lowlands. As with discussion of the East Plaza I will incorporate additional archaeological information and ethnohistoric/ ethnographic analogy under the headings associated with Talen’s criteria.

6.3.1 Criterion 1: Community association

Shaw (2001), in building on previous works (e.g. Benavides Castillo 1981), suggests a typology for the categorization of causeways critical to a discussion of community-scale association. Her categories include: (1) “local intrasite *sacbeob*” that connect major architectural groups within and immediately around a site epicentre. These often run less than one kilometre and remain within the high-density settlement and monumental portions of a centre. These are the most common *sacbeob* identified in the Maya lowlands, roadways running fewer than 500m representing 70% of Shaw’s database; (2) “core-outlier intrasite *sacbeob*” cover one to five kilometre distances, and connect an epicentre with more distant portions of a site; and (3) “intersite *sacbeob*” that connect spatially distinct sites at least five kilometres apart (e.g. the 100km-long *sacbe* connecting the northern lowland sites of Coba and Yaxuna). Shaw (2001:264) goes on to describe systems of *sacbeob*, distinguishing between (a) “linear systems” that simply connect terminus-area architectural groups, and (b) “radial patterns” involving multiple roads like spokes on a wheel (e.g. Caracol).

The southern sacbe at Buenavista was mapped and tested by the MMT project, and construction was dated to the very late eighth to early ninth centuries (Taschek and Ball 2004:196). It connects the southern portion of the East Plaza with settlement in the Buenavista South (BVS) settlement zone, as well as the Buenavista East settlement zone, and is an example of the local intra-site category. However, construction of the sacbe was not completed (Taschek and Ball 2004), and it can only be assumed that the road would have continued out further into the hinterland of the Buenavista zone, making it a "core-outlier intrasite" sacbe.

Overall, the function of *sacbeob* appear to connect two points in space, the most rapid way to traverse such a distance, and/or to integrate whole distances or sites, i.e. all points along its path (Chase and Chase 1996:807). As such, they serve to physically integrate important parts of a site and area/region, establishing them as protected territory united between end points along raised white conduits. To Kurjack (1977:225), most differences between *sacbeob* are simply a matter of scale, with longer examples bridging greater distance. However, with distance, referenced community size and political importance also increases, potentially allowing us to examine the sliding scale of urban integration (from *societas* to *civitas*) within a given area. For example, Demarest (2004:271) suggests the increased construction of the significant *sacbeob* of Coba may have been a sign of the urban centre trying to hold together in the face of the ever increasing power of neighbouring Puuc centres and Chichen Itza during the 9th century, signaling an attempt to establish a more centralized urban entity and associated polity or state. He goes on to suggest the use of causeways, and large monumental works in general, may be tied in to the mentality of integration display adopted particularly among “Theatre States” (Tambiah 1977) to increase monumental displays in order to increase power.

6.3.2 Criterion 2: Accessibility, control, and security

While constructing monumental buildings in epicentres and outlying areas may serve as daily visible reminders that everyone within sight was part of the same powerful socio-political and potentially, religious unit, isolated monumental constructions lack the physical and overt symbolic ties (administrative arms) that roads inherently provide (Shaw 2001:267). As such, Kurjack and Andrews (1976) discuss *sacbeob* as early forms of boundary maintenance within urban centres, although Shaw (2001:268) rightly notes that at most lowland sites outside the Central Karst Altiplano, such features do not appear until the Late Classic well beyond the point of initial occupation and urban development. Rather, I believe they more correctly indicate changes in the nature of urban integration and boundary maintenance over time and space (Chapter 8). As such, the use of causeways might serve to change the notion of “scale of community” or “scale of urbanism”, discussed above, at different times in the life-history of a given urban centre.

Scott (1998) reminds us that the use of long, straight, formal paved causeways can be very much an administrative control tool, allowing quick movement to suppress uprisings. The reimagining of Paris by Louis Napoleon and Baron Haussman from 1853-1869 involved the establishment of more centralized marketplaces, new public parks and squares, new rail lines and terminals, and new roads leading in a radial pattern from the centre to outlying boroughs (Scott 1998:59). This represents a significant slide along the continuum of integration toward the *civitas* end of such a spectrum. It is when such “slides” ignore the other end of the spectrum that potential problems can arise with regard to urban integration (Chapter 2 and 8). Although the current tendency among many Maya scholars is to shy away from explanations of “control” on the part of the administrative elite, preferring to engage in more post-modern bodies of thought attributing “power” to commoner populations, we cannot ignore discussions of the potential use of such tools among the ancient Maya and their urban administrations.

6.3.3 Criterion 3: Engaging architecture and design

Typically *sacbeob* are composed of large stone lined edges, with interior fills consisting of large cobbles gradually gradated to fine gravel near the surface of the road (Keller 2010). This is essentially the same process as that involved in house platform construction, involving core face construction cells/pens, interior fill with a grade spanning from boulders to cobble/pebble ballast, and occasional exterior facings. The surfaces of *sacbeob* are typically paved with fine *sascab* (lime plaster) and pressed smooth with large roller stones. On occasion, packed sediment, tamped earth, or oyster shell will substitute for a plaster surface, subject to local availability of each of these resources (Shaw 2001:261). Their widths vary, although typically provide enough room for three or more people to stand comfortably side-by-side. Their gleaming white colour provides an immediate “eye catching” visual snaking across a landscape.

By contrast, the *sacbeob* of Buenavista appear to be distinct, in that they have a fill of smaller cobbles and mixed refuse. Neither road has evidence of stone facings, although this may attest to their possible “incomplete” status (Jason Yaeger, personal communication, 2012). In 2010 following the ploughing of the northern half of the BVS Cluster 1 area, the *sacbe* was immediately visible on the landscape: the whiteness of its construction material now disturbed by modern ploughs shone brightly against the tilled earth. This visualization would have been similar during ancient times when such roads were maintained, attracting the attention of anyone in the vicinity.

6.3.4 Criteria 4 & 5: Sense of place and Counter pressure

The *sacbe* at Buenavista is located at the southeast corner of the epicentre. It is initiated at the edge of the East Plaza, and begins its traverse in a southeasterly direction from this point. This creates a physical connection between the epicentre and dispersed settlement of the BVS Cluster 1 settlement area, as well as settlement clusters to the east.

Ball and Taschek’s investigations revealed initiation of construction sometime late in the Paloverde phase (late facet of the Late Classic, 670-780 C.E.. to Terminal Classic, 780-890 C.E.), but was never completed (Taschek and Ball 2004). The feature simply peters out on its east end, having traversed approximately 150m. The intended length and destination of the road can therefore not be completely understood. Ploughing over the feature in 2010 allowed me to confirm this dating through surface inspection of ceramic materials (predominantly late facet Late Classic), in addition to verifying trajectory, dimensions, and to glean a rough idea of construction.

According to Inomata and Houston (2001:30), Maya roads or elevated paths are “tokens of ‘straightness’, probably symbols of rectitude and correct, ordered movement”. In terms of scale, *sacbeob* are notable features on any landscape (Ashmore et al. 1994: 266**)**, functioning in many cases as elaborate walkways formally linking parts of a Maya city, or sometimes joining separate cities (Kurjack and Garza 1981:300). As such, these features physically integrate settlement beyond the individual settlement site (household) and cluster (neighbourhood) scales by creating material connections and formalizing movement.

6.3.5 Criterion 6: Mixed land use

Sacbeob are suggested to have had numerous functions within the urban built environment landscape, taken from archaeological, ethnohistoric, and ethnographic documentation (Bolles and Follan 2001; Chase and Chase 2001; Cobos and Winemiller 2001; Denevan 1991; Folan et al. 2001; Keller 1994, 2010). These include transport functions, boundary maintenance, water management, ritual-religious purposes, and relief of congestion (relating back to the discussion of access and control). In certain environmental situations, they permit dry passage over wet zones in addition to assisting in the diversion, channeling, and collection of water (Reese 1996). These can be used as dams in combination with reservoirs and sloped plaza/courtyard/patio pavements as part of water catchment and storage systems, allowing the direction and entrapment of water in desired locations (Folan 1991). In the case of Buenavista, this was likely an important function of the southern *sacbe* that is located immediately adjacent an *aguada* and its northern end is built into the raised west side of the East Plaza that runs into (and likely below) the south face of the large Structure 3.

In terms of economic functions, *sacbeob* also permit the eased movement of goods and personnel to intended destinations, such as marketplaces. The Buenavista *sacbeob* run directly into the East Plaza: the proposed location of the Late Classic marketplace. Their symbolic function is also important, serving a constant physical reminder of the close relationships among groups who assisted in the construction and maintenance of such features, make use of such features, or inhabit areas connected along its path.

Along with the symbolic nature of such features comes the sacred. Causeways along the four cardinal directions extend from pilgrimage centres, cities, clusters, etc., and serve as "conduits of life force" through the sacred movement (walk, dance, sing, chant) of people along their course (discussed above; Dunning 1992:135; Freidel et al. 1993). The ancient Maya, like modern-day Maya, would have stopped their processions at certain points along the way, often defined by constructions or monuments where a variety of rituals could take place. Freidel and Sabloff (1984:184-185) note that the "festivals and the processions associated with them provided an important structural balance…the transcendent event of moving from shrine to shrine, weaving a fabric of unity over the dispersed symbols of heterogeneity".

6.4 Contrasting Scales of Built Environment Integration

Although a more conjunctive discussion of the aforementioned observations and interpretations is provided in Chapter 8, along with those observations and interpretations provided in Chapter 7, I will very quickly offer a basic comparison of the three integrative built environments covered in this chapter. Although we can discuss a number of qualities inherent to integrative environments, many of which I have covered in the preceding sections, here I will compare the three environments in terms of physical capacity alone to provide the reader with a sense of space for these environments.

To estimate the amount of space required by individuals within public venues, Moore (1996:147) uses data collected from ethnographic research among the Yanomamo tribes of Amazonia. These studies examined the use of space and movement of Yanomamo people within the “public” areas of *shabonos* (villages). The numbers generated ranged from 0.46 m^2/person providing tightly packed space with little room for movement, to 21.6 m^2/person allowing ample space around each person or a large open stage for dynamic performances. There are of course issues with applying any such types of data cross-culturally as concepts of “personal space” can vary tremendously across space and time. Inomata (2006a: 812) suggests the latter figure is probably far too large for the more urban situations of the ancient Maya. He therefore adjusts the figures to compensate, using the following values: 0.46 m^2/person, 1 m^2/person, and 6.6 m^2/person. I apply these values to an evaluation of the physical “open” space provided by each integrative feature. Of course, we must consider the presence of space-consuming features (perished and/or semi-permanent) that may have been in many of these spaces, but for the purpose of this analysis and discussion we will assume areas to be devoid of such inhibitors.

To begin, we must provide at the very least a population estimate for BVS Cluster 1, from which to compare the carrying capacity of all spaces. As the earliest use of a public venue does not begin until the Early Classic (300-600 C.E., at BVS-007), and the formal surfaces of all paved areas associated with each of the three integrative built environments do not appear until the early facet of the Late Classic (600-670 C.E.), I will use a population estimate for this time frame. As all settlement sites save one are occupied during the early facet Late Classic (representing the highest period of occupation in the cluster), this is most convenient (Chapter 4: Fig. 4.10). However, population estimates from archaeological remains is unbelievably “sketchy”. Not only must we consider the use-life of each settlement site, we must also consider the problem of "invisible structures", and the presence of non-domestic or ancillary structures. As outlined in Chapter 4, we tested all mound features in BVS Cluster 1, allowing us a degree of control on occupation chronology as well as determining the primary function of each structure.

Typically in the Belize Valley, particularly down river from the confluence, formal masonry ancillary structures are not common. Most structures within settlement sites appear to have served as multi-purpose domestic settings. Of course, such ancillary structures were likely present, but made of more perishable materials. However, if a mistake has been made in terms of identifying function (e.g. a structure actually served as a kitchen or shrine as oppose to a domestic building), the "trade off" becomes that we assume those buildings we have missed in survey (in this case, "invisible structures") are replaced by the misidentified structures. This is the common assumption made in population estimation for archaeology (Casselberry 1974; Haviland 1972).

In Maya archaeological studies, population estimate formulae are based on ethnographic mean averages of household membership and individual domestic building ($20m^2$ or greater in covered floor area) occupation (Wauchope 1938; Redfield 1950, 1955; Steggerda 1941). This is typically calculated to fluctuate between 4 and 5.5 individuals per nuclear family/individual building: multiple building compounds suggested to be multiple nuclear family households (extended families) (Haviland 1972).

In the case of BVS Cluster 1, I will adopt the higher value within this estimate range, as is typical in Maya archaeology. The formula therefore becomes:

5.5 people x 19 (number of *individual buildings* occupied) = 105 people in the early facet LC

With this estimate, we can then examine the potential of the three public built environments in terms of their holding capacity (Table 6.2). As indicated by results presented, as we move through the built environments and also through time (further discussed in Chapter 8), the physical carrying capacity of integrative built environments adopted within the Buenavista urban setting increases significantly, from the view point of the BVS Cluster 1 neighbourhood, particularly during the late facet of the Late Classic (670-780 C.E.) when both the East Plaza and the two *sacbeob* are potentially in operation. However, it must also be noted that this comparison is somewhat of an apples to oranges comparison, as people presumably would have congregated on the BVS-007 plaza and the East Plaza, while the *sacbeob* were presumably simply conduits of movement, although the use of roads as areas of congregation should not be ruled out. The use of such spaces will be further evaluated in Chapter 8, alongside results of observations and interpretations presented in the following chapter regarding the integrative and disintegrative potential of competing knowledge bases in this dynamic urban setting.

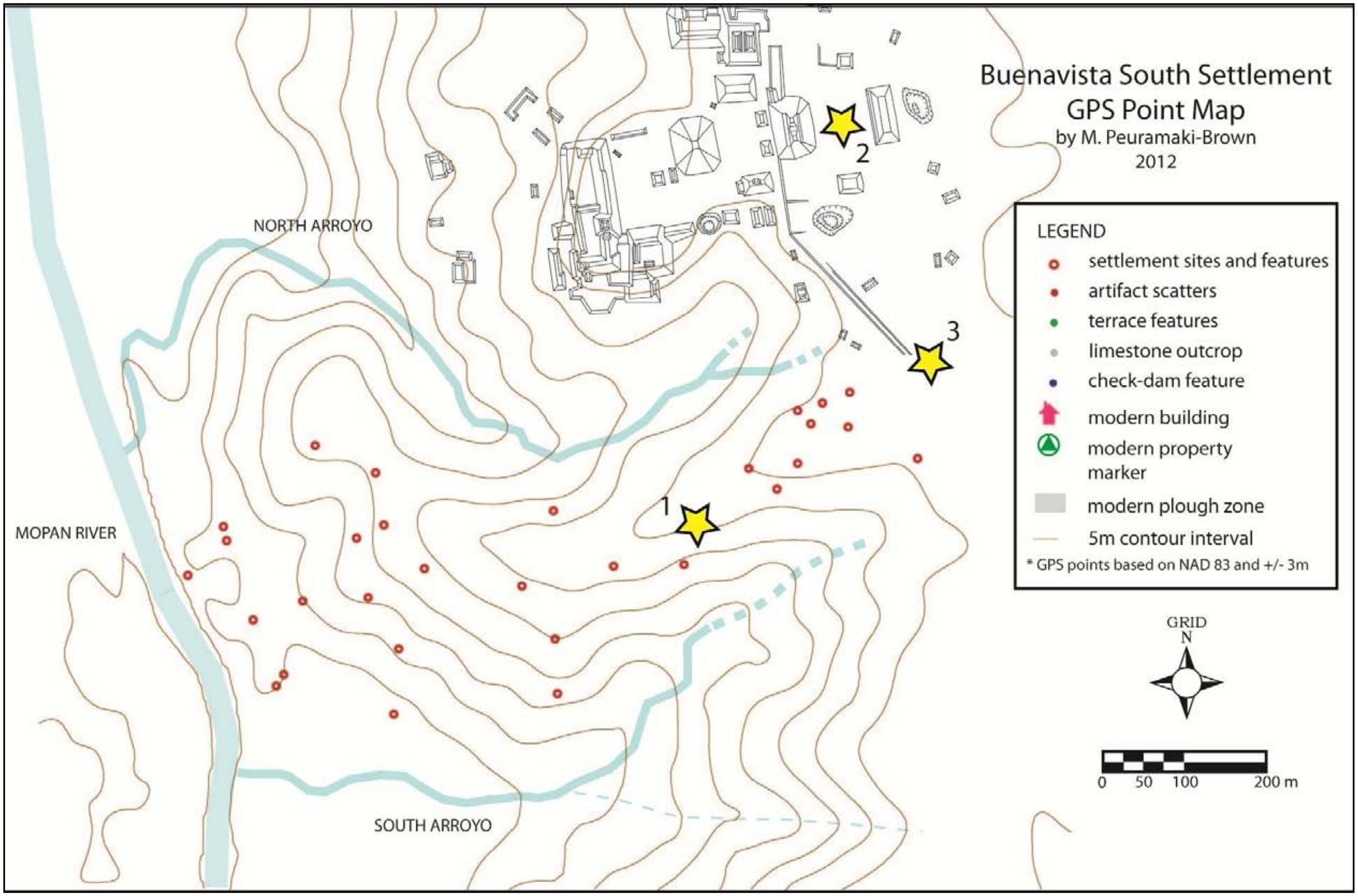


Figure 6. 1: Potential integrative built environments at Buenavista, addressed in text: 1) BVS-007, 2) East Plaza, 3) sacbe

Table 6. 1: Small finds from all contexts at BVS-007. Total bulk counts and breakdown available in Chapters 4 and 7.

Location	Lot			Artifact Class	Cat #	Ct.	Weight (g)	Description
007-patio								
	350	AA	1	GROUNDSTONE	GS-068	1	317.4	hammerstone
	350	AA	4	LITHIC	LT-034	1	15.2	thin biface fragment - non-local chert
	350	AA	6	LITHIC	LT-037	1	173.1	thick biface
	350	AA	8	LITHIC	LT-042	1	68.6	thin biface fragment - non-local chert
	350	AA	7	LITHIC	LT-251	1	14.8	thin biface fragment
	350	AA	1	OBSIDIAN	OB-407	1	0.5	blade
	350	AA	1	OBSIDIAN	OB-408	1	0.5	blade
	350	AA	7	OBSIDIAN	OB-421	1	0.2	blade
	350	AA	2	OBSIDIAN	OB-463	1	0.8	blade
	350	AA	2	OBSIDIAN	OB-464	1	0.3	blade
	350	Y	5	OTHER	OT-023	1	255.3	speleothem
	350	Y	4	OTHER	OT-028	1	1.6	quartz crystal
						12	**848.2**	
007-1								
	354	E	2	CERAMIC	CR-013	1	13.0	whorl - formed
	354	E	4	CERAMIC	CR-014	1	27.5	censer plug
	354	J	3	CERAMIC	CR-015	1	144.3	large vessel chunk
	354	C	14	CERAMIC	CR-035	2	47.3	Saxche Orange-Polychrome
	354	O	7	CERAMIC	CR-054	1	23.0	Codex-style ceramic sherd
	354	C	17	CERAMIC	CR-055	1	15.1	sherd - glyphic element
	354	X	3	GROUNDSTONE	GS-030	1	393.0	celt - basalt
	354	P	3	GROUNDSTONE	GS-031	1	237.0	mano fragment - granite
	354	G	3	GROUNDSTONE	GS-036	1	211.6	hammerstone
	350	Q	9	GROUNDSTONE	GS-045	1	665.0	mano fragment - granite
	354	C	7	GROUNDSTONE	GS-049	1	251.0	metate fragment - granite
	354	Q	2	GROUNDSTONE	GS-051	1	827.0	metate fragment - granite
	354	O	5	GROUNDSTONE	GS-055	1	677.0	mano fragment - granite
	354	O	6	GROUNDSTONE	GS-056	1	24.0	mano fragment - granite
	354	A	4	GROUNDSTONE	GS-082	1	68.0	metate fragment - granite
	354	D	17	GROUNDSTONE	GS-083	1	291.0	mano fragment - granite
	354	D	19	GROUNDSTONE	GS-084	1	482.5	mano fragment - granite
	354	D	26	GROUNDSTONE	GS-085	1	787.6	mano fragment - granite
	354	E	2	GROUNDSTONE	GS-086	1	147.2	raw fragment - granite
	354	G	2	GROUNDSTONE	GS-087	1	1491.0	hammerstone
	354	G	3	GROUNDSTONE	GS-088	1	926.6	mano - granite
	354	G	3	GROUNDSTONE	GS-089	1	702.9	mano - basalt
	354	G	3	GROUNDSTONE	GS-090	1	256.6	mano fragment - granite
	354	G	2	GROUNDSTONE	GS-091	1	532.2	mano - granite
	354	G	2	GROUNDSTONE	GS-092	1	452.1	celt - basalt
	354	K	2	GROUNDSTONE	GS-093	1	163.4	celt - basalt
	354	K	4	GROUNDSTONE	GS-094	1	407.1	mano fragment - granite
	354	A	4	GROUNDSTONE	GS-119	1	355.1	metate fragment - granite

	354	B	2	GROUNDSTONE	GS-120	1	533.1	metate fragment - granite
	354	B	2	GROUNDSTONE	GS-121	1	731.1	metate fragment - granite
	354	C	2	GROUNDSTONE	GS-122	1	354.6	metate fragment - granite
	354	C	3	GROUNDSTONE	GS-123	1	361.9	metate fragment - granite
	354	E	10	GROUNDSTONE	GS-124	1	317.7	metate fragment - granite
	354	E	10	GROUNDSTONE	GS-125	1	2267.9	metate fragment - granite
	354	G	1	GROUNDSTONE	GS-126	1	583.6	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-127	1	670.4	metate fragment - granite
	354	G	1	GROUNDSTONE	GS-128	1	429.6	metate fragment - granite
	354	G	1	GROUNDSTONE	GS-129	1	42.5	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-130	1	556.3	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-131	1	77.0	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-132	1	175.9	metate fragment - granite
	354	G	3	GROUNDSTONE	GS-133	1	583.2	metate fragment - granite
	354	G	3	GROUNDSTONE	GS-134	1	109.7	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-135	1	671.8	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-136	1	339.4	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-137	1	168.7	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-138	1	6350.3	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-139	1	376.4	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-140	1	836.9	metate fragment - granite
	354	G	2	GROUNDSTONE	GS-141	1	3628.7	metate fragment - granite
	354	G	3	GROUNDSTONE	GS-142	1	3175.1	metate fragment - granite
	354	J	3	GROUNDSTONE	GS-143	1	295.7	metate fragment - limestone
	354	L	2	GROUNDSTONE	GS-144	1	284.7	metate fragment - granite
	354	Y	3	GROUNDSTONE	GS-165	1	210.0	mano - granite
	354	Y	5	GROUNDSTONE	GS-166	1	1088.0	metate fragment - granite
	354	Y	5	GROUNDSTONE	GS-167	1	926.0	metate fragment - granite
	354	P	4	GROUNDSTONE	GS-168	1	186.0	metate fragment - granite
	354	Y	5	GROUNDSTONE	GS-169	1	4082.3	grooved sphere - limestone
	354	X	5	GROUNDSTONE	GS-175	1	228.0	metate fragment - limestone
	354	X	5	GROUNDSTONE	GS-176	1	1211.0	metate fragment - limestone
	354	Z	12	GROUNDSTONE	GS-178	1	260.0	metate fragment - granite
	354	G	11	GROUNDSTONE	GS-180	1	2086.0	grooved sphere - limestone
	354	AB	2	GROUNDSTONE	GS-181	1	411.0	metate fragment - granite
	354	Q	5	GROUNDSTONE	GS-184	1	470.0	metate fragment - granite
	354	AI	4	GROUNDSTONE	GS-185	1	1041.0	metate fragment - granite
	354	M	2	GROUNDSTONE	GS-186	1	361.0	metate fragment - granite
	354	AI	7	GROUNDSTONE	GS-190	1	462.0	metate fragment - granite
	354	AI	7	GROUNDSTONE	GS-191	1	159.0	metate fragment - granite
	354	AI	9	GROUNDSTONE	GS-194	1	501.0	metate fragment - unknown
	354	AI	6	GROUNDSTONE	GS-196	1	434.0	mano fragment - granite
	354	Z	16	GROUNDSTONE	GS-210	1	74.0	metate fragment - granite
	354	C	16	GROUNDSTONE	GS-211	1	190.0	mano fragment - granite
	354	Z	21	GROUNDSTONE	GS-212	1	307.0	hammerstone
	354	Z	21	GROUNDSTONE	GS-213	1	707.0	metate fragment - granite
	354	C	17	GROUNDSTONE	GS-214	1	855.0	mano fragment - unknown

	354	Q	2	GROUNDSTONE	GS-215	1	393.0	hammerstone
	354	C	16	GROUNDSTONE	GS-216	1	12.0	raw fragment - granite
	354	Z	20	GROUNDSTONE	GS-217	1	884.0	metate fragment - granite
	354	Z	21	GROUNDSTONE	GS-218	1	962.0	mano fragment - granite
	354	Z	22	GROUNDSTONE	GS-219	1	441.0	mano fragment - granite
	350	V	2	LITHIC	LT-050	1	43.0	thin biface - laurel leaf
	350	T	3	LITHIC	LT-062	1	14.4	scraper
	354	A	4	LITHIC	LT-065	1	231.3	thick biface fragment
	354	A	4	LITHIC	LT-066	1	192.9	thick biface fragment
	354	A	4	LITHIC	LT-067	1	99.0	thick biface fragment
	354	A	4	LITHIC	LT-068	1	192.1	thick biface
	354	A	4	LITHIC	LT-069	1	43.7	thick biface fragment
	354	A	4	LITHIC	LT-070	1	142.4	thick biface fragment
	354	C	5	LITHIC	LT-071	1	67.6	thick biface fragment
	354	D	11	LITHIC	LT-072	1	121.9	thick biface fragment
	354	D	20	LITHIC	LT-073	1	134.8	thick biface fragment
	354	D	23	LITHIC	LT-074	1	56.1	biface fragment - non-local chert
	354	D	23	LITHIC	LT-075	1	35.9	thick biface fragment
	354	D	23	LITHIC	LT-076	1	179.6	thick biface fragment
	354	D	24	LITHIC	LT-077	1	545.3	thick biface fragment
	354	E	5	LITHIC	LT-078	1	17.6	thin biface fragment
	354	E	8	LITHIC	LT-079	1	88.9	thick biface fragment
	354	F	1	LITHIC	LT-080	1	167.9	thick biface fragment
	354	G	2	LITHIC	LT-081	1	237.1	thick biface fragment
	354	G	2	LITHIC	LT-082	1	160.2	thick biface fragment
	354	G	3	LITHIC	LT-083	1	109.9	thick biface fragment
	354	G	3	LITHIC	LT-084	1	86.5	thick biface
	354	H	1	LITHIC	LT-085	1	267.0	thick biface fragment
	354	H	2	LITHIC	LT-086	1	133.3	thick biface fragment
	354	J	2	LITHIC	LT-087	1	128.4	thick biface
	354	K	1	LITHIC	LT-088	1	60.9	thick biface fragment
	354	K	5	LITHIC	LT-089	1	47.9	drill/graver
	350	Q	8	LITHIC	LT-253	1	50.0	thick biface fragment
	354	A	3	LITHIC	LT-258	1	39.3	thick biface fragment
	354	O	4	LITHIC	LT-271	1	187.6	thick biface fragment
	354	P	4	LITHIC	LT-272	1	114.9	large thin biface - lanceolate
	354	X	2	LITHIC	LT-273	1	298.3	thick biface
	354	P	4	LITHIC	LT-275	1	110.1	thick biface fragment
	354	X	4	LITHIC	LT-276	1	110.9	thick biface fragment
	354	P	2	LITHIC	LT-277	1	15.4	thin biface
	354	C	11	LITHIC	LT-278	1	102.5	thick biface fragment
	354	Y	2	LITHIC	LT-285	1	11.6	drill
	354	Y	3	LITHIC	LT-286	1	192.6	thick biface
	354	G	11	LITHIC	LT-293	1	164.3	thick biface
	354	Z	10	LITHIC	LT-296	1	21.5	thick biface fragment
	354	P	5	LITHIC	LT-302	1	379.3	thick biface fragment
	354	Q	5	LITHIC	LT-303	1	168.6	thick biface fragment

	354	AI	3	LITHIC	LT-308	1	178.6	thick biface fragment
	354	AI	7	LITHIC	LT-309	1	56.2	thick biface fragment
	354	M	3	LITHIC	LT-312	1	533.2	thick biface fragment
	354	AI	9	LITHIC	LT-313	1	163.0	thick biface fragment
	354	Z	21	LITHIC	LT-333	1	38.9	chisel fragment
	354	Z	23	LITHIC	LT-334	1	79.7	thick biface fragment
	354	Z	23	LITHIC	LT-335	1	42.9	drill/graver
	354	Z	20	LITHIC	LT-353	1	25.4	thin biface - non-local chert
	354	E	10	LITHIC	LT-360	1	52.4	scraper
	354	E	10	LITHIC	LT-361	1	50.0	thick biface fragment
	354	Z	9	MARINE SHELL	MS-021	4	5.0	Strombus sp cf pugilis
	354	Q	5	MARINE SHELL	MS-022	1	1.8	worked shell
	354	Z	20	MARINE SHELL	MS-029	1	1.0	Strombus sp cf pugilis
	354	Z	20	MARINE SHELL	MS-030	1	1.9	Strombus sp cf pugilis
	354	C	9	MARINE SHELL	SP-023	1	0.4	bead
	354	Y	2	MARINE SHELL	SP-026	1	0.8	pick
	354	P	4	MARINE SHELL	SP-030	1	1.0	bead
	354	A	1	OBSIDIAN	OB-670	1	0.3	blade
	354	A	1	OBSIDIAN	OB-671	1	0.8	blade
	354	A	2	OBSIDIAN	OB-672	1	0.4	blade
	354	A	3	OBSIDIAN	OB-673	1	0.3	blade
	354	A	3	OBSIDIAN	OB-674	1	0.7	blade
	354	A	3	OBSIDIAN	OB-675	1	0.5	blade
	354	A	3	OBSIDIAN	OB-676	1	0.9	blade
	354	A	5	OBSIDIAN	OB-677	1	0.6	blade
	354	C	4	OBSIDIAN	OB-678	1	0.6	blade
	354	D	1	OBSIDIAN	OB-679	1	2.1	blade
	354	D	18	OBSIDIAN	OB-680	1	0.9	blade
	354	D	18	OBSIDIAN	OB-681	1	0.5	blade
	354	D	22	OBSIDIAN	OB-682	1	0.9	blade
	354	D	24	OBSIDIAN	OB-683	1	1.1	blade
	354	D	24	OBSIDIAN	OB-684	1	0.8	blade
	354	D	24	OBSIDIAN	OB-685	1	0.6	blade
	354	E	1	OBSIDIAN	OB-686	1	1.2	blade
	354	E	2	OBSIDIAN	OB-687	1	0.7	blade
	354	E	2	OBSIDIAN	OB-688	1	0.5	blade
	354	E	3	OBSIDIAN	OB-689	1	0.9	blade
	354	E	4	OBSIDIAN	OB-690	1	1.3	blade
	354	E	6	OBSIDIAN	OB-691	1	0.4	blade
	354	E	12	OBSIDIAN	OB-692	1	1.7	blade
	354	G	3	OBSIDIAN	OB-693	1	1.1	blade
	354	J	2	OBSIDIAN	OB-694	1	0.4	blade
	354	J	2	OBSIDIAN	OB-695	1	0.4	blade
	354	J	3	OBSIDIAN	OB-696	1	0.3	blade
	354	J	3	OBSIDIAN	OB-697	1	8.3	core
	354	J	5	OBSIDIAN	OB-698	1	0.8	blade
	354	J	5	OBSIDIAN	OB-699	1	0.3	blade

	354	J	5	OBSIDIAN	OB-700	1	0.3	blade
	354	K	1	OBSIDIAN	OB-701	1	0.3	blade
	354	K	3	OBSIDIAN	OB-702	1	0.9	blade
	354	K	3	OBSIDIAN	OB-703	1	0.3	blade
	354	K	3	OBSIDIAN	OB-704	1	1.0	blade
	354	K	5	OBSIDIAN	OB-705	1	2.2	blade
	354	K	6	OBSIDIAN	OB-706	1	0.7	blade
	354	K	6	OBSIDIAN	OB-707	1	0.3	blade
	354	K	6	OBSIDIAN	OB-708	1	0.5	blade
	354	K	9	OBSIDIAN	OB-709	1	0.1	blade
	354	L	1	OBSIDIAN	OB-710	1	0.2	blade
	354	L	2	OBSIDIAN	OB-711	1	1.2	blade
	354	L	4	OBSIDIAN	OB-712	1	1.9	blade - green obsidian
	354	J	4	OBSIDIAN	OB-781	1	0.5	blade
	354	K	8	OBSIDIAN	OB-782	1	0.5	blade
	354	C	10	OBSIDIAN	OB-783	1	11.4	thin biface - green obsidian
	354	C	7	OBSIDIAN	OB-786	1	0.9	blade
	354	X	1	OBSIDIAN	OB-787	1	0.7	blade
	354	P	3	OBSIDIAN	OB-788	1	0.6	blade
	354	P	3	OBSIDIAN	OB-789	1	0.4	blade
	354	Y	1	OBSIDIAN	OB-791	1	0.4	blade
	354	C	14	OBSIDIAN	OB-792	1	0.6	blade
	354	G	5	OBSIDIAN	OB-793	1	1.6	blade
	354	Y	1	OBSIDIAN	OB-795	1	0.7	blade
	354	Z	8	OBSIDIAN	OB-810/811	1	0.6	blade
	354	G	11	OBSIDIAN	OB-826	1	1.5	blade
	354	F	12	OBSIDIAN	OB-827	1	0.5	blade
	354	O	14	OBSIDIAN	OB-828	1	1.3	blade
	354	Z	5	OBSIDIAN	OB-839	1	0.5	blade
	354	Z	18	OBSIDIAN	OB-847	1	0.6	blade
	354	Q	7	OBSIDIAN	OB-879	1	0.5	blade
	354	AI	1	OBSIDIAN	OB-883	1	1.0	blade
	354	J	2	OTHER	OT-032	1	1.0	quartz crystal
	354	I	1	OTHER	OT-033	1	0.9	quartz crystal
	354	K	5	OTHER	OT-034	1	1.7	quartz crystal
	354	C	7	OTHER	OT-040	1	4.9	quartz crystal
	354	Z	6	OTHER	OT-046	1	4.1	quartz crystal
	354	X	5	OTHER	OT-048	1	3.0	quartz crystal
	354	AI	2	OTHER	OT-052	1	88.2	quartz crystal
	354	Z	18	OTHER	OT-053	1	2.9	quartz crystal
	354	P	5	OTHER	OT-055	1	366.0	petrified wood? Quartzite
	354	Z	21	OTHER	OT-058	1	7.8	quartz crystal
	354	AI	8	OTHER	OT-085	1	5.4	quartz crystal
	354	Z	23	OTHER	OT-087	2	23.0	river pebbles
	354	Z	21	OTHER	OT-088	6	248.5	river pebbles
	354	P	4	OTHER	OT-089	1	3.5	river pebble - carnelian?
	354	F	9	OTHER	OT-090	1	19.5	river pebble - greenstone?

	354	Z	18	OTHER	OT-093	1	2.1	quartz crystal
	350	Q	4	SPECIAL FIND	SP-015	1	0.3	celt - slate?
	354	G	2	SPECIAL FIND	SP-017	1	363.0	bark beater - limestone
	354	A	2	SPECIAL FIND	SP-018	1	1.9	worked shell
	354	A	3	SPECIAL FIND	SP-019	1	13.1	worked greenstone
	354	Q	2	SPECIAL FIND	SP-024	1	8.9	bead - unknown stone
	354	P	4	SPECIAL FIND	SP-029	1	17.9	whorl - limestone
						233	**61539.4**	
007-2								
	350	U	2	CERAMIC	CR-009	1	2.5	whorl/pendant - recycled sherd
	354	W	6	CERAMIC	CR-037	1	3.9	rattle ball or blow gun pellet
	354	V	13	CERAMIC	CR-051	1	6.8	Codex-style ceramic sherd
	350	U	2	GROUNDSTONE	GS-038	1	61.6	polishing stone
	350	R	1	GROUNDSTONE	GS-050	1	35.9	mano fragment - granite
	354	AH	7	GROUNDSTONE	GS-192	1	222.0	speleothem
	354	AG	4	GROUNDSTONE	GS-220	1	13.0	worked slate
	354	AK	2	GROUNDSTONE	GS-221	1	8.0	worked slate
	354	AJ	1	GROUNDSTONE	GS-222	1	130.0	smoothing stone?
	354	T	1	LITHIC	LT-274	1	67.7	thick biface fragment
	354	AH	4	LITHIC	LT-300	1	123.9	thin biface fragment - non-local chert
	354	W	6	LITHIC	LT-311	1	375.9	thick biface fragment
	354	AJ	3	LITHIC	LT-314	1	176.1	thick biface fragment
	354	V	12	LITHIC	LT-330	1	4.5	drill
	354	T	2	LITHIC	LT-331	1	55.3	thick biface fragment
	354	T	2	LITHIC	LT-332	1	86.1	scraper/recycled?
	354	T	1	MARINE SHELL	MS-018	1	2.0	Strombus
	354	W	2	MARINE SHELL	MS-019	1	3.4	Strombus
	354	AJ	1	MARINE SHELL	MS-031	1	2.3	Strombus
	350	R	2	MARINE SHELL	SP-007	1	1.5	adorno - flower
	354	W	2	MARINE SHELL	SP-025	1	2.6	ear flare fragment
	354	U	4	MARINE SHELL	SP-037	1	0.7	tinkler
	354	T	1	OBSIDIAN	OB-784	1	0.3	blade
	354	T	1	OBSIDIAN	OB-785	1	0.8	blade
	354	S	1	OBSIDIAN	OB-794	1	1.3	blade
	354	V	4	OBSIDIAN	OB-797	1	0.4	blade
	354	W	3	OBSIDIAN	OB-799	1	1.1	blade
	354	S	2	OBSIDIAN	OB-802	1	0.7	blade
	354	AE	1	OBSIDIAN	OB-804	1	0.5	blade
	354	AE	1	OBSIDIAN	OB-805	1	1.4	blade
	354	T	3	OBSIDIAN	OB-806	1	0.9	blade
	354	T	2	OBSIDIAN	OB-808	1	0.5	blade
	354	T	3	OBSIDIAN	OB-809	1	0.9	blade
	354	AD	2	OBSIDIAN	OB-812	1	0.2	flake
	354	AD	2	OBSIDIAN	OB-813	1	0.2	blade
	354	AD	2	OBSIDIAN	OB-814	1	0.6	blade
	354	AD	2	OBSIDIAN	OB-815	1	0.4	blade
	354	AD	2	OBSIDIAN	OB-816	1	0.4	blade

	354	AD	2	OBSIDIAN	OB-817	1	1.4	blade
	354	AD	2	OBSIDIAN	OB-818	1	0.3	blade
	354	R	3	OBSIDIAN	OB-822	1	0.6	blade
	354	AE	1	OBSIDIAN	OB-823	1	0.4	blade
	354	AE	1	OBSIDIAN	OB-824	1	0.5	blade
	354	AE	1	OBSIDIAN	OB-825	1	1.0	blade
	354	W	4	OBSIDIAN	OB-829	1	0.5	blade
	354	W	4	OBSIDIAN	OB-830	1	0.5	blade
	354	W	4	OBSIDIAN	OB-831	1	0.1	blade
	354	W	4	OBSIDIAN	OB-832	1	2.7	shatter
	354	AD	2	OBSIDIAN	OB-833	1	0.2	blade
	354	AD	2	OBSIDIAN	OB-834	1	1.8	blade
	354	AD	2	OBSIDIAN	OB-835	1	0.5	blade
	354	AA	1	OBSIDIAN	OB-836	1	0.9	blade
	354	AA	1	OBSIDIAN	OB-837	1	1.2	blade
	354	AG	2	OBSIDIAN	OB-841	1	0.3	blade
	354	AG	2	OBSIDIAN	OB-842	1	0.6	flake with cortex
	354	V	3	OBSIDIAN	OB-844	1	0.9	blade
	354	V	5	OBSIDIAN	OB-845	1	0.5	blade
	354	V	5	OBSIDIAN	OB-846	1	0.6	blade
	354	AG	11	OBSIDIAN	OB-849	1	0.5	blade
	354	W	3	OBSIDIAN	OB-850	1	2.3	blade
	354	AH	4	OBSIDIAN	OB-852	1	0.1	blade
	354	AC	3	OBSIDIAN	OB-853	1	0.3	flake
	354	W	8	OBSIDIAN	OB-855	1	0.3	blade
	354	W	8	OBSIDIAN	OB-856	1	0.5	blade
	354	AH	2	OBSIDIAN	OB-857	1	0.7	blade
	354	AH	2	OBSIDIAN	OB-858	1	0.6	blade
	354	V	6	OBSIDIAN	OB-859	1	0.4	blade
	354	V	6	OBSIDIAN	OB-860	1	0.5	blade
	354	V	7	OBSIDIAN	OB-866	1	0.6	blade
	354	V	7	OBSIDIAN	OB-867	1	0.7	blade
	354	V	7	OBSIDIAN	OB-868	1	0.6	blade
	354	V	7	OBSIDIAN	OB-869	1	0.3	flake
	354	AG	14	OBSIDIAN	OB-871	1	0.5	blade
	354	AC	8	OBSIDIAN	OB-872	1	0.4	shatter
	354	V	8	OBSIDIAN	OB-874	1	0.2	shatter
	354	V	8	OBSIDIAN	OB-875	1	0.5	blade
	354	V	8	OBSIDIAN	OB-876	1	0.9	blade
	354	AJ	3	OBSIDIAN	OB-878	1	0.7	blade
	354	V	5	OBSIDIAN	OB-880	1	0.3	blade
	354	W	6	OBSIDIAN	OB-882	1	0.2	blade
	354	AG	3	OBSIDIAN	OB-884	1	0.7	blade
	354	W	5	OBSIDIAN	OB-885	1	0.5	blade
	354	W	5	OBSIDIAN	OB-886	1	0.5	blade
	354	W	5	OBSIDIAN	OB-887	1	0.7	blade
	354	W	5	OBSIDIAN	OB-888	1	0.8	blade

	354	W	5	OBSIDIAN	OB-889	1	0.5	blade
	354	AG	2	OBSIDIAN	OB-903	1	0.1	blade
	354	AJ	1	OBSIDIAN	OB-919	1	1.2	blade
	354	V	18	OBSIDIAN	OB-929	1	0.7	blade
	354	V	18	OBSIDIAN	OB-930	1	0.3	blade
	350	R	1	OBSIDIAN	SP-006	1	0.6	blade - green obsidian
	354	T	1	OTHER	OT-041	1	27.0	quartz crystal
	354	W	2	OTHER	OT-042	1	2.5	quartz crystal
	354	U	4	OTHER	OT-049	1	3.7	quartz crystal
	354	W	9	OTHER	OT-051	1	7.0	quartz crystal
	354	W	5	OTHER	OT-059	1	1.0	quartz crystal
	354	W	5	OTHER	OT-060	1	1.9	quartz crystal
	354	AF	3	OTHER	OT-086	1	81.9	quartz crystal
	354	AG	4	OTHER	OT-091	1	21.5	river pebble
						98	**1576.0**	

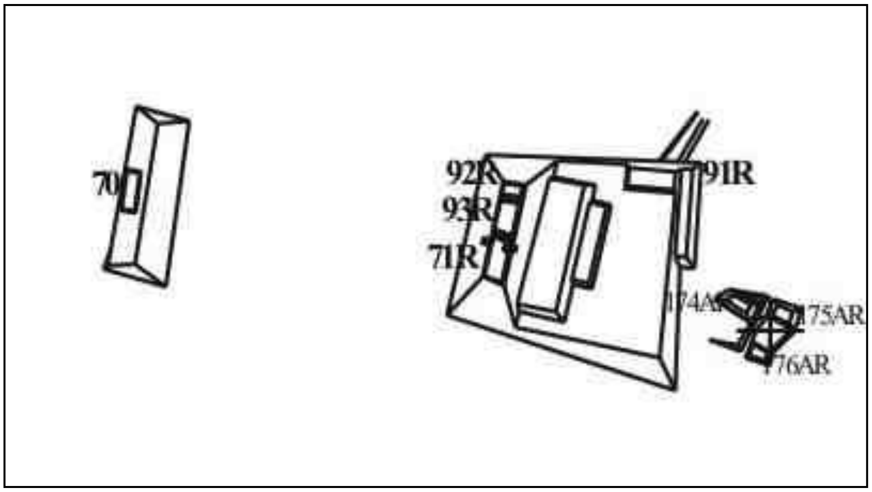


Figure 6. 2: Group R and Mound 70 at Minanha, Vaca Plateau, Belize (from Prince 2000).

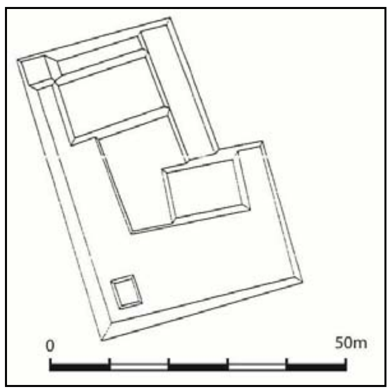


Figure 6. 3: Site SL-13 at San Lorenzo, Lower Mopan Valley, Belize (from Yaeger 2000b).

Table 6. 2: Person capacity for the three analyzed integrative built environments at Buenavista del Cayo.

			Person Capacity		
Built Environment	**Dimensions (approx. m)**	**Area (m^2)**	**$0.46m^2$**	**$1m^2$**	**$6.6m^2$**
BVS-007 plaza	12 x 12	144	313	144	22
East Plaza	75 x 125	9375	20,380	9375	1420
sacbeob	(150 x 13) 2	3900	8478	3900	590

* Cap (personal communication, 2012) calculates East plaza area at 11,414-7,989m^2

** Person capacity based on Moore (1996) and Inomata (2006)

Chapter Seven: Urbanization and Knowledge Bases

Sicinius:

What is the city
but the people?

Citizens:

True,
The people are the city.

From *The Tragedy of Coriolanus*, Act 3, Scene 1, by William Shakespeare.

To continue a discussion of urban integration and disintegration, I now turn from the role of the built environment and associated activities, to the role of knowledge bases as reflected in household identities and pursuits. As addressed in previous chapters, an approach to communities, including neighbourhoods and urban entities, can involve an examination of space and its use (the "places" of community addressed through New Urban Theory) or by attempting to examine the social actors themselves, often involving different groups of people operating together and dependent on one another in some form or another (the "people" and "things" of community, addressed through High Modernist State Theory). Also previously noted was the central role of households in the transmission of knowledge to their membership, as well as the guarding of such knowledge from other community members.

In this chapter I attempt to distinguish between commoner households that make up the BVS Cluster 1 neighbourhood through the concept of knowledge bases, and to also diachronically contrast any existing "practical" knowledge bases (*mētis*) with the more esoteric forms represented by urban administrative activities, such as that showcased in the evaluation of three urban built environments in Chapter 6 (although this step will feature more strongly in the Chapter 8 discussion). This contrasting of knowledge bases operating within urban settings is outlined within the High Modernist State Theory addressed in Chapter 2. To accomplish this task, I address not only the previously outlined life histories of the BVS Cluster 1 community and individual settlement sites, but also the nature of associated domestic built environments and their spatial organization, and activities conducted within these settings through the examination of material culture assemblages recovered at each locale.

Within this discussion, I will only address materials recovered from the settlement sites subject to extensive horizontal and vertical excavations (Phase 3), as materials recovered from sites only subject to testing are not statistically relevant in terms of discussing representative activities and identities. Full descriptions of analytical processes adopted for each artifact class are presented in the appendices. Many results of these analyses are not presented in text but will feature in future individual publications.

In this chapter I address artifact assemblages solely from lot group contexts (Appendix I) designated as secondary "habitation debris" or use-related features and the rare instances of primary floor deposits, unless otherwise indicated. These lot group assemblages, presented in Chapter 4: Table 4.16, are further broken down in a series of tables by major artifact class (Table 7.1, 7.2, 7.3, 7.4, 7.5). In many instances these lot groups are limited in chronological span as they were recovered from between or beneath architectural phases; however, many are found free of architectural "capping" and therefore potentially represent longer spans of time (debris accumulation). Such lot groups can potentially be further broken down into shorter chronological spans, as they were excavated in smaller individual lots, typically in stratigraphic order, and later joined as lot groups. This is not extensively attempted in this dissertation, but future work will endeavour to do just this to better understand the changes in individual household assemblages and related activities over time. Of particular importance for such future work will be a consideration of the extent of post-abandonment scavenging of sites and how this potentially affects resulting assemblages (Deal 1984; Inomata and Webb 2003). For example, large pieces of more exotic household items, such as metate fragments, may be taken along with departing households or scavenged later on, effectively skewing their representation in the surviving archaeological record of individual settlement sites. The shorter occupation span of Late Established households must also be considered when contrasting assemblages with those of Early Established households, as well as the use of debris deposits in later fill contexts.

7.1 Local Knowledge Bases and Identity

The general conflation of any social strata, such as commoners, within vertical organizational structures such as urban environments, can obscure some fascinating differences in their operation (Potter and King 1995:24). How does the differentiation of distinctive groups among commoner households affect our understanding of knowledge bases operating in the Buenavista and BVS Cluster 1 communities over their life histories?

As mentioned in Chapter 2, Souvatzi (2009) outlines a series of potential archaeological observations that might assist in the distinction between households with regards to identity and potentially reflective of acquired and guarded locational, limitational, and social knowledge bases (Rockman 2003). These include (1) architectural variability and location, (2) differences in economic activity, and (3) variation in domestic rituals and burials. Adopting these criteria, and considering the theoretical underpinnings discussed in Chapter 2 concerning the potential role of various knowledge bases in urban integration and disintegration, I will continue to address the case of BVS Cluster 1 and the larger Buenavista urban community. Through an examination of individual settlement sites I argue for the presence of at least two different groups, Early Established/Founding versus Late Established households, and three forms of practical knowledge bases integral to the understanding of the life history of the community.

Local knowledge bases and identities are contrasted with a collective, esoteric identity and knowledge base employed by administrative bodies (urban, polity-state, general elite, etc.) (McAnany 1993; Smith 1998). This more formal knowledge base can be addressed through observations of (1) external uniformity and orientation of architecture, (2) the presence of large scale architectural works, (3) the standardization and control of economic activity, (4) differential intra-site distributions of exotic and ritual items, and (5) the presence of collective and public rituals and burial practices. In Chapter 6, such observations and associated interpretations have been argued for the role of BVS-007 in BVS Cluster 1 and the larger urban environment, in particular the role of collective and public rituals through a lens of New Urban Theory, and will be further addressed here and in Chapter 8 discussion.

7.2 Early Established versus Late Established Households

"Early Established" households, or "Founding Households", are extensively addressed among the Maya by McAnany (1995; 1998; 2010) under the principal of "Primary Occupancy" (recognition that a people has taken possession of land without disturbing any other occupants) and are known from both ethnographic and archaeological contexts in various parts of the Maya world and beyond. Distinctions between commoner households are also addressed by Wilk

(1983) in his assessment of "senior" and "junior" household cluster members, by Nesheim et al. (2006) in their consideration of "host" and "newcomer" groups in the colonization of new landscapes, and ethnographically by Vogt (1969:141) who discussed the "Junior-Senior Principle" that operates "to produce status differentiation within socially comparable settlement components within present-day Zinacantan community".

In archaeology, Founding Households have been addressed significantly in terms of the role they played in the naissance and development of communities, but rarely in terms of their potential role in the characterization of disintegration and decline. I hope to demonstrate that the two forms of commoner households coexisted and interacted for a period of the BVS Cluster 1 life history, and in so doing created pre-existing fissures in intra-community organization at Buenavista del Cayo, crucial to the understanding of urban disintegration. I also suggest a level of guarded *mētis* knowledge was acquired and utilized by Founding Households both in establishing residence and in maintaining residency beyond the point of urban disintegration. The latter is suggested based on the continuity displayed by Early Established households, all settlement sites continuously occupied beyond the point of urban disintegration are those occupied by the descendents of Founding Households (Chapter 4). The following sections distinguish Early Established households from Late Established households through the characterizations suggested by Souvatzi and Rockman, and will factor into further discussion of civic integration and disintegration in Chapter 7.

7.2.1 Locational Knowledge: Architectural variability

7.2.1.1 Dwelling location

In Chapter 4 I describe the spatial distribution of BVS Cluster 1 settlement sites, argued to represent distinct commoner houselots and associated households (Goldsmith 2006), and their physical separation from those sites associated with BVS Cluster 2 and additional surrounding settlement zones both in terms of distance and natural topographic divisions. The proximity of these BVS Cluster 1 residential groups would have made possible a higher level of day-to-day interaction among residents of the associated settlement sites.

However, within this spatial proximity is a distinguishable division. Early Established households, represented by sites BVS-004, BVS-005, BVS-006, BVS-034, and BVS-035, situated themselves on the flat upper alluvial terrace of the cluster area, while all Late Established households (save two) were positioned on sloping areas leading to lower terraces. This distinction is further emphasized by the location of the ceremonial-administrative site of BVS-007, with Early Established households located to the east of this site and Late Established households to the west. This division in cluster settlement can also be observed in the ethnographic settlement studies discussed below and has much to do with the arrival time of immigrants and the guarding of local space (though not necessarily land tenure) and associated locational knowledge.

As mentioned in previous chapters, this upper terrace area of the BVS zone is also easily controlled due to a narrowing of the land around the area of BVS-007. This would allow control of foot traffic through the zone and up into the epicentral area, as well as controlling access to and from the river. The close spatial proximity of Early Established houselots to the eventual location of the integrative and controlling BVS-007 site may serve to represent and reinforce an initial alliance struck between urban administration and founding members of the BVS Cluster 1 community (Meyers and Carlson 2002:237).

Traditional Environmental Knowledge (TEK) refers to the traditional knowledge and use of natural resources when people migrate, and is a form of Rockman's locational knowledge. In most communities in developing countries, natural resources are extremely important to ensure livelihoods and are a major "Central Place" attractor (pull factor) in terms of initial settlement (Christaller 1933). The practical knowledge concerning such resources is therefore extremely important and can be heavily guarded by founding groups (Neisheim et al. 2006:100). Because of this, new settlers may become subject to community-level regulatory mechanisms, particularly the "authority" of founding groups based on the acquisition of such knowledge. This can lead to increased pressures between "hosts" and "newcomers" with regards to land access and competition for resources, and can ultimately lead to land (and social) degradation (Neisheim et al. 2006:100). However, it must also be acknowledged that the integration of newcomers with founders may also bring about new practical knowledge incorporated within the community structure.

From a human-ecological-centric view, the most essential environmental features in the Maya lowlands were: (1) fertile, well-drained, upland agricultural soils, (2) bajo and riverine areas suitable for intensive agriculture, and (3) potable water (Potter and King 1995:18). In the

BVS zone, the upper alluvial terrace contains the best drained (although very poor relative to larger valley perspectives) and most fertile of soils. This may have attracted early settlers (or autochtonous settled life) to the area, as has been suggested for the Macal floodplain, perhaps having created ideal settings for the growing of important perishable goods, in particular, cacao (Muhs et al. 1985). It is also from this upper terrace that water runoff that feeds the North and South Arroyos could be easily controlled, as evidenced by the cross-channel terracing noted during Phase 1 survey (Chapter 4). The location of Early Established households on this upper terrace suggests that over time they may have come to control the associated soils and waterways in this area of Buenavista (limitational knowledge).

The next most important considerations would be access to salt and other resources such as clay, chert, and marine/riverine/lacustrine resources. All such resources have spatially discrete patches/zones (Fedick 1988, 1996) and are of variable quality within their distribution, therefore the potential to link such resources to settlement decisions is likely. Some of these resources can be improved and/or maintained through human labour, and this activity would likely have enhanced and further localized important resources. Potter and King (1995:19) propose that this "patchy" resource structure made opportunistic specialization a key factor in settlement location, in particular its dispersed nature, and I believe also played a key role in the importance of locational and eventual limitational knowledge bases in community life history. Examples of opportunistic specialization communities include the many small communities that made up part of the Greater Tikal area (an urban amalgamation) that set themselves up near important clay deposits (Fry 1980, 2003), and of course the numerous communities of Northern Belize that made use of the presence of high quality chert in parts of the region (Hester and Shafer 1984; Shafer and Hester 1983).

Throughout the BVS Cluster 1 area, pockets of clay matrix were noted on survey particularly along the northern sloped area. Raw clay material was also found in association with the GPS Site/BVS-037 firing feature (see report by Dykstra in Appendix I) and a possible ceramic manufacture locale was identified at BVS-006 (see below). This might suggest that clay sources were an important factor in initial settlement decisions by Early Established households in BVS Cluster 1. Such an importance of clay resources is further supported by the identification of Late Classic polychrome painted pottery manufacture by attached specialists in the Buenavista epicentre (Reents-Budet et al. 1994, 2000).

7.2.1.2 Dwelling form

The settlement sites of BVS Cluster 1 are typical of ancient Maya residences, characterized by "sequential dwellings" that involve the chronological and vertical cumulative construction of perishable superstructures and, on occasion, associated masonry substructures (Moore and Gasco 1990). The sequential nature of the Upper Belize Valley sites typically involves the rebuilding of a structure on the same spot as the previous, as oppose to moving to a new spot with each new construction (Netting 1977; Pyburn 1998). The presence over time of multiple, closely spaced, sequential dwellings may reflect the developmental cycle of a family (Kramer 1979:157; Tourtellot 1988; Yaeger 2000a), intra-community differences in household wealth and status (Arnold and Ford 1980; Haviland 1982; Kramer 1979:157; Yaeger 2000a), dynamic changes in the corporate nature of residential groups (Hayden and Cannon 1982; Wilk 1988), or all of the above.

In BVS Cluster 1 the presence of multiple structures within a single settlement site is not clearly linked to differences in household wealth and status, or whether a settlement site represents an Early Established or Late Established household lineage. In considering the terminal configurations of settlement sites (Chapter 4: Table 4.4 and 4.13) 3 of the 5 (60%) BVS Cluster 1 settlement sites representing Early Established households were Type I settlement site forms, with 2 of 5 (40%) representing Type III forms. For Late Established households, 7 of the 9 (78%) settlement sites are Type I, while 2 of 9 (22%) are Type III. Although Type III sites are more prominent among Early Established households by the end of their life histories, this number is still quite low. The high percentage of single structure houselots is interesting when compared regionally (Table 7.6). Around Baking Pot, such a high number is also typical. However, once one moves up the valley toward Xunantunich or out of the valley proper and into the neighbouring Vaca Plateau, such as at the site of Minanha, this number drops significantly, with patio groups representing a much higher percentage of settlement sites. This is most probably linked to the nature of land quality and use in these two different areas, possibly affecting the development cycle and corporate nature of households.

A dwelling is often rebuilt when key architectural components have deteriorated due to rot or insects, accidental fire, or for more ideological reasons such as the death of a family member (Moore and Gasco 1990:207; Redfield and Villa Rojas 1934; Vogt 1969, 1998). Houses are typically salvaged for any useable materials and, as a result, when people clean their yards large areas are swept clean of debris and rocks (including former foundation stones) are routinely pulled up and placed in piles out of the way. This results in sets of materials recognizable in the archaeological record: intact stone foundations from final dwelling phases, small remnants of earlier dwellings, and piles of rocks in provisional discard zones (Hayden and Cannon 1982). In BVS Cluster 1 testing and excavations, such piles were encountered at some of the Late Established settlement sites including BVS-060 (lot group 060-2/4) and BVS-091 (Op 350AQ/4) (Chapter 4, Appendix I). The use of old building materials from earlier structures in the cluster appears more prominent at the Late Established settlement sites, suggesting a lesser degree of access to building materials, particularly soft limestone.

Masonry materials and fills appear to vary over time and space in BVS Cluster 1. Most construction phases within the structures of BVS-007 are composed of large, shaped, six-sided limestone blocks and slabs (urban, elite sponsored), while later architectural phases consist of small, roughly shaped or unshaped limestone blocks/boulders (no longer sponsored). Buildings associated with Early Established sites typically consist of at least roughly shaped limestone faces throughout their life histories, while the buildings of Late Established sites are typically a mix of larger and smaller materials, of shaped, roughly shaped, and unshaped materials. This suggests pillaging of abandoned site construction materials, as appears to have been the fate of BVS-007-2 (discussed in Chapter 4 and 5) whose facings were used in construction activity at the Late Established site BVS-077. However, this pillaging behaviour does appear in all Terminal Classic (780-890 C.E.) construction episodes throughout the cluster and likely represents a general trend noted of Terminal Classic construction pursuits throughout much of the lowlands (Longstaffe 2010:173).

Overall, use of larger limestone pieces in the architecture of Early Established sites suggests a degree of control over access to this resource, or to labour, that was of limited availability in the local environs, and the knowledge concerning its acquisition, whether this represents locational, limitational, or social knowledge, was guarded. This knowledge exhibited by Founding Households is contrasted with that of the elite and urban administration that had access to much more material of finer finished quality, exemplified by construction materials used at BVS-007 and in epicentral architecture.

Architectural fills of substructures (platforms) in BVS Cluster 1 also vary over space and time. In terms of chronological distinctions, those fills dating to the Early Classic (300-600

C.E.) and early facet of the Late Classic (600-670 C.E.) are predominantly of clay-based soils (likely from the surrounding occupation horizon) with few alluvial cobbles and some refuse material, particularly within BVS-007 structures and the architecture of Early Established settlement sites. A similar pattern is observed in the monumental construction of the epicentre (Ball 1993; Yaeger 2000a). Late facet Late Classic (670-780 C.E.) and Terminal Classic (780-890 C.E.) construction fills are predominantly of alluvial cobbles, refuse material, and a darker silt-loam soil. The limited example of Preclassic architecture uncovered also suggests fills predominantly of soil and some refuse, particularly *jute* shells. This pattern has been previously noted in the archaeological record of the Belize River Valley and neighbouring regions (Halperin et al. 2003; Healy et al. 1990; Solis 2010). A higher degree of artifact debris was also noted within fill deposits of Late Established settlement site architecture (Table 7.7), perhaps suggesting limited access to other fill materials such as alluvial cobbles and local clays. Rather, these "junior" cluster members made use of readily available, and seemingly uncontrolled, debris deposits from their immediate surroundings or beyond. However, this may also simply be a result of accumulation of refuse over time within the cluster, therefore more prominent within the construction phases of later household environments.

With regard to structure orientations, this topic is somewhat controversial in Maya settlement studies particularly with regard to the degree of accuracy one can observe today and to what degree a difference in orientation the ancient Maya themselves would have acknowledged as significant. Of the five Phase 3 excavated settlement sites (I will not attempt orientations based on buildings subject to testing alone), the terminal buildings of the four domestic sites were oriented 12˚ west of magnetic north, while those of BVS-007 were oriented 19˚ west of magnetic north (2008 declination) (Table 7.8). These values fall within the range of orientations noted from buildings plotted on the MMT map of the Buenavista epicentre. At this point, I do not feel confident to make any interpretations based on these results, if there are indeed any to be made, although it is worth noting that all domestic sites are of the same orientation, while the civic/community-oriented site differs slightly.

7.2.2 Limitational Knowledge: Economic activity

As mentioned in Chapter 2, the acquisition and guarding of locational knowledge leads to limitational knowledge involving understandings of boundaries and costs regarding the exploitation of necessary resources and leading to larger understandings such as the carrying capacities of landscapes. The manufacture, distribution, and consumption of objects are social phenomena involving the co-operation of many persons and the transmission of locational and limitational knowledge (Childe 1949:3). How we make and use "things" are skills learned from our closest relationships in society. Although they are typically individually invented, people are persuaded by others to use and to reproduce them, resulting in the patterning of culture.

All houselots examined suggest associated households were at minimum involved with food production and processing and basic lithic core reduction for expedient flake tools, with similar percentages of primary, secondary, and utilized flakes recovered from all domestic settlement sites. However, other forms of craft production appear limited to Early Established households within the neighbourhood who already possessed hundreds of years of locational knowledge prior to the arrival of Late Established households. The level of activity suggested by material remains may imply manufacture for individual household consumption, with possible larger neighbourhood production, but does not suggest specialized marketplace-level production (in my opinion). It is these activities that I argue represent limitational knowledge guarded by these households and allow them, along with control over locational and social knowledge, in part to persist beyond the point of urban disintegration. This is in contrast to views gaining popularity among many Maya archaeologists that consider lowland craft specialists (part time and full time) as land poor or marginal households that are attached to wealthier land owning households (McAnany 1993; Ball 1993). The situation at BVS Cluster 1 appears more similar to findings within many rural communities around nearby Xunantunich where VandenBosch (1999) discovered settlement clusters composed of households that exhibited a wide range of variability with regards to lithic manufacture pursuits suggestive of economic differentiation and likely integration.

Sheets (2000) discusses the simultaneous operation of a Village Level (horizontal) Economy, in which one household in a "village" (specified community) produces a particular item, such as manos and metates, leaving remaining households dependent on their production in conjunction with a Vertical Economy focused on the acquisition of "exotic" or more mass produced (market level goods) or specially produced items through elite activity. This is in contrast to an Ideal Free Distribution that dictates how people settle on a landscape in looking for the most beneficial patch of a resource (Ford and Fedick 1992; Sutherland 1996). However, there is no reason these three cannot all operate within the life history of a single community and I feel this is the case that best illustrates the dynamics between Early Established and Late Established households and urban administration in BVS Cluster 1 over time.

7.2.2.1 BVS-004 *metateros*

During 2007 testing and 2009 excavations, an attached terrace was uncovered on the east side of BVS-004-1, and wrapped around to the south side of the building. At the south end, a concentration of metate fragments was uncovered on the surface of the terrace, potentially indicating a special activity area that continued around to the south side terrace [lot groups 004-1/10, 1/11, 1/13, covering the Early Classic (300-600 C.E.) to the Terminal Classic (780-890 C.E.)]. Groundstone materials represent 0.2% of the total assemblage from all contexts at BVS-004 (0.27% of all habitation debris), while at other domestic sites it represents only 0.1% (at BVS-077 this is 0.3% due to the small size of the total assemblage). Metates represent 53.85% of groundstone materials within the BVS-004 habitation debris assemblage, much higher than other domestic contexts, and concentrated in the central area and southern edge of the east terrace. BVS-004 habitation debris produced seven fragments from different individual metates, while BVS-006 produced three, and BVS-060 and BVS-077 produced none.

Floatation samples (356G/3-F1, 356F/4-F1, 356K/4-F1, Appendix VIII) collected from the north and east terrace areas resulted in many tiny grano-diorite fragments in the heavy fraction material, not found in other floatation samples from habitation debris contexts at other sites. Along with higher number of groundstone pieces, such small debitage pieces are expected in *metatero* work areas where grinding and pecking is involved in manufacture (Hayden 1987:37; Turuk 2006:31). Also expected would be a number of hammerstones. BVS-004 habitation debris includes two hammerstones, while only one other was recovered from BVS-007, however many utilized cores with visible battered ends were recovered from the north and east terrace areas. This could suggest use of exhausted cores, as well as recycled thick biface tools, as metate pecking stones (McAnany 2010:112-113). Utilized cores from other settlement sites do not typically possess this battered appearance, although those from BVS-006 appear to have been used in both battering and scraping functions.

No metate preforms were recovered from the site, although one was recovered from the patio/plaza surface of BVS-007 and one from GPS Site 037, the enigmatic daub feature. This site, representing a possible lithic heat-treating site (Appendix I), is in the near vicinity of BVS-004 and used during the Late Classic and may have served as a special activity area for the household. Large pieces of granite would likely have been removed from settlement sites during abandonment or post-abandonment activity.

7.2.2.2 BVS-004 woodworkers

Another special activity performed at BVS-004 took place on or near the north terrace (lot group 004-1/10). In this area, eleven scrapers and four graver/incisors were recovered in debris deposits. Around the corner on the east terrace, three drills and two graver/incisors were also found. Thirteen cores were also recovered from the north terrace, perhaps to produce the scrapers and graver/incisors that were fashioned from individual flakes. What was being produced with the scrapers, gravers, and drills is unknown, although woodworking would be a possible pursuit. Future use-wear analysis will be conducted on these materials.

7.2.2.3 BVS-004 and BVS-006 biface manufacture

The Early Established households appear to be involved in biface manufacture. Most thick bifaces in BVS Cluster 1, most commonly of a celt shape typical of General Utility Thick Bifaces in the Maya Lowlands (Appendix III), appear to have been produced from bipolar cores: possessing a slightly convex cross-section and often containing cortex patches on several aspects of finished forms.

Preforms were only recovered from BVS-004 and BVS-006 deposits. Biface Reduction Flakes (BRFs) represent 3.6% (38 pieces) of the BVS-004 lithic assemblage and 2.12% (26 pieces) of the BVS-006 lithic assemblage, while BVS-060 and BVS-077 contain only 5 pieces (1.28%) and 1 piece (0.88%) respectively. A higher percentage of tertiary flakes were also recovered from BVS-004 and BVS-006 assemblages along with a higher percentage of thick bifaces, thick biface fragments, and cores. As mentioned above, GPS Site 037 is a possible location of lithic heat-treating, and is in the vicinity of BVS-004, possibly associated with material preparation for biface manufacture. The adoption of heat-treating would suggest a higher level of limitational knowledge regarding the workability of some local chert materials.

7.2.2.4 BVS-006 ceramic manufacture

Findings at BVS-006 suggest ceramic manufacture may have been pursued by residents of the site throughout most of its life history. Arnold (1991:87) distinguishes three classes of data that might potentially serve to identify Mesoamerican ceramic manufacture locations and inferred behaviour from the archaeological record: 1) the tools and facilities of manufacture, including often cited “enigmatic firing features” in archaeological literature, 2) the mistakes and residues of manufacture, and 3) the finished products (see Rice 1996 and Stark 1983 for similar classes of data).

During 1m x1m profile window excavations into BVS-007-2, a solid layer of debris was uncovered beneath the building fill (lot group 006-2/6d), sitting directly atop the buried occupation horizon (Chapter 4). This partial deposit (the remainder extending beneath the structure) included over 1400 ceramic sherds. This extremely dense concentration of debris, approximately 40cm thick, had little earthen matrix within and had the appearance of lying in situ. It is very similar to a description in Willey et al. (1965) concerning a house site at Barton Ramie in the Central Belize Valley. In house mound BR-1 between occupational levels (identified by plaster floors), excavators found a 50cm thick level of non-occupational use that included alignments of stones, without clearly associated floors. There were two discrete episodes or levels of burned clay along with ash and charcoal layers as thick as 5cm dating to the Late Classic period. Also in this provenience were “…two large pockets or clusters of sherds that were found in an extremely dense concentration… with so little earth fill among them that it would appear that the sherds had been dumped all at once from some large container” (Willey et al. 1965: 45-47). This also fits patterns associated with Features 1, 2, and 3 discussed below, as well as the midden feature of GPS Site/BVS-160.

Feature 1 on the BVS-006 patio is an enigmatic firing feature, consisting of a round, raised, cobble circle on the patio surface, although it is not clear as to whether it was purely associated with the terminal surface as it may have been continuously built up/maintained over time.[14] The interior of the circle is a pit or sunken circle, filled with a mixture of soil, carbon pieces, small daub pieces, and lithic chunks. The pit is roughly 65cm in diameter north-south,

[14] This area was ploughed in 2010 before we could return to further investigate the feature.

90cm in diameter east-west, 40cm deep, and is partially lined with cobbles and continues into the buried occupation horizon below the BVS-006-patio-1st surface.

The feature was initially thought to be a hearth; however, the lack of typical ash layers and its significant depth argue against an oxidized firing feature/atmosphere. It is now believed this may be the basal portion of an earth oven or *pibnal* used in food production, similar to the pit-hearths and patio-hearths of Nohmul (Pyburn 1989:336), or possibly smudge pit for smoking hides (Binford 1967), or firing furniture related to pottery production (Potter and King 1995). Analysis is currently underway on all soil material removed from the interior of the pit feature.

To the immediate southwest of the firing feature, crossing a portion of the elevated circle is an alignment of upright stones (soft limestone) embedded in the patio. This line is almost below the patio surface and is not associated with any other architectural alignments in the group. It is possible, based on the points mentioned above concerning the large amounts of ceramic debris and the extension of the pit-hearth into the buried occupation horizon, that this line is associated with early patio activity. Such an oddly placed and oriented line may have served as an early wind-block for prevailing or dominant winds, prior to the enclosure of this area by the placement of a larger building at BVS-006-1, and the addition of BVS-006-2 and 3 at the site (Deal 1998:75). The remains of an in-filled post-hole (Feature 4) were also located directly south of this feature beneath the patio fill and may also be associated with early activity at the site (Chapter 4).

Immediately east of the firing feature is a large concentration of daub (Feature 2, lot group 006-patio/6) unlike the *bajareque* recovered from typical perishable superstructure remains (form and colour). This concentration covers an area of roughly 1.5m x 1.5m and is 20cm thick in some areas, resting directly atop the patio surface. From within the concentration, various curved piece of daub were recovered (Chapter 4). These pieces were of the correct curvature to either have been from the inside of the pit, or to have been part of a superstructure for the feature. Willey et al. (1965) also frequently mention the association of burned-clay lenses/features associated with potential firing pits and dense concentrations of ceramics.

Finally, a concentration of carbonized wood/logs (Feature 3, lot group 006-patio/7) was located directly north of the daub concentration, resting directly atop the cobble patio surface. No burning was found in the humus or colluvium layers above this area, so it is likely not the result of modern burning. It is odd that complete, large pieces of charred wood would survive in this type of context archaeologically. The direct association of the pieces with the terminal cobble surface (they were completely removed and the cobble surface was found to continue intact and uninterrupted beneath) and their direct proximity with the daub and firing features is curious and may suggest its use as fuel (set aside between firings, see Deal 1998:Fig. 3.31).

Initial macrobotanical analyses suggest these were all dicot woods (not pine) and mostly compression wood, elbows, joints, etc. (John Jones, personal communication, 2011). These might be expected "scavenged" fuels in a valley that was likely largely deforested and particular large trees are known to have been scarce during the Late Classic (Lentz et al. 2005). Unfortunately, preliminary radiocarbon analysis suggests this deposit is not Precolumbian, producing a conventional radiocarbon age of 140±30 BP (Appendix VIII). It is possible this is a mistake, but until the material can be retested this possibility must be acknowledged.

Potter and King (1995:24) mention that the firing of ceramics in open firing features near workshops or houses in ethnographic contexts is often only identifiable later on by quickly dispersed debris of temporary firing installations, leaving little or no trace in the archaeological record. Barbara Stark (1983:164) also discusses Yucatecan beehive or round kilns that are quite similar in description to the remains on the BVS-006 patio if a daub superstructure is taken into consideration. Vertical kilns in the form of earthen pits within stone/bedrock or even clay lined have also been identified in ethnographic pottery manufacture contexts (Stark 1983). An enigmatic "fire pit" described at Barton Ramie (BR-64) is also similar to that of BVS-006. It was roughly 1m in diameter and 1m deep and "…contained dark refuse, loose soil, and rock chips…at the bottom…a deposit of large sherds associated with a great many lumps of burned clay" (Willey et al. 1965:186). It was concluded to be a garbage pit, but may have been something akin to the Rio de On fire pits (Masson 2000:86).

The possibility of ceramic manufacture using this firing feature is quite strong. The concentrated deposit of ceramic sherds beneath BVS-006-2 is quite intriguing, as are the large number of ceramics recovered off the north and east sides of the structure (over 3300 sherds, lot groups 006-2/6b and 2/6c), the majority of which are quite large compared to most debris assemblages recovered (>5% rim), and an overall count of 10,161 sherds were recovered from all habitation debris contexts at the site. Possible opportunistic ceramic tools, broken sherds used as scrapers, shapers, and smoothers in pottery manufacture (Small Find # CR-046 and CR-047, Figure 7.1) were also recovered from these deposits, similar to those found at the site of K'axob in Northern Belize (Varela et al. 2001:186–187) and at Rancho del Rio in Honduras (Peuramaki-Brown 2012).

Finally, a midden consisting of over 2400 ceramic sherds located down slope (approximately 15m north) of BVS-006, was excavated as part of Operation 357 (Chapter 4). Excavations confirmed the presence of a sloping landscape in Precolumbian times and large sherds (>5% rim) dominated the assemblage throughout the deposit that was piled in a talus formation against the sloping surface. Materials removed from the deposit were predominantly ceramic with a maximum vessel frequency of 245 (based on 281 rim fragments). The deposit materials date predominantly to the late facet of the Late Classic (670-780 C.E.) and Terminal Classic (780-890 C.E.), the same time span as activity associated with the terminal patio surface. A more detailed assessment of this assemblage, particularly to attempt more complete refits to understand if this definitely represents a pile of "mistakes" from ceramic manufacture (among other debris), is necessary.

7.2.2.5 BVS-006 slate working

Slate working is another possible endeavour pursued by the residents of BVS-006. The highest percentage of groundstone material within the habitation debris of the site is raw slate (47.83%) from deposits at BVS-006-1 and BVS-006-2 as well as worked pieces of slate and a slate plaque, and the highest number of slate pieces (raw/refuse and worked) overall were recovered from this site (30 pieces, within the range of counts reported for domestic Pacbitun slate manufacture locales, Healy et al. 1995). A rare piece of a slate wrench (mace, Small Find # GS-016, Figure 7.2) was also recovered from the humus of BVS-006-1 (lot group 006-1/1), the only such artifact found in the settlement zone (similar artifacts in Willey et al. 1965:Fig.295).

Slate is considered a somewhat "exotic" material in the Belize River Valley as it is restricted in spatial distribution, and it is typically used in the production of small "special" portable items or quarried as large slabs for tomb capstones or stelae monuments (Kersey 2000). It was possibly collected from the Macal River to the east, or traded in from the Mountain Pine Ridge, and access was most likely controlled (Healy et al. 1995). Residents at BVS-006 would have had to control access to either groups (elites, merchants, etc.) linked to such sources, or to locational knowledge regarding where to access such a resource.

7.2.2.6 Exotic material access and use

Knowledge of and access to exotic materials has long been recognized as an important aspect of ancient Maya socio-political and economic life. One of the most prominent of exotic materials found within settlement site assemblages is volcanic glass or obsidian (Appendix III). Of the four domestic settlement sites extensively investigated, the households of BVS-006 had access to the most sources of obsidian material: five different sources determined by EDXRF characterization (Table 7.9).[15] This site also produced the only obsidian core, other than the one recovered from BVS-007-1 fall material, and suggests this Founding Household was significantly engaged in long distance trade networks, or at least possessed the locational and social knowledge or relationships with merchants or elite sponsors, necessary to gain such prized material.

Another form of obsidian analysis to consider are CE/M averages (length in cm x 2 divided by mass in grams): centimetres of cutting edge per gram of mass (McKillop 1996), values that can reveal general availability, local production efficiency, and potential conservancy of obsidian products at specific locations or groups of locations. Also considered are blade and blade segment width values that might indicate production efficiency and relationship between blade production and exchange in a given locality. In the case of BVS Cluster 1 excavated groups, the two Early Established households have higher average widths of blades and lower average cutting edge values (Table 7.10). The opposite is true of the Late Established households. BVS-007 has the highest average width and a low average cutting edge value; not surprising given its probable non-domestic function. Tritt (1997) concluded that greater variety of obsidian sources existed among the middle status elite of Buenavista with blade width and CE/M also highest. He suggests this implies a special relationship between these groups and those who supplied the obsidian (middlemen). A similar assumption would therefore be made of Early Established (Founding) commoner households in BVS Cluster 1.

[15] Further EDXRF characterization of additional BVS obsidian material is currently underway at the McMaster Archaeological XRF Lab.

7.2.3 Social Knowledge: Domestic ritual and burials

Ceremonial activity and burial practices can also serve to distinguish household identities and associated social knowledge bases. With regards to burials, the only human remains recovered in BVS Cluster 1 were Burial 350-B1 from BVS-034 and the phalanges recovered from the primary deposit at BVS-007-1. As such, I will focus rather on the distinction of Early Established households from Late Established households as represented through domestic ritual/ceremonial activity.

Other than the assemblage at BVS-007, both BVS-004 and BVS-006 contain much higher percentages of ceremonial materials within their habitation debris deposits. This is possibly linked to the previously noted ethnographic information that discusses clusters among the Northern Lacandon that consist of older and younger households (Boremanse 1998:27). The reason for nucleation within a cluster includes the maintaining of social knowledge, including the transmission or guarding of myths, rituals, incantation, and ceremonial leadership. The older households are typically the ritual leaders of a community and younger households make use of their ceremonial paraphernalia, such as censers.

The access to and guarding of social knowledge linked to the practice of particular rituals is also linked to prestige and social esteem within communities (Clark and Blake 1994). This can be knowledge linked to more local, household, community ritual (*mētis*) or to more esoteric civic/state-level ceremonial knowledge. Shaman often held important community roles due to their control over ritual knowledge bases on the community level. When ritual activity was occurring at BVS-007, this may represent direct conflict between those community members (either from the neighbourhood community, or more likely, from the urban administration) who held knowledge of larger public rituals versus those community/neighbourhood leaders (Founders) who held the knowledge of more local ceremonial activities.

7.3 Ethnographic analogy

Many of the ethnographic patterns examined in Chapter 6 continue to be relevant for our discussion of household differentiation and knowledge bases, particularly with regard to the nature of interaction between Founding Households and "others". In this section I will relate two other analogies that can be used in the consideration of urban integration, disintegration, and knowledge bases.

7.3.1 The shantytown

Shantytowns are an underutilized modern day situation from which we might gain important information concerning settlement development over time, including gaining an understanding of differences among households that make up such settlements (Pugh 2000; Ward 2002:8-13). Shanties are defined as inadequate domestic structures, flimsily constructed with makeshift materials by unskilled labour (not formal/esoteric architectural knowledge) by owners and their friends. Popular views of shantytowns see these forms of settlement as rather static, homogenous communities. However, shantytowns in Latin America can consist of more than one class of people and even contain businesses. Residents are capable of improving their financial conditions, they can move around within the settlement and renovate their dwellings, and infrastructure can also appear and be improved upon within these communities (e.g. streets), while at the same time are subject to the reverse if financial conditions deteriorate. This emphasizes the dynamic nature of these communities and reminds us that these individual communities/neighbourhood areas are part of the overall process of urbanization.

Shanty towns are commonly found in the preindustrial cities of developing areas where marginal public lands still exist on the urban fringe (Safa 1974:2) and their often quick development, denouement, and collapse contain important information from which we might draw analogies for the archaeological record. The lack of securely "owned" land within shantytowns also makes it a potentially superior comparative dataset against which to compare Precolumbian commoner settlement transformation.

In her ethnography of the Puerto Rican urban development program, Safa (1974) examines the impact of "Operation Bootstrap" on the urban poor. This ethnographic study differs significantly from other studies that focus on national/polity-level changes measured in terms of indices of economic growth and other standard measures of modernization. In her study, Safa attempts to describe the impact of changes on a particular segment of Puerto Rican society: migrants who left rural areas in the early 1940s for the urban core of San Juan. She argues that the lives of these families reflect the transformations in society in ways previously unaddressed by social science studies. Shantytowns are the principal form of residence for the urban poor, and Safa notes a number of patterns in the shantytown development that may be relevant to our discussion of BVS Cluster 1 life history and the knowledge bases reflected in associated household biographies and identities.

The study questioned how these migrants fared over time in the city? Where did they settle and what kind of jobs and other opportunities did they find? How did the shantytown community facilitate (or not) their adaptation to the urban milieu? Investigations followed 200 families/ households (474 individuals) through the tracing of the movements of these shantytown residents over a ten year period and emphasized the resourcefulness and optimism of the urban poor and their ability to respond to changing socio-economic conditions, while at the same time highlighting the differences between families/ households that compose individual communities (Safa 1974:3). A heavy concentration of activity occurred in the San Juan metro area (downtown, epicentre) that acted as a powerful magnet for rural migrants looking for jobs and urban amenities (pull factors). The emergence of shantytowns was therefore explained by the need for an urban labour force, similar to the need for support populations within Maya urban centres. As such, the fate of the urban "proletariat" became inextricably linked to the development of the urban economy as a whole, which is in turn linked to the larger social, political, and economic worlds it inhabited.

San Juan is the chief port of trade for Puerto Rico, serving as a gateway within the Caribbean. The rise in importance of the capital was reflected in rapid population growth due to migration from rural areas, with the population having doubled from 1900 to 1950. The same doubling of population occurred at Buenavista (reflected in BVS Cluster 1) during the initial Early Classic boom (Chapter 4). As part of this boom in San Juan, the boundary lines between neighbouring settlements (the urban core and surrounding communities including shantytowns) became blurred and eventually all were absorbed into the San Juan administration.

Safa (1974:8) provided an outline of the growth and decline of shantytowns, and noted that early rural migrants to San Juan settled themselves along the banks of the Marin Pena Channel. This area of land was an example of "marginal public land" in the larger urban settlement, located outside the urban epicentre. It was deemed unfit for residence or commercial use over the course of San Juan's history, deemed so by the urban administration (formal esoteric knowledge). These settlements started in previously unclaimed or unwanted areas, often focused on channels or waterways and spread in a linear fashion. This is of course reminiscent of the "water-focus" of the BVS clusters mentioned in Chapter 4. Early Established households in the shantytown never acquired legal title to land, but over time did hold authority over its use. For example, houses/shanties were bought, sold, and families were even compensated if their dwellings were destroyed. Because the shantytown land was marginal land, these communities found themselves set off both physically and socially from the rest of the metropolitan area.

Individual settlement sites within the shantytown were distinguished based on their location. Those people whose houses extended over the banks of the channel, a less desirable location, were referred to as "Los de Abajo" or "Those Below". These households were distinguished from those Early Established families who situated themselves further up on the banks. This segregation of families lead to an overall concentric development of the shantytown (Safa 1974:9), similar to the somewhat Concentric Zonation (Chapter 1) noted in BVS Cluster 1. Differences between residents were also reflected in their houses that could vary considerably in size and overall condition. When possible, newcomers to the community would often settle near relatives who would then help them to adjust to urban life in the shantytown, passing on acquired practical knowledge. This might be comparable to those Late Established households situated amidst the Founding Households at BVS Cluster 1.

A shantytown, for the most part, functions as a cohesive face-to-face community "knit together by kinship, *compadrazgo*, friendship, and patterns of mutual aid and cooperation built up over years" (Safa 1974:61). While relationships within the community tended to be highly personal, those relationships beyond tended to be more impersonal and highly utilitarian. This may be similar to communities of the ancient Maya, where lineages may have been important relationships represented by clusters of settlement, while less personal, esoteric relationships linked different areas of urban dispersed settlement.

Although separated from others within the metropolitan downtown area, shantytown residents worked/cooperated with the others nearby who had services they lacked (e.g. water) in order to gain these necessities within the shantytown. This demonstrated the operation of dynamic relationships not only within the shantytown but also between communities that made up the larger urban entity. Within the town committees were formed, particularly of older town members, to protest poor conditions but few civic services were ever provided. This required that individuals, particularly members of those younger households who had not fully discovered how to survive as self-sufficient entities, shop at times in the downtown for most things and to seek employment. This created a degree of dependence of some shantytown residents on the wider metropolitan community, creating a group of "wage-oriented" urban poor (Safa 1974:12). We might consider such a group similar to the Late Established households of BVS Cluster 1.

It is recognized that a core of "old timers" within the dynamic shantytown created a sense of stability within the neighbourhood. This Founding group represented the local, *mētis* knowledge that underlay the community throughout its life history. "These old timers form a stable nucleus to who new migrants can attach themselves and provide important sources of leadership and continuity for the community" (Safa 1974:13). These original residents even ran businesses within the town, often stores that became very popular public meeting areas within the community. Their socio-economic status within the community was gained through the acquisition of occupational skills related to their surrounding environment (locational and limitational knowledge), as well as in their ability to increase the number of active members of their households (limitational and social knowledge) (Safa 1974:26, 63). For example, extramarital affairs were acceptable if they meant the acquisition of new viable household members. These groups also commonly acted as middlemen in illegal activity within the community, acquiring "exotic" resources for their members. This same role is proposed of the Early Established (Founding) households of BVS Cluster 1.

When civic involvement increased within the community (esoteric knowledge), the authority and control assumed by "old timers" could decrease and potentially lead to the breakup of kin and neighbourhood bonds and therefore a loss of localized control. The reverse was then also true, with an increase of authority to Founding Households when civic involvement decreased. Such shifts can be key to the integration as well as disintegration of shantytowns (Safa 1974:66), as is argued for Buenavista (Chapter 8).

As there was room for social mobility within the shantytown, the guarding of relevant knowledge was often key to survival. Residents would exchange labour or skills (acquired limitational knowledge) in return for required resources (food, drink, etc.) or other reciprocal favours. A saying existed within the town: "Nadie aqui pasa hambre" (no one goes hungry here) (Safa 1974:18). This further suggested a degree of cooperation within the shantytown when possible, that could also function as a leveling mechanism between the different resident groups. This might function in a similar way as public ceremonies or rituals, such as the religious fiesta redistribution practices in peasant communities (Wolf 1966). Such mechanisms are emphasized, as too high of a degree of internal differentiation would weaken neighbourhood solidarity. However, cooperation among community members was usually on an *ad hoc* basis and was often more evident in times of crisis, e.g. during accidents or fires (Safa 1974:62).

The cohesion of the shantytown permitted the urban poor to "retain an integral, meaningful style of life despite their position at the bottom of the social ladder [horizontal integration]" (Safa 1974:20), although stresses within the systems of vertical integration, such as urban changes and failures, could find pre-existing fractures within the horizontal integration. When relocation was suspected due to such stresses, those who did not invest in their homes/furnishings, either due to inability or reluctance, would acknowledge the impending decline and move on. Those who had invested in their homes, most typically the Early Established sites/households, would entrench themselves and hold on as long as possible (Cost-Sunk Effect).

Overall the shantytown could not support all of its residents. Only a few families operated businesses within the community and would survive for any extended period of fluctuation within the wider urban community (Safa 1974:29). The rest were left extremely vulnerable to the fate of the larger urban entity. When residents could not find jobs, migration was the most suitable option. This tended to be most prominent among younger age groups (households). Even when migration occurred, close kin ties would be maintained with those who remained in the shantytown, and kin within the new adoptive community would help the newcomers adapt for a period of time (Safa 1974:59).

7.3.2 Zinacantan settlement

Ethnographers Sol Tax and Evon Z. Vogt first made the municipio of Zinacantan famous in the 1940s, 1950s, and 1960s. Among other observations, Vogt's work *Zinacantan: A Maya Community in the Highlands of Chiapas* (1969) related the nature of settlement in Zinacantan. He describes the *municipio* as a "classic example of an ancient type of Maya settlement pattern: a ceremonial center with a sustaining area of outlying hamlets in which the bulk of the population lives" (Vogt 1969:155). These hamlets were made up of two types of residential clusters known as *sna* and waterhole groups.

A *sna* is one or more localized patrilineages, an extension of patrilocally extended domestic groups, whose members live on adjacent lands that they have inherited from their ancestors. Lineages can marry into a *sna*, and these people/households will settle in the new cluster. The predominant lineage of a *sna* is typically that which first settled on the land now controlled by the *sna*. Senior male members or households make important decisions within the sna, and these households can also control associated lands and ritual paraphernalia used in ceremonies in the settlement and the centre (Vogt 1969:140-141).

The recognition of predominant lineages is linked to a code, important to the ordering of most aspects of Zinacantan life, known as the "Junior-Senior Principle (Vogt 1969:238-239). This is a principle of ranking that applies to all people, places, and things in Zinacantan communities. Its primary use is in the distinguishing between older and younger brothers however, it is also applied to hills, mountains, waterholes, crosses, lineages, households, etc. It serves to separate the world into binary pairs of "older/younger, more powerful/less powerful, and more prestigeful/less prestigeful" (Vogt 1969:239). The most important factor in distinguishing position of rank is "time elapsed since an event occurred in the life of a person or in the transformation of a natural object" (Vogt 1969:239), such as the initial establishment of a lineage on a settlement landscape.

In discussing the possible origins of such a principle, Vogt (1969:244-245) mentioned the potential outcomes of such systems. These included recurrent struggles for power and resources each generation between senior lineages and junior lineages. Such events would have the potential to lead to fissions in the systems of social organization, or by extent, a community and urban landscape, in which junior lineages are forced to move to new lands where they would establish their separate ancestral shrines. He went on to state that "this type of age-ranking also has a built-in potential for strain, for if a man's worth is basically judged by 'time in service,' there is bound to be conflict with younger men who display intelligence and competence and achieve given goals more quickly" (Vogt 1969:239).

With regards to settlement and this principle, we might look at the role of *principales* in the functioning of communities. Two *principales* are selected each year from each hamlet to represent the *Presidente* (administrative leader of the *municipio*), and the status of one's household/lineage plays into this choice, particularly if from a founding lineage. It is the duty of the *principales* to carry out orders that come from the ceremonial centre, to report hamlet affairs and problems, to collect "taxes" to offset major fiestas, and to carry out ritual duties particularly at Year Renewal ceremonies (Vogt 1969:148). This creates an administrative division between households within the community that includes higher levels of social and esoteric knowledge among families named as *principales*.

Hamlet unity is ritually expressed by two annual ceremonies. These rituals symbolize the unity of the hamlet (horizontal integration) and its relationship to the tribal ancestral gods in the ceremonial centre (vertical integration). People move between the centre and the hamlets for the purpose of working farmland (move into hamlet), to work or own stores (move into centre), and for ritual activity (Vogt 1969:161). Ceremonial movements link the centre with the hamlets through ritual processions that visit the temples (Chapter 6), sacred mountains, and waterholes that make up ceremonial circuits tying the centre to the periphery. Political functions also provide links between the areas: e.g. the reports of the *principales* to the *Presidente*, also the provision of construction supplies for civic and religious buildings in both areas come from both the centre and hamlets. Economic reasons also include the movement of personnel and things, such as the advent of market days that bring in people and things from surrounding areas to both buy and sell items.

Rituals that connect different parts of the urban zone, often involving the rituals of a *cargo* system, serve to define the limits of community membership, reinforce commitment to common values, reduce potential conflict, and supports traditional kinship patterns (Vogt 1969:269). It is these rituals that move from centre to outlier and the public rituals and activities in the centre that keep contact between people and orient people to the central place. However, problems can arise when such rituals do not grow with the size of an urban population. Vogt noted that although the number of positions in the ritual hierarchy increases, it cannot keep pace with demographic explosions and expansions of urban administration (or increased centralization), resulting in local leaders waiting 20+ years for positions on the ritual circuits (ignoring of *mētis* knowledge and the authority of local leaders). As a result, the system could be strained to a point where it would lose importance as a social integrative institution on a local level. It is this failure, along with additional stresses within the valley, that I believe lead to the disintegration of the Buenavista community through the worsening of pre-existing cleavages/fissions within neighbourhood organization.

7.4 Communities, Households, and Knowledge

This chapter attempted to address the crucial role of knowledge and time in the urban environment (Low 1996:401). More specifically, I attempted to examine the role of social landscape differences over time, as reflected in the identities and associated knowledge bases of individual commoner households throughout the life history of a community. Future research with this dataset will focus further on addressing the individual agency/choices reflected in the material records of households, particularly during periods of decline.

The next chapter will discuss both sets of observations and interpretations addressed in Chapters 6 and 7 with regard to the topic of urban integration and disintegration as seen through the lenses of built environment and knowledge bases at Buenavista del Cayo. It will incorporate observations from wider contexts in which the life history of the Buenavista urban zone are situated, and will conclude with a suggestion as to how to extend a similar discussion to the larger issue of the development of the Lower Mopan River and Belize River Valleys over time through an "urbanization" lens.

lot group	time	utilitarian	serving	ceremonial	other	unknown calcite	unknown ash	TOTAL	COMMENTS
004-1/10	EC-TC	38	22	4	1	21	4		other = perforated disk/whorl
004-1/11	TC	26	5	3	1	11	0		other = pendant
004-1/12	TC	15	15	0	0	11	2		
004-1/13	TC	43	22	8	0	32	4		
004-1/14	LCI-LCII	7	1	1	0	5	0		
004-1/15	MP-EC	0	0	1	0	0	0		
004-1/17	EC	4	1	1	0	11	1		
004-1/18	MP	2	0	0	0	0	0		
		135	**66**	**18**	**2**	**91**	**11**	**323**	
		41.80%	***20.43%***	***5.57%***	***0.62%***	***28.17%***	***3.41%***	***100.00%***	
006-1/8a	TC	83	31	1	0	17	3		
006-1/8b	TC	10	4	0	0	0	0		
006-1/8c	LCII-TC	14	5	6	0	7	6		
006-1/8d	GP-TC	7	5	1	0	5	0		
006-1/9	ND	1	0	0	0	0	0		
006-2/6a	MP-LCII	24	14	2	0	4	1		
006-2/6b	PP-TC	60	27	11	0	19	2		
006-2/6c	GP-TC	69	36	4	0	20	2		
006-2/6d	MP-LCII	50	40	6	2	15	1		other = ceramic tools
006-3/5	LCI-TC	28	21	5	0	14	0		
006-patio/4a	LCII-TC	12	4	0	0	4	1		
006-patio/4b	LCII-TC	15	6	4	0	5	0		
006-patio/4c	LC	5	1	0	0	0	0		
006-patio/4d	LCII-TC	2	1	0	0	0	0		
006-patio/4e	LC	4	2	0	0	2	0		
		384	**197**	**40**	**2**	**112**	**16**	**751**	
		51.13%	***26.23%***	***5.33%***	***0.27%***	***14.91%***	***2.13%***	***100.00%***	
007-1/22a	LCII	19	3	3	0	1	3		
007-1/22b	LCII-TC	15	11	4	0	3	0		
007-1/22c	EC-LCI	35	2	5	0	6	0		
007-1/22d	LCI-II	28	2	0	0	0	0		
007-1/22e	EC-TC	37	22	18	0	9	1		
007-1/23	TC	0	0	1	0	0	0		
007-1/24	LCI	7	0	0	0	3	1		
007-1/25	PP-LCI	107	35	9	1	56	0		other = disk/lid
007-2/12	EC-LCI	39	5	10	0	16	0		drum included in ceremonial
007-2/14	LCI	7	1	0	0	13	0		
007-2/15	LCI	0	5	1	0	0	0		
007-2/16	LCI	3	0	0	0	0	0		
007-2/17	LCI	0	0	0	0	3	0		
007-2/18	PP-EC	8	0	1	0	0	0		
007-patio/6a	LCI-LCII	33	11	11	0	4	2		
007-patio/6b	LCI-TC	50	9	0	0	14	0		
007-patio/6c	EC/LCI-TC	14	5	1	1	13	2		other = disk/lid
007-patio/7	LCI	4	1	0	0	0	0		
		305	**86**	**52**	**1**	**110**	**5**	**559**	
		54.56%	***15.38%***	***9.30%***	***0.18%***	***19.68%***	***0.89%***	***100.00%***	
060-1/8	LCI	6	1	0	0	0	0		
060-1/9	LCI	3	1	0	0	0	0		
060-1/10	EC/LCI	9	4	1	0	0	0		
060-1/11	EC/LCI	12	4	4	0	6	2		3 ceremonial = intrusive pit
060-2/4	EC-LCI	57	13	0	0	37	5		
060-3/6	ND	0	0	0	0	0	0		
060-3/7	LCI	13	4	0	2	3	0		other = disk
		100	**27**	**5**	**2**	**46**	**7**	**187**	
		53.48%	***14.44%***	***2.67%***	***1.07%***	***24.60%***	***3.74%***	***100.00%***	
077-1/4a	EC-LCII	8	1	0	0	6	1		
077-1/4b	LCII	5	1	0	0	4	0		
077-1/4c	LCI-LCII	1	0	0	0	1	0		
077-1/5	ND	0	0	0	0	1	0		
		14	**2**	**0**	**0**	**12**	**1**	**29**	
		48.28%	***6.90%***	***0.00%***	***0.00%***	***41.38%***	***3.45%***	***100.00%***	

Table 7. 1: Bulk and small find ceramic from all Phase 3 use-debris lot groups, broken down by functional category/form.

lot group	General reduction			Special Reduction				Other			Tools											TOTAL
	primary	secondary	tertiary	BRF	resharpen	cores	util cores	uk flake	blocky	thermal	utlized flakes	recycled	thick biface	broken bit	tb-preform	thin biface	scraper	drill/graver	graver/incisor	burinated	thick uniface	
004-1/10	13	37	42	9	4	13	3	67	99	26	6	0	1	0	0	0	11	0	4	0	0	
004-1/11	5	20	30	6	3	1	0	31	15	6	5	1	0	0	0	0	1	0	0	0	0	
004-1/12	12	31	15	6	0	5	1	29	32	5	4	0	3	0	0	0	0	0	0	0	0	
004-1/13	15	56	42	12	3	6	3	106	69	1	7	0	4	3	1	1	0	3	2	0	0	
004-1/14	0	7	5	3	0	0	0	7	2	2	0	0	0	1	0	0	1	0	0	0	0	
004-1/15	0	1	1	1	0	0	0	2	5	3	0	0	0	0	0	0	0	0	0	0	0	
004-1/17	1	6	8	1	1	0	0	10	25	19	1	0	0	0	0	0	0	0	0	0	0	
004-1/18	0	1	2	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	0	
	46	**159**	**145**	**38**	**11**	**25**	**7**	**252**	**247**	**66**	**23**	**1**	**8**	**4**	**1**	**1**	**14**	**3**	**6**	**0**	**0**	**1057**
	4.35%	***15.04%***	***13.72%***	***3.60%***	***1.04%***	***2.37%***	***0.66%***	***23.84%***	***23.37%***	***6.24%***	***2.18%***	***0.09%***	***0.76%***	***0.38%***	***0.09%***	***0.09%***	***1.32%***	***0.28%***	***0.57%***	***0.00%***	***0.00%***	***100.00%***
006-1/8a	6	37	15	3	1	8	2	40	32	7	11	1	2	2	2	1	4	0	0	0	0	
006-1/8b	3	7	2	0	0	1	4	6	10	2	0	1	1	0	1	0	1	0	0	0	0	
006-1/8c	3	11	16	0	0	4	0	24	48	2	0	0	0	0	0	0	4	0	0	0	0	
006-1/8d	0	8	5	0	1	1	1	16	0	1	2	0	0	0	0	0	0	0	0	0	0	
006-1/9	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	
006-2/6a	2	5	7	0	0	0	0	1	4	3	0	0	1	0	0	0	0	0	0	0	0	
006-2/6b	15	34	27	4	2	10	1	33	36	6	7	0	3	2	0	0	0	1	0	0	0	
006-2/6c	41	79	57	7	0	14	0	47	56	24	8	1	1	0	0	0	1	0	0	0	1	
006-2/6d	8	39	22	2	0	3	0	9	23	4	3	0	2	0	0	1	1	0	0	0	0	
006-3/5	15	31	16	7	0	3	2	15	12	4	4	0	0	0	1	0	0	0	0	0	0	
006-patio/4a	2	8	1	1	0	2	0	1	2	0	3	1	1	0	0	0	1	0	0	1	0	
006-patio/4b	2	3	3	0	0	4	1	3	1	0	3	0	1	0	0	0	0	0	0	0	0	
006-patio/4c	0	5	1	0	0	1	0	6	7	1	0	0	0	0	0	0	0	0	0	0	0	
006-patio/4d	0	9	5	2	0	0	0	1	5	0	0	0	1	0	0	0	0	0	0	0	0	
006-patio/4e	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
	97	**276**	**178**	**26**	**4**	**51**	**11**	**207**	**236**	**54**	**42**	**4**	**13**	**4**	**4**	**2**	**12**	**1**	**0**	**1**	**1**	**1224**
	7.92%	***22.55%***	***14.54%***	***2.12%***	***0.33%***	***4.17%***	***0.90%***	***16.91%***	***19.28%***	***4.41%***	***3.43%***	***0.33%***	***1.06%***	***0.33%***	***0.33%***	***0.16%***	***0.98%***	***0.08%***	***0.00%***	***0.08%***	***0.08%***	***100.00%***
007-1/22a	7	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	
007-1/22b	2	6	2	1	0	2	1	2	3	0	1	0	0	0	0	0	0	0	0	0	0	
007-1/22c	4	17	11	2	0	4	0	10	5	7	0	0	0	0	0	0	0	0	0	0	0	
007-1/22d	0	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/22e	9	30	24	0	1	9	0	36	27	10	0	0	2	0	0	0	4	0	0	0	0	
007-1/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/24	3	5	1	0	0	0	1	4	9	21	0	0	0	0	0	0	0	0	1	0	0	
007-1/25	32	69	26	4	0	4	5	56	69	32	2	0	0	0	0	2	4	0	1	0	0	
007-patio/6a	1	5	1	2	0	0	0	1	0	0	0	0	2	0	0	1	1	0	0	0	0	
007-patio/6b	0	1	1	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	
007-patio/6c	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	
007-patio/7	0	2	3	1	0	0	0	5	2	0	0	0	1	0	0	0	0	0	0	0	0	
007-2/12	4	16	10	3	0	0	0	24	24	9	6	0	0	0	0	0	1	0	0	0	0	
007-2/14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/17	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/18	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
	64	**153**	**80**	**13**	**1**	**20**	**7**	**140**	**145**	**79**	**12**	**1**	**5**	**0**	**0**	**4**	**10**	**0**	**2**	**0**	**0**	**736**
	8.70%	***20.79%***	***10.87%***	***1.77%***	***0.14%***	***2.72%***	***0.95%***	***19.02%***	***19.70%***	***10.73%***	***1.63%***	***0.14%***	***0.68%***	***0.00%***	***0.00%***	***0.54%***	***1.36%***	***0.00%***	***0.27%***	***0.00%***	***0.00%***	***100.00%***
060-1/8	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
060-1/9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
060-1/10	1	8	2	0	0	0	0	2	5	1	0	0	1	0	0	0	0	0	0	0	0	
060-1/11	1	9	4	0	1	3	0	7	6	6	0	0	0	0	0	0	0	0	0	0	0	
060-2/4	16	44	21	5	1	10	0	45	112	43	6	0	0	1	0	0	0	1	1	0	0	
060-3/6	0	1	1	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	
060-3/7	2	5	6	0	0	0	0	0	3	2	0	0	1	0	0	0	1	0	0	0	0	
	20	**70**	**34**	**5**	**2**	**13**	**0**	**54**	**129**	**52**	**6**	**0**	**2**	**1**	**0**	**0**	**2**	**1**	**1**	**0**	**0**	**392**
	5.10%	***17.86%***	***8.67%***	***1.28%***	***0.51%***	***3.32%***	***0.00%***	***13.78%***	***32.91%***	***13.27%***	***1.53%***	***0.00%***	***0.51%***	***0.26%***	***0.00%***	***0.00%***	***0.51%***	***0.26%***	***0.26%***	***0.00%***	***0.00%***	***100.00%***
077-1/4a	3	6	4	0	0	0	0	5	6	2	0	0	0	0	0	0	0	0	0	0	0	
077-1/4b	1	12	5	0	0	1	1	16	13	7	1	0	0	0	0	0	0	0	1	1	0	
077-1/4c	4	7	0	1	0	4	1	4	1	0	3	0	2	0	0	1	0	0	0	0	0	
077-1/5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8	**26**	**9**	**1**	**0**	**5**	**2**	**25**	**20**	**9**	**4**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**114**
	7.02%	***22.81%***	***7.89%***	***0.88%***	***0.00%***	***4.39%***	***1.75%***	***21.93%***	***17.54%***	***7.89%***	***3.51%***	***0.00%***	***1.75%***	***0.00%***	***0.00%***	***0.88%***	***0.00%***	***0.00%***	***0.88%***	***0.88%***	***0.00%***	***100.00%***

Table 7. 2: Bulk and small find chipped stone from all Phase 3 use-debris lot groups, broken down by form.

lot group	raw material	unknown worked piece	mano	metate	metate preform	hammer stone	smooth/ burnish stone	spindle whorl	raw slate	worked slate	slate plaque	unused cobble	quartz crystal	precious stone	Total
004-1/10	0	1	0	0	0	1	0	0	0	0	0	0	0	0	
004-1/11	0	1	0	1	0	0	0	0	0	0	0	0	0	0	
004-1/12	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
004-1/13	0	0	1	5	0	1	0	0	1	0	0	0	0	0	
004-1/14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
004-1/15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
004-1/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
004-1/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	**2**	**1**	**7**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**13**
	0.00%	***15.38%***	***7.69%***	***53.85%***	***0.00%***	***15.38%***	***0.00%***	***0.00%***	***7.69%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***
006-1/8a	0	0	2	0	0	0	0	0	1	0	0	1	0	0	
006-1/8b	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
006-1/8c	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
006-1/8d	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
006-1/9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
006-2/6a	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
006-2/6b	0	0	0	1	0	0	0	0	2	0	0	0	0	0	
006-2/6c	0	0	2	1	0	0	0	0	2	0	0	0	0	0	
006-2/6d	0	0	0	0	0	0	0	0	4	1	0	0	0	0	
006-3/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
006-patio/4a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
006-patio/4b	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
006-patio/4c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
006-patio/4d	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
006-patio/4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	**0**	**5**	**3**	**0**	**0**	**0**	**0**	**11**	**1**	**1**	**1**	**1**	**0**	**23**
	0.00%	***0.00%***	***21.74%***	***13.04%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***47.83%***	***4.35%***	***4.35%***	***4.35%***	***4.35%***	***0.00%***	***100.00%***
007-1/22a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/22b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/22c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/22d	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/22e	0	0	2	0	0	0	0	0	0	0	0	0	0	0	
007-1/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-1/25	0	3	1	2	0	1	0	0	0	0	0	6	2	0	
007-2/12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-2/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-patio/6a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
007-patio/6b	0	0	1	1	1	0	0	0	0	0	0	0	1	0	
007-patio/6c	0	0	0	1	0	0	0	1	0	0	0	0	0	1	ps = carnelian
007-patio/7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	ps = petrified wood with pyrite
	0	**3**	**3**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**6**	**2**	**0**	**17**
	0.00%	***17.65%***	***17.65%***	***3.51%***	***0.00%***	***5.88%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***35.29%***	***11.76%***	***0.00%***	***91.74%***
060-1/8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
060-1/9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
060-1/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
060-1/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
060-2/4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
060-3/6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
060-3/7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**
	0.00%	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***
077-1/4a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
077-1/4b	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
077-1/4c	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
077-1/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
	0.00%	***50.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***50.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***

Table 7. 3: Groundstone and "other stone" small find materials from all Phase 3 use-debris lot groups, broken down by form.

lot group	blades				other			Total
	first series	second series	third series	unknown	core	flake	thin biface	
004-1/10	0	0	1	1	0	0	0	
004-1/11	0	0	0	0	0	0	0	
004-1/12	0	0	0	0	0	0	0	
004-1/13	0	0	1	1	0	0	0	
004-1/14	0	0	0	0	0	0	0	
004-1/15	0	0	0	0	0	0	0	
004-1/17	0	1	0	0	0	0	0	
004-1/18	0	0	0	0	0	0	0	
	0	**1**	**2**	**2**	**0**	**0**	**0**	**5**
	0.00%	***20.00%***	***40.00%***	***40.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***
006-1/8a	0	0	0	3	0	0	0	
006-1/8b	0	0	0	0	0	0	0	
006-1/8c	0	0	1	0	0	0	1	
006-1/8d	0	0	0	0	0	0	0	
006-1/9	0	0	0	0	0	0	0	
006-2/6a	0	0	0	0	0	0	0	
006-2/6b	0	0	2	1	1	0	0	
006-2/6c	0	1	1	0	0	0	0	
006-2/6d	0	0	0	0	0	0	0	
006-3/5	0	0	0	1	0	0	0	
006-patio/4a	0	0	1	0	0	0	0	
006-patio/4b	0	0	0	0	0	0	0	
006-patio/4c	0	0	0	0	0	0	0	
006-patio/4d	0	0	0	0	0	0	0	
006-patio/4e	0	0	0	0	0	0	0	
	0	**1**	**5**	**5**	**1**	**0**	**1**	**13**
	0.00%	***7.69%***	***38.46%***	***38.46%***	***7.69%***	***0.00%***	***7.69%***	***100.00%***
007-1/22a	0	0	0	0	0	0	0	
007-1/22b	0	0	0	0	0	0	0	
007-1/22c	0	3	2	0	0	0	0	
007-1/22d	0	0	0	0	0	0	0	
007-1/22e	0	1	1	0	0	0	0	
007-1/23	0	0	0	0	0	0	0	
007-1/24	0	0	0	0	0	0	0	
007-1/25	0	2	1	0	0	0	0	
007-2/12	0	0	0	0	0	0	0	
007-2/14	0	0	0	0	0	0	0	
007-2/15	0	0	0	0	0	0	0	
007-2/16	0	0	0	0	0	0	0	
007-2/17	0	0	0	0	0	0	0	
007-2/18	0	0	0	0	0	0	0	
007-patio/6a	0	0	0	1	0	0	0	
007-patio/6b	1	1	1	0	0	0	0	
007-patio/6c	0	0	2	0	0	1	0	
007-patio/7	0	0	0	0	0	0	0	
	0	**6**	**4**	**0**	**0**	**0**	**0**	**10**
	0.00%	***60.00%***	***40.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***
060-1/8	0	0	0	0	0	0	0	
060-1/9	0	0	0	0	0	0	0	
060-1/10	0	0	0	0	0	0	0	
060-1/11	0	1	0	1	0	0	0	
060-2/4	0	0	1	0	0	0	0	
060-3/6	0	0	0	0	0	0	0	
060-3/7	0	0	0	0	0	0	0	
	0	**1**	**1**	**1**	**0**	**0**	**0**	**3**
	0.00%	***33.33%***	***33.33%***	***33.33%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***
077-1/4a	0	0	1	0	0	0	0	
077-1/4b	0	0	2	0	0	0	0	
077-1/4c	0	0	0	0	0	0	0	
077-1/5	0	0	0	0	0	0	0	
	0	**0**	**3**	**0**	**0**	**0**	**0**	**3**
	0.00%	***0.00%***	***100.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***

Table 7. 4: Obsidian small finds from all Phase 3 use-debris lot groups, broken down by form.

lot group	*Pachychilus*	*Nephronaias*	*Strombus*	*Oliva*	Orthalicus	Unknown marine	unknown	Total	natural	modified	adorno	bead	pendant	Total
004-1/10	1	0	0	0	0	0	0		1	0	0	0	0	
004-1/11	0	0	0	0	0	0	0		0	0	0	0	0	
004-1/12	0	0	0	0	0	0	0		0	0	0	0	0	
004-1/13	0	0	0	0	0	0	1		1	0	0	0	0	
004-1/14	0	0	0	0	0	0	0		0	0	0	0	0	
004-1/15	0	0	0	0	0	0	0		0	0	0	0	0	
004-1/17	0	1	0	0	0	0	2		3	0	0	0	0	
004-1/18	0	0	0	0	0	0	0		0	0	0	0	0	
	1	**1**	**0**	**0**	**0**	**0**	**3**	**5**	**5**	**0**	**0**	**0**	**0**	**5**
	20.00%	***20.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***60.00%***	***100.00%***	***100.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***
006-1/8a	0	0	0	0	0	0	0		0	0	0	0	0	
006-1/8b	0	0	0	0	0	0	0		0	0	0	0	0	
006-1/8c	0	1	0	0	0	1	0		1	0	1	0	0	ad=bird
006-1/8d	0	0	0	0	0	0	0		0	0	0	0	0	
006-1/9	0	0	0	0	0	0	0		0	0	0	0	0	
006-2/6a	0	0	0	0	0	0	0		0	0	0	0	0	
006-2/6b	2	0	0	0	0	0	0		1	1	0	0	0	
006-2/6c	1	0	0	0	0	0	0		0	1	0	0	0	
006-2/6d	0	0	0	0	0	0	0		0	0	0	0	0	
006-3/5	0	0	0	0	0	0	0		0	0	0	0	0	
006-patio/4a	0	0	0	0	0	0	0		0	0	0	0	0	
006-patio/4b	0	0	0	0	0	0	0		0	0	0	0	0	
006-patio/4c	0	0	0	0	0	0	0		0	0	0	0	0	
006-patio/4d	0	0	0	0	0	0	0		0	0	0	0	0	
006-patio/4e	0	0	0	0	0	0	0		0	0	0	0	0	
	3	**1**	**0**	**0**	**0**	**1**	**0**	**5**	**2**	**2**	**1**	**0**	**0**	**5**
	60.00%	***20.00%***	***0.00%***	***0.00%***	***0.00%***	***20.00%***	***0.00%***	***100.00%***	***40.00%***	***40.00%***	***20.00%***	***0.00%***	***0.00%***	***100.00%***
007-1/22a	0	0	0	0	0	0	0		0	0	0	0	0	
007-1/22b	0	0	0	0	0	0	0		0	0	0	0	0	
007-1/22c	1	0	0	0	1	0	0		2	0	0	0	0	
007-1/22d	0	0	0	0	0	0	0		0	0	0	0	0	
007-1/22e	4	0	0	0	2	0	0		2	4	0	0	0	
007-1/23	0	0	0	0	0	0	0		0	0	0	0	0	
007-1/24	0	0	0	0	1	0	0		1	0	0	0	0	
007-1/25	4	0	6	0	0	0	0		0	10	0	0	0	
007-2/12	0	0	0	0	0	0	0		0	0	0	0	0	
007-2/14	0	1	0	0	0	0	0		1	0	0	0	0	
007-2/15	0	0	0	0	0	0	0		0	0	0	0	0	
007-2/16	0	0	0	0	0	0	0		0	0	0	0	0	
007-2/17	0	0	0	0	0	0	0		0	0	0	0	0	
007-2/18	0	0	0	0	0	0	0		0	0	0	0	0	
007-patio/6a	0	0	0	0	0	0	0		0	0	0	0	0	
007-patio/6b	1	0	0	0	4	0	0		5	0	0	0	0	
007-patio/6c	0	0	0	0	0	1	0		0	0	0	1	0	
007-patio/7	0	0	0	0	0	0	0		0	0	0	0	0	
	9	**1**	**6**	**0**	**4**	**0**	**0**	**20**	**6**	**14**	**0**	**0**	**0**	**20**
	45.00%	***5.00%***	***30.00%***	***0.00%***	***20.00%***	***0.00%***	***0.00%***	***100.00%***	***30.00%***	***70.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***
060-1/8	0	0	0	0	0	0	0		0	0	0	0	0	
060-1/9	0	0	0	0	0	0	0		0	0	0	0	0	
060-1/10	0	0	0	0	0	0	0		0	0	0	0	0	
060-1/11	1	0	0	0	0	0	0		0	1	0	0	0	
060-2/4	1	1	0	0	0	0	0		0	1	0	0	1	
060-3/6	0	0	0	0	0	0	0		0	0	0	0	0	
060-3/7	0	0	0	0	0	0	0		0	0	0	0	0	
	2	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**2**	**0**	**0**	**1**	**3**
	66.67%	***33.33%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***	***0.00%***	***66.67%***	***0.00%***	***0.00%***	***33.33%***	***100.00%***
077-1/4a	0	1	0	0	0	0	0		1	0	0	0	0	
077-1/4b	2	0	0	0	0	0	0		0	2	0	0	0	
077-1/4c	0	0	0	0	0	0	0		0	0	0	0	0	
077-1/5	0	0	0	0	0	0	0		0	0	0	0	0	
	2	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**2**	**0**	**0**	**0**	**3**
	66.67%	***33.33%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***	***33.33%***	***66.67%***	***0.00%***	***0.00%***	***0.00%***	***100.00%***

Table 7. 5: Bulk and small finds faunal (shell) material from all Phase 3 use-debris lot groups, broken down by material and form.

Settlement Unit Type	Buenavista South		Greater Baking Pot Zone		Minanha Core Zone	
	Total in Area	% of Total	Total in Area	% of Total	Total in Area	% of Total
I: isolated mound (less than 2 m high)	19	67.9%	314	74.6%	10	25.6%
II: 2-4 mounds (informally arranged; all less than 2m high)	3	10.7%	78	18.5%	6	15.4%
III: 2-4 mounds (orthogonally arranged; all less than 2m high)	4	14.3%	13	3.1%	18	46.2%
IV: 5 or more mounds (informally arranged; all less than 2m high)	0	0.0%	3	0.7%	0	0.0%
V: 5 or more mounds (at least 2 arranged orthogonally; all less than 2 m high)	0	0.0%	2	0.5%	3	7.7%
VI: 1 or more mounds (at least 1 being 2-5m high)	2	7.1%	10	2.4%	2	5.1%
VII: 1 or more mounds (at least 1 being higher than 5m)	0	0.0%	1	0.2%	0	0.0%
	28	**100.0%**	**421**	**100.0%**	**39**	**100.0%**

* Baking Pot data from Peuramaki-Brown and Hoggarth 2009

** Minanha data from Longstaffe 2010

Table 7. 6: Comparison of settlement site types between Buenavista (Lower Mopan Valley), Baking Pot (Belize Valley Proper), and Minanha (Vaca Plateau).

Site	Lot	Volume (m^3)	Structure	Date	Artifact Count	Artifact Weight (g)	count/m^3	wgt./m^3
BVS-004	356M/4	0.096	004-1-1st-B	LCI/II	17	156.52	177.08	1630.416667
BVS-006	355C/5	0.089	006-1-2nd	LCII	474	4359.02	5325.84	48977.75281
Early Established							**2751.46**	**25304.08474**
BVS-077	359E/2	0.162	077-1-1st	LCI/II	603	7085.8	3722.22	43739.50617
BVS-060	358D/6	0.099	060-1-1st	LCII	1430	13675.02	14444.44	138131.5152
Late Established							**9083.33**	**90935.51066**
BVS-007	354C/8	0.086	007-1-1st-B	LCII	61	563.1	709.30	6547.674419
Other							**709.30**	**6547.674419**

Table 7. 7: Comparison of artifact/debris content from late facet Late Classic (670-780 C.E.) fill lots of various buildings in BVS Cluster 1.

Site	Terminal Architectural alignments
BVS-004	12° W of MN
BVS-006	12° W of MN
BVS-007	19° W of MN
BVS-060	12° W of MN
BVS-077	12° W of MN
*based on 2008 magnetic declination	

Table 7. 8: Orientation of terminal architecture at the five intensively investigated BVS Cluster 1 sites.

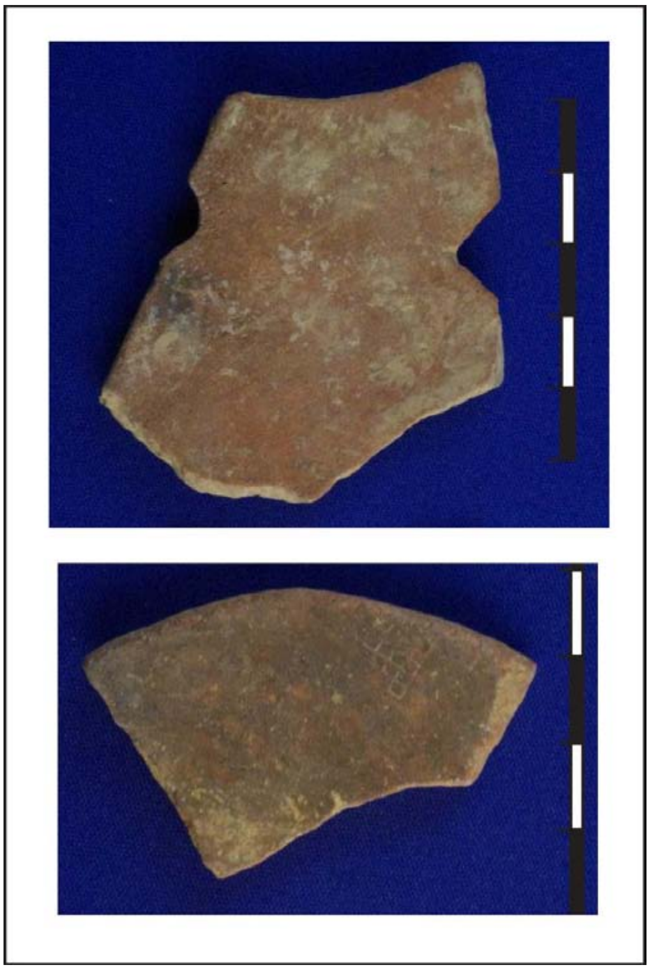


Figure 7. 1: Possible expedient/opportunistic ceramic tools, CR-046 and CR-047 (scale 1cm).

Figure 7. 2: Fragment of a slate "wrench"/"mace" from BVS-006-1 (lot group 006-1/1).

		Sources							
Site	***n***	**EC**	**EC?**	**IXT**	**PAC**	**SBMA**	**SMJ**	**UK1**	**UK2**
BVS-004	6	5	1						
BVS-006	12	6	1	1	1	1	2		
BVS-007	28	14	2	6	3	1		1	1
BVS-060	10	8		2					
BVS-077	2	2							
TOTALS	**58**	**35**	**4**	**9**	**4**	**2**	**2**	**1**	**1**

EC	El Chayal
EC?	possibly El Chayal
IXT	Ixtepeque
PAC	Pachuca
SBMA	San Bartolome Milpas Altas
SMJ	San Martin Jilotepec
UK1	unknown source 1
UK2	unknown source 2

Table 7. 9: Distribution of EDXRF sourced obsidian from BVS Cluster 1 sites.

Site	avg width (mm)	avg CE/M (cm)	*n*
BVS-004	11.46	6.48	5
BVS-006	10.7	6.9	13
BVS-007	12.1	6.75	15
BVS-060	9.01	8.48	2
BVS-077	9.57	8.16	3
AVERAGE	**10.57**	**7.35**	

Table 7. 10: Average blade widths and cutting edge values of obsidian blades recovered from BVS Cluster 1 site debris deposits

Chapter Eight: A Biography of Urbanization at Buenavista

Communities, in particular those that form urban environments, are described by Watanabe (1990:132) as "problematic social nexus within which people constantly negotiate the immediate existential concerns and possibilities of their lives, conditioned by the wider economic, political, and natural ecology of which they are a part". An additional fundamental definition attune to the concept of life-history would be Harris' (2012) description, building from Deleuze and Guittari (2004), of communities as the consequences of "affective assemblages": relationships between people, places, and things operating within a range of specific scales both geographically and temporally. The previous three chapters have attempted to outline: (1) the life histories of the BVS Cluster 1 and various individual settlement sites that make up the community, (2) the development of urban public places over the course of the BVS Cluster 1 history, and (3) to describe the potential knowledge bases, representative of people and their "things", that served to shape the histories of these communities. This chapter will present the aforementioned interpretations within a summarizing biography of urbanization at Buenavista, as reflected through people, places, and things, couched within processes occurring within the larger Lower Mopan River Valley region. It will conclude with a suggestion for an urbanization model applicable to the larger valley biography.

8.1 A Biography of Buenavista and the Lower Mopan Valley

Although at the outset of this research I emphasized the need to analyze urban settings on their own, I also acknowledge the need to eventually understand associated processes within larger socio-political contexts. In the case of Buenavista del Cayo, the next largest context would be that of the Lower Mopan Valley. In this section I discuss the urbanization processes at Buenavista (Table 8.1) within the context of the Lower Mopan River (or Upper Belize Valley), which includes processes occurring simultaneously at the nearby centres of Actuncan, located on a low ridge overlooking the Mopan roughly 2km north of Xunantunich (McGovern 2004; LeCount et al. 2011), and Xunantunich proper and surrounding settlement zones (Ashmore 2010; Ehret 1995; Leventhal and Ashmore 2004; Taschek and Ball 2004; Yaeger 2010). I also refer on occasion to processes further south in the Central and Upper Mopan Valley, as well as within the

Central Belize Valley (east of the confluence of the Mopan and Macal), and in the neighbouring Vaca Plateau (foothills of the Maya Mountains).

I also move slightly further afield in the Maya world to address the major urban centre of Naranjo, located midway between the two major river drainages of the Holmul and Mopan Rivers in Guatemala (Fialko 2004, 2005). Its position between these two drainages gave administrators of the urban centre ready access to their fertile valleys and the Caribbean coast beyond, part of the same geographic and economic "hinge zone" of the Lower Mopan River Valley. Located immediately west of the Upper and Central Belize Valley, the centre likely held a degree of control over the valley during much of the Classic Period (Ball and Taschek 1991; Houston et al. 1992). For most of its history, Naranjo was engaged with the centres of the Lower Mopan and under direct supervision by the Kaan polity: a Classic period dynasty of kings and queens first associated with the northern city of Dzibanche, then the city of Calakmul located in the northern Petén (García 2005; Martin 2005; Martin and Grube 2008).

Along with the polity of Mutal, focused on the Petén city of Tikal, these two "superpowers" of the Maya lowlands had great impact on the Belize Valley region: attempting to control other city-state areas through the acquisition of tribute from these subject polities. This is attested to at some locales in the region, such as Ucanal on the Upper/Middle Mopan in Guatemala that was under Tikal sponsorship by the mid fifth century C.E. (see St-Hilaire 2009 for a good summary of activity in the Upper Mopan region). The strategies employed to control other polities in the Maya lowlands were diverse and remain poorly understood. Warfare appears to have been a common tool in the southwest lowlands, attested to by epigraphic and archaeological evidence (Aoyama 2005; Demarest 1992; Martin and Grube 2008; Webster 2000), but is rarely attributed to activity in other parts of the lowlands, including the Belize Valley where limited archaeological and epigraphic evidence has been uncovered (desecration of architecture at Blackman Eddy, discussed in Brown and Garber 2003).

Within the Lower Mopan Valley, Ball and Taschek (1991; Taschek and Ball 2004) have argued for functional differences between Cahal Pech, Buenavista, and Xunantunich, leading to a more synchronic view of the political organization of urban centres over time: Buenavista being the primary administrative site. Leventhal and Ashmore (2004; LeCount and Yaeger 2010b) see a more diachronic succession of administrative capitals within the valley, with Actuncan presiding over the Late Preclassic (1000-300 C.E) to Early Classic (300-600 C.E.) periods, Buenavista taking charge from the Early Classic to early facet of the Late Classic period (600-670 C.E.), and Xunantunich taking over during the late facet of the Late Classic period (670-780 C.E.). This is based in part on their demonstration that functional differences are in fact not clear between sites, with all major sites in the valley demonstrating administrative, ritual, and economic centralization capacities (LeCount and Yaeger 2010b; Leventhal and Ashmore 2004). It is also based on the demonstration of parallel growth of a series of closely spaced centres within and beyond the valley proper (Actuncan, Las Ruinas de Arenal, Buenavista, Cahal Pech, Minanha, Pacbitun, etc.), and implying a degree of sustained competition (not warfare) for local labour and agricultural resources. This final point is important for the urbanism model that I forward for the Lower Mopan Valley involving a case of "conurbation" or "Megalopolis".

8.1.1 Early Preclassic (ca. 1400-1000 B.C.E): First settled life

By the Early Preclassic, the beginnings of settled occupation appear in the Belize Valley proper. This area is an important geographic location, with the river providing a crucial transportation/communication corridor from the Caribbean to the Maya heartland, while the fertile alluvial plains are ideal for growing many types of crops. The function of the area as a geographic and economic "hinge zone" within the Maya world is likely critical to its development over time.

Occupation at this time includes the appearance of the earliest pottery in the region, identifying what has been termed the Cunil Phase (ca. 1200-900 B.C.E.) at sites such as Cahal Pech and Blackman in the Central Belize Valley (Awe 1992; Ford and Fedick 1992; Willey et al. 1965) and Xunantunich (beneath the "Castillo; LeCount and Yaeger 2010). Recent work by Brown (2010; Brown et al. 2011) has also confirmed the presence of a Cunil phase occupation roughly 800 m from the epicentre of Xunantunich near later Group E, including monumental architecture and also possible Preceramic activity. Within the Buenavista zone, evidence does not currently exist for occupation during the Early Preclassic. Further afield, settlement in the areas of Naranjo and Caracol is also initiated at this time (Chase and Chase 2008; Fialko 2005).

8.1.2 Middle Preclassic (1000-300 B.C.E): Small villages

Sometime during the Middle Preclassic Period, equivalent to the Jenny Creek phase at Barton Ramie (Gifford 1976), Founding Households (Early Established) arrived in the Buenavista zone and situated themselves on the flat, elevated portions of the upper alluvial terraces. 33% of the BVS Cluster 1 settlement sites are occupied at this time (Table 8.2). Initial attraction to the area includes on-river location, and all the resources that come along with such positioning. This marks the beginning of local, *mētis* knowledge acquisition by these Founding Households.

At Xunantunich, Middle Preclassic pyramids at Group E may suggest more than "simple village life" at this time (Brown et al. 2011). At nearby Actuncan, 100% of tested settlement sites were occupied at this time, as were 90% of sites tested at Callar Creek (Ehret 1995; Yaeger 2010). Within this Small Village stage of the valley, a system of relative decentralized organizational structure and authority (esoteric polity knowledge), and the start of urbanization processes, is likely to have appeared (Ashmore 2010), although the higher rate of occupation at Actuncan may suggest the start of its political centralized authority within the valley by this time.

Integrative methods at this time appear focused on small Founding Household groupings, represented by localized community clusters. These centripetal communities were likely integrated through basic kinship affiliations, as well as communal land and ritual ties. At BVS Cluster 1, this is inferred from the early masonry architecture at BVS-034, surrounded by the Founding Households occupying perishable dwellings, on the upper alluvial terrace. The BVS-034 location may have served as early ritual location focused on ancestor veneration.

The possible desecration of architecture downriver at Blackman Eddy during the Middle Preclassic is some of the only evidence suggestive of any conflict in early times (Brown and Garber 2003), but is important to consider when addressing the rise of urbanism in these regions.

8.1.3 Late Preclassic (300 B.C.E.-100 C.E.): The push of urbanization

During the Late Preclassic Period, equivalent to the Barton Creek-Mount Hope-Floral Park phases at Barton Ramie (Gifford 1976), the first monumental construction occurred in the Buenavista epicentre (Figure 8.1) where additional Founding Households established themselves, and 40% of BVS Cluster 1 sites are occupied at this time. Construction in the epicentre included initiation of elite compounds, ceremonial structures of the Central Plaza, and the south ballcourt. This early ballcourt (Ball 1993:Fig. 43), along with the north ball court established in the Protoclassic (100-300 C.E.), possibly served as the first boundary-marking tools and formal entranceways of the new centre, a common early function of ballcourts in the Maya lowlands (Hansen 1998:142). The residential-level ritual location of BVS-034 is continued to be used by the Founding Households in BVS Cluster 1 until the end of the Late Preclassic and possibly into the subsequent Protoclassic period (equivalent to the Mount Hope-Floral Park phases) as a local community integrative feature beyond the Buenavista urban centre.

A series of small centralizing/epicentral trends, representing more formal initiations of urban trends, appear throughout the valley and beyond: Actuncan, Las Ruinas de Arenal, Buenavista, Nohoch Ek, Pacbitun, and Xunantunich in the Upper Belize Valley (Lower Mopan and Macal), and Blackman Eddy, Cahal Pech, and El Pilar in the Central Belize Valley, although this trend may be argued to begin as early as the Middle Preclassic (Garber 2004). The frequency of open settings among the locations of these new centres, as opposed to particular defensive positioning and features, suggest that despite the frequency and close proximity of these fledgling centres, armed conflict may not have been of huge concern at this time.

Upriver from Buenavista at Actuncan, the bulk of the South Temple Complex was constructed, and an early carved monument (Stela 1) was erected, portraying an elaborately dressed individual with a ceremonial staff (McGovern 2004). It is possible that the early stelae in the valley were also marking boundaries of early urban administrative zones, or perhaps the borderlands of larger polities further afield. Testing and excavations has confirmed agrarian settlement at nearby Xunantunich by the end of the second millennium B.C.E. (Leventhal and Ashmore 2004).

Whatever the political climate of the valley at this time, these emerging nodes of urban activity were likely affiliated with nearby agrarian settlements, possibly serving as larger ritual foci. They contained formal plazas, platforms, and some temple-pyramids. This architecture and associated artifacts mark these nodes as focal points for communal gatherings and displays of wealth, authority, and associated esoteric knowledge early on in the urbanization process of the valley. Not only did these nodes have the capacity to integrate nearby communities at minimum through ritual/theatric methods, they also emphasize a link to happenings in the Maya heartland, including the use of E-groups, large stucco masks, and carved monuments (Hansen

1998). A Late Preclassic or Protoclassic tomb was also recently recovered from Group E at Xuantunich, although its contents had been emptied out in antiquity (Jason Yaeger, personal communication, 2012). However, there are still no palaces or secured elite burials in principal temple buildings of the Lower Mopan at this time. Most likely the political organization of these fledgling urban centres involved administrators overseeing small territories, possibly including the immediate periphery of each centre, however, boundary markers appear to focus on epicentral zones. Although urban centres were likely competitive at this time, there is no evidence that any one exerted any type of definite power over the entire valley until the time of the Classic period city-states.

By 200 B.C.E. the count of kings may have already begun at Naranjo. By 250 C.E., significant demographic and architectural growth was occurring in the Petén at sites such as Tikal and Calakmul, particularly following the decline of the earlier cities of Nakbe and El Mirador (Folan et al. 1995; Fry 2003; Haviland 2003).

8.1.4 Early Classic Period (300-600 C.E.): Buenavista's boom

Population within the Lower Mopan Valley grew dramatically during the Early Classic, equivalent to the Hermitage phase at Barton Ramie (Gifford 1976), in both the agriculturally productive valley bottomlands and adjacent fertile uplands. For many lowland scholars, this period represents the beginning of true political (and urban) centralization and the development of individual city-states among the lowland Maya, as evidenced from increased construction of monumental civic architecture, sculptured stelae with hieroglyphic texts and/or portraits of local rulers, although the latter two features are significantly less common in the Belize Valley. At this time, the valley consists of a series of small to medium-sized centres (relative to the larger centres of the Petén heartland) that defined small competing polities/city-states (Helmke and Awe 2008). Buenavista is suggested to have had a degree of power over the Lower Mopan beginning in the Early Classic. This is suggested based on the high degree of monumental construction activity, not seen at other centres, and the highest settlement occupation in the region.

By 378 C.E., the dynasty founded by Yax Nuun Ayiin, who likely had close ties with Teotihuacan, began at Tikal/Uaxactun, and was also a lineage closely connected to the early dynasty at Naranjo. The earliest named ruler of Naranjo (32nd or 33rd of the dynasty), Tzik'in

Bahlam, was the maternal grandfather of Chak Tok Ich'aak II of Tikal (Martin and Grube 2008:70; Fialko 2004, 2005; Tokovinine and Fialko 2007). By 534 C.E., Caracol rises to power in the Vaca Plateau/Maya Mountains and is to become one of Naranjo's primary adversaries, perhaps competing for access to the Belize Valley resources and routes (Chase 2004:329).

Of possible importance to the power-role of Buenavista in the Lower Mopan Valley at this time is the accession of the longest reigning king of Naranjo in 546 C.E.: Aj Wosal Chan K'inich (Grube 2006). This accession is supervised by the Kaan polity, likely centred on the northern centre of Dzibanche at this time (García 2005; Martin 2005). The possible rise of Buenavista as a dominant urban centre within the Lower Mopan at roughly the same time as the accession of this king is noteworthy (although this temporal collation is still extremely tenuous), particularly given strong connections between the centre and Naranjo in the proceeding period. Aj Wosal's reign lasts at least seventy years and there is strong epigraphic evidence that his connection with the Kaan polity endures the span of his reign (Martin and Grube 2008:71-72).

By the Early Classic period, new households (Late Established) situated themselves around Buenavista proper on less favourable terrain, causing occupation levels in BVS Cluster 1 to jump to 87%. This corresponds with an earlier significant decline in occupation at Actuncan (McGovern 2004), and may represent a physical shift of less established households from that zone to the Buenavista settlement zones. It is possible that households leaving the Actuncan area were re-establishing and attaching themselves to a new, more prosperous administration at Buenavista, now supported by a strong Naranjo-Kaan sponsor (see below). Construction activity expands and elaborates significantly in the Buenavista "downtown" at this time (Ball and Taschek 2004). However, renewed research at Actuncan may suggest higher occupation levels during the Early Classic than previously believed (Jason Yaeger, personal communication, 2012).

The possible ritual focus of BVS-034 shifts at this time to a larger community and urban-level ritual and administrative site at BVS-007. This corresponds with a shifting integrative concern at the urban level, expanding from the epicentre to include nearby settlement clusters. This serves a larger horizontal and vertical integrative function between the BVS Cluster 1 households, both Early Established and Late Established households, and the burgeoning civic administration. The interjection of this site, a visible expression of esoteric, civic-administrative knowledge, not only in terms of architectural elements but likely also in terms of the timing knowledge required for joint urban-local community ritual activity, amidst local community activity is a new integrative feature within the urban zone. Its introduction also immediately precedes the ritual deactivation of the south ballcourt around 640-660 C.E. (Ball and Taschek 2001:182), located immediately north of the BVS Cluster 1 area, and potentially suggestive of the formal expansion of the urban entity boundaries. New boundary markers, using stelae at BVS-007 and at Callar Creek, may be activated at this time and ritual circuits are increasingly important to maintaining urban cohesion as a means of tying these outlying communities and their pre-existing power structures, capped by the Founding Households and their control over local knowledge, to the civic administrators (royal court) of the epicentre.

The BVS Cluster 1 area at this time, along with other core settlement zones, might be compared to Scott's (1998; Jordan 1995) discussion of the *ceinture sauvage* of Paris in mid 1800s. This area was located between the customs wall and outer fortifications of the urban centre, BVS Cluster 1 being located between the river representing a possible border of urban economic activity, along with the secondary ritual and administrative function of BVS-007, and the borders of the epicentral "downtown" of Buenavista. These "between" communities have traditionally been difficult areas to control as residents are particularly subject to the sway of other administrative urban bodies. Such areas are therefore crucial to maintaining control throughout the life of an urban centre. In the case of Paris, new avenues were constructed to these areas to facilitate the movement of troops in the case of uprisings, as these were quarters of possible insurrectionary movements based on pre-existing social power structures (Jordan 1995). Such quarters might be compared to the outlying clusters of the Buenavista zone, in which the long established Founding Households and resulting lineages carried much authority and sway over surrounding populations. The typical reaction of urban administrations to such quarters is to either demolish them or break them up by running new roads, public spaces, and commercial developments through them that improve the circulation of goods, labour, and people (troops), in addition to serving as constant reminders of the esoteric knowledge and power of "the city" (Scott 1998).

8.1.5 Early facet of the Late Classic Period (600-670 C.E.): Buenavista centralization

This early facet of the Late Classic period (600-670 C.E.), equivalent to the Samal ceramic phase at Xunantunich (LeCount et al. 2002) and the Tiger Run phase at Barton Ramie

(Gifford 1976), represents the height of Buenavista activity in terms of settlement occupation (93% in BVS Cluster 1) and epicentral construction and activity (Ball 1993). At Xunantunich, no substantial increase in population of the core or surrounding settlement is noted until after this facet (Yaeger 2010). Up river at Actuncan, a significant decrease in epicentral activity occurs, although settlement occupation begins to recover from its previous drop. In fact, in most areas of the valley a population boom occurs: Barton Ramie reached 85% of its ultimate population, while the populace documented by BRASS attained 98% of its maximum size between 600-800 C.E. (Ford 1990; Willey et al. 1965; Yaeger 2003). Agricultural intensification through terracing also occurs at this time, directed by individual communities (Neff 2008). Interdependence of households for tools and supplies characterizes many communities of the Lower Mopan (VandenBosch 1999), including BVS Cluster 1, Late Established households being closely dependent on Early Established households and the urban administration.

Back at Naranjo, the death of Aj Wosol in 615 C.E. marks the beginning of a difficult course for the polity, entering its first hiatus period from 615-644 C.E. (Martin and Grube 2008: 72-73). The death of the king may have also led to a period of separation from the overseeing Kaan polity, as suggested by the “star war” conquest of Naranjo in December 631 by Yuhknoom Head with Caracol’s assistance. It is worth noting that by 636 C.E. the base of the Kaan polity had shifted to the city of Calakmul, based on new monuments found at the site of La Corona erected under the rule of Yuhknoom Ch’een – possibly the accession name of Yuhknoom Head (Stanley Guenter, personal communication, 2012). By 644, a revitalizing figure, K’ahk’ Skull Chan Chaak, took the throne at Naranjo (Martin and Grube 2008:73).

The significant expansion at Buenavista at this time, suggested both in terms of settlement occupation (based on BVS investigations) and epicentral construction activity (based on MMT results), may mark Naranjo’s first or continued attempt at controlling the valley. The open-nature East Plaza is delineated and formally surfaced at this time, serving as a possible location for events consisting of large population gatherings, including the marketplace activities, and represents a crucial shift toward increased centralized civic integration with a ritual and economic focus, potentially linked to a decline in the focus of urban integration on small community hierarchy integration and expansion into larger polity driven territorial claims. These large centralizing places also would require people to come to the downtown, as oppose to central administrators making journeys out into the periphery. This is marked by the abandonment of BVS-007-2 sometime during the early facet of the Late Classic (before the late facet), perhaps also suggesting that urban boundaries have been pushed even further afield by this point in time.

A shifting and refocus of urban integrative strategies on the role of the marketplace and other East Plaza events may have served to "overstep", on the part of the urban administration, no longer sufficiently addressing those pre-established small community hierarchies of households (Founding Households), but rather only addressing individual communities as parts of larger settlement aggregates (i.e. the entire Buenavista settlement zone). This possible ignoring of the power of Founding Households may have served to initiate fractures in the urban fabric that would lead to the initiation of disintegrating tendencies in the Buenavista urban core.

8.1.6 Late facet of the Late Classic Period (670-780 C.E.): Contraction of urban boundaries

The late facet of the Late Classic period (670-780 C.E.), equivalent to the Hats' Chaak ceramic phase at Xunantunich (LeCount et al. 2002) and the early facet of the Spanish Lookout phase at Barton Ramie (Gifford 1976), begins with continued elaboration of the Buenavista urban entity but ends with the initiation of disintegrating processes and urban contraction. A possible shift in centralized power within the Lower Mopan region from Buenavista to Xunantunich may also occur early on in this facet (Helmke and Awe 2008; Leventhal and Ashmore 2004; LeCount and Yaeger 2010; Taschek and Ball 2004). This facet represents the population maxima for the valley as a whole, occupying 79% of all tested/excavated settlement sites (Yaeger 2010). Occupation of settlement sites is at 100% at Xunantunich, Actuncan (confirmed by recent excavations by LeCount et al. 2011), and Vaca Brava, as well as jumping to 83% at San Lorenzo (Yaeger 2010). At Buenavista, occupation drops to 87%, although this is still very high and may emphasize the "high-level" politics nature of the eventual decline and power shift, affecting the urban administration more so than connected communities.

Cahal Pech, Actuncan, and Buenavista all persist as foci on the landscape, but their relative hold on the surrounding populace seems to have shifted dramatically by the mid point of this facet, although perhaps experiencing a slight resurgence in the Terminal Classic (royal burials having been found at Buenavista and Cahal Pech, dating to the Terminal Classic; LeCount and Yaeger 2010:365). This shift in location of centralization is not only reflected in settlement patterns but also potentially in artifact distributions. Prior to this period at Chaa

Creek, a settlement zone closely linked to Buenavista during the Early Classic and start of the Late Classic period, ceramics formed part of a more typical Central Belize Valley sphere with red-slipped calcite wares dominating the assemblage (Connell 2000:399-400). By the late facet of the Late Classic, this assemblage percentage shifts and black-slipped wares, more closely tied to distribution networks to the south and west, dominate household assemblages (Connell 2000: 399-400, 2010: 310-311; Gifford 1976; LeCount 1996; Preziosi 2003:171; Thompson 1940; Willey et al. 1965).

BVS Cluster 1 displays a similar shift in terms of percentage of black over red-slipped calcite wares in household assemblages, although begins with far fewer red-slipped wares. When single sample (lot) Samal phase (600-670 C.E.), Hats' Chaak (670-780 C.E.), and Tsak' (780-890 C.E.) deposits were compared from each of the three excavated settlement sites occupied/used into the Terminal Classic, the percentages of each slip-type fluctuated dramtically from the early to late facet of the Late Classic (Samal to Hats' Chaak) (Figure 8.2). This perhaps emphasizes a shift in economic focus of Buenavista households, perhaps from the Belize Valley proper and Macal to the Lower Mopan, and its associated markets. Yaeger (2010) argues that the red/black dichotomoy may be a reflection of where people go to the market: Xunantunich and Buenavista for Mount Maloney black wares, and Cahal Pech or Pacbitun for red wares. Thus the shift observed at Chaa Creek and Buenavista might be an artifact of the changing economic and political centre of gravity from east to west. It might also suggest that those households that do not abandon the Buenavista zone at the initiation of decline or urban contraction are somehow, at least loosely, integrated into the economic-urban sphere of nearby Xunantunich or depending more heavily on extreme local products (vs. more "exotic" red wares). The independence of households may be more representative if we examine red-slipped vs. black-slipped materials over time on an individual scale, and is an issue to be investigated in future offshoot publications.

Dramatic new construction is initiated at Xunantunich at this time, including a change in city plan to emulate those of Naranjo and the Kaan polity at Calakmul (Ashmore 1991; Ashmore and Sabloff 2002, 2003; M.E. Smith 2003), while its surrounding zones experience a significant occupation increase during the early part of late facet of the Late Classic (Ashmore 2010:57; LeCount and Yaeger 2010b:72). The location of the new centralized polity on a high ridge might be attributed to defensive concerns, although evidence for local militarism is minimal

(Ashmore 2010:59), and may have been more for visual survey purposes. From the hilltop at Xunantunich you can see Buenavista, Actuncan, and Cahal Pech, and visual survey can be tantamount to power (Foucault 1977).

The reorganization of the Xunantunich city plan and associated settlement expansion may be linked to Naranjo's resurgence in 682 C.E. when a new royal lineage is established upon the arrival of Lady Six Sky (628-741 C.E.) from Dos Pilas: a princess of the exiled Tikal family that ruled the southern centre (Martin and Grube 2008:75). At this time, and during the reign of her son K'ahk' Tiliw Chan Chaak or "Smoking Squirrel" (693-728 C.E.), Naranjo reaffirms alliances with administrators of the upper Belize River region under the supervision of the Kaan polity at Calakmul. The most famous item connecting Buenavista to the Naranjo polity at this time is the elegant ceramic cacao vessel known as the "Buenavista Vase" recovered from a tomb in Structure BV-1 in the epicentre that Taschek and Ball (1992) believe to have been a gift from the royal house of Naranjo to the ruling house of Buenavista.

As mentioned above, during the early portion of this facet architectural expansion continues to occur in the "downtown" epicentre of Buenavista, including the enlargement of the palace and inclusion of a grand *audiencia*, and final maintenance of the marketplace (Ball and Taschek 2004). The initiation of many construction projects also included the two *sacbeob* leading out from the East Plaza and into the hinterlands. These formal roads further emphasize the increased centralized tendencies (larger scope integrative concerns) and economically based integrative strategies (versus previous more ritual-based) adopted by the urban administration, possibly de-valuing the role of Founding Households within the urbanization process and overall organizational plans. This perhaps is at the detriment to the overall civic form, allowing splinters within smaller communities to widen. It is also an interesting occurrence when examined from a gateway community perspective. Such centres, when threatened by other gateways communities or central places, attempt a tighter hold on their respective hinterlands (Burghardt 1971), as may be exemplified by concerns of developing formal over-land routes that can symbolically link territories, but also provide physical routes for the deployment of force if necessary (Scott 1998).

This is also a period of massive upheavals and alterations, although it begins with a boom, particularly in the more southerly regions of the Mopan, by the first half of the 9th century a massive population drop occurs. Occupation levels in BVS Cluster 1 drop to an astounding 27% before the Terminal Classic, representing a loss of all Late Established households. The increases in population during the start and middle of the facet at San Lorenzo, Xunantunich, Chan Noohol (Robin 1999), etc., may reflect movement of these households to those regions, although these areas also suffer significant depopulations before the start of the Terminal Classic; emphasizing the rapidity of the "boom-bust" scenario at Xunantunich (LeCount and Yaeger 2010). These "voters-by-foot" are likely forms of "attached-commoners", previously discussed by de Montmollin (1995:241), with regards to links between commoners and rulers/ administrators and the effects of these links on settlement distribution.

The Late Established/Early Abandoned households at Buenavista might therefore be thought of as the urban proletariat, or landless households, "mobile fringe commoners", or *lumpenproletarian*: key members of communities that shape the social landscape (Fariss 1984; Pyburn 1990; Tourtellot 1983). The loss of these households (either by leaving or change in degree of independence, perhaps absorbed by others) would have served a drastic change of membership in the BVS Cluster 1 community and beyond. If a similar pattern were also found in the many other clusters of the Buenavista core settlement, this would represent a drastic overall change in the urban social landscape, likely impacting the life of those left behind both in terms of the practical and social behaviours of the community. For example, their "security" in terms of food production (loss of labourers), the successful meeting of any further existing tribute demands, and the breaking up of previously established community relations.

The continuation of Early Established households into the Terminal Classic would ideally represent the Sunk-Cost Effect at work in the community. This postulates that people get more stubborn as things get worse as they have invested much more in their community as compared to younger households (Janssen et al. 2003). This is a common occurrence in urban crisis situations where often the elder residents (both individuals and households) are less likely to pick up and move: case in point would be the recent Katrina Disaster in New Orleans (McCarthy et al. 2006). Although, in the case of New Orleans and Katrina, this event occurred immediately before welfare cheques were made available, so people closely reliant on the state could also not leave and typically suffered the greatest (John Lindsay, personal communication, 2011).

Some administrative entities cannot survive a shock to the system, often launching on self-reinforcing cycles of increased pressure on the associated populace and land to offset shrinking collections, getting less rather than more as a result and therefore squeezing still harder (Kaufman 1988:224). A decline in revenues along with disorder, insecurity, and unproductiveness (population pressure, drought, and all the other suggestions regarding the "Great Collapse") then adds to such tensions, creating pressure on systems and finding pre-existing "flaws" within and initiate fracture, similar to pressure flaking in lithic manufacture (Kaufman 1988:225).

By 741 C.E. Naranjo enters its second hiatus due to considerable political upheaval in the region linked to actions by Tikal (Martin and Grube 2008:77). It is by this time that Buenavista likely enters the throws of its urban decline midway through the period, with new and undergoing construction projects ceasing, including the incomplete sacbeob. At Callar Creek, the stumps of three broken stelae, oriented for visibility from Buenavista, were found embedded in a Protoclassic plaza surface that was used well into the Late Classic (Ehret 1995:179). When the stelae were placed is unknown, but it is likely to have occurred after the surface was constructed. If this occurred sometime in the early facet of the Late Classic, it may have been around the same time that activity at BVS-007 was changing, perhaps due to shifting integrative strategies and expanding urban borders at Buenavista. It is perhaps at this time that Callar Creek is formally brought into the urbanization processes at Buenavista. Ehret (1995:179) believed the stelae where destroyed during the late facet of the Late Classic, when the shift of political power swung to Xunantunich. At this time, occupation drops to 20% at Callar Creek and this would reflect a solid contraction of the urban form.

8.1.7 Terminal Classic Period (780-890 C.E.): Disintegration

The Terminal Classic period (780-890 C.E.), equivalent to the Tsak' ceramic phase at Xunantunich (LeCount et al. 2002) and the late facet of the Spanish Lookout phase at Barton Ramie (Gifford 1976), marks the end of significant activity at all sites in the Lower Mopan region. Use of the marketplace at Buenavista ended although asignificantly reduced palace life may have continued, as suggested by the Terminal Classic burial of a nobleman with a carved bone pendant naming its owner as the *ajaw of Puluul* (Helmke et al. 2006). Activities of Founding Households persist until the start of the Early Postclassic period, likely due to the preservation and guarding of local knowledge bases and resource acquisition (both through trade connections and direct access). At this time, an increased concern regarding drought is suggested by some for the valley (Lentz et al. 2005; Moyes et al. 2009; Webster et al. 2007) and may have impacted the resilience of remaining households.

At Xunantunich, three sculptured stelae are linked stylistically to those of Naranjo and one of the eroded monuments bears what is probably an emblem glyph referring to the site (Helmke et al. 2010). Population remains high at Barton Ramie in the Central Belize Valley, but declined in areas examined by BRASS (Ford 1990; Yaeger 2003). In the 750s C.E., Ucanal is politically superior to its neighbours in the middle and upper reaches of the Mopan, but this is not a harmonious relationship, and by 780 C.E. is destroyed by a vassal of Calakmul. By 780 C.E., Naranjo seizes the opportunity left by the decline of its competitors and/or overlords, evidenced by the erection of four monuments that year and by dedicating many others over the next forty years. With the accession of Itzamnaaj K'awil (784-810 C.E.), monumental activity returns to the city and a new growth spurt occurs, aided by the increasing disarray at Tikal (Jones 1977, 1991). However, by 830 C.E. Naranjo's last stela is erected (Martin and Grube 2008:83). In 800 C.E., Caracol takes the king of Ucanal captive along with the ruler of the unidentified site of B'ital (possibly Minanha), although twenty years later Ucanal is again in the good graces of Caracol (Martin and Grube 2008: 97). Caracol experiences a renaissance, but the dynasty declines by 830 C.E.: Its last monument/text is erected in 859 C.E. (Martin and Grube 2008). The subject population of Xunantunich diminishes sometime prior to the onset of Terminal Classic, although Barton Ramie appears more resilient, as do Cahal Pech and Baking Pot in the Central Belize Valley. Overall there is a marked decrease in activity by the mid to late 9th century throughout the Central and Upper Belize Valley. By the start of period urban decline and contraction is also fully initiated at Xunantunich, with some buildings in the epicentre fully abandoned (Ashmore 2010).

Overall at this time, it is perhaps important to view the fate of Buenavista urbanism as suffering from a lack of communal integration and overall failure of organization. This alone would leave communities more vulnerable to other pressures inflicted on the region in relation to "Great Collapse" events and occurrences.

8.1.8 Early Postclassic (post-890 C.E.): The end of urban processes

During the Early Postclassic, equivalent to the New Town phase at Barton Ramie (Gifford 1976), little activity occurred in the Lower Mopan Valley, as is the case for many parts of the Maya lowlands. Recent research by Brown et al. (2011; Brown 2010) demonstrate continuing activity in areas of Xunantunich, while sites such as Minanha, Tipu, and Baking Pot also exhibit some minimal occupation (Graham 2011; Hoggarth 2012; Hoggarth et al. 2010; Longstaffe 2010). At Buenavista, Ball and Taschek (2004) suggest some residential/habitation use of the "downtown", although current work in the epicentre by MVAP crews suggests this not to be the case, and no settlement sites in BVS Cluster 1 were further occupied. This period represents the end of the urbanization life history in the Lower Mopan Valley. It is possible populations from this area began the slow journey to the northern lowlands where Maya culture continued to thrive, albeit in altered forms from the Classic Periods.

8.2 Integration and Disintegration of the Urbanized Buenavista Landscape

De Montmollin (1995), in his examination of three Classic Maya polities, identifies four potential strategies of political centralization: 1) elite sub-rulers living among scattered commoners (Adams and Smith 1981), 2) social invention involving an elite strategy of going out to live among and normatively control scattered commoners (Freidel 1981), 3) commoners asked to come into civic centres to attend normatively-integrated rituals (Vogt 1964, 1968, 1983), and 4) written files on citizenry (Giddens 1984, Goody 1986, Scott 1998). Similarly DeMarrais et al. (1996), through a cross-cultural examination of chiefdoms, states, and empires, address the primary means of materialization of power in society: 1) the dedication and erection of public monuments, 2) use of symbolic objects, 3) use of written documents, and 4) ceremonial events. Schoenfelder (2004) adds the use of cultural experts to this list, including the adoption of local (*mētis*) knowledge, held by village councils or elders, into larger political systems. Souvatzi (2008) further discusses the integration of pre-modern communities through the use of symbols, physical interaction, ritual, and daily practice to forge and reinforce collective ideals and notions of "identity'. These strategies are all to be found along a *societas-civitas* continuum, and are commonly regarded as mutually exclusive strategies, whereas I see them as potentially overlapping strategies and part of a larger diachronic integrative whole, particularly as they evolve within an urban setting through time.

At Buenavista, over the length of its occupation, we witness a number of integrative strategies at an urban level: 1) the use of household ritual within the individual Founders' community, i.e. BVS-034, 2) the use of physical boundary markers, i.e. the south ballcourt, BVS-007 and Callar Creek structures and stelae, 3) community-urban integrative ritual and administration, making use of local community power structures (Founding Households), i.e.

activity at BVS-007, 4) large-scale urban socio-ritual ceremonies and economic events capable of bringing multiple small communities together in one location, i.e. East Plaza, and 5) the commissioning of formalized pathways that link multiple places and communities, i.e. the sacbeob. Over time these measures alter and or/overlap, however, often one is favoured at the expense of another along the trajectory of centralization within the urbanization process.

Because power and integrative strategies are altered to fit changing landscapes of control opportunities, particularly critical within dispersed settlement situations, shaped by multi-interacting and perpetual systems, this makes the study of such strategies from a life history perspective vital to the understanding of the urbanization processes in prehistory. If we examine integrative measures as examples of “point and package” (Schoenfelder 2004:406), we can address their change over time. The “point” of an integrative measure is its intended message(s) (e.g. power of a ruler, cohesion of group, etc.) while its “package” serves as vehicle of the “point” (e.g. tradition -system of ideas that allow an observer to understand the “point”- and form -the object and/or action created). To understand urbanization, we can examine changes in “point and package” over time. This has been accomplished through the outlining of the Buenavista and BVS Cluster 1 urban life history.

In order to recognize forms of integration strategy for the dispersed city, and the phenomenon of urbanization, scholars need to surpass previous sterile separations between rural and urban environments (Brunfaut 2002:6). Previously noted patterns in dispersed urban integration management include a period of integration, followed by loss of sight of a systemic vision of urban problems (loss of “point”), leading to a period of fragmentation of integration methods. At this point, integration mechanisms that work on a local scale become questionable at the larger urban scale. This duality creates fragmentation in the urban systems, pulling focus away from the local, and can lead to disintegration (Brunfaut 2002; Greenberg 2011). Any tool of integration that is hinged on the strengthening of sense of place and identity keeps all its value in its specific contexts and can create strong local entities that are detrimental to the larger system. This is exemplified at Buenavista by the continuing use of BVS-007-1 by the BVS Cluster 1 community, beyond the use-life of BVS-007-2. It is this exact pattern that is observed over time at Buenavista: an initial focus on individual local communities and then a loss of that focus to a larger “urban vision”.

As the case of Buenavista urbanization might exemplify, it remains essential to continuously incorporate the local integrated development initiatives into the broader urban structure, or else alienation of those local communities can lead to overall disintegration (Greenberg 2011; Jacobs 1961, 2004). An overall "cautionary tale" is therefore created, in emphasizing that the efficiency of an urban dispersed city thus hinges on the administration's ability to recognize and incorporate complementary power structures at the varying scales of local-urban-region, through diverse means of integration such as the provision of public space, infrastructure, landscape, or new social means such as ritual, all while incorporating more localized power-integration structures, requiring a significant balancing act. Since its essence is to rest on local resources, such a tool of integrated policy tends to strengthen the territorial anchoring and identity building of the actors and contexts involved. This strategy fits very nicely with the "place"-oriented nature of Maya belief systems that hinge on the power of ancestors (McAnany 1995), as well as an existence of economic systems that can be extremely localized to particular environments, as is often the case in river settlement zones (Fedick 1988). The urban administration must therefore incorporate the local integrated development initiatives into its broader structure – both in terms of space (physical community, people, and things) and the knowledge bases held within. A key way to achieving this is using local intervention and action: making use of pre-existing power dimensions that can promote more stable and sustainable systems of integration over time (Lewellen 2003:119). However, the disintegration of dispersed civic systems occurs when communities take on their own concerns at the expense of the whole, known as "extreme locality" (Greenberg 2011). The efficiency of an urban dispersed city therefore depends on the complementarities with which its integrative strategies project at varying scales (local, urban, region).

The key therefore to any discussion of urbanization, including both situations of rise and decline, are the examinations of internal and external forces that serve to join and strengthen. These forces include the polity, represented by central officials, that requires people to implement their policies, consisting of the civic authorities that produce action. The hierarchies of urbanism therefore serve a vertical integrative purpose, communicating the wishes of the central power (e.g. mobilization of resources, public work direction, etc.), and the role of the civic structure to serve as stimulator and coordinator but not operator. Because such unifying forces are offset by deeply rooted tendencies toward fragmentation, even modest shocks could start the process of decomposition into smaller groups and social structures (Kaufman 1988:234). Although many of the component parts can be highly unified and durable, the overarching political and civic entities into which they were assembled were comparatively easily disrupted. The diversity of interest groups represented by the urban core may therefore be both the foundation of urban life as well as the threat to it (Jacobs 2004; Janusek 2002).

Based on the Buenavista data, I would argue that in Classic period urbanizations, the stability role within communities is held primarily by the Primary Occupancy groups (Founding Households), similar to Freidel's (1992) "commoners as custodians" view of local political continuities. This argues for commoner involvement in high politics, although of a lower involvement, and can maintain a system during flux periods. This would be exemplified by the survival of households, particularly Founding Households, throughout the processes of increased urban-integrated population size, increased urban-integrated territorial size, and beyond the point of urban disintegration involving the loss of population and territory.

8.3 Future Directions: A Regional Urbanism Model

A need currently exists to continue the examination of Maya centres as individual urban entities in terms of the nature, successes, and failures of organization and integration strategies over time. However, we must also expand a similar conversation to a regional level. The "conurbation" (Geddes 1915) or "Megalopolis" (Gottmann 1957, 1961, 1987; Gottmann and Harper 1990) models might be useful perspectives to adopt for the Lower Mopan and larger Belize Valley, alongside views linked to gateway regions (Burghardt 1971), which serve to join functional and social explanations for urbanization on local as well as more regional scales.

As previously mentioned, over time, particularly during the Late Classic Period in the Lower Mopan River Valley, there is social, ritual, political, and economic activities occurring concurrently at multiple, closely-spaced centres and no clear evidence of domination *per se* by one. This may support the idea of the region functioning as a conurbation or "Megalopolis".

8.3.1 Conurbation and "Megalopolis"

Pyburn (2008:255) discusses sites of the New River in Northern Belize -Lamanai, Altun Ha, and Chau Hiix- as an example of conurbation: a geographically contiguous and historically and politically interrelated group of cities and towns that form one continuous settlement area. She suggests there may have been no political centre of this conurbation, with "each site tied to the others in shifting ways fuelled by complementary roles and specialties" but that the very different sizes and trajectories of the three suggest interesting possibilities (Pyburn 2008:270). In human geography, a conurbation is a polycentric urban agglomeration in which transportation has developed to link areas to create a single urban labour market and/or travel zone (Pitzl 2004:37-38). This development has been previously exemplified by Midlanton in England, the Ruhr in Germany, Randstad in the Netherlands, and more famously New York-Boston in the US and the Great Lakes Megalopolis, etc. (Geddes 1915; Pitzl 2004:136).

Pyburn's (2008) view of the "New River Conurbation", and my view of the Upper and Central Belize Valley (discussed below), is very similar to that pattern originally defined for the mega-metropolis area of the Northeastern United States by French geographer Jean Gottmann (1957, 1961). "Megalopolis", an ancient Greek term for the largest city plan that never happened, represents a manifold concentration and polynuclear settlement structure (Gottmann 1957; Pitzl 2004 135-136). One of its earliest uses in geography was its appearance in Mumford's (1938) book *The Culture of Cities* in which it is described as the first stage in urban overdevelopment and social decline. Later Gottmann (1961:8) uses the term to describe the Northeastern US seaboard, nicknamed "The Main Street of the Nation", that incorporates many great and impressive cities and populations over an 800 km stretch. This region is more equivalent to the size of a nation than a metropolis, running from New Hampshire to North Virginia and the Atlantic shore to the Appalachian foothills. This area is one of the largest industrial belts of the world, as well as a major financial and political hub.

Megalopolis represents an almost continuous stretch of urban and suburban areas along the northeast seaboard, and contradicts traditional notions of "city" and "country" distinctions as a result of its development over hundreds of years: a consequence of the growth of cities, the division of labour, and the development of world resources (Gottmann 1957:190). The region has been referred to as "an urbanized area with a nebulous structure" (Gottmann 1961:5), with many encompassed sections appearing more rural due to their degree of "green space", but that actually function as suburbs. Every city in the region spreads out far and wide around its original nucleus and grows amidst an inarguably colloidal mixture of rural and suburban landscapes. As such, communities can belong to more than one urban orbit and designated "urban areas" can cut across political boundaries (Gottmann 1961:8). “Simultaneously the old city core or ‘downtowns’ are evolving toward decline or renewal, while uptowns, suburbs, and outer suburbia are becoming interlocked in a new and still constantly changing web of relationships” (Gottmann 1961:11). This is reminiscent of periods in the Belize Valley history during which "minor" centres developed and thrived (Iannone 2004; Iannone and Connell 2003).

The area provides the key transport, commerce, banking operations, and political conferences for the rest of America. People leave from it and arrive to it, making it a chief debarkation wharf and hub. “Just as Main Street lives for and prospers because of the functions of the whole city, so is Megalopolis related to the whole United States and its rich resources” (Gottmann 1961:8). The entangled relationships it represents involve the interrelationships between diverse urban and economic processes. While most regional studies stay on the safer and more superficial grounds of statistical and functional classifications, this model attempts to understand the “dynamics of urbanization” (Gottmann 1961:10). This dynamic is best exemplified in the daily “tidal” movements in Megalopolis of people shifting/commuting from work to home, as well as seasonal and some irregularly recurrent movements: also possible in the Maya world if we accept a degree of movement from home to outlying fields and potentially seasonal movements between sites. The affluence of those who have risen within a particular area of Megalopolis also draws large groups of humbler people, coming to profit by local abundance of money and volume of spending and to serve the wealthier: creating shifts over time in the occupation levels and prosperity of different areas of the region. These movements reflect the relations between different parts of Megalopolis and the complicated needs required by its citizens. Growth of populations and the tidal movements of people require a reshaping of the landscape in terms of use, resulting in new specialized forms with regards to agricultural development, forestry, etc., but also in the economic and social foundations of society. This creates a general picture of dynamic and prosperous societies, responsible for maintaining the growth of large scale urbanization, but also responsible for the problems created and for finding the solutions. As such, decline within Megalopolis occurs from both internal pressures and decay as well as from external sources (Gottmann 1957:191).

The history of the seaboard (Gottmann 1961: Chapter 4) begins in the 1600s with ordered settlement of Europeans along the strip in a series of villages and towns. Founders of an area were encouraged by grants of land and naming rights to settlements, creating the powerful corporate Founding Families of New England that still exist to this day. The fur trade was at this time one of the major resources for merchants operating in the area: merchants having played key roles in the development of major towns, exploiting local resources as well as those further flung, and developing the marketplaces that continue to this day. This led to somewhat different specializations of some centres early on in the urbanization process of the region. By the 18th century, successful maritime activities turned many villages into larger centres particularly those located immediately along the coastal areas and estuaries and initiated competition between towns. By 1720 settlement further distributed itself along the coast and valleys of navigable rivers and channels, later advancing inland substantially. Temporary peace among European countries, fostered by the Treaty of Utrecht (1713), also greatly assisted in the expansion of settlement and commerce at this time. By the end of the 1800s suburban sprawl and coalescence between neighbouring urban centres was already obvious and even smaller cities were showing scatterings of suburban residences outside municipal boundaries. By the early 1900s the "metropolitan district" was introduced: composed of one or more central cities and contiguous suburban townships. By 1950s, additional administrative bodies included "urbanized areas", "standard metropolitan areas", and "metropolitan state economic areas" (Gottmann 1961:19). By the 1960s the process of more or less loose urbanization had expanded over still more territory, filling up the lands in between the larger centres. As settlement expanded, competition occurred between major seaboard nuclei at the same time as they developed degrees of specialization of function. This specialization made them more interdependent while competition helped them all to grow as they expanded and overlapped. "Had one section of present Megalopolis been strangled by some other, it would have declined in terms of wealth and size of population" (Gottmann 1961: 25).

Geographers and historians explain what happened on the Northeast seaboard by what was going on inland. Resources were being exploited and exported (land/agriculture, coal/oil, timber, iron, copper, gold, silver, etc.). Within Megalopolis itself, the ocean (navigation/ fisheries) and coal were key resources of wealth. The urbanization of the zone, both the good and the bad, is therefore strongly linked to the growth of economies in and around the surrounding zones. The key factor of Megalopolis is therefore its location in a geographic and economic "hinge zone" known as the "Fall Line": the area of the piedmont between the coastal plain and the Appalachian mountains to the west, and a natural setting that is a favourable location for the development of a great hub of relationships (Gottmann 1961:102). This is also similar to the locations of "gateways" or "gateway regions" in terms of the movement of people, ideas, and goods (Burghardt 1971). The "hinge" is at the contact point of two realms. In the case of Megalopolis this is the American continent and the Atlantic Ocean and connected Caribbean Sea. Seaports, along with other areas that attracted people and activity (e.g. ritual centres), therefore assumed the role of hinges in linking these two foundations of the economy. These places would attract people and activity that required space and this would lead to the development of new areas and growth that eventually challenged old areas. In other cases this growth expanded into suburbs and later were absorbed by the legal extension of central cities or could become their own cities over time. This leads to a pattern of the scattering of features previously associated with "downtown" (e.g. elite residences) into suburb or "non-urban" zones. "From period to period, the main weight of this seaboard's interest has oscillated from sea trade and overseas ventures to continental development and back again" (Gottmann 1961:103). "A study of the mechanisms and oscillations of the hinge in the past therefore naturally emphasized the system of relationships and the factors of growth linking Megalopolis with the rest of the country and the world" (Gottmann 1961:165). Circumstances of economic systems therefore depend on decisions made in the hinge zone, and the survival of the hinge zone depends upon the health of areas surrounding the zone. The needs of the inland as well as those of Europe therefore were key to the area's success and failures. The imperial value of this position therefore increased greatly as the European stakes in the West Indies grew.

8.3.2 The Belize Valley Conurbation

Did such a system of urbanization operate within the Lower Mopan and Belize Valleys? These areas are part of an important economic and geographic hinge zone: connecting the Petén heartland to the ocean-going trade networks of the Caribbean coast (and vice versa). The centres of the Upper and Central Belize Valley are situated both at a confluence of rivers (the Macal and Mopan) as well as along points that are easy jumping off areas for transport along inland trails (heads of navigation). The zone is also at the nexus of numerous geographic, geologic, and ecological zones (discussed in Chapter 3). The success in detection of marketplace locales may also be key to the function of the zone within the larger Maya world.

Was the dynamic political organization between the Belize Valley and the larger polities of the Petén and Vaca Plateau a similar example to that of the NE seaboard and European "overlords", affecting the successes and failures of the conurbation over time? Were these processes affected by an oscillating focus on inland trade versus seagoing trade over time, as well as the status of urban centres inland? I believe these issues may be addressed by the application of a Megalopolis model to existing archaeological and epigraphic data for the Belize Valley. This model emphasizes that there are no easy lines of divisions between units within a conurbation, which may help to address the issues and difficulties faced by Driver and Garber (2004) and others who have attempted to draw such lines in the Belize Valley by emphasizing a much more organic urbanization process at work, particularly when no clear dominance exists of one site over the others evidenced by the lack of clear "collapse" of sites prior to the Terminal Classic.

8.4 Conclusions

At the initiation of this research, I aimed to address the following questions:

1) Does data from BVS Cluster 1 testing and excavations support dates of decline proposed by MMT research in the Buenavista epicentre?

2) Does data support the oscillation and dynamic nature of populations and activities between urban centres within the valley?

3) Does urban decline at Buenavista manifest itself as a particular pattern in the surrounding settlement? Who leaves first and who remains? What does any given pattern suggest regarding the nature of decline and the nature of urbanization at Buenavista?

Within the adopted urbanism framework, I successfully address not only these questions but also the issue of changing civic integration as represented in the built environment and knowledge bases of individual factions and communities. This research also takes a processual approach to communities and urbanism: considering the entanglement of people, places, and things as diachronic developments. Integrating bodies of thought from modern urban and state theory can be challenging and controversial. However, at their core are a series of issues relevant to multi-cultural and multi-disciplinary urban and polity studies. A similar approach to Maya political organization is being sought by Harri Kettunen (2011), but from a military perspective. All polities combine civil and military bureaucracies, although their strict division is likely often analytical, and a continued focus on each should help bring diverse and interesting issues and perspectives to the forefront of discussion concerning the ancient Maya and complex societies in general.

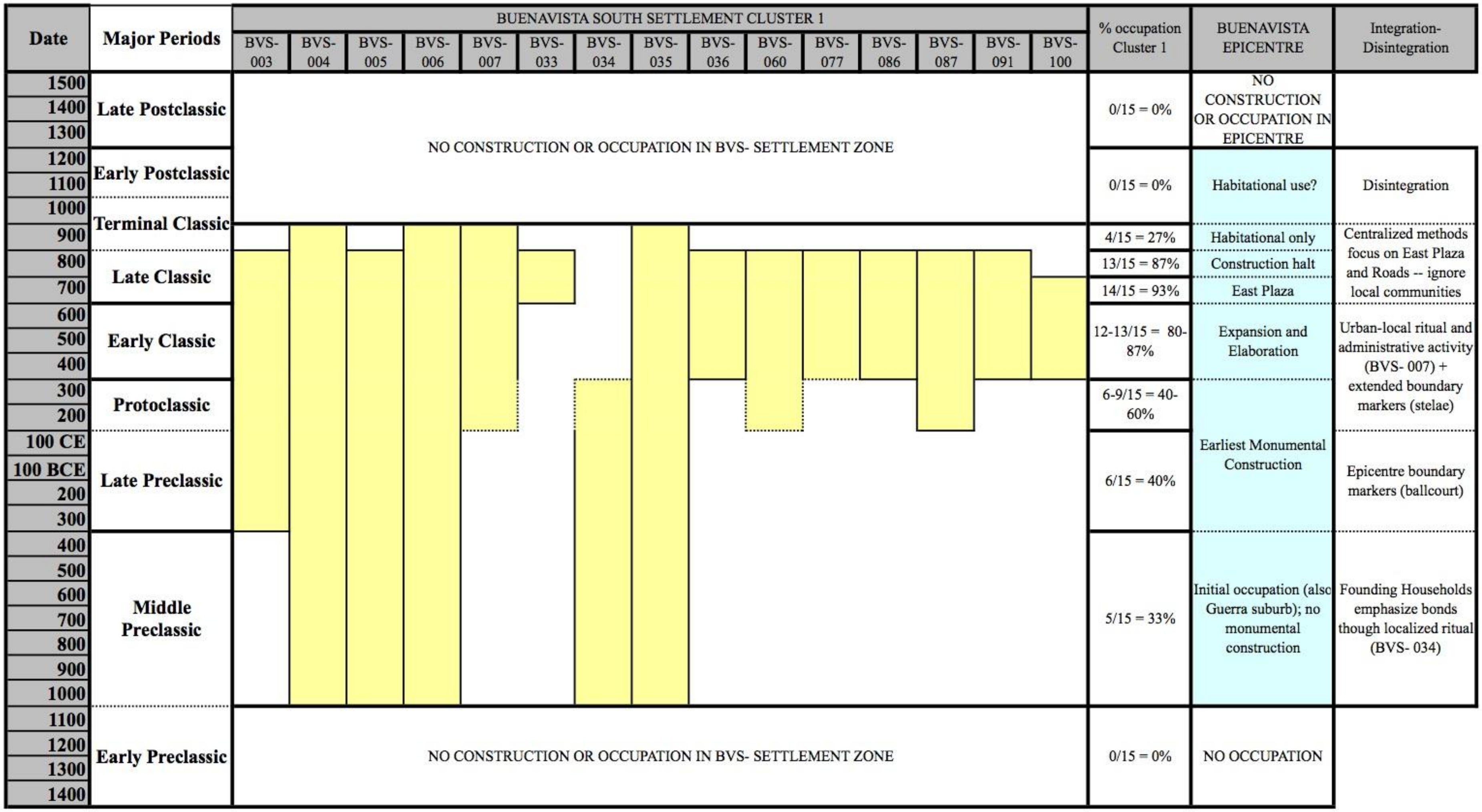


Table 8. 1: Charting the urbanization biography of Buenavista and BVS Cluster 1.

	San Lorenzo N = 29		Xunantunich N = 6		Actuncan N = 7		Vaca Brava N = 5		Callar Creek N = 10		BSS cluster 1 N = 15		Total N = 72	
	N	Freq (%)	N	Freq (%)	N	Freq (%)	N	Freq (%)	N	Freq (%)	N	Freq (%)	N	Freq (%)
Middle Preclassic	5	17	0	0	7	100	3	60	9	90	5	33	29	40
Late Preclassic	2	7	0	0	4	57	2	40	6	60	6	40	20	28
Proto-Classic	5	17	0	0	4	57	3	60	9	80	9	60	30	42
Early Classic	2	7	2	33	4	57	1	20	7	70	13	87	29	40
Late Classic I	13	45	5	83	5	71	2	40	9	90	14	93	48	67
Late Classic II	24	83	6	100	7	100	5	100	2	20	13	87	57	79
Terminal Classic	10	34	2	33	3	43	2	40	1	10	4	27	22	31
Postclassic	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*From Yaeger 2010:Table 11.3; Ehret 1995; M. Peuramaki-Brown data
*San Lorenzo frequencies refer to structures, while all other refer to rez groups

Table 8. 2: Settlement occupation by time period at BVS Cluster 1 and nearby settlement zones in the Lower Mopan Valley.

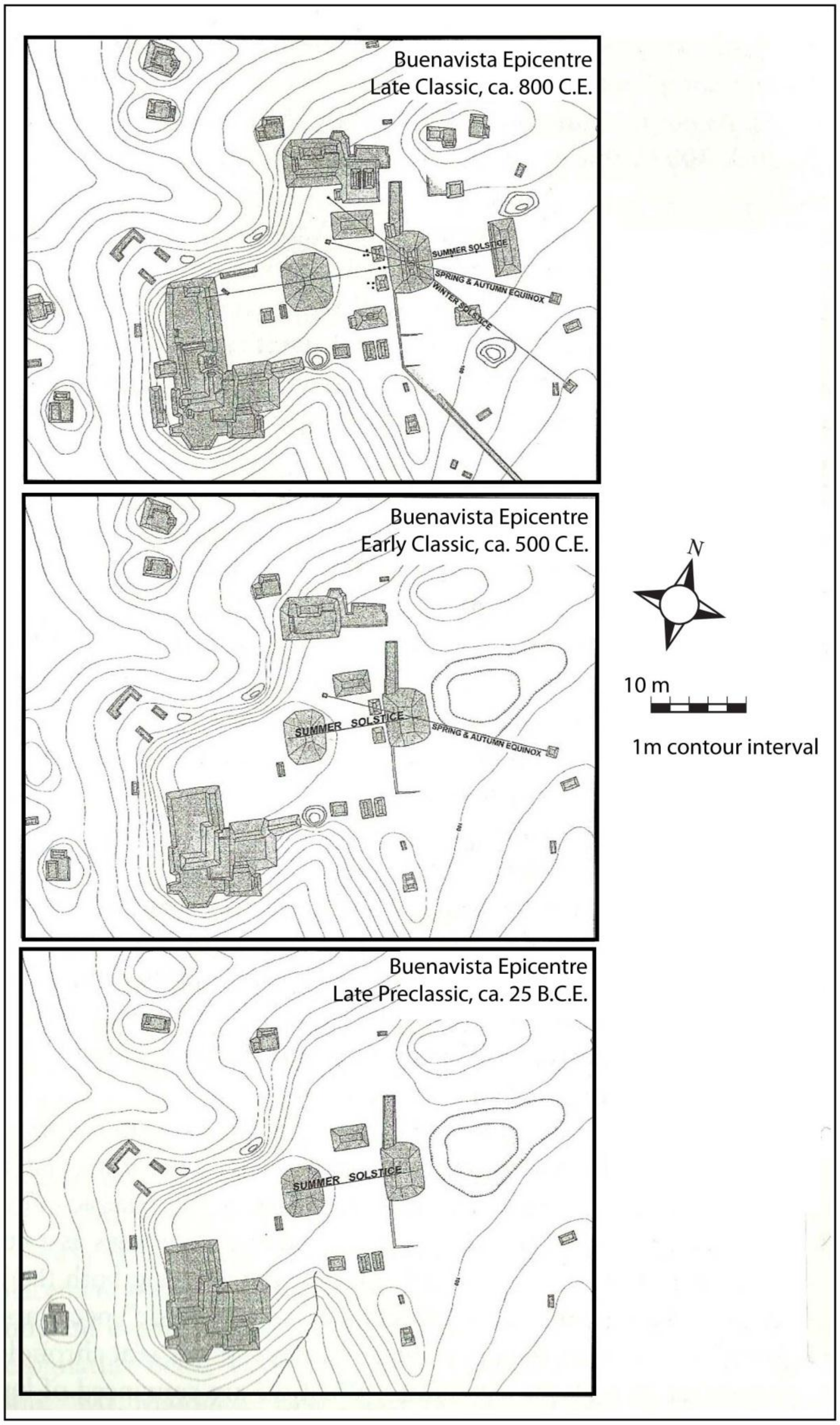


Figure 8. 1: Major periods of construction in the Buenavista epicentre (modified from Ball and Taschek 2004).

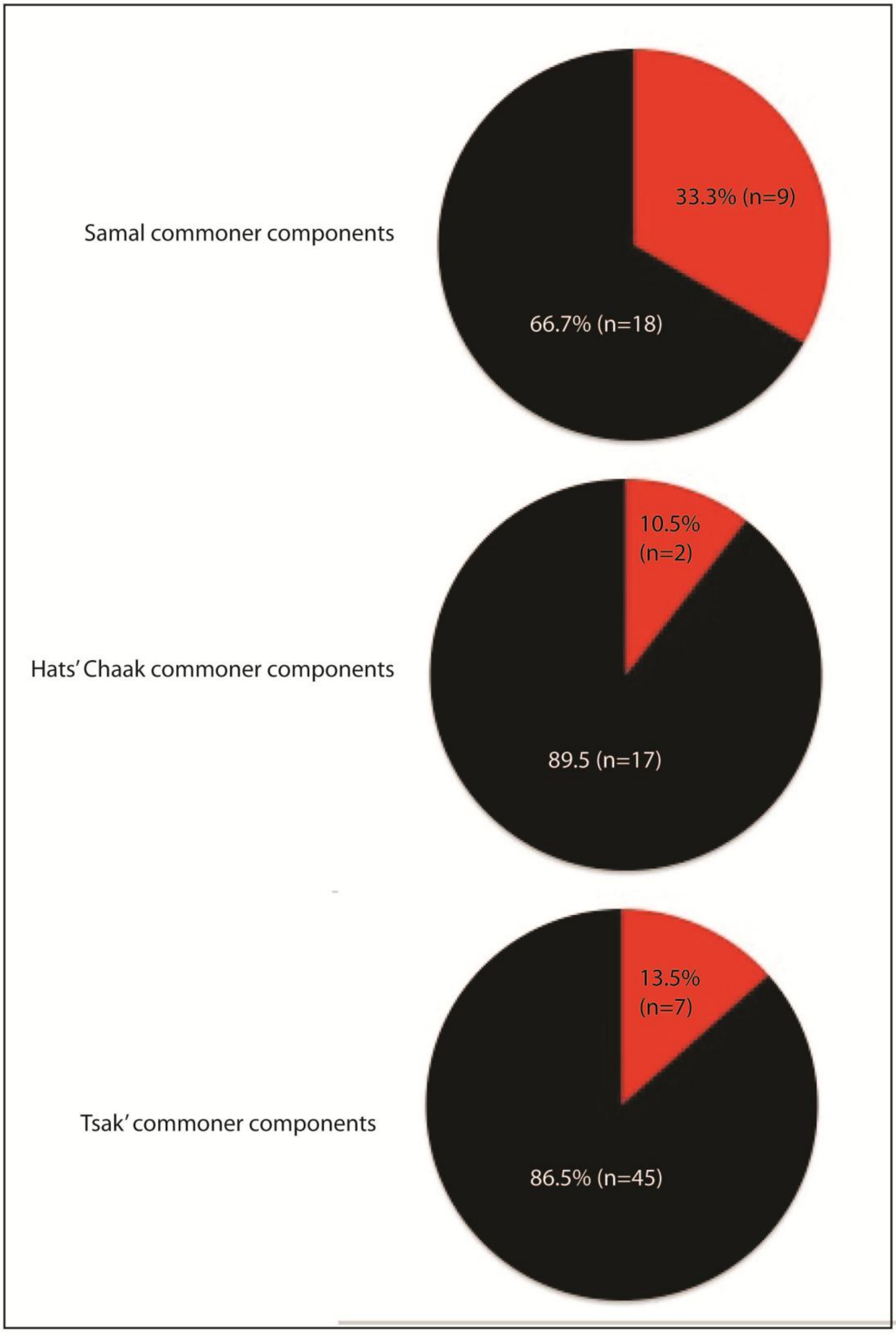


Figure 8. 2: Frequencies of red-slipped and black-slipped calcite wares (body sherds not included) at BVS Cluster 1 sites (sample only).

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APPENDIX I: EXCAVATION PROCEDURES AND RESULTS

In this appendix, I present raw excavation data/descriptions from the Phase 2 test suboperations (summarized in Chapter 4), and additional information concerning Phase 3 excavations (presented in Chapter 4). MVAP excavation procedures and recording apply a version of the University of Pennsylvania's Tikal project numbering system (Shook and Coe 1961); however, some modifications have been made and are explained in the following sections.

Settlement Site and Structure Designations

The Mopan Valley Archaeological Project plans to eventually number all mapped/tagged structures around Buenavista (there are no previously established numbers for BVS settlement sites associated with MMT) according to their location within a north-oriented grid with its origin from the Buenavista epicenter. This will be conducted with past and current Xunantunich and Actuncan project mapping efforts, in order to create a continuous valley database and grid reference system. This system has not yet been instituted and in this dissertation I adopt a provisional numbering system that labels settlement sites in the BVS settlement survey area as "BVS-###", as explained in Chapter 4.

An important difference between my system and that applied at Tikal is that of structure numbering. I have numbered structures based on height of the mounded features at surface (e.g. BVS-007-1 is taller than BVS-007-2), not within grid squares as at Tikal. This has allowed for easy additions to a settlement site's structure numbering if new structures were encountered during testing or extensive excavation, as was the case at BVS-006 and BVS-060. In labeling architectural phases at each structure, I follow the Tikal Project system of employing a sequence of ordinal suffixes to denote major constructions from most recent to oldest, and a subordinate sequence of capital letters to designate the various completed construction episodes and architectural modifications of each structure, again from latest to earliest (Shook and Coe 1961:9)

I adopt the term "patio" to refer to any formal, constructed open space that exists between the structures of some settlement sites, even those not necessarily domestically-oriented. Patios are typically elevated with respect to the surrounding occupation surface.

Contexts, Lot Groups, and Stratigraphy

With regard to terminology, although formally I make use of the terms *operation* (<u>**350**</u>A/1), *suboperation* (350<u>**A**</u>/1) and *lot* (350A/<u>**1**</u>), at times I also use "unit" and "level" interchangeably with the latter two. Where possible I try to use the formal terms but in many cases the less formal are applied. Architectural alignments are referred to by number in complex situations, such as BVS-007-1, and in particular when referring to top plans and profile drawings. The numbering sequence does not necessarily follow the stratigraphic sequence.

As mentioned in Chapter 4, during our Phase 3 horizontal clearing excavations in BVS Cluster 1 we used multiple adjacent suboperations, none larger than 2m x 2m, and we generally stopped individual lots arbitrarily after 10 or 20cm if no natural or cultural break was observed. This was done for cautionary purposes, particularly as many excavations were assisted by field school students. As such, many contexts are spread across several suboperations and include multiple lots. I have grouped lots from the same context together in lot groups, numbered by structure in no particular order.

Each individual lot and lot group is provided a cultural context description modified from Trent University's Social Archaeology Research Program (SARP) (Table AI.1). As I worked with SARP for four years, I felt more comfortable assigning their designations to my excavations from the start of investigations in 2007, particularly as set context designations had not yet been determined for MVAP investigations. Some lots are mixed to a greater or lesser degree, and in such cases I list the cultural context that I feel characterizes the bulk of the cultural materials in the lot/ lot group first, followed by the likely secondary context.

The dates given for the lots and lot groups refer to the diagnostic sherds analyzed from all contexts. I attempted a basic analysis for chronological control purposes of all diagnostic sherds in <u>all</u> lots in the test excavations and extensive excavations (Appendix II). I found this particularly important given a significant focus of my research was on the temporal abandonment of settlement sites. Much of the latest occupation material is found in the humus layer of any site and unfortunately, due to time constraints and taphonomy issues, many projects ignore this important layer. Although the diagnostic ceramics provide the foundation for building an occupation history for each structure, the reader should note that the ceramic dates listed in the lot group tables are the raw data and not the inferred date of construction or deposition.

Habitation debris designations are attributed to any horizontally-lying materials on cobble ballast surfaces, as well as horizontal layers encountered within fill, and talus-like accumulation off the sides of buildings. The context designation *on floor material* is reserved for materials encountered on preserved surfaces (plaster). *Construction fill with rubble* is considered those structural fills composed primarily of alluvial cobbles and/or debris. By contrast *construction fill without rubble* are fills primarily composed of soil/clay. This distinction is quite important at Buenavista, as it appears to be a chronological marker for architecture, both within the settlement and epicentre: clay filled buildings are primarily a product of the Early Classic (300-600 C.E.) and the early facet Late Classic (600-670 C.E.).

Time Spans and Occupational Sequences

The palimpsest nature of the archaeological record means that some lot groups include material from several inferred time spans, even though those individual time spans cannot be distinguished stratigraphically. This is true, for example, of use debris that accumulates behind a structure over the course of several architectural modifications. For example, debris accumulation probably continued with the occupation of each new construction phase, but it is unlikely that these new phases are reflected in the physical strata of the debris deposit. In some cases where the occupation spans two ceramic phases, changing ceramic inventories in vertically stacked lots can be used to try to divide one observed stratum into distinct lot groups pertinent to distinct time spans, although this does not resolve the problem of correlating these with architectural phases.

Cultural Materials

In Chapters 4, 6, 7. and 8 of this dissertation, I have discussed some artifact and ecofact distributions and patterns in the context of understanding the ancient settlement sites of BVS Cluster 1. In the proceeding appendices, I will provide broad summaries of the artifactual and ecofactual data recovered from Phases 2 and 3, as well as outlines of the exact analytical processes followed. All raw analysis data and summarized data are not presented in this dissertation but will appear in forthcoming publications.

Illustration Conventions

It would be impossible to reproduce in this report the extensive collection of field drawings we drew at BVS Cluster 1 over the course of four seasons of fieldwork. Instead, I have included only those that are illustrative of issues discussed in the text. Table AI.2 shows the various conventions followed in the illustrations that accompany the text describing Phase 2 and Phase 3 excavations in Chapter 4 and in this appendix. The scale of presentation of the drawings varies somewhat, but I have tried to consistently depict profile drawings at 1:20, top plan drawings at 1:10, and rectilinear site maps at 1:100. I depart from this convention where more detailed illustrations are required or where a larger scale is needed to show all of the features under discussion.

Phase 2 Testing: Operation 350 testing descriptions

Individual lot and lot group descriptions for Phase 2 testing are presented in Tables AI.3 and AI.4.

BVS-003

When initially encountered in the preliminary survey of the study area, this site was thought to possibly represent an extremely tightly organized patio-group (Figures AI.1, AI.2, AI.3, and AI.4). This led to the placement of three test units placed on each of the three possible mounds (Operations 350A, 350B, 350C). Early on in test excavations the site was discovered to be a single looted structure with a trench dug at its centre and associated looters' backdirt piled to the side. At this point, excavations in Op 350B were terminated. Op 350A and 350C excavations continued as it was decided they could potentially provide information on both the looters' activities and the looted structure form. The looting activity severely distorted at-surface topography of the structure, therefore neither exact nor approximate dimensions and height can be provided. Based on Op 350A excavations, we may be able to assume a platform of at least 60 cm in height with a lower terrace abutting the west face of the platform.

Op 350A. This unit was placed along the western side of the mound, positioned in attempt to capture on- and off- structure remains. No architecture was visible at the initiation of test excavations. This area of the BVS-003 mound appeared lower when compared with the northeast and southeast portions; possibly representing a lower terrace area joined to the main structure.

It was determined early on that initial lots of the suboperation consisted of looters' backdirt. Relatively few roots impeded trowel excavations, unlike excavations at other mounds, providing initial indication of recent and severe topsoil disturbance, as did the colour of the matrix that differed significantly from other mound topsoil excavations (much lighter yellow in colour). Included in the matrix was rubble from within the structure thrown out from the looters' trench, as well as a sherd of modern colourless glass located early on in testing. The cobble-sized rubble increased in density the deeper excavations penetrated, consistent with the expected ratios that would be displaced from a structure interior. The light yellow soil encountered at the start of testing is also identical to the clay-like material used in the fill of structures such as BVS-007-1, and appears to be a characteristic fill material for the Early Classic (300-600 C.E.) and early facet of the Late Classic (600-670 C.E.). The layering of yellow clay-like soil with larger and smaller cobbles beneath would be consistent with the looting of a building with predominantly clay fill, and river cobble fill in the upper layers.

Below the backdirt, a line of roughly shaped soft limestone boulders was encountered approximately a meter out from the western wall of the suboperation; representing the facing or core face of an attached terrace or part of an underlying patio platform. The "pushed out" appearance of the line suggested slumping or disturbance of internal fill, possibly due to bioturbation and/or the looting activity. Large pockets of daub and burned limestone may indicate the destruction of the building by fire at some point, although due to damage by looters this cannot be confirmed. Two additional limestone boulders were encountered at the extreme eastern end (uphill from the terrace facing) of the suboperation, and is likely the northern face of the substructure platform that would have supported the perishable superstructure. Excavations in the western portion of the suboperation ended when terrace ballast (small cobble and pebble sized river materials) was uncovered, abutting the side of the main structure platform. No plaster or discernible surfacing material survived. Habitation debris on this terrace could not be completely separated from construction fill (mixed), although its presence was suggested by a slight darkening of matrix immediately above the terrace ballast and the horizontal positioning of debris, particularly ceramic sherds, immediately above the intact fill.

Op 350B. This suboperation was placed along the northeast side of the mound, positioned in attempt to capture on- and off-structure remains. No architecture was visible at the start of excavations. This area of the BVS-003 mound appeared higher than the western portion

(Op 350A), and roughly the same height as the southeast portion (Op 350C), possibly representing the on-structure portion, although looters' backdirt has severely obscured such interpretation. Upon determining the presence of looters' backdirt in this suboperation (based on matrix colour, degree of compactness, and lack of roots), and the determination that the site represented a single looted mound, it was decided that this suboperation was not required at this time for the information sought. No architecture was encountered.

Op 350C. This suboperation was placed along the southeast side of the mound, positioned in attempt to capture on- and off-structure remains. No architecture was visible at the initiation of excavations. Once again, the "loose" nature of the matrix, few significant roots, and colour and texture of the matrix provided initial indication of recent and severe topsoil disturbance. The entire suboperation excavations consisted of the removal of looters' backdirt. Architectural material uncovered consisted of a pile of cut stones: large, well-cut (six-sided, rectangular) limestone blocks and some smaller, squared and burned blocks, encountered in the northwest corner of the suboperation. They did not appear to be in any particular formation, lying in a haphazard manner (one vertical, one horizontal, etc.), with the burned blocks resting closer to the top of the pile, perhaps indicative of burning in the area following looting activity, or removal from a particular portion of the building which was subjected to burning at some point.

The lack of larger cobbles in addition to the limestone blocks uncovered suggests this was the looters' "facing block pile," in the same manner that we as archaeologists separate the larger material from the smaller when we remove facings and fill materials during excavations. The largest facing block has a dimension of approximately 44 cm x 22 cm. This large dimension and the quality of shaping of the block suggest this was a larger structure, in comparison to most in the area, and possibly implies a higher socio-economic commoner stratum for the associated household. These blocks resemble those used for facings at site BVS-007. Soil matrix began to darken towards the bottom of the suboperation excavations, possibly representing the original humus layer or surface on which the looters' pile was placed. At this point, at what appeared to be the base of the pile, excavations were ended due to time constraints, the misplacement of the unit as to not have encountered any in-situ architecture, and the achievement of a rough idea regarding platform architecture gained from Op 350A.

Site Conclusions. This mound represents a single looted structure, and the terminal architectural form is yet to be determined. When looting took place is uncertain, although the discovery of modern artifacts within backfill suggests it is not Precolumbian. Excavations in Op 350A suggest a building or patio platform a minimum of 60 cm in height with an abutting terrace on its northwest side, associated with ceramic material from the Early Classic to late facet Late Classic (300-780 C.E.), with a strong early facet (600-670 C.E.) presence. The large dimensions and quality of shaping of the limestone blocks uncovered in Op 350C suggests this to have been a larger structure and possibly implying higher socio-economic commoner stratum for any associated household.

The targeted looting of this mound may also suggest this to have been a ceremonially-focused structure, although closer analysis of artifacts and the nature of the mound (with a possible associated activity area down slope to the west, discovered after 2010 ploughing) continue to suggest domestic functions. Based on artifacts recovered to date from the three suboperations, activities appear to be both domestically and ritually oriented, however the mixed nature of the contexts does not allow us to make any firm conclusions. The possible association of this structure with BVS-004 and 034 may suggest an ancillary structure (possibly ritually focused) associated with a domestic compound, although the significant distance between the buildings (22-2 m, much further spaced than other formally arranged groupings in the area)[16] may suggest a separate function.

BVS-004

This site consists of a single structure, a minimum of 60 cm in height (based on Op 350D excavations) and measuring approximately 6 m x 6.5 m unexcavated. Unlike BVS-003, architectural alignments were visible at ground surface, including a possible four-sided upper platform (used to orient and position suboperations). Based on Op 350D, 350E, and 350G excavations, we can assume this site consisted of a substructure platform with an upper platform or bench area and a delineated terrace area abutting the east side (Figures AI.5, AI.6, AI.7, AI.8, AI.9). The terminal structure may also cover an earlier structure, possibly visible in the southern

[16] Distances: from BVS-003 to BVS-004 = 29m, BVS-003 to BVS-034 = 27m, and BVS-004 to BVS-034 = 30m (verified after 2010 ploughing).

profile window of Op 350D. A backfilled pit was located atop the mound at the western end, likely from previous excavations at the site, although Ball says no MMT testing/excavations were conducted in this area (Jason Yaeger, personal communication, 2007) or from looting or perhaps bioturbation from root disturbance due to a large palm growing atop the mound.

Op 350D. This suboperation was placed on the northern side of the mound, positioned in attempt to capture on- and off-structure remains. Root disturbance from a large palm at the centre of the mound has likely disturbed the surface topography; however, this side of the mound appears steeper than the east.

Excavations removed a humus layer from the entire suboperation as well as architectural fall consisting primarily of alluvial cobbles. A line of roughly shaped soft limestone and more compact boulders, part of the platform facing to the front and core face behind, was encountered towards the centre of the suboperation running roughly east/west. Upon removal of the architectural fall, a large compact boulder was encountered in the southwest corner of the suboperation, resting roughly 30 cm higher than the line of limestone. This is considered part of the platform core face, or the core face of an upper platform or bench. No other large boulders were found in alignment at this higher point, therefore this could not be firmly determined.

The line of limestone boulders and facing blocks was further defined, and the bases of the large boulders were found to rest on a layer of river cobbles, likely part of an underlying platform surface or an attached terrace area. This cobble surface rests atop a buried horizon consisting of 10YR 5/4 yellowish brown silty clay, determined to be the Precolumbian occupation horizon, or "old land surface" (Loten and Pendergast 1984), represented throughout the cluster. Habitation debris was found atop the cobble surface, distinguished by horizontally resting pottery below architectural fall. The density of habitation debris was noted more thinly spread toward the northern end of the suboperation further from the structure, with the highest density directly abutting the platform. Such domestic debris deposits are typical of domestic zones (Hayden and Cannon 1983).

A profile window was placed in order to excavate through a portion of the off-structure cobble ballast layer to determine if this was in fact a constructed surface. The sides of large limestone boulders were encountered below the boulders associated with the lower buried horizon, and are considered part of platform construction fill below the platform facing/core face, or possibly part of an earlier structure.

A change in soil matrix colour was noted associated with these lower boulders and may better represent the early occupation horizon associated with an earlier structure (below the later cobble terrace surface/construction surface). A disintegrating limestone was encountered near the bottom of the profile window, thought possibly to be the residue from a thin plaster layer; however, excavations revealed it to be spalling/disintegrating from a soft, shaped limestone block uncovered protruding from deep below the terminal structure on the south side of the profile window. The direct association of this block with the buried horizon and its shaped form suggests it to be part of a platform facing for an earlier structure in the same location; this was further examined during Phase 3 (see below). Excavations were terminated when a sterile lot was attained.

Op 350E and 350G. These adjoined suboperations were placed on the east side of the mound, positioned in attempt to capture on- and off- mound remains. An alignment of roughly shaped limestone boulders toward the top of the mound guided the orientation of the first suboperation (350E) directly above and below, working on the assumption that this alignment represented an upper platform/bench facing, and attempting to catch the east side of the lower platform (encountered in 350D) as well. When it was determined that Op 350E did not capture a significant off-structure area, Op 350G was placed as an extension immediately to the east. Based on mound topography, it is possible this area is the "back" of the structure, with the "front" likely located on the west side of the mound.

A thin humus layer was removed from both suboperations, although the extreme thinness of the layer in Op 350G caused a mixed context of humus and architectural fall. Artifact densities were noted to increase down slope on the structure (toward the east) and off-structure with much soil matrix surround, suggesting significant colluvial action and modern glass confirmed its mixed nature.

The removal of architectural fall (primarily alluvial cobbles) was limited due to the nearness of architectural elements to the ground surface. An upper and lower platform facing was uncovered and ran perpendicular to those lines encountered in Op 350D, representing the east and north faces.

Off-structure, a ballast of small cobbles and pebbles was encountered, similar to Op 350D, and is believed to represent an adjacent terrace or formal activity area. Artifacts encountered on this surface were left in place and collected as habitation debris. Unfortunately, modern green glass was also removed from within the habitation debris, suggesting continued disturbance of the material. This is not surprising due to the shallow nature of deposits on this side of the mound. Excavations did not continue into the terrace fill, as the goal was to recover occupation information rather than construction.

Site Conclusions. The shallow nature of the terminal architecture uncovered within the mound at BVS-004 has led to numerous disturbed contexts; however, the deeper lots of Op 350D are promising in terms of secured occupational information. Excavations in Op 350D, 350E, 350G suggest a building platform a minimum of 60 cm in height above a compacted cobble surface uncovered on the north and east sides of the mound. All excavations suggest a basal support platform (substructure) represented by a core face and facing, and upper platform and bench composed of limestone facings and alluvial cobble fill. This upper platform is the likely location of the perishable superstructure that is represented by large amounts of daub recovered from all suboperations. Mound dimensions and the large amounts of limestone boulders and alluvial cobbles involved in construction suggests this to have been a larger structure, in comparison to other sites in the area, and possibly implying higher socio-economic status for any associated household. However, the quality of material used in facings pale in comparison with that material uncovered at BVS-003.

Based on artifacts recovered from the three suboperations, activities seem domestically oriented, although this was further evaluated during Phase 3.

BVS-005

This site consists of two orthogonally arranged mounds and formally outlined patio area. BVS-005-1 is located in the southwest corner of the site, directly north of the main property access road (Figures AI.10, AI.11, AI.12, AI.13, AI.14). The mound measures roughly 80 cm in height and covers an area approximately 5 m x 7 m unexcavated. Visible architectural alignments were detected at ground surface, including a possible four sided upper platform/bench facing (used to orient Op 350H). The terminal architecture of the structure is extremely close to the surface; therefore significant disturbance was expected. BVS-005-2, located in the northeast corner of the site, is a minimum of 50 cm in and measures approximately 6 m x 6 m unexcavated. Visible architectural alignments were also present, although less so than at BVS-005- 1, including a possible upper platform/bench facing. A backfilled pit was located atop each of the mounds at their centre, and likely due to similar cause(s) as described above.

BVS-005-1: Op 350H and 350J. These suboperations were placed on the south side of BVS-005-1 in attempt to capture on- and off- structure remains. A series of aligned roughly shaped limestone blocks atop the mound guided the orientation of the first suboperation directly above and below, assuming this was an upper platform/bench facing, and attempting to catch the lower portion of the platform. This was the least desirable side of the mound to test, due to the nearness of the property road that had likely disturbed the area; however, a back or side of the structure was desired in order to recover occupation debris. The west side of the mound would have been the most desirable; however, an extremely large palm had grown along the immediate edge of the mound in this location. Early on in excavations of Op 350H it was determined a significant amount of off-structure area was not captured, so Op 350J was placed on the south end to extend off-structure coverage.

A thin humus layer was removed from both suboperations, revealing a thin layer of architectural fall directly beneath. A large roughly shaped limestone boulder was encountered toward the southern end of Op 350J, part of the southern core face of the platform. We were only able to capture a small off-structure area in this suboperation, as the road and associated ditch were located directly south of the excavation. Artifact densities increased down slope, particularly in off-structure areas. This was extremely frustrating as it appeared likely the artifacts in this area (throughout all lots of Op 350J) would be a mix of the humus, architectural fall, and habitation debris, as well as disturbance from the road construction and ditch digging (as well as earlier fence construction, therefore architectural fill).

Removal of architectural fall began following humus layer removal; however it was impossible to distinguish a separate fall lot from other contexts due to the extremely mixed nature of the area of the mound. The mixed context was verified by the recovery of modern artifacts at deeper strata.

The line of roughly shaped limestone facing blocks encountered at the northern end of Op 350H were further defined as an upper platform/bench facing. The large limestone boulder at the southern end of the lot was further defined and found to be part of an alignment with boulders outside of the suboperation, forming part of the lower or supporting platform core face. Overall, the extreme disturbance of this area led to the termination of excavations.

BVS-005-2: Op 350I. This suboperation was placed on the north side of the mound in attempt to capture on- and off-structure remains. A short visible alignment of nicely shaped limestone blocks atop the mound helped to guide unit placement, although final orientation was found to not run parallel with the actual structure due to displacement of on-mound alignments.

A thick layer of humus and architectural fall was removed from the suboperation that allowed us to hope that preservation below would be much improved than was observed on BVS-005-1. An alignment of limestone boulders and hewn blocks was encountered toward the centre of the unit running roughly east-west representing the structure's north core face. More compact limestone boulders and some shaped limestone were encountered immediately north of this higher alignment, in no particular configuration, and were determined to be architectural slump or fall. The location and angle of the boulders and blocks, with no surrounding fill material, suggested it was held in place by the edge of the platform, having slumped forward and not completely dislocated.

Below the slumped material, two courses of facing bricks were uncovered; the facing measured roughly 40 cm in height and was composed of nicely hewn bricks roughly 30 cm in length. Both courses consisted of nicely shaped limestone bricks, hewn mostly on their front faces in contrast with the six-sided shaped blocks of BVS-003 and BVS-007.

A layer of habitation debris was recovered beneath architectural fall encountered off-structure, and directly beneath and north of the slumped blocks, spanning an area approximately 45 cm out from the structure face. Two layers of cobbles were also encountered to the west and south of the debris (immediately adjacent the facing). The western scatter was located roughly 5 cm higher than the southern scatter and sloped down toward the north, suggesting both scatters were separate features. The more southerly scatter was composed of smaller cobbles and pebbles and was found to be a very thin scatter with unclear dimensions.

The western "pile" of cobbles, larger in size than the southern scatter, is most likely the result of architectural fall during Precolumbian times, based on depth and association with the habitation debris layer. However, it is also possible this is a stone pile (provisional discard, see Hayden and Cannon 1983) from the time of structure occupation, a common occurrence in developing Maya houselots both past and present. The pile continued westward along the structure. Bulk artifacts from this pile included ceramic and lithic material. Small finds from the pile include: one large obsidian blade fragment (Small Find #22). Bulk artifacts from the habitation debris included much ceramic and lithic material and numerous daub pieces. Small finds included: one obsidian blade fragment, one circular carved shell bead, three freshwater bivalve shells (*Nephronaias*), one granite groundstone mano fragment, one unshaped slate fragment, two tiny *P. glaphyrus* shells, one burnishing stone, one quartz crystal, one quartzite groundstone mano fragment, one shell fragment (species undetermined), one small *P. glaphyrus* (ridged *jute*) river shell with broken tip, one unidentified shell, two unidentified (possible) groundstone fragments, one granite fragment, one tiny *P. indiorum* shell, one burnishing stone, one shell (species undetermined), one obsidian blade fragment , two unidentifiable fired clay forms (in with bulk ceramic), and one obsidian fragment . The large amount of shell material, including worked pieces, suggests possible craft activity at this site, while the burnishing stones and unidentifiable fired clay forms may be associated with ceramic manufacture.

The southern carpet of small cobbles and pebbles was found directly beneath parts of the habitation debris in a small area directly adjacent the platform facing. Its location and discontinuity north suggests it may have served as a leveling feature laid out prior to platform construction. This thin carpet lay directly atop the buried occupation horizon (same encountered at BVS-003, BVS-004, etc.). Excavations into the structure would determine whether the cobble layer continued under the building, which seems likely.

The buried horizon and associated habitation debris beneath the scatter was identified by a soil colour change. Artifact densities were considerably lower, and may be the result of downward trampling. Excavations ceased upon attainment of a sterile lot.

Site Conclusion. This site consists of two substructure platforms comprising a patio group. Architectural features at BVS-005-1 were poorly preserved on the south side therefore excavations were of little use in terms of an architectural discussion. Artifacts recovered from the site suggest domestic use, although the disturbed context is not reliable.

BVS-005-2 excavations proved more insightful presenting an in-situ platform facing, minimum two courses in height, and constructed with well-shaped limestone bricks of a high quality, possibly suggestive of a higher commoner stratum for the associated household. Artifacts recovered from the site suggest domestic use, and are possibly also craft oriented based on the amount of riverine shell and shell artifacts recovered. The ground-truthing conducted by Hudacin in this area, along with examination of artifacts, confirms such activity likely involving the creation of *Nephronaias* pendants. Such pendants have been linked to notions of identity among the ancient Maya, particularly to children (Aispurua and McAnany 1999; Hammond 1991:185-186).

BVS-006

This site was originally thought to consist of a single mound (BVS-006-1), a maximum of 80 cm in height on its steepest side, covering an area of approximately 12 m x 6 m unexcavated (Figures AI.15, AI.16, AI.17). The mound/structure appeared to be built into and level with a natural terrace slope on the south side (north half of survey area), and an adjacent leveled patio area to the north that drops steeply on its north face. Upon closer inspection it was found to consist of three orthogonally arranged mounds, with BVS-006-2 on the north side of the patio (built up significantly on its north face), and BVS-006-3 on the west side. These additional two mounds are much lower in topographic relief on their inward facing sides (single course facings). As additional mounds were not formally noted until the initiation of Phase 3, no testing was conducted at BVS-006-2 and BVS-003-3. Few visible architectural alignments were noted at ground surface therefore mapping and suboperation placement was based on topographic interpretation. A backfilled pit was located atop the mound at the centre; cause is unknown (see above).

Op 350K and L. These suboperations were placed on the west side of the mound, positioned in attempt to capture on- and off-structure remains. We had hoped to place the initial suboperation on the south side of the mound however the possible aforementioned disturbance atop the mound and adjacent to the desired location caused us to choose another side in order to avoid context issues. Early on in the excavations of Op 350K it was determined a significant amount of off-structure area was not captured, so Op 350L was placed on the west end to extend off-structure coverage.

A humus layer was removed from both suboperations. This layer contained much cultural material with densities increasing down slope on the mound (toward the west), the result of significant wash-down (colluvium) from the top of the structure as this side represents a steady slope.

Architectural fall was removed beneath the humus, revealing a carpet of in-situ platform fill and habitation debris off-structure. A line of limestone boulders, blocks, large cobbles, etc., was encountered towards the western end of Op 350L (roughly 60 cm from the west wall of the suboperation). This appeared similar to the line of slump encountered in the upper lots of Op 350I. These stones were left in place for later removal. Large amounts of artifacts continued to be encountered and likely once again consisted of wash-down from the top of the structure, along with fallen fill. The presence of a speleothem (cave rock) is of note as archaeologists are frequently accused of ignorance when identifying cave debris in residential structure fill and debris, often linked to ritual and animistic concepts (Peterson et al. 2005).

When the slumped blocks were removed, another alignment of small, squared limestone facing blocks was encountered further east in a slightly pushed out line. Considering the size/height of the structure, it is surprising theses blocks are so small: measuring roughly 10cm x 10cm x 5 cm at the most. However, these are similar to blocks used in portion of BVS-007-2 and are nicely hewn.

A significant amount of habitation debris was recovered beneath the fall and slump. Artifacts in the area off-structure were positioned horizontally, suggestive of habitation debris, and were of greater density nearer the structure, suggestive of a sloping pile. The sloping nature of the debris is important as it may explain the great variation in dates represented by ceramics in most lots due to problems with roll-down: later material rolling downhill past the earlier artifacts in the pile and closer to the structure, therefore later material was found in lower lots.

In profile, the buried occupation horizon was noted to begin in the lower levels of the habitation debris, as encountered elsewhere in Phase 2. It is believed the artifacts are the result of downward movement/pushing into this lower level. Excavations ended with the attainment of a sterile lot.

Site conclusion. This site is composed of three rectangular structures formally arranged around a patio area. Excavations in Op 350K and 350L uncovered the west platform facing composed of relatively small shaped limestone blocks. Overall, this is one of the latest occupied groups in the study area. Ceramics suggest occupation spanning from the Late Preclassic to the Terminal Classic. This material suggests BVS-006, along with BVS-004, may be one of the longest and latest occupied settlement sites in this part of the Buenavista settlement.

The significant number of artifacts recovered from the suboperations is likely due to the steepness of slope of the mound and underlying structure (debris rolling down hill and settling). Artifacts are suggestive of domestic activities and the presence of possible shell-related craft activity at this site is to be investigated further. A similar craft activity is possibly represented at

BVS-005, adjacent to BVS-006, and may suggest this to be a particular area of the site associated with such production. The proximity of the sites may also suggest familial relationships existed between the households.

BVS-007

Results presented in Chapter 4.

BVS-033

This site consists of a single, low-lying mound, approximately 20 cm in height and covering an area of approximately 6 m x 6.5 m unexcavated (Figures AI.18, AI.19, AI.20). At ground surface the enclosed structure is indicated solely by the upper surfaces of a couple limestone boulders in rough alignment. No “mound-like” topography is visible and test excavations were placed to confirm site status and to determine whether this was a deeply buried structure or perhaps part of a formal houselot boundary or other feature. More limestone boulders could be seen around the area of the site, however only large horizontal excavation will be able to determine their function. The GPR testing focused around this area of Cluster 1 (see above).

Op 350F. This suboperation was placed to either side (north and south) of the best alignment of limestone boulders in this area, in attempt to determine whether this was in fact a structure, and if so, to capture on- and off-structure areas. A thin humus layer was removed from the suboperation area. This revealed the extremely shallow nature of the deposits, despite the limited surface visibility, and prepared excavators for severely mixed or disturbed contexts.

Beneath the humus was a minor amount of architectural fall, due to the limited height of the structure, and was mostly scattered in nature. This scatter surrounded an alignment of limestone boulders (the structure’s southern core face) and backing masonry (alluvial cobbles and soil) was uncovered between the core face and a facing: a line of roughly hewn soft limestone blocks approximately 10 cm south of the platform core face. This confirmed the presence of a masonry substructure/platform, and associated daub material confirmed a perishable superstructure. A cobble ballast layer was found on the north half of the suboperation and a lower ballast layer extended south from the facing line out to a compact clay surface. The absence of this surface in the roughly 70 cm area immediately adjacent the platform was curious and it was decided that a profile window would be used to investigate below. A break was noted between the large boulders of the core face and in the facing toward the centre of the unit, possibly indicating an entrance area for the perished superstructure (explaining the “scattered nature” of material in this area, clearly visible in the top plan), and the large boulder of the core face displayed wear patterns with a degree of polish consistent with typical tread stones displaying intense use. The southern ballast surface, immediately adjacent the platform, appeared to slope downwards towards the eastern and southern sides of the lot, again, perhaps due to a build-up of debris in the central area due to traffic.

Artifacts found within the compact clay surface were both vertical and horizontal, with the latter closer to the top of the lot, suggesting the trampling of on-surface debris into the clay layer. Bulk artifacts consisted of ceramic and lithic material. The clay matrix was extremely hard to excavate through, but did peel back quite easily from the ballast directly beneath, perhaps functioning as a ballast to secure the clay surface. It remains unclear as to whether this was in fact a formal surface or if it is the result of natural activity. This area is close to the possible *rollada* area, and dark thick clays are common. This area was also subject to cattle activity in historic time and trampling by cows may have led to odd consistencies in surrounding soils (Hector Guerra, personal communication, 2009).

When some overlooked architectural scatter was removed from adjacent the facing, the top of a second alignment of thin limestone blocks/slabs was encountered directly south of the face and roughly 3 cm lower, with the ballast leading up to it. When this lower course was removed later in profile excavations, it was found that the cobble carpet extended beneath this alignment. It may even be that the ballast continues beneath the core face as well; if this is the case, this surface may also be part of a leveling technique placed prior to platform construction, as was seen at BVS-005-2. The second alignment of blocks was possibly part of a later facing or stair treads, although the height of the building would not suggest a need for such a feature. It seems most likely this second short alignment (limited to the eastern side of the suboperation) is a fallen course of the facing; only further horizontal excavation would clarify.

The sloping or shifting of the ballast surface (noted above) suggests much disturbance in this area. The presence of a formal facing for a structure of such limited height is peculiar, out of place, and of poor quality. Upon reflection, this may be a situation of “pillaged” blocks; the hewn facing blocks, often a sign of architecture associated with higher socio-economic strata, may have been removed from another area and placed directly in front of the core face of the platform, or at the very least a later addition to the structure. The early abandonment of BVS-007-2, which incorporates similar small blocks in its upper construction, may have been a source for such material (see Phase 3 results).

Excavations continued through the ballast, and fill size was found to increase (larger alluvial cobbles) as excavations deepened, typical of Maya construction patterns (larger cobble/boulder fill lower down with small cobble/pebble ballast above). Bulk material from the ballast and fill layers of the off-structure area included ceramic, lithic, and daub pieces. Although numerous potential diagnostic sherds were pulled from the bulk ceramics, their extremely poor condition provided no information suitable for chronological placement. The extreme weathering of the material suggests this was taken from an exposed midden for use in construction, typically observed in ethnographic contexts (Deal 1984; Hayden and Cannon 1983).

Below the larger fill appeared the buried occupation horizon, similar to that encountered elsewhere in the cluster. No additional architecture was encountered despite the continuation of cultural material.

Site Conclusions. The extremely low height of this site and test excavations provided useful insight for further survey at Buenavista, representing structure architecture indicated only by the upper surfaces of single boulders or at most a line of boulders. This will provide problems for further area survey, as excavation was required to confirm structure presence. This problem of "invisible mounds" is one that must be considered when attempting to assess the socio-economic strata present in the settlement, as well as attempting calculations such as population estimates.

Excavations in Op 350F suggest a single substructure platform (confirmed by GPR and ground-truthing) and adjacent terrace activity area to the south, with a maximum height of 20 cm, and possibly resting atop a leveled surface or ballast and covered by a compact clay surface. Ceramics from the site suggest occupied was limited to the Late Classic (600-780 C.E.). Additional large limestone boulders in the immediate vicinity do not appear to be part of formal architecture based on ground-truthing results. The low height of the platform and possible recycling/pillaging of more fine limestone material in order to create one or two formal facings suggests association with a lower stratum household.

Based on artifacts recovered from the suboperation, activities appear domestically-oriented, although no formal tools or obsidian was encountered. A large amount of raw and worked slate was recovered from almost all contexts, and may represent ritually-oriented activities or production of artifacts from this material.

BVS-034

Results are presented in Chapter 4.

BVS-035

This site is located at the junction of the Main Site Access Road and the Main Property Access Road, and comprises a single low (<50cm) mound with some associated shaped limestone boulders and cultural material (Figures AI.21, AI.22, AI.23). An outlined patio area was noted by the alignment of stones beyond the mound proper, possibly suggestive of a formal patio platform running below the substructure platform represented by the mound, although the low topography did not allow such a judgment without larger excavations. Overall the site covers an area roughly 12 m x 8 m (the mound itself covering 7 m x 8 m). The site is assigned to the XAP Type I settlement category.

Although the mound is low-lying, many large limestone boulders were visible at ground surface and should have made the site visible at the time of the MMT survey; however it could not be identified on the maps provided. Upon full clearing of the site in 2008, numerous granite metate fragments were found littering the surface (photographed), possibly suggesting a more intense level of associated production activity. This may be additionally significant as it is thought granite artifacts were being manufactured at BVS-004, just northeast of the site. Test excavations indicated two phases of construction to the site structure, possibly due to a burning episode. Suboperations at this site consisted of Op 350O.

Op 350O. This suboperation was placed on the south side of the mound, in attempt to capture both on- and off-structure remains. The unit was oriented based on visible surface architectural alignments and mound topography.

A humus layer was removed from the entire length of the unit, ending with the exposure of fall and structure fill (north end). Structure fill consisted of typical alluvial chert cobbles. The associated fall layer was quite thick and consisted of limestone boulders, chert alluvial cobbles, and artifacts.

Below the fall, the tops of two architectural alignments were uncovered, composed of limestone blocks, and later determined to represent two phases of construction. Between the faces was an inter-face fill, and off-structure was a layer of habitation debris associated with the terminal occupation phase.

A roughly 5 cm layer of terminal habitation debris was excavated immediately below the fall, in front of the terminal face. Within this layer, a large lens consisting of 100s of *mazamorra N. dysoni* shell was removed. This is a natural occurrence (no human alteration to the small, soft shells) in highly organic areas (possibly a confirmation of perishable habitation debris), where large numbers of this snail congregate (Carolyn Freiwald, personal communication, 2008). Below the habitation debris, a layer of burnt daub and burnt limestone was uncovered. This is believed to be debris from the penultimate phase of the structure. The burning of perishable houses is common in the tropics, for reasons such as accidental firing or pest control (Redfield and Villa Rojas 1934). The burning of a house following the household head's death is also noted in the ethnographic record of the Maya lowlands (Thompson 1971). The lack of other nearby residential burning suggests this was not due to a wild fire or intentional warfare-related burning incidents.

Excavation of the inter-face fill (terminal phase) was conducted in order to determine any chronological differences between phases. The burnt limestone and daub layer found beneath the terminal habitation debris and terminal platform face was excavated to its base (no significant charcoal pieces were encountered). Below this was a penultimate habitation debris layer. Removal of the burnt layer, along with a section of the terminal platform face, allowed the viewing of two lower courses of stone in the penultimate platform face: covered over in the terminal phase. This penultimate face is composed of faced limestone blocks, compared to the terminal face that consists of unshaped soft and compact limestone boulders. Material from the burnt limestone layer includes ceramic, lithic, and daub bulk material, as well as an obsidian blade (OB-109), a stone/slate celt (SP-005), a chert biface (LT-020), and a chert uniface (LT-021).

The penultimate habitation debris, below the layer of burnt daub and limestone, was excavated to the base of the penultimate face. Below this appeared the yellowish buried occupation horizon. Excavation continued into the buried horizon until a sterile lot was encountered.

Site Conclusions. Excavations at BVS-035 confirmed the presence of a structure at the south end of the site, although a more complex construction than indicated by a simple topographic evaluation. Two construction phases were noted, represented by two platform faces, inter-face fill, two separate layers of habitation debris, and a layer of burned material from the penultimate structure. Perishable superstructures were inferred from large amounts of daub recovered associated with both penultimate and terminal phases. As noted above, the periodic burning of perishable superstructures is common in the tropics and damage to substructures is also possible. Two types of construction material were noted: the use of nicely faced blocks in the penultimate face, and rough unshaped boulders in the terminal face. The patio area of the site was not investigated beyond mapping of its perimeter and noting of large artifacts (metates) on its surface.

Artifacts from this site suggest domestic pursuits and may also suggest some form of craft activity, such as slate carving, and higher levels of food processing based on the relatively high number of metate fragments littering the site.

BVS-036

When first encountered in the 2007 survey, BVS-036 was described as possibly consisting of two very low mounds with a sunken patio area, and located on the third alluvial terrace (Figures AI.24, AI.25, AI.26, AI.27, AI.28). Testing and ground-truthing excavations went on to suggest this is a single low-lying mound, possibly with formal adjoining terrace areas. Large facing blocks were noted at surface alongside compact limestone boulders. It was believed the site extended over a large area, although the low-lying nature of the mounds made it difficult to assess without excavation. Such low features, nearly flush with the ground, would likely not have been visible at the time of the MMT survey at which time this area would have been pasture. The site was designated a Type 1 settlement.

The BVS-036 mound is below 50 cm in height with very little architecture protruding above ground, and covers an area of approximately 8 m x 12 m. An odd trench runs north-south across the mound; however GPR analysis could not determine any anomalies along its course and may be the result of vehicle activity in the area in historic times. Test excavation units at the site included Op 350M, Op 350N, and Op 350S.

Op 350N. This suboperation was placed on the west side of the mound, positioned in attempt to capture on- and off-structure remains. The unit was oriented based on visible surface lines of architecture and mound topography.

A humus layer was removed from the entire length of the unit, ending with the exposure of structural fall and fill (east end). The fall was relatively thick and the odd positioning of large limestone boulders off-structure was initially suggestive of a cyst burial, although this was quickly ruled out by careful excavation. It is possible this pile of limestone represents a provisional discard pile of construction material.

The thick fall layer was removed from the unit, directly above the platform face (see below) and a layer of habitation debris. The fall consisted primarily of large, naturally flat limestone boulders (likely collapsed from the platform face), large alluvial cobbles, and artifacts: likely all from the fill of the structure. During excavation of the fall, the first course of the platform face was uncovered, consisting of soft limestone boulders.

A roughly 10cm layer of habitation debris was then excavated and collected. Removal of this layer allowed the exposure of the lower course of the platform face. However, unlike the upper course, part of the lower contained intentionally faced limestone blocks. This may represent "pillaging" of material from abandoned residences, or perhaps two phases of construction; possibly matching up with the dual phases observed on the other side of the site (see below). Below the habitation debris, the buried occupation horizon was encountered. Excavations continued off-structure into the buried horizon until sterile soil was encountered.

Op 350M and Op 350S. These adjoined suboperations were positioned on the east side of the mound, in attempt to capture both on- and off- mound remains. These were placed as originally it was thought the site may represent two structures (later negated by GPR and ground-truthing). Orientation was determined from visible architectural alignments and mound topography. Once determined that Op 350M had actually captured two terrace areas in addition to the east face of the substructure platform, it was decided to extend excavations to find the edge of the second terrace (Op 350S). This area of BVS-036 appears to be more of a gradual slope when compared to the west side; although, again these are minimal differences due to the extremely low topography of the site.

A relatively thick humus layer was removed from both suboperations, except in the most westerly section of Op 350M (on-mound). This layer overlay a thin wash (colluvium) layer immediately below throughout most of Op 350M. Humus excavation was ceased when cobbles were encountered in all areas of the suboperations.

The removal of the thin layer of colluvium, displaced material caused by water movement and other erosive factors, was determined by vertical ceramics, soil, and alluvial cobble and pebble mix overlying horizontally lain ceramics on a more compact and dense cobble surface (habitation debris overlaying terrace ballast). The colluvium appeared limited to the area of Op 350M due to the lack of significant sloping topography. Below the colluvium, an alignment of large cobble and small boulder soft limestone was uncovered at the west end of Op 350M representing the west face of the main structure substructure platform. Below the colluvium on the east side of the alignment, habitation debris was encountered atop a compact alluvial cobble and pebble ballast. Artifacts from the colluvium included ceramic and lithic bulk material, including flaked quartz material (a rare find). Also noted in excavations was the preponderance of very small retouch flakes, which continue into the habitation debris.

Off-structure, to the east of the platform face, a thin layer of habitation debris was recovered. Upon removal of the debris a second alignment of large limestone cobbles and small boulders was present at the east end of Op 350M, leading to the placement of the Op 350S extension. This additional alignment of limestone ran parallel with the platform face to the west. It was determined that this was the edge of a first terrace (perhaps an additional roofed area); however an additional ballast surface was encountered past this single course line, although different from that which lay to the west. This ballast consisted of a dense matrix of alluvial chert cobbles and dark brown (10YR 3/3) silty clay, while the ballast to the west was composed predominantly of soft limestone cobbles and pebbles. This suggests two visibly different phases of construction (discussed below). Artifacts within the habitation debris consist of ceramic, lithic, daub and one metate fragment (GS-024), as well as pieces of burnt limestone.

The first terrace ballast, as mentioned above, consisted primarily of limestone material while the masonry substructure ballast/fill appears to be typical fill predominantly of alluvial chert cobbles. Excavation of a thin layer of the first terrace ballast was conducted in order to better outline the first terrace face. Material from this lot is considered to be fill (part of the penultimate phase, the second terrace being terminal), with a possible mixture of habitation debris as no formal surface (plaster, etc.) has survived.

The second terrace cobble ballast, to the east of the first terrace, had a matrix of dark brown silty clay and chert cobbles and was excavated in two profile windows on the north side of Op 350M and S. This fill was found to overlay a similar limestone surface as detected on the first terrace, suggesting this terminal fill covered a penultimate surface. Two more courses of roughly shaped soft limestone were also found below the first course of the first terrace face.

Excavations continued in the profile windows through the penultimate limestone fill of the second terrace, which proved to be only 5-10cm thick. Immediately below the limestone ballast/fill the buried occupation horizon was encountered. Profile window excavations continued through the buried horizon until sterile soil was reached.

Site conclusions. Excavations at BVS-036 suggest the site consists of a single low substructure platform with two adjoining terraces on the east side of the site (likely one being an interior lower level of the platform, and the other an exterior terrace), with a perishable superstructure (based on recovery of numerous daub pieces). Multiple construction phases were identified and present varying construction techniques and material. Excavations in Op 350N suggest that at least the west platform face is of a minimum of two courses high (deceptive from surface topography).

Based on the artifacts recovered, activities at the site appear domestically oriented, with the possibility of final stage lithic work (resharpening) being conducted on the eastern terraces.

BVS-037

This single mound site was determined early on to represent remains of an activity area not clearly linked to any other settlement site. Christina Dykstra, a PhD candidate in the Department of Anthropology, University of Wisconsin-Madison, investigated it as part of Operation 350. Her report can be found in the next section.

BVS-060

This site consists of three orthogonally arranged mounds, two very low in height (< 50 cm) and one higher principle mound (< 1m), atop a formal patio platform. During the Phase 1 this site was thought to consist of only two mounds, therefore only two were tested. The third mound was investigated during Phase 3. It is located on the south side of the upper alluvial terrace of the survey zone, immediately adjacent the Main Property Access Road. Overall the site covers an area roughly 16 m x16 m and is assigned to the XAP Type III settlement category. Suboperations at this site included Op 350AB, Op 350 AD, and Op 350AE (Figures AI.29, AI.30, AI.31, AI.32, AI.33).

BVS-060-1: Op 350AB. This suboperation was placed on the south side of BVS-060-1 to capture on- and off-structure remains. The unit was oriented based on visible architectural alignments and mound topography. Excavations were not placed on the east, west, or north sides (most likely to be the back and sides of the structure) due to the proximity of the road and ditch. Excavations of Op 350H & J at BVS-005 demonstrated significant disturbance of on and off-structure remains next to the ditch and road (see above).

A relatively thin humus layer was removed from the entire length of the unit, ending with the exposure of structure fall and fill. The fall layer was removed from across the unit. Structure fill was encountered at the north end of the unit and consisted of a typical dense mixture of alluvial chert cobbles and soil. Removal of the fall exposed the platform face: a single course of large faced limestone boulders. Off-structure, a layer of habitation debris was encountered overlying the patio surface.

A small profile window was placed into the structure fill where a limestone block appeared to be missing from the face. The aim was to determine whether the block had sunk over time and was actually resting lower than the other face blocks. Excavations determined that no such block was to be found, and likely had been displaced over time. Phase 3 excavations would confirm the pillaging of terminal phase blocks (see below).

A layer of habitation debris was excavated from above the patio surface. Excavations continued into the patio fill in order to gain some chronological and architectural information concerning construction. The fill consisted primarily of alluvial cobbles and artifacts, with few larger inclusions. Below the patio fill the buried occupation horizon was encountered. Excavations continued through this horizon until a sterile lot was achieved.

BVS-060-2: Op 350AD and Op 350AE. These adjoined suboperations were placed on the east side of BVS-060-2 to capture on- and off-structure remains. Units were oriented based on mound topography.

A layer of humus was removed from the entire length of the suboperations, ending with the exposure of structure fill and fall. A north-south alignment of faced limestone boulders was encountered in Op 350AD and was determined to be the penultimate platform face. A second alignment of unshaped limestone boulders was encountered approximately 50 cm to the east sitting at the same level as the first, although the fill between the two lines differed significantly from that to the west of the penultimate platform face: suggestive of two construction phases similar to that encountered at BVS-036. The terminal fill contained dense deposits of artifacts, likely from a nearby midden based on the extremely eroded surfaces of ceramic material, and a marl-like material.

A fall (or scatter) layer was removed from most areas of the suboperations, exposing the lower of two courses of the terminal platform face. Below the fall was a layer of habitation debris and what appeared to be a pile of large limestone construction blocks (see below). A small profile window was placed into the terminal fill to gain chronological and architectural information.

A layer of habitation debris was encountered to the east of the terminal platform face, directly above the buried occupation horizon. At this same level, at the extreme eastern end of Op 350AE, a pile of faced limestone blocks was uncovered. The blocks were in no particular order and the faced sides were oriented to all different directions. This was interpreted to be a Precolumbian pile, and may represent another provisional discard pile for future construction phases. The material from this layer is likely a mixture of the penultimate and terminal phases. Excavations continued into the buried horizon in Op 350AE until a sterile lot was encountered.

Site Conclusions. Test excavations confirmed the presence of an L-shaped or two orthogonally organized mounds positioned atop the patio platform at the NE corner of the site, with perishable superstructures. Excavation of BVS-060-3 occurred in Phase 3. Excavations in BVS-060-2 suggest at least two phases of construction: the expansion of the mound to the east, represented by two platform faces (or one platform and a terrace extension) with distinctions in fill composition. This expansion may be related to the developmental cycle of the domestic group (Tourtellot 1988). The interesting Precolumbian pile of limestone blocks associated with the habitation debris in this area may represent delayed construction activity or provisional discard (Hayden and Cannon 1983) of the material. The presence of multiple structures atop the patio platform may suggest a higher socio-economic status for residents in addition to larger household (requiring higher labour investment), although the quality of construction is nowhere near what was found at BVS-003, BVS-005, BVS-006, BVS-007.

Artifacts suggest typical domestic pursuits in both investigated areas. The somewhat late establishment of occupation at the site may be reflected in their position at the very edge of the upper alluvial terrace, toward the start of the drop to both the South Arroyo and the Mopan.

BVS-077

This site is represented by a single low mound (< 1 m) on the south slope of the survey area (Figures AI.34, AI.35, and AI.36). The north side of the structure is built into the hillside, with the south side built up to level. Overall the site covers an area roughly 5 m x 5 m and is assigned to the XAP Type I settlement category. Suboperations at this site included Op 350Z.

Op 350Z. This suboperation was placed on the south side of the mound in attempt to capture on- and off-structure remains. The unit was oriented based on visible architectural alignments and mound topography.

A humus layer was removed from the entire length of the unit, ending with the exposure of structure fall. The fall layer was removed from across the unit and alluvial cobble structure fill was encountered at the north end of the unit. Removal of the fall exposed the southern platform face: a single course of large faced limestone boulders. Off-structure a layer of habitation debris was encountered, compressed over time into the buried occupation horizon. The layer of habitation debris was removed along with matrix from the buried horizon. This lot, habitation debris, was significantly shallower relative to other sites in the cluster, possibly reflective of the short occupation duration of the site (see below). Excavations were terminated with a sterile lot.

Site Conclusions. Excavations at BVS-077 proved extremely quick and straightforward. They confirmed the presence of a single low masonry substructure platform. The paucity of habitation debris is likely due to the very short occupation of the site (relative to other sites), although may also be due to the down slope of the area, and debris would continue further down. Artifacts suggest domestic pursuits, although no special finds were recovered. Based on ceramic chronologies, the site was occupied exclusively during the late facet of the Late Classic, 670-780 C.E. (although possibly beginning in the early facet, 600-670 C.E.). The late establishment of occupation may be reflected in the site's position on the slope of the peninsula: less desirable than the upper alluvial terrace area. The site was further investigated in Phase 3 (see below).

BVS-086

This is a single, low mound (< 1 m) located on the south slope of the peninsula (Figures AI.37, AI.38, AI.39). The north side of the mound is built into the hillside, with the south side built up to level. Overall the site covers an area of approximately 9 m x 6 m and is assigned to the XAP Type I settlement category. Suboperations at this site included Op 350AH and Op 350AK (Figure 29).

Op 350AH and Op 350AK. These adjoined suboperations were placed on the north side of the mound to capture on- and off-structure remains. Units were oriented by visible architectural alignments and mound topography.

A humus layer was removed from the entire length of the units, ending with the exposure of structure fill (south end of Op 350AH) and fall. Structure fill consisted of dense alluvial cobbles. A fall layer was removed from across the units, exposing a penultimate platform face composed of shaped limestone, and a terminal platform face of soft and compact limestone boulders, with associated inter-face fill and a terminal occupation surface consisting of a light brown matrix.

The terminal light brown occupation surface (terminal horizon) and inter-face fill were then excavated in order to better understand structure architecture and chronology of the penultimate platform face. The terminal horizon appears to be an intentional build-up of material in order to raise the occupation surface to the level of the new platform face (expansion), thus likely representing a fill material (mixed contexts). Excavation also involved the removal of a section of the terminal face (after mapping and photographing). Excavation of the terminal horizon revealed a second course to the penultimate face, consisting of shaped limestone, and terminating at the start of a penultimate grey-brown occupation horizon, associated with an enigmatic pile of habitation debris at the extreme northern end of Op 350AK. It appears the natural occupation horizon is different in this area of the cluster, as it is further down on the southern sloped area.

A profile window was placed on the east side of the strange habitation debris pile. Material from this excavation included much odd burned daub, similar to the aforementioned site

BVS-037. The pile in Op 350AK contained many more artifacts relative to the feature excavated at GPS Site/BVS-037 (independent report by Dykstra below), suggesting it may be part of a normal habitation debris pile/midden; although its distance from the structure is unusual. The preponderance of burned material within the pile may suggest it to be a “clean up” pile from perhaps a fire during the earlier phase of the structure, although this cannot be demonstrated at this time. Other suggestions have been features used to fire treat lithic material for tool manufacture.

Excavations continued down through the buried penultimate horizon (grey-brown), until a sterile lot was encountered in Op 350AH. A yellowish brown clay lens was uncovered below the penultimate platform face, and is believed to be the same matrix encountered elsewhere at the site.

Site Conclusions. Excavations confirmed the presence of a single structure at BVS-086 with two identifiable construction phases, perhaps linked to the developmental cycle of the domestic group, or a burning incident suggested by considerable burnt material in the penultimate phase habitation debris. Two types of construction quality were noted between the phases, with a higher quality in the penultimate phase. This may suggest decreased access to resources (material and labour) during the terminal occupation of the site. Artifacts suggest domestic pursuits throughout site occupation. Once again, the relatively late establishment of site occupants may be reflected in their position on the southern slope, as opposed to the flat upper alluvial terrace.

BVS-087

This site is a single, low mound (< 1 m) located on the southern slope of the survey area, immediately south of BVS-086. The north side of the structure is built into the hillside, with the south side built up to level. Overall the site covers an area of roughly 8 m x 6 m and is assigned to the XAP Type I settlement category. Suboperations at this site include Op 350AI (Figures AI.40, AI.41, and AI.42).

Op 350AI. This suboperation was placed on the east side of the mound in attempt to capture on- and off-structure remains. The unit was oriented based on visible architectural alignments and mound topography.

A humus layer was removed from the entire length of the unit, ending with the exposure of structure fall. A thick fall layer, due to the steepness of the slope on which the mound is situated, was removed from across the unit, exposing a terminal platform face of faced limestone blocks, and an underlying plastered construction platform. The plaster was determined to continue under the terminal platform face, suggesting it was part of a pre-existing/penultimate platform.

A thin layer of habitation debris was encountered on the penultimate plastered surface, although the deterioration of this surface has likely caused mixing of artifacts from the above fall material, as well as the fill below. Excavations were then conducted through the penultimate platform fill, in order to gain chronological and architectural information. This was achieved through the placement of a profile window in the northeast quadrant of the suboperation. Excavations revealed the platform to be composed of a plaster cap, above a roughly 5cm layer of small alluvial cobble ballast. Below this was a layer of large alluvial cobble and boulder fill. Excavations ceased below this layer, as a lens of natural marl amidst small cobbles and light brown clay was encountered. This is believed to be the result of natural alluvial processes.

Site Conclusions. Excavations confirmed the presence of a substructure masonry platform at BVS-087 consisting of two construction phases. A lower, plastered platform was discovered underlying an upper terminal platform: its edge extending beyond the face of the terminal platform. Why this was done is uncertain and the presence of surviving plaster on a low, single structure is unique in the study area. A perishable superstructure is inferred from the presence of daub in test excavations. Artifacts suggest domestic pursuits throughout occupation of the site. Once again, the relatively late establishment of occupation at the site may be reflected in their low position on the southern slope.

BVS-091

This site is a complex mound group located on the northern slope of the survey area. This was the only mound site encountered on the northern slope within Cluster 1. At surface level the site appears to consist of two low-lying (< 50 cm) mounds orthogonally arranged on a patio platform, although excavations may suggest these to be two phases of the same structure: BVS-091-1 possibly serving as an extension to BVS-091-2 (based on ceramic dates and odd platform faces). The site was built into the hillside on the south face and is assigned to the Type

III settlement unit category. Suboperations include Op 350AM, Op 350AN, Op 350AP, and Op 350AQ (Figures AI.43, AI.44, AI.45, AI.46).

Op 350AM, Op 350AN, Op 350AP, and Op 350AQ. These adjoined suboperations were positioned on the north side of the BVS-091- 2 and the west side of BVS-091-1 to capture on- and off-structure remains. Units were oriented using some visible architectural alignments and mound topography.

A humus layer was removed from the entire length of the units, ending with the exposure of colluvium. Colluvium was removed from across the units, exposing three platform faces and a patio surface. The BVS-091-1 western and northern faces were encountered first in Op 350AN. The possible BVS-091-2 northern face (either of the actual substructure platform or an adjoined terrace) was then encountered in Op 350AP. The intersection of all three faces is intriguing and may suggest that BVS-091-1 is an extension BVS-091-2. Further excavation is required to better understand this layout. Excavations were then conducted into the fill of both structures and associated patio area.

A very thin and scattered habitation debris layer, along with an isolated pile of alluvial chert cobbles, limestone boulders, and artifacts, were uncovered on the patio surface. The pile of debris encountered in Op 350Q did not contain any ceramic material, although is the source of the thick biface mentioned below. The pile may represent a provisional discard area.

Excavations into the patio fill revealed a top ballast layer of smaller alluvial cobbles with much artifact content. Below this, a fill of larger boulders was uncovered. Excavations were terminated at this large fill level.

Excavations also targeted the fill of both structures through the placement of a large profile window into BVS-091-1 and a skinny, shallow window into BVS-091-2 both in Op 350N. The BVS-091-1 profile shows a thin cobble ballast overlying a brown soil fill (or a buried natural horizon). Excavations continued partway through the brown soil, and were terminated due to time constraints and the attainment of pertinent information. The BVS-091-2 profile revealed a similar cobble ballast; however excavations were terminated early due to time constraints and the attainment of preliminary chronological information.

Site Conclusions. The location of BVS-091 on the lowest level on the north slope above the North Arroyo has likely caused a large amount of wash from the upper alluvial terrace area. Its downhill location from larger groups such as BVS-007 may explain the presence of painted plaster pieces in the fall and fill layers. Test excavations at the site have demonstrated a much more complex formation to the area. Oddly interacting platform facings were uncovered and may represent separate construction phases as opposed to separate structures. Perishable superstructures are inferred from the large amounts of daub recovered in all excavations. Artifacts suggest domestic pursuits at the site and its location on the northern slope surrounded by artificial terrace areas may link this household directly to the maintenance or use of these areas. Once again, the relatively late establishment of occupation at the site may be reflected in their low position on the northern slope.

BVS-100

This site consisted of a low-lying (< 2 m) mound with a possible adjoined terrace area to the east. BVS-100 is classified as a Type I settlement unit and is located at the transition point from the upper alluvial terrace to the next lower terrace on the south side of the Main Property Access Road. A definite form for the structure could not be determined as both adjoining suboperations at the site, Op 350AL and Op 350AO (Figures AI.47, AI.48) did not expose any lines of architecture. All lots below the humus are assumed to be a mixture of structure fall and fill. At the centre of the mound, is a large "Hobo tree" with very large, sprawling roots. It is assumed that root disturbance by the tree has severely displaced any architectural faces. Excavations on the north side of the platform uncovered what appears to be a mixture of fall and fill material, based on the lack of architectural construction pens, and huge numbers of artifacts (counts usually reserved to fill material). The large quantities of artifacts uncovered suggest significant use of midden material in construction phases of the structure. Ceramic chronologies date site occupation from Early Classic to the late facet Late Classic (300-780 C.E.). A lack of large limestone boulders for platform faces may indicate pillaging of such material during the final phases of occupation in the Cluster, discussed further in Phase 3.

Phase 3 Excavation results

Excavation descriptions were presented in Chapter 4 and individual lot and lot group descriptions are presented in Tables AI.4 and AI.5.

Table AI. 1: Lot context designations (based on SARP).

CONTEXT	TYPE	NATURE	BREAK
LOOTER'S BACKDIRT	domestic (de facto)	not mixed	cultural
ARCHAEOLOGIST'S BACKDIRT	domestic (primary)	mixed (specify)	natural
MODERN ACTIVITY BACKDIRT	domestic (secondary)		arbitrary
HUMUS	domestic (unknown)		
FALL	non-domestic (de facto)		
SLUMP	non-domestic (primary)		
COLLUVIUM/WASH	non-domestic (secondary)		
SASCAB	non-domestic (unknown)		
HABITATION DEBRIS	ceremonial (de facto)		
CONSTRUCTION FILL WITH RUBBLE	ceremonial (primary)		
CONSTRUCTION FILL WITHOUT RUBBLE	ceremonial (secondary)		
FACING STONES	ceremonial (unknown)		
BACKING MASONRY			
CORE FACE STONES			
FLOOR FILL			
ON FLOOR MATERIAL			
HEARTH FILL			
PIT FILL			
DAUB FEATURE			
CARBON FEATURE			
PLOW ZONE			
SOIL HORIZON	buried 'A'		
	buried 'B'		
	buried 'C'		
	buried 'D'		
	sterile		
	unknown lens		
GRAVE (Welsh 1988)	simple/simple		
	simple/pit		
	simple/ceiling slab		
	simple/blocked up room		
	simple/burial between others		
	chultun		
	cist/haphazard		
	cist/partial		
	cist/head		
	cist/capped pit		
	cist/uncapped		
	crypt/unspecified		
	crypt/simple		
	crypt/elaborate		
	tomb/unspecified		
	tomb/rock-cut		
	tomb/stone-lined		
	urn		

	unclassified/unknown
OFFERING	dedicatory cache (monumental)
	dedicatory cache (axially aligned)
	non-dedicatory cache (non-axial)
	non-dedicatory cache (sub-floor)
	termination cache (structural)
	termination cache (occupation surface)
	exposed offering (dedicatory)
	exposed offering (non-dedicatory)
	exposed offering (termination)

Table AI. 2: Legend of illustration conventions for Phase 2 testing and Phase 3 excavations (unless otherwise noted).

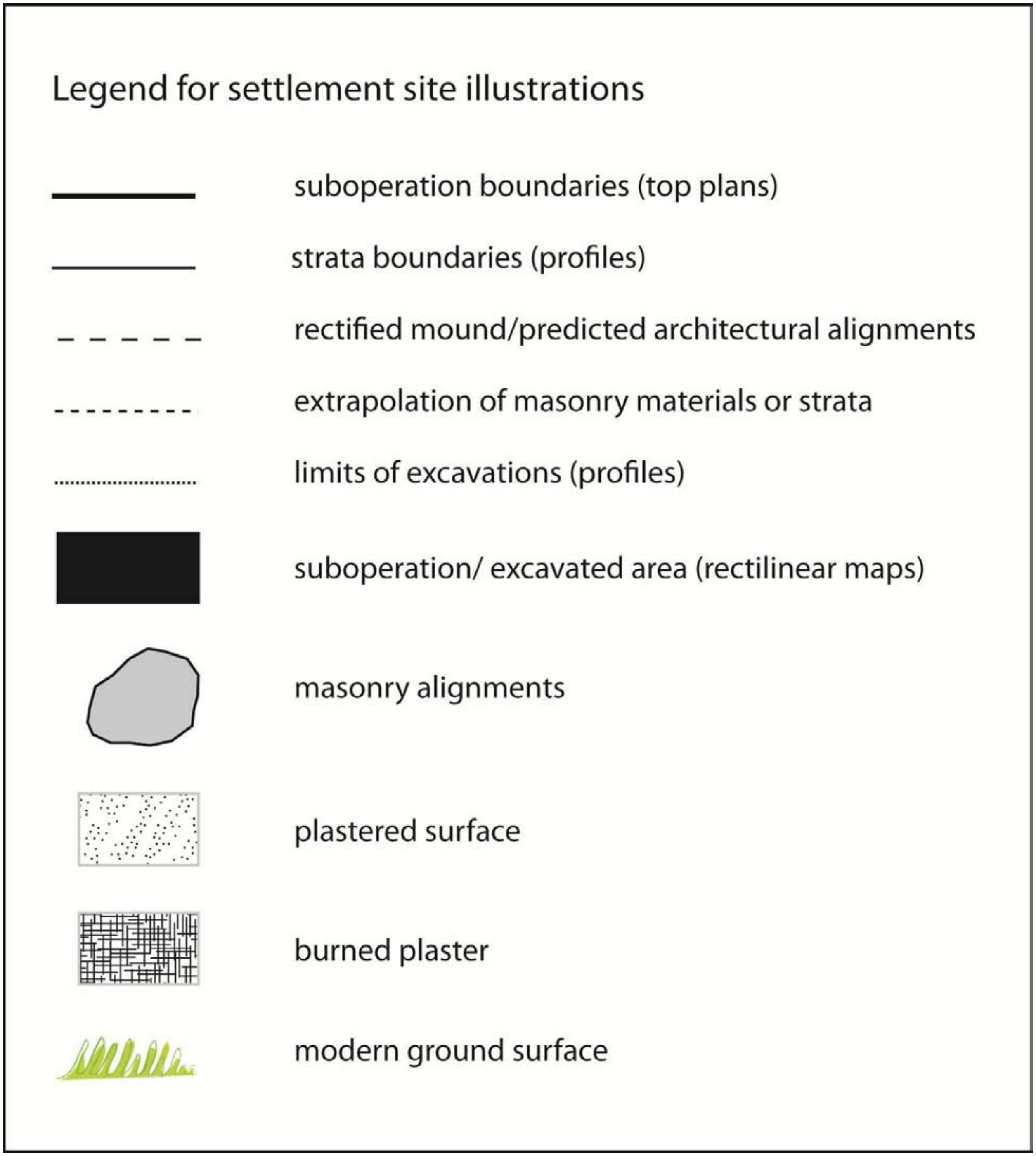

Table AI. 3: Individual lot descriptions for all Phase 2 testing and Phase 3 excavations.

Lot	Lot Group	Ceramic Date	CONTEXT			DIMENSIONS			MATRIX			Vol_m3
			description	nature	break	w (m)	l (m)	t (cm)	inclusions	colour	texture	
350A/1	003-1/1	ND	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (10)	1	2	6.8	90% soil; 10% cobble	2.5 y 3/3 dark olive brown	sandy clay loam	0.136
350A/2	003-1/1	LCI	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (10)	1	2	12.2	30% soil, 60% cobbles, 10% cut limestone blocks	2.5 y 4/4 olive brown	silty clay loam	0.244
350A/3	003-1/1	LC	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (10)	1	1.1	5.6	40% soil, 60% cobbles/pebbles	2.5 yr 4/4 olive brown	silty clay loam	0.0616
350A/4	003-1/2	LC	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.75	1	5.4	95% soil, 5% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.0405
350B/1	003-1/1	LC	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (5)	1	1	5	undetermined	2.5 y 4/4 olive brown	undetermined	0.5
350C/1	003-1/1	LP-LC	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (10)	1	2	11.2	90% soil, 10% cobbles	mix 7.5 yr 3/1, 7.5 yr 3/4	sandy loam	0.224
350C/2	003-1/1	LC	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (10)	1	2	15.8	90% soil, 10% cobble	7.5 yr 5/6 strong brown	sandy loam	0.316
350C/3	003-1/1	LCII	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (20)	1	2	16	90% soil, 10% cobble	7.5 yr 5/6 strong brown	sandy loam	0.32
350C/4	003-1/1	EC-LCI	looter's backdirt - domestic (secondary)	mixed (various)	arbitrary (10)	1	2	6.8	90% soil, 10% cobbles/pebbles	7.5 yr 5/6 strong brown	undetermined	0.136
350D/1	004-1/1b	MP-LC	humus - domestic (secondary)	mixed (various)	natural	1	2	9.8	undetermined (humus)	2.5 y 3/2 very dark grayish brown	loamy clay	0.196
350D/2	004-1/3	EC-LCI	fall - domestic (secondary)	mixed (habitation debris)	cultural	1	1	4.6	undetermined	2.5 y 3/2 very dark grayish brown	loamy clay	0.046
350D/3	004-1/3	LC	fall - domestic (secondary)		cultural	1	1	1.6	undetermined	2.5 y 3/2 very dark grayish brown	loamy clay	0.016
350D/4	004-1/3	LCI	fall - domestic (secondary)		arbitrary (10)	0.94	1	3.8	undetermined	2.5 y 3/2 very dark grayish brown	loamy clay	0.03572
350D/5	004-1/3	LCI-II	fall - domestic (secondary)		arbitrary (10)	1	1	7	30% cobbles, 60% soil, 10% pebbles	2.5 y 3/2 very dark grayish brown	loamy clay	0.07
350D/6	004-1/10	LCI-II	habitation debris - domestic (secondary)		cultural	1	1	2.6	undetermined	2.5 y 4/4 olive brown	loamy clay	0.026
350D/7	004-1/10	LCI-II	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.5	1	9.8	undetermined	10 yr 4/4 dark yellowish brown	loamy clay	0.049
350D/8	004-1/5	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.53	0.94	11.8	undetermined	10 yr 4/4 dark yellowish brown	loamy clay	0.058788
350D/9	004-1/5	EC	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.53	0.94	11.6	undetermined	10 yr 4/4 dark yellowish brown	undetermined	0.057791

350D/10	004-1/5	EC	construction fill with rubble - domestic (secondary)	mixed (buried ‘a’)	arbitrary (10)	0.53	0.94	11.2	undetermined	2.5 yr 5/4 light olive brown	loamy clay	0.055798
350D/11	004-1/16	ND	soil horizon - buried 'a'		arbitrary (10)	0.53	0.94	10	undetermined	10 yr 5/4 yellowish brown	loamy clay	0.05
350D/12	004-1/16	NA	soil horizon - sterile		arbitrary (5)	0.53	0.94	7	slightly rougher texture than previous soils??	10 yr 4/4 dark yellowish brown	loamy clay	0.0329
350E/1	004-1/1c	EC-LCI	humus - domestic (secondary)		natural	1	2	3.6	undetermined	10 yr 3/4 dark yellowish brown	silty clay	0.072
350E/2	004-1/4c	LC	colluvium - domestic (secondary)		cultural	1	2	5.6	many inclusions, large cobbles and smaller pebbles	2.5 y 3/3 dark olive brown	silty clay	0.112
350E/3	004-1/7	LCII-III	construction fill with rubble - domestic (secondary)	mixed (habitation debris)	arbitrary (5)	1	2	0	na	na	na	0
350F/1	033-1/1	LC	humus - domestic (secondary)		natural	2	2	5.4	different matrix at south end .Very hard clay/clay loam slightly lighter in colour (2.5 y 3/3) than surrounding soil	2.5 y 3/2 very dark grayish brown	silty clay loam or clay loam	0.216
350F/2	033-1/2	LCI	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	0.5	2	7.4	undetermined	2.5 y 3/2 very dark grayish brown	silty clay loam or clay loam	0.074
350F/3	033-1/2	LC	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	0.5	0.68	12	undetermined	2.5 y 3/2 very dark grayish brown and 2.5 y 3/3 dark olive brown	silty clay loam and clay loam	0.0408
350F/4	033-1/3	ND	construction fill with rubble - domestic (secondary)	mixed (colluvium, habitation debris)	cultural	0.2	0.34	5.8	undetermined	2.5 y 3/2 very dark grayish brown and 2.5 y 3/3 dark olive brown	silty clay loam and clay loam	0.004
350F/5	033-1/3	LCI-II	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.5	1.24	5	not determined	2.5 y 3/3 dark olive brown	clay loam	0.031
350F/6	033-1/3	LC	construction fill with rubble - domestic (secondary)		cultural	0.5	1.02	9.8	not determined	2.5 y 3/3 dark olive brown	clay loam	0.04998
350F/7	033-1/4	LCI-II	soil horizon - buried 'a'	mixed (fill)	arbitrary (10)	0.5	1.02	12.4	smooth with few pebble inclusions	2.5 y 4/2 dark grayish brown	silty clay loam	0.06324
350F/8	033-1/4	ND	soil horizon - buried 'a'	mixed (fill)	arbitrary (10)	0.5	1.02	8.6	few inclusions	2.5 y 4/2 dark grayish brown	silty clay loam	0.04386
350F/9	033-1/4	ND	soil horizon - buried 'a'		arbitrary (10)	0.5	1.02	6.2	no inclusions	2.5 y 4/2 dark grayish brown	clay	0.032
350F/10	033-1/5	NA	soil horizon - sterile		arbitrary (10)	0.5	1.02	3.4	undetermined	2.5 y 4/2 dark grayish brown	clay	0.01734
350F/11	033-1/3	EC-LC	construction fill with rubble - domestic (secondary)	mixed (mound fill)	cultural	0.38	0.5	6.2	undetermined	2.5 y 3/3 dark olive brown	clay loam or silty clay loam	0.01178

350G/1	004-1/1c	LC	humus - domestic (secondary)	mixed (fall)	natural	1	1	3.4	undetermined	10yr 5/3 brown	silty clay	0.034
350G/2	004-1/11	LCII-III	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	1	4.2	undetermined	10 yr 5/3	silty clay	0.042
350H/1	005-1/1	EC-LCI	humus - domestic (secondary)		natural	1	2	1.4	cobbles, roots	7.5 yr 3/2 dark brown	sandy loam	0.028
350H/2	005-1/2a	EC-LC	fall - domestic (secondary)	mixed (humus, habitation debris)	cultural	1	2	2.2	cobbles	7.5 yr 3/2 dark brown	sandy loam	0.044
350I/1	005-2/1	LCI	humus - domestic (secondary)		arbitrary (10)	1	2	9.6	small pebbles and cobbles in soil	2.5 y 4/4 olive brown	silty clay loam	0.192
350I/2	005-2/1	LC	humus - domestic (secondary)		arbitrary (10)	0.9	1	15.8	some pebbles/cobbles	2.5 y 4/4 olive brown	silty clay loam	0.1422
350I/3	005-2/2	EC-LCI	fall - domestic (secondary)		cultural	1	1.1	2.2	small cobbles in soil	2.5 y 4/4 olive brown	silty clay loam	0.0242
350I/4	005-2/2	MP-LCI	fall - domestic (secondary)		arbitrary (10)	0.65	1	8.2	undetermined	2.5 y 4/4 olive brown	silty clay loam	0.0533
350I/5	005-2/2	MP-LC	fall - domestic (secondary)		cultural	0.65	1	1.4	undetermined	2.5 y 4/4 olive brown	silty clay loam	0.0091
350I/6	005-2/3	LCI-II	habitation debris - domestic (secondary)		arbitrary (10)	0.65	1	11.2	undetermined	2.5 y 4/4 olive brown	silty clay loam	0.0728
350I/7	005-2/3	LCI-II	habitation debris - domestic (secondary)		arbitrary (10)	0.65	1	8.4	small pebbles in matrix	2.5 y 4/4 olive brown	silty clay loam	0.0546
350I/8	005-2/5	LCI	construction fill with rubble - domestic (secondary)	mixed (habitation debris)	cultural	0.25	1	10	98% small cobbles, 2% soil	2.5 y 4/4 olive brown	silty clay loam	0.025
350I/9	005-2/3	LCI	habitation debris - domestic (secondary)		natural	0.65	1	1.4	undetermined	10 yr 6/8 brownish yellow	clay loam	0.0091
350I/10	005-2/4	EC-LCI	slump - domestic (secondary)		cultural	0.75	1	6.6	cobble inclusions, some large limestone blocks (slumped)	2.5 y 4/4 olive brown	silty clay loam	0.0495
350I/11	005-2/5	LCI	construction fill with rubble - domestic (secondary)		arbitrary (5)	0.45	0.5	5.4	large chert cobbles	2.5 y 4/4 olive brown	silty clay loam	0.01215
350I/12	005-2/3	LCI-II	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.65	1	11.6	mostly soil	10 yr 6/8 brownish yellow	clay loam	0.0754
350I/13	005-2/3	LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.7	1	8.8	mostly soil	10 yr 6/8 brownish yellow	clay loam	0.0616
350I/14	005-2/3	LC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.18	0.2	13	undetermined	2.5 y 4/4 olive brown	silty clay loam	0.00468
350I/15	005-2/3	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	cultural	0.7	1	5	mostly soil	10 yr 6/8 brownish yellow	clay loam	0.035
350I/16	005-2/6	NA	soil horizon - sterile		arbitrary (10)	0.7	1	9	just soil	10 yr 6/8 brownish yellow	clay loam	0.063
350J/1	005-1/1	EC-LCI	humus - domestic (secondary)		natural	1	2	6.4	pebbles, cobbles, roots	7.5 yr 3/2 dark brown	sandy loam	0.128

350J/2	005-1/2b	MP-LC	fall/unknown - domestic (secondary)	mixed (habitation debris, fill)	arbitrary (5)	1	1.25	4	cobbles	2.5 y 4/3 olive brown	silt loam	0.05
350J/3	005-1/2b	EC-LCI	fall/unknown - domestic (secondary)	mixed (habitation debris)	arbitrary (10)	0.75	1	4	cobbles	2.5 y 4.3 olive brown	silt loam	0.03
350J/4	005-1/2b	EC-LCI	fall/unknown - domestic (secondary)	mixed (habitation debris)	arbitrary (10)	0.75	1	2.8	cobbles	2.5 y 4/3 olive brown	silt loam	0.021
350J/5	005-1/2b	EC-LC	fall/unknown - domestic (secondary)	mixed (habitation debris)	arbitrary (5)	0.75	1	1.8	cobbles	2.5 y 4/3 olive brown	silty loam	0.0135
350K/1	006-1/1	LCI-II	humus - domestic (secondary)		natural	1	2	3	30% soil, 60% pebbles/cobbles, 10% roots	7.5 yr 5/3 brown	sandy clay loam	0.06
350K/2	006-1/3	LCII	fall - domestic (secondary)	mixed (habitation debris)	cultural	1	2	1.6	60% cobbles, 35% soil, 5% roots	10 yr 4/3 brown	silty clay	0.032
350L/1	006-1/1	LC	humus - domestic (secondary)		natural	1	2	15.8	some pebbles and small cobbles	2/5 y 4/3 olive brown	silty clay	0.316
350L/2	006-1/3	LCI-II	fall - domestic (secondary)		cultural	1	2	6.4	75% soil, 15% small cobbles, 8% pebbles, 2% roots	2.5 y 4/3 olive brown	silty clay	0.128
350L/3	006-1/8c	LCII-III	habitation debris - domestic (secondary)	mixed (fall)	arbitrary (10)	1	1.2	4.6	85% soil, 7% cobbles, 2% pebbles, 3% roots	10 yr 5/4 yellowish brown	silty clay	0.0552
350L/4	006-1/8c	LCII-III	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.73	1	4.2	90% soil, 10% cobbles/pebbles	10 yr 5/4 yellowish brown	silty clay	0.03066
350L/5	006-1/3	LCII-III	fall - domestic (secondary)	mixed (habitation debris)	cultural	0.62	1	20.2	small cobbles	10 yr 4/4 dark yellowish brown	silty clay	0.12524
350L/6	006-1/4	TC	slump - domestic (secondary)	mixed (habitation debris)	cultural	0.3	1	0.8	15% pebbles, 20% large cobbles, 65% limestone	10 yr 4/4 dark yellowish brown	silty clay	0.0024
350L/7	006-1/8c	TC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1.2	7	94% soil, 6% pebbles/small cobbles	10 yr 4/4 dark yellowish brown	silty clay	0.084
350L/8	006-1/8c	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	1	1.2	4.6	6% pebbles, 94% soil	10 yr 6/6 brownish yellow	silty clay	0.0552
350L/9	006-1/10a	NA	soil horizon - sterile		arbitrary (5)	1	1.2	5.8	6% pebbles, 94% soil	10 yr 6/6 brownish yellow	silty clay	0.0696
350M/1	036-1/1a	EC-LC	humus - domestic (secondary)		natural	1	2	4.8	95% soil, 4% pebbles/cobbles, 1% root	10 yr 3/2 very dark grayish brown	silty clay	0.096
350M/2	036-1/2	ND	colluvium - domestic (secondary)		cultural	1	1.76	1.4	95% soil, 5% roots	10 yr 3/2	silty clay	0.02464
350M/3	036-1/3a	LCII	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	1.53	0.6	95% soil, 5% pebbles	10 yr 3/2 very dark greyish brown	silty clay	0.00918
350M/4	036-1/4a	LCII	construction fill with rubble - domestic (secondary)		cultural	1	1.53	0.6	45% soil, 55% pebbles/cobbles	7.5 yr 3/2 dark brown	silty clay	0.00918

350M/5	036-1/4a	EC-LCII	construction fill with rubble - domestic (secondary)		cultural	1	1.23	5	65% soil, 35% cobbles	10 yr 4/3 brown	silty clay loam	0.0615
350M/6	036-1/4a	ND	construction fill with rubble - domestic (secondary)		cultural	0.3	0.3	6.2	50% soil, 50% limestone	10 yr 4/3 brown	silty clay	0.00558
350M/7	036-1/4a	LC	construction fill with rubble - domestic (secondary)		cultural	0.3	0.3	2.8	99% soil, cobbles, 1% other	10 yr 4/4 dark yellowish brown	silty clay	0.00252
350N/1	036-1/1b	LC	humus - domestic (secondary)		natural	1	2	5.2	85% soil, 5% pebbles, 10% roots	2.5 y 4/2 dark greyish brown	silty clay	0.104
350N/2	036-1/1b	LCI-II	humus - domestic (secondary)		arbitrary (10)	1	1.5	6.4	80% soil, 15% cobbles, 5% roots	10 yr 4/2 dark greyish brown	silty clay	0.096
350N/3	036-1/5	LCII	fall - domestic (secondary)		arbitrary (10)	1	1.7	4.2	85% soil, 15% large cobbles	10 yr 3/2 very dark greyish brown	loam	0.0714
350N/4	036-1/5	ND	fall - domestic (secondary)	mixed (habitation debris)	cultural	1	1.5	8.4	87% soil, 3% large cobbles/ boulders, 10% other	2.5 y dark grayish brown	silty clay loam	0.126
350N/5	036-1/5	EC-LCII	fall - domestic (secondary)	mixed (habitation debris)	cultural	0.54	0.77	10	99% limestone cobbles/small boulders; 1% soil	2.5 y dark greyish brown	silty clay loam	0.04158
350N/6	036-1/3b	ND	habitation debris - domestic (secondary)		arbitrary (10)	0.37	0.4	9.8	large limestone blocks	2.5 y dark greyish brown	silty clay loam	0.014504
350N/7	036-1/3b	LCI-II	habitation debris - domestic (secondary)		arbitrary (10)	0.49	0.56	5.8	95% soil, 2.5% pebbles/limestone, 2.5% other	10 yr 4/3 brown	silty clay loam	0.015915
350N/8	036-1/3b	LCI	habitation debris - domestic (secondary)		cultural	0.49	0.56	3.8	95% soil, 4% pebbles, 1% boulders	10 yr 4/3 brown	silty clay loam	0.010427
350N/9	036-1/3b	LC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1.25	14.4	undetermined	10 yr 4/4 dark yellowish brown	clay	0.18
350N/10	036-1/3b	EC-LC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1.25	5.6	undetermined	10 yr 5/8 yellowish brown	clay	0.07
350N/11	036-1/7b	NA	soil horizon - sterile		arbitrary (10)	1	1.25	13.6	some red specks in clay	10 yr 5/6 yellowish brown	clay	0.17
350O/1	035-1/1	LCI-II	humus - domestic (secondary)		natural	1	2	6	1% roots, 3% cobbles, 2% other, 2% large cobbles/boulders, 4% pebbles, 88% soil	10 yr 3/2 very dark greyish brown	silty clay	0.12
350O/2	035-1/2	LCII-III	fall - domestic (secondary)		arbitrary (5)	1	2	3.6	95% soil, 5% cobbles/pebbles	10 yr 3/2 dark greyish brown	silty clay	0.072
350O/3	035-1/2	EC-TC	fall - domestic (secondary)		cultural	1	2	4	85% soil, 11% cobbles/pebbles, 1% roots, 3% other	10 yr 3/2 very dark greyish brown	silty clay	0.08
350O/4	035-1/3	LCI-II	habitation debris - domestic (secondary)		cultural	1	1.5	2.4	99% soil, 1% pebbles/cobbles	10 yr 3/2 very dark greyish brown	silty clay	0.036
350O/5	035-1/2	LCI-II	fall - domestic		cultural	1	1.5	12.2	75% soil, 25% cobbles	10 yr 3/2	silty clay	0.183

			(secondary)									
350O/6	035-1/7	LCI-II	habitation debris - domestic (secondary)		arbitrary (5)	0.64	1.32	3.8	97% soil, 3% cobbles, large roots in se corner	10 yr 4/3	silty clay	0.032102
350O/7	035-1/7	MP-LCI	habitation debris - domestic (secondary)		arbitrary (5)	0.36	1.37	3.4	undetermined	10 yr 3/2	silty clay	0.016769
350O/8	035-1/4	EC-LCII	fall - domestic (secondary)	mixed (fall)	cultural	0.32	1	3	60% soil, 40% cobbles	10 yr 4/3 brown	silty clay	0.0096
350O/9	035-1/7	MP-LCI	habitation debris - domestic (secondary)		arbitrary (10)	1	1.32	15.8	98% soil, 1% cobbles/pebbles, 1% daub	10 yr 4/3 brown	silty clay	0.20856
350O/10	035-1/7	EC-LCII	habitation debris - domestic (secondary)		arbitrary (10)	1	1.32	11.2	99% soil, 1% daub	7.5 yr 4/3 brown	silty clay	0.14784
350O/11	035-1/7	EC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1.32	8.4	99% soil, 1% cobbles/pebbles	7.5 yr 4/4 brown	silty clay	0.11088
350O/12	035-1/7	EC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.21	0.23	28.8	95% soil, 3% pebbles/cobbles, 2% other	10 yr 4/3 brown	silty clay	0.01391
350O/13	035-1/5	NA	soil horizon - sterile		arbitrary (10)	1	1.32	11.2	99% soil, 1% pebbles	10 yr 4/6 dark yellowish brown	silty clay	0.14784
350O/14	035-1/6	LCII	construction fill with rubble - domestic (secondary)		cultural	0.35	1	16.4	60% soil, 40% pebbles/cobbles/boulders	10 yr 3/2 very dark greyish brown	silty clay	0.0574
350Q/1	007-1/1	EC-TC	modern activity backdirt - non-domestic (secondary)	mixed (bioturbation, humus)	arbitrary (10)	1	2	12	13% roots, 5% pebbles, 80% soil, 2% cobbles	10 yr 3/4 dark yellowish brown	nd	0.24
350Q/2	007-1/1	LCI-II	modern activity backdirt - non-domestic (secondary)	mixed (bioturbation, humus)	arbitrary (10)	1	2	8.2	80% soil, 5% cobbles, 10% roots, 5% pebbles	7.5 yr 4/3 brown	silty clay loam	0.164
350Q/3	007-1/2b	LCII	humus - non-domestic (secondary)		arbitrary (10)	1	2	8.6	75% soil, 7% cobbles, 10% roots, 3% pebbles	7.5 yr 3/3 dark brown	clay loam	0.172
350Q/4	007-1/2b	EC-LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	12.6	60% soil, 25% cobbles, 10% boulders, 5% roots	7.5 yr 3/4 dark brown	clay loam	0.252
350Q/5	007-1/4c	EC-TC	fall - non-domestic (secondary)		arbitrary (10)	1	2	12	clay loam	7.5 yr 3/4 dark brown (south); 10 yr 4/6 dark yellowish brown (north)	nd	0.24
350Q/6	007-1/2b	LCI	humus - non-domestic (secondary)		arbitrary (10)	0.65	1	14.4	nd	10 yr 4/6 dark yellowish brown	silty clay	0.0936
350Q/7	007-1/4c	LCI-III	fall - non-domestic (secondary)		arbitrary (10)	1	2	8.4	nd	10 yr 4/6 dark yellow brown	silty clay	0.168
350Q/8	007-1/22e	LCI	habitation debris - non-domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.5	0.6	59.8	nd	10 yr 4/6 dark yellowish brown	silty clay	0.1794
350Q/9	007-1/4c	LCI-III	fall - non-domestic (secondary)	mixed (habitation debris)	cultural	0.5	1	37.8	30% boulders, 20% large cobbles, 20% small cobbles, 30% soil	7.5 yr 5/6 strong brown	silty clay	0.189
350R/1	007-2/1c	ND	humus - non-domestic (secondary)		natural	1	2	6.2	90% soil, 5% roots, 5% pebbles	10 yr 4/3 brown	sandy clay loam	0.124

350R/2	007-2/3b	EC-LCI	fall - non-domestic (secondary)		arbitrary (10)	1	2	8.2	75% soil, 15% cobbles, 8% pebbles, 2% roots	10 yr 4/4 dark yellowish brown	sandy clay loam	0.164
350R/3	007-2/3b	EC-LCI	fall - non-domestic (secondary)		cultural	1	2	17.4	85% soil, 10% cobbles, 5% pebbles	10 yr 4/6 dark yellowish brown	silty clay loam	0.348
350R/4	007-2/12	EC-LCI	habitation debris - non-domestic (secondary)	mixed (interface fill and fall)	cultural	1	1	2.4	75% soil, 10% pebbles, 15% cobbles	10 yr 5/6 dark yellowish brown	silty clay loam	0.024
350S/1	036-1/1a	ND	humus - domestic (secondary)		natural	1	1	12	97% soil, 1% pebbles, 2% roots; soil/clay is very hard and compacted like area around site 033/ 350f	10 yr 4/2 dark greyish brown	silty clay	0.12
350S/2	036-1/2	ND	colluvium - domestic (secondary)		cultural	1	1	8.6	95% soil, 4% pebbles, 1% roots	10 yr 3/3 dark brown	silty clay	0.086
350S/3	036-1/3a	EC-LCII	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	1	3	80% soil, 10% pebbles, 10% roots/other	10 yr 3/3 dark brown	silty clay	0.03
350S/4	036-1/1a	LCII	humus - domestic (secondary)	mixed (habitation debris)	cultural	0.5	0.6	6	97% soil, 2% pebbles, 1% roots	10 yr 4/3 brown	silty clay	0.018
350S/5	036-1/4a	LCII	construction fill with rubble - domestic (secondary)		cultural	0.4	0.5	3.8	90% soil, 10% pebbles/small cobbles	10 yr 4/3 brown	silty clay	0.0076
350S/6	036-1/8	ND	construction fill with rubble - domestic (secondary)		natural	0.5	1	3.2	50% soil, 49% soft limestone cobbles, 1% roots	10 yr 4/4 dark yellowish brown	silty clay	0.016
350S/7	036-1/6	ND	soil horizon - buried 'a'	mixed (fill)	arbitrary (5)	0.5	1	2.6	97% soil, 2% pebbles, 1% roots	10 yr 5/4 yellowish brown	silty clay	0.013
350S/8	036-1/6	ND	soil horizon - buried 'a'	mixed (fill)	arbitrary (5)	0.5	1	6.8	98% soil, 2% roots	10 yr 5/4 yellowish brown	clay	0.034
350S/9	036-1/7a	NA	soil horizon - sterile		arbitrary (5)	0.5	1	2.4	99% soil, 1% roots	10 yr 5/6 yellowish brown	clay	0.012
350T/1	007-1/1	EC-LC	modern activity backdirt - non-domestic (secondary)	mixed (bioturbation, humus)	arbitrary (10)	1	1	11.2	95% soil, 5% roots	10 yr 3/4 dark yellowish brown	silty clay loam	0.112
350T/2	007-1/2b	EC-LCI	humus - non-domestic (secondary)		arbitrary (10)	1	1	15.2	85% soil, 10% cobbles, 5% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.152
350T/3	007-1/2b	LC	humus - non-domestic (secondary)		arbitrary (10)	1	1	17	85% soil, 2% roots, 13% cobbles	10 yr 4/6 dark yellowish brown	clay	0.17
350T/4	007-1/4c	ND	fall - non-domestic (secondary)		arbitrary (10)	1	1	9.6	90% soil, 10% cobbles	10 yr 5/6 yellowish brown	clay	0.096
350U/1	007-2/1c	LCI	humus - non-domestic (secondary)		natural	1	1	21.2	90% soil, 5% pebbles, 2% cobbles, 3% roots	10 yr 4/3 brown	sandy clay loam	0.212
350U/2	007-2/3b	LCI	fall - non-domestic (secondary)		cultural	1	1	6.6	85% soil, 10% cobbles, 5% pebbles	10 yr 4/3 dark yellowish brown	sandy clay loam	0.066
350U/3	007-2/12	EC-LCI	habitation debris - non-domestic (secondary)		cultural	1	1	9.2	90% soil, 10% pebbles	10 yr 5/6 yellowish brown	silty clay loam	0.092
350U/4	007-2/12	EC-LCI	habitation debris - non-domestic (secondary)		cultural	1	1	14.8	85% soil, 10% cobble, 5% pebble	7.5 yr 5/6 strong brown	silty clay	0.148

350U/5	007-2/12	ND	habitation debris - non-domestic (secondary)	mixed (prep construction layer below platform)	cultural	1	1	4.6	70% soil, 5% cobbles, 25% pebbles	10 yr 6/8 brown yellow	silty clay	0.046
350V/1	007-1/1	TC	modern activity backdirt - non-domestic (secondary)	mixed (bioturbation, humus)	arbitrary (10)	1	2	11.4	5% roots, 10% cobbles/pebbles, 85% soil	7.5 yr 3/3 dark brown	loamy clay	0.228
350V/2	007-1/1	LCI	modern activity backdirt - domestic (secondary)	mixed (bioturbation, humus)	arbitrary (10)	1	2	17.2	2% roots, 5% pebbles, 3% cobbles, 90% soil	7.5 yr 4/4 brown	silty clay	0.344
350V/3	007-1/2b	EC-LCI	humus - non-domestic (secondary)		arbitrary (10)	0.85	1	10.8	85% soil, 7% cobbles, 5% pebbles, 3% roots	7.5 yr 4/4 brown	silty clay	0.0918
350V/4	007-1/2b	TC	humus - non-domestic (secondary)		arbitrary (10)	0.85	1	6.8	85% soil, 7% cobbles, 5% pebbles, 3% roots (thick and thin)	5 yr 5/6 yellowish red (area burned daub); 7.5 yr 5/6 strong brown	sandy to silty clay	0.0578
350V/5	007-1/4c	LCI	fall - non-domestic (secondary)		arbitrary (10)	1	2	16.6	30% boulders, 20% large cobbles, 20% small cobbles, 30% soil	7.5 yr 5/6 strong brown	silty clay	0.332
350V/6	007-1/22d	LCI-II	habitation debris - non-domestic (secondary)		cultural	1	1	17.6	99% soil, 1% small cobbles/pebbles	10 yr 5/6 yellowish brown	silty clay	0.176
350V/7	007-1/4c	LCI-II	fall - non-domestic (secondary)		cultural	0.6	1	37	3% boulders, 20% cobbles, 77% soil	10 yr 5/6 yellowish brown	silty clay	0.222
350V/8	007-1/6	LCII-III	sascab - non-domestic (secondary)	mixed (habitation debris)	cultural	0.25	1	19.4	2% large cobbles/small boulders, 10% small cobbles/pebbles, 88% soil	10 yr 6/6 brownish yellow	silty clay	0.0485
350X/1	034-1/1	MP-LP	humus - domestic (secondary)		arbitrary (10)	1	2	8.4	1% cobbles, 1% pebbles, 2% roots, 96% soil	10 yr 4/3 brown	silty clay loam	0.168
350X/2	034-1/1	MP-PP	humus - domestic (secondary)		arbitrary (10)	1	2	9	3% cobbles, 1% pebbles, 1% roots, 95% soil	10 yr 4/3 brown	silty clay loam	0.18
350X/3	034-1/1	MP	humus - domestic (secondary)		arbitrary (10)	1	1.33	9.6	2% roots, 3% pebbles, 1% cobbles, 94% soil	10 yr 4/4 dark yellowish brown	silty clay	0.12768
350X/4	034-1/2	MP	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1.33	12.2	1% cobbles, 1% pebbles, 1% roots, 97% soil	10 yr 5/8 yellowish brown	silty clay	0.16226
350X/5	034-1/2	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	1	1.33	5	1% roots, 99% soil	10 yr 5/8 yellowish brown	silty clay	0.0665
350X/6	034-1/3	NA	soil horizon - sterile		arbitrary (10)	1	1.33	7.8	1% roots, 99% soil	10 yr 5/8 yellowish brown	silty clay	0.10374
350X/7	034-1/6	MP	construction fill without rubble - domestic (secondary)		arbitrary (10)	0.5	0.67	7.6	15% pebbles, 4% cobbles, 1% roots, 80% soil	10 yr 4/4 dark yellowish brown	sandy clay loam	0.02546
350Y/1	007-patio/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	1	2	9.4	89% soil, 1% cobbles, 5% pebbles, 5% roots	10 yr 4/3 brown	silty clay	0.188
350Y/2	007-patio/1	LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	1	2	12	2% roots, 3% pebbles, 2% cobbles, 93% soil	10 yr 4/4 dark yellowish brown	silty clay	0.24
350Y/3	007-patio/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	1	2	11.8	2% roots, 3% pebbles, 2% cobbles, 93% soil	10 yr 5/6 yellowish brown	silty clay	0.236

350Y/4	007-patio/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	1	2	10.6	2% roots, 2% pebbles, 3% cobbles, 93% soil	10 yr 5/6 yellowish brown	silty clay	0.212
350Y/5	007-patio/1	LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	1	2	9	2% roots, 2% pebbles, 3% cobbles, 93% soil	10 yr 6/6 brownish yellow	silty clay	0.18
350Y/6	007-patio/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	1	1	4	2% roots, 2% pebbles, 3% cobbles, 93% soil	10 yr 6/6 brownish yellow	silty clay	0.04
350Y/7	007-patio/1	EC-LCI	unknown - non-domestic (secondary)		arbitrary (10)	1	1	19.4	2% roots, 50% cobbles, 30% pebbles, 18% soil	10 yr 6/6 brownish yellow	silty clay	0.194
350Z/1	077-1/1d	LCI	humus - domestic (secondary)		natural	1	2	9.4	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.188
350Z/2	077-1/2	LCI-II	fall - domestic (secondary)	mixed (humus)	cultural	1	2	7.6	85% soil, 5% cobbles, 5% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.152
350Z/3	077-1/2	LCI-II	fall - domestic (secondary)	mixed (habitation debris)	cultural	0.9	1	11.6	1% boulders, 20% cobbles, 30% pebbles, 1% roots, 48% soil	10 yr 4/4 dark yellowish brown	silty clay	0.1044
350Z/4	077-1/4c	LCI-II	habitation debris - domestic (secondary)	mixed (buried 'a')	natural	0.9	1	14.8	90% soil, 5% cobbles, 5% pebbles	10 yr 5/6 yellowish brown	silty clay	0.1332
350Z/5	077-1/6	NA	soil horizon - sterile		arbitrary (10)	0.9	1	6.4	99% soil, 1% pebbles	10 yr 6/6 brownish yellow	silty clay	0.0576
350AA/1	007-patio/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (20)	1	1	18.2	5% pebbles, 1% cobbles, 89% soil, 5% roots	10 yr 4/3 brown	silty clay	0.182
350AA/2	007-patio/1	LC	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	1	1	12.8	2% roots, 3% pebbles, 2% cobbles, 93% soil	10 yr 4/4 dark yellowish brown	silty clay, with bit sandy texture	0.128
350AA/3	007-patio/2b	EC-LCII	humus - non-domestic (secondary)		natural	1	1	18	1% roots, 4% pebbles, 5% cobbles, 90% soil	10 yr 4/4 dark yellowish brown	silty clay	0.18
350AA/4	007-patio/4	EC-LCII	fall - non-domestic (secondary)		arbitrary (10)	1	1	8	1% roots, 5% pebbles, 15% cobbles, 74% soil	10 yr 4/4 dark yellowish brown	silty clay	0.08
350AA/5	007-patio/6a	LCI-II	habitation debris - non-domestic (secondary)	mixed (fall)	arbitrary (5)	1	1	7	2% roots, 15% cobbles, 5% pebbles, 74% soil	10 yr 6/6 brownish yellow	silty clay	0.07
350AA/6	007-patio/6a	LCI	habitation debris - non-domestic (secondary)	mixed (fall)	arbitrary (5)	1	1	5.4	2% roots, 15% cobbles, 5% pebbles, 74% soil	10 yr 6/6 brownish yellow	silty clay	0.054
350AA/7	007-patio/6a	LC	habitation debris - non-domestic (secondary)		arbitrary (10)	1	1	8.6	8% cobbles, 2% pebbles, 90% soil	10 yr 6/6 brownish yellow	silty clay	0.086
350AA/8	007-patio/6a	LCII	habitation debris - non-domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	13.6	3% cobbles, 1% pebbles, 96% soil	10 yr 6/6 brownish yellow	silty clay	0.136
350AA/9	007-patio/9b	NA	soil horizon - sterile		arbitrary (10)	1	1	9	1% pebbles, 99% soil	10 yr 6/6 brownish yellow	silty clay	0.09
350AB/1	060-1/1b	LCI	humus - domestic (secondary)		natural	1	2	5.4	90% soil, 4% pebbles, 1% cobbles, 5% thin roots	10 yr 4/3 brown	clay loam	0.108
350AB/2	060-1/2	EC-LCI	colluvium - domestic (secondary)	mixed (fill, habitation debris)	cultural	1	2	5	40% cobbles, 5% pebbles, 1% roots, 64% soil	10 yr 4/3 brown	clay loam	0.1
350AB/3	060-patio/3a	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (fill)	arbitrary (10)	1	1.34	5.2	40% cobbles, 5% pebbles, 1% roots, 54% soil	10 yr 4/3 brown	clay loam	0.06968

350AB/4	060-patio/4	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (fill)	arbitrary (10)	1	1.34	16.4	40% cobbles, 7% pebbles, 53% soil	10 yr 5/4 yellowish brown	silty clay	0.21976
350AB/5	060-patio/6a	ND	soil horizon - buried 'a'		arbitrary (10)	0.5	1.34	12.4	2% cobbles, 3% pebbles, 95% soil	10 yr 5/4 yellowish brown	silty clay	0.08308
350AB/6	060-patio/6a	EC	soil horizon - buried 'a'	mixed (debris, fill)	arbitrary (10)	1	1.34	8	1% cobbles, 2% pebbles, 97% soil	10 yr 6/6 brownish yellow	silty clay	0.1072
350AB/7	060-patio/6a	MP-LCI	soil horizon - buried 'a'	mixed (debris, fill)	arbitrary (10)	1	1.34	9.8	1% pebbles, 99% soil	10 yr 6/6 brownish yellow	silty clay	0.13132
350AB/8	060-1/5	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	0.3	0.5	19.6	15% cobbles, 7% pebbles, 78% soil	10 yr 4/3 brown	silty clay	0.0294
350AB/9	060-patio/7	NA	soil horizon - sterile		arbitrary (10)	1	1.34	9.4	1% pebbles, 99% soil	10 yr 6/6 brownish yellow	silty clay	0.12596
350AC/1	034-1/1	MP-LP	humus - domestic (secondary)		natural	1	1	9.6	10% pebbles, 10% cobbles, 80% soil	10 yr 4/3 brown	silty clay loam	0.096
350AC/2	034-1/4	MP-LP	construction fill with rubble - domestic (secondary)	mixed (colluvium)	cultural	1	1	3.4	3% roots, 7% pebbles, 50% cobbles, 40% soil	10 yr 4/3 brown	sandy clay loam	0.034
350AC/3	034-1/4	MP	construction fill with rubble - domestic (secondary)	mixed (fill)	arbitrary (10)	0.5	0.5	15	15% pebbles, 4% cobbles, 1% roots, 80% soil	10 yr 4/4 dark yellowish brown	sandy clay loam	0.0375
350AC/4	034-1/6	MP	construction fill without rubble - domestic (secondary)	mixed (fill)	arbitrary (10)	0.5	0.5	15	10 % cobbles, 10% pebbles, 3% roots, 77% soil	10 yr 4/4 dark yellowish brown	sandy clay loam	0.0375
350AC/5	034-1/4	MP-LP	construction fill with rubble - domestic (secondary)		cultural	0.5	1	5.2	30% cobbles, 30% pebbles, 2% roots, 38% soil	10 yr 4/3 brown	sandy loam	0.026
350AC/6	034-1/5	MP-LP	grave - simple/simple		arbitrary (5)	0.3	0.35	2.6	2% cobbles, 3% pebbles, 95% soil	10 yr 4/3 brown	silt loam	0.00273
350AC/7	034-1/5	ND	grave - simple/simple		arbitrary (5)	0.3	0.35	2.6	99% soil, 1% other	10 yr 4/3 brown	silt loam	0.00273
350AC/8	034-1/5	ND	grave - simple/simple		arbitrary (5)	0.24	0.26	1	99% soil, 1% pebbles	10 yr 4/3 brown	silt loam	0.000624
350AC/9	034-1/5	MP	grave - simple/simple		cultural	0.3	0.35	3.2	99% soil, 1% cobbles/pebbles	10 yr 4/3 brown	silt loam	0.00336
350AD/1	060-2/1	LCI	humus - domestic (secondary)		cultural	1	2	9	90% soil, 4% pebbles, 19% cobbles, 5% roots	10 yr 4/3 brown	clay loam	0.18
350AD/2	060-2/2	EC-LCI	colluvium - domestic (secondary)		arbitrary (5)	1	2	7	4% boulders, 10% cobbles, 5% pebbles, 81% soil	10 yr 4/3 brown	silty clay	0.14
350AD/3	060-2/1	EC	humus - domestic (secondary)		arbitrary (10)	0.1	1	7	100% soil	10 yr 5/8 yellowish brown	silty clay	0.007
350AD/4	060-2/3	EC	construction fill with rubble - domestic (secondary)		arbitrary (5)	0.5	0.7	6.4	undetermined	10 yr 5/6 yellowish brown	silty clay	0.0224

350AE/1	060-2/1	EC-LCI	humus - domestic (secondary)		natural	1	2	14.2	90% soil, 4% pebbles, 1% cobbles, 5% roots	10 yr 4/3 brown	silty clay	0.284
350AE/2	060-2/2	EC-LCI	colluvium - domestic (secondary)		arbitrary (10)	1	2	5.8	1% boulders, 10% cobbles, 5% pebbles, 81% soil	10 yr 4/3 brown	silty clay	0.116
350AE/3	060-2/2	EC-LCI	colluvium- domestic (secondary)		arbitrary (10)	1	2	11.2	25% cobbles, 1% roots, 4% pebbles, 70% soil	10 yr 5/4 yellowish brown	silty clay loam	0.224
350AE/4	060-2/4	LC	unknown?/ habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	0.46	1	10.2	100% soil	10 yr 5/8 yellowish brown	silty clay	0.04692
350AE/5	060-2/4	MP, EC-LCI	unknown?/ habitation debris - domestic (secondary)		arbitrary (5)	0.5	1	11	25% pebbles, 50% cobbles, 25% soil	10 yr 5/4 yellowish brown	silty clay	0.055
350AE/6	060-2/4	LCI	unknown?/habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	0.5	1	3.8	undetermined	10 yr 5/4 yellowish brown	silty clay	0.019
350AE/7	060-2/4	LCI	unknown?/habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	0.9	1	10.2	80% soil, 15% cobbles	10 yr 5/8 yellowish brown	silty clay	0.0918
350AE/8	060-2/4	EC-LCI	unknown?/habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	0.3	0.4	12.6	undetermined	10 yr 5/8 yellowish brown	silty clay	0.01512
350AE/9	060-2/4	EC-LCI	unknown?/habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	0.7	1.6	12.2	80% soil, 15% cobbles, 5% pebbles	10 yr 5/8 yellowish brown	silty clay	0.13664
350AE/10	060-2/4	EC	unknown?/habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	1	1.4	6.8	5% cobbles, 5% pebbles, 90% soil	10 yr 5/8 yellowish brown	silty clay	0.0952
350AE/11	060-2/4	ND	unknown?/habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.46	1	13.4	100% soil	10 yr 6/8 brownish yellow	silty clay	0.06164
350AE/12	060-2/5	NA	soil horizon - sterile		arbitrary (5)	0.46	1	4.8	100% soil	10 yr 6/8 brownish yellow	silty clay	0.02208
350AF/1	034-1/1	ND	humus - domestic (secondary)		natural	0.3	0.5	10.2	5% roots, 20% pebbles/cobbles, 75% soil	10 yr 4/3 brown	silty clay	0.0153
350AF/2	034-1/4	MP-LP	construction fill with rubble - domestic (secondary)	mixed (fill)	cultural	0.3	0.5	10	30% cobbles, 30% pebbles, 2% roots, 38% soil	10 yr 4/3 brown	silty clay loam	0.015
350AH/1	086-1/1	LCI	humus - domestic (secondary)		arbitrary (10)	1	2	13.2	1% small cobbles/pebbles, 5% roots, 94% soil	10 yr 3/2 very dark greyish brown	silty clay	0.264
350AH/2	086-1/1	EC-LCI	humus - domestic (secondary)		arbitrary (10)	1	2	3.8	1% small cobbles/pebbles, 5% roots, 94% soil	10 yr 3/2 very dark greyish brown	silty clay	0.076
350AH/3	086-1/1	LCI	humus - domestic (secondary)		arbitrary (5)	1	2	1	1% small cobbles/pebbles, 5% roots, 94% soil	10 yr 3/3 dark brown	silty clay	0.02
350AH/4	086-1/2	LCI	fall - domestic (secondary)		cultural	1	1.25	4	undetermined	10 yr 3/3 dark brown	silty clay	0.05

350AH/5	086-1/3	LCI-II	construction fill with rubble - domestic (secondary)		cultural	1	1.25	4.6	30% boulders, 20% large cobbles, 50% soil	10 yr 4/4 dark yellowish brown	silty clay	0.0575
350AH/6	086-1/3	LCI-II	construction fill with rubble - domestic (secondary)		cultural	1	1.2	7.6	40% boulders, 20% cobbles, 40% soil	10 yr 4/4 dark yellowish brown	silty clay	0.0912
350AH/7	086-1/4	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (penultimate slump/fall)	cultural	0.5	1	2.4	10% boulders, 30% cobbles, 60% soil	10 yr 4/4 dark yellowish brown	silty clay	0.012
350AH/8	086-1/5a	EC-LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.95	1	9.8	2% cobbles, 1% pebbles, 97% soil	10 yr 5/4 yellowish brown	silty clay	0.0931
350AH/9	086-1/5a	EC-LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.95	1	9.6	1% cobbles, 1% pebbles, 98% soil	10 yr 5/4 yellowish brown	silty clay	0.0912
350AH/10	086-1/5b	LC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.95	1	9.4	marl speckling, 1% pebbles, 99% soil	10 yr 5/3 brown	silty clay	0.0893
350AH/11	086-1/5b	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.95	1	9.4	1% pebbles, 99% soil	10 yr 5/4 yellowish brown	silty clay	0.0893
350AH/12	086-1/5b	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.95	1	4.8	1% pebbles, 99% soil	10 yr 5/4 yellowish brown	silty clay	0.0456
350AH/13	086-1/6	NA	soil horizon - sterile		arbitrary (5)	0.95	1	2.4	1% pebbles, 99% soil	10 yr 6/8 brownish yellow	silty clay	0.0228
350AI/1	087-1/1	LCI	humus - domestic (secondary)		arbitrary (10)	1	2	6.4	1% small cobbles/pebbles, 5% roots, 94% soil	10 yr 2/2 very dark brown	silty clay loam	0.128
350AI/2	087-1/1	LCII	humus - domestic (secondary)		natural	1	2	3.6	1% small cobbles/pebbles, 5% roots, 94% soil	10 yr 2/2 very dark brown	silty clay loam	0.072
350AI/3	087-1/2	EC-LCI	fall - domestic (secondary)	mixed (habitation debris)	arbitrary (10)	1	2	5.8	30% cobbles, 10% pebbles, 60% soil	10 yr 2/2 very dark brown	silty clay	0.116
350AI/4	087-1/2	LCI-II	fall - domestic (secondary)		arbitrary (10)	1	2	5.6	beginning lighter/redder brown soil; 35% cobbles, 20% pebbles, 45% soil	10 yr 3/3 dark brown	silty clay	0.112
350AI/5	087-1/2	EC-LCII	fall - domestic (secondary)		natural	1	1.4	3.2	2% boulders, 30% cobbles, 68% soil	10 yr 3/3 dark brown	silty clay	0.0448
350AI/6	087-1/2	EC-LCI	fall - domestic (secondary)		natural	1	1.4	3	turning lighter grey colour at bottom; 2% boulders, 30% cobbles, 68% soil	10 yr 3/3 dark brown	silty clay	0.042
350AI/7	087-1/2	LCI-II	fall - domestic (secondary)	mixed (fill)	arbitrary (5)	0.6	1	13.4	20% cobbles, 30% pebbles, 49% soil, 1% boulders	10 yr 2/2 very dark brown	silty clay loam	0.0804
350AI/8	087-1/3	EC-LCI	habitation debris - domestic (secondary)	mixed (fall, fill)	cultural	1	1.4	13.6	20% boulders, 30% cobbles, 50% soil	10 yr 4/3 brown	silty clay	0.1904
350AI/9	087-1/3	PP-EC	habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	0.65	1.4	6	10% cobbles, 1% boulders, 10% pebbles, 79% soil	10 yr 6/2 light brownish grey	silty clay	0.0546

350AI/10	087-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.65	1.4	9	5% cobbles/pebbles, 95% soil	10 yr 6/3 pale brown	silty clay	0.0819
350AI/11	087-1/5	ND	soil horizon - buried 'a'		arbitrary (10)	0.65	1.4	6.2	2% cobbles, 98% soil	10 yr 6/2 light brownish grey	silty clay	0.05642
350AI/12	087-1/2	ND	fall - domestic (secondary)	mixed (fill)	cultural	0.65	1	4.4	30% cobbles, 20% pebbles, 50% soil	10 yr 3/3 dark brown	silty clay	0.0286
350AJ/1	099-1/1	ND	humus - non-domestic (secondary)	mixed (fall)	arbitrary (20)	2	2	15.4	5% roots, 95% soil, no cobbles	10 yr 3/1 very dark grey	silty loam	0.616
350AK/1	086-1/1	LC	humus - domestic (secondary)	mixed (fall)	natural	1	1	25.2	1% cobbles, 2% roots, 93% soil	10 yr 3/2 very dark greyish brown	silty clay	0.252
350AK/2	086-1/2	EC-LCI	fall - domestic (secondary)	mixed (various)	arbitrary (10)	0.5	1	11	99% soil, 1% pebbles	10 yr 4/3 brown	silty clay	0.055
350AK/3	086-1/5a	EC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	0.5	1	6	1% pebbles/small cobbles, 94% soil	10 yr 4/4 dark yellowish brown	silty clay	0.03
350AK/4	086-1/5a	GP	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.5	1	4.6	1% small cobbles/pebbles, 99% soil	10 yr 5/4 yellowish brown	silty clay	0.023
350AK/5	086-1/5a	LC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.5	1	7	1% small cobbles, 99% soil	10 yr 5/4 yellowish brown	silty clay	0.035
350AK/6	086-1/5a	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	0.5	1	5	1% small cobbles/pebbles, 99% soil	10 yr 5/4 yellowish brown	silty clay	0.025
350AK/7	086-1/5a	EC-LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	cultural	0.5	1	14.4	99% soil, 1% cobbles	10 yr 5/3 brown	silty clay	0.072
350AK/8	086-1/5b	EC-LCI	habitation debris - domestic (secondary)		cultural	0.4	1	4.8	50% small cobbles/pebbles, 50% soil	10 yr 5/3 brown	silty clay	0.0192
350AK/9	086-1/5b	LCI-II	habitation debris - domestic (secondary)	mixed (buried 'a')	cultural	0.4	1	13.8	1% cobbles, 99% soil, speckles of red burned clay in matrix, as well as brownish yellow speckles	10 yr 5/3 brown and 2/5 yr 5/8 red	silty clay to clay	0.0552
350AL/1	100-1/1	EC-LCI	humus - domestic (secondary)		cultural	1	2	7.2	20% pebbles/small cobbles, 4% roots, 76% soil	10 yr 3/2 very dark greyish brown	silty clay	0.144
350AL/2	100-1/2	EC-LCII	construction fill with rubble - domestic (secondary)	mixed (various)	arbitrary (5)	1	2	12.2	30% cobbles, 20% pebbles, 50% soil	10 yr 3/2 very dark grayish brown	silty clay	0.244
350AL/3	100-1/2	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (various)	arbitrary (10)	0.5	2	11.6	10% large cobbles, 20% small cobbles, 20% pebbles, 50% soil	10 yr 4/3 brown	silty clay	0.116
350AL/4	100-1/2	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (various)	arbitrary (10)	0.5	2	8.2	10% large cobbles, 20% small cobbles, 20% pebbles, 50% soil	10 yr 4/3 brown	silty clay	0.082
350AL/5	100-1/2	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (various)	arbitrary (10)	0.5	1	15.8	10% large cobbles, 20% small cobbles, 20% pebbles, 50% soil	10 yr 4/3 brown	silty clay	0.079
350AM/1	091-1/1	LC	humus - domestic (secondary)		natural	1	2	3.2	2% roots, 5% cobbles, 5% pebbles, 88% soil	10 yr 3/1 very dark grey	silty clay	0.064

350AM/2	091-1/2	EC-LCI	colluvium - domestic (secondary)		arbitrary (10)	1	2	12.6	49% cobbles, 49% soil, 2% roots	10 yr 3/1 very dark grey	silty clay	0.252
350AM/3	091-1/3	EC-LCI	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.5	2	6.2	undetermined	10 yr 3/1 very dark grey	silty clay	0.062
350AM/4	091-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.5	2	6	1% roots, 10% pebbles, 44% cobbles, 45% soil	10 yr 3/1 very dark grey	silty clay	0.06
350AM/5	091-1/3	LCI	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.5	0.5	9.2	undetermined	10 yr 3/1 very dark grey	silty clay	0.023
350AM/6	091-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	0.5	0.5	9.2	1% roots, 15% pebbles, 42% cobbles, 42% soil	10 yr 4/1 dark gray	silty clay	0.023
350AM/7	091-1/4	EC-LCII	construction fill with rubble - domestic (secondary)		cultural	0.5	1.47	15	undetermined	2.5 y 4/2 dark greyish brown	silty clay	0.11025
350AN/1	091-1/1	EC-LCI	humus - domestic (secondary)		natural	1	2	3.8	12% roots, 44% cobbles, 63% soil	10 yr 3/1 very dark brown	silty clay	0.076
350AN/2	091-1/2	EC-LCI	colluvium - domestic (secondary)	mixed (fill)	cultural	1	2	14.4	50% cobbles, 2% roots, 2% pebbles, 46% soil	10 yr 3/1 very dark grey	silty clay	0.288
350AN/3	091-1/2	EC-LCI	colluvium - domestic (secondary)	mixed (fill)	cultural	0.85	1	10.4	undetermined	10 yr 4/1 dark gray	silty clay	0.0884
350AN/4	091-2/3	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (5)	1	1.34	4.4	15% pebbles, 3% roots, 41% cobbles, 41% soil	10 yr 3/1 very dark grey	silty clay	0.05896
350AN/5	091-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	0.54	0.57	21.8	10% cobbles, 15% pebbles, 1% roots, 74% soil	2.5 y 4/2 dark greyish brown	silty clay	0.0671
350AN/6	091-1/4	EC-LCI	construction fill without rubble - domestic (secondary)	mixed (buried 'a')	cultural	0.57	1.34	8.6	undetermined	2.5 y 4/3 olive brown	silty clay	0.065687
350AO/1	100-1/1	EC-LCI	humus - domestic (secondary)		arbitrary (10)	1	1	11.6	10% pebbles/small cobbles, 4% roots, 86% soil	10 yr 3/2 very dark greyish brown	silty clay	0.116
350AO/2	100-1/2	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (various)	arbitrary (10)	1	1	7.8	15% pebbles/small cobbles, 4% roots, 81% soil	10 yr 3/2 very dark grayish brown	silty clay	0.078
350AO/3	100-1/2	EC-LCI	construction fill with rubble - domestic (secondary)	mixed (various)	arbitrary (10)	1	1	7.2	10% large cobbles, 20% small cobbles, 20% pebbles, 50% soil	10 yr 4/3 brown	silty clay	0.072
350AP/1	091-2/1	EC-LCI	humus - domestic (secondary)		natural	1	2	3	6% roots, 4% pebbles, 10% cobbles, 80% soil	10 yr 3/1 very dark grey	silty clay	0.06
350AP/2	091-2/2	EC-LCI	colluvium - domestic (secondary)		arbitrary (5)	1	2	8.6	20% pebbles, 2% roots, 39% cobbles, 39% soil	10 yr 3/2 very dark greyish brown	silty clay	0.172
350AQ/1	091-patio/1	LCII-III	humus - domestic (secondary)		natural	1	1	2.2	6% roots, 4% pebbles, 10% cobbles, 80% soil	10 yr 3/1 very dark grey	silty clay	0.022
350AQ/2	091-patio/2	LCI-II	colluvium - domestic (secondary)		arbitrary (5)	1	1	10.6	2% roots, 20% pebbles, 39% cobbles, 39% soil	10 yr 3/2 very dark greyish brown	silty clay	0.106

350AQ/3	091-patio/2	EC-LCI	colluvium - domestic (secondary)		cultural	1	1	3.8	5% roots, 20% pebbles, 35% cobbles, 40% soil	10 yr 3/1 very dark grey	silty clay	0.038
350AQ/4	091-patio/3	ND	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	1	1	undetermined	10 yr 3/1 very dark grey	silty clay	0.01
354A/1	007-patio/2c	LCI	humus - non-domestic (secondary)	mixed (backdirt)	arbitrary (10)	2	2	6.4	5% large roots, 15% small roots, 10% pebbles, 70% soil	7.5 yr 3/2 dark brown	clay loam	0.256
354A/2	007-patio/2c	EC-LCI	humus - non- domestic (secondary)	mixed (backdirt)	natural	2	2	8.4	10% small roots, 5% large roots, 30% cobbles, 55% soil	7.5 yr 4/4 brown	clay loam	0.336
354A/3	007-patio/3b	EC-LCI	colluvium - non-domestic (secondary)	mixed (habitation debris)	cultural	2	2	4.6	5% large roots, 10% cobbles, 30% pebbles, 2% small roots, 53% soil	7.5 yr 4/4 brown	clay loam	0.184
354A/4	007-patio/5a	LP-LCI	construction fill with rubble - non-domestic (secondary)		cultural	1	2	12.6	25% large cobbles, 50% small cobbles, 23% soil, 2% roots	7.5 yr 4/4 brown	clay	0.252
354A/5	007-patio/5a	EC-LCI	construction fill with rubble - non-domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.5	1	14.8	90% soil, 1% roots, 9% cobbles/pebbles	7.5 yr 5/6 strong brown	silty clay	0.074
354A/6	007-patio/5a	LC	construction fill with rubble - non-domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.5	1	3	90% soil, 3% roots, 7% pebbles	7.5 yr 5/6 strong brown	silty clay	0.015
354B/1	007-1/2a	EC-TC	humus - non- domestic (secondary)		arbitrary (10)	2	2	17.2	30% small roots, 20% big roots/tree stump, 20% cobbles, 30% dirt	7.5 yr 4/4 brown	silty clay loam	0.688
354B/2	007-1/3	EC-LCII	fall/colluvium - non-domestic (secondary)	mixed (habitation debris)	cultural	2	2	8.4	30% fine root, 10% thick root,	7.5 yr 4/6 strong brown	clay loam	0.336
354B/3	007-1/22a	LCI-II	habitation debris - non-domestic (secondary)	mixed (fill)	cultural	2	2	3.2	nd	7.5 yr 4/6 strong brown	clay loam	0.128
354C/1	007-1/2a	LCI-II	humus - non-domestic (secondary)		arbitrary (10)	2	2	11.8	5% root, 25% cobbles, 1% tree root, 69% soil	10 yr 3/4 dark yellowish brown	silt loam	0.472
354C/2	007-1/2a	EC-TC	humus - non-domestic (secondary)		natural	2	2	13.4	nd	7.5 yr 5/6 strong brown	sandy loam	0.536
354C/3	007-1/3	LCII-III	fall/colluvium - non-domestic (secondary)	mixed (habitation debris)	cultural	2	2	4	15% cobbles, 10% pebbles, 5% tree root, 70% soil	3.5 yr 3/3 dark brown	silty clay loam	0.16
354C/4	007-1/7a	EC-LCI	construction fill with rubble - non-domestic (secondary)	mixed (habitation debris)	cultural	1	2	18	15% roots, 30% cobbles; 55% soil	10 yr 4/6 dark yellowish brown	sandy clay loam	0.36
354C/5	007-1/8a	EC-LCI	construction fill without rubble - non-domestic (secondary)		cultural	1	2	14.6	20% cobbles, 8% roots, 72% soil	10 yr 5/6 yellowish brown	loam	0.292
354C/6	007-1/25	LC	construction fill without rubble - non-domestic (secondary)	mixed (termination debris on plaster)	cultural	1	1.2	1.2	90% soil, 5% small cobbles, 5% large cobbles	10 yr 5/8 yellowish brown	clay loam	0.0144

354C/7	007-1/25	EC-LCI	on floor material - non-domestic (primary)		cultural	1	1.2	5.2	30% soil, 60% pebbles/cobbles, 10% other	10 yr f/6 yellowish brown	clay	0.0624
354C/8	007-1/7a	LCI	construction fill with rubble - non-domestic (secondary)		cultural	0.8	1	10.8	40% soil, 50% cobbles/small boulders, 10% pebbles	7.5 yr 4/4 brown; 10 yr 4/4 dark yellowish brown	sandy clay loam	0.0864
354C/9	007-1/7a	EC-LCI	construction fill with rubble - non-domestic (secondary)		cultural	0.8	1	10.6	40% soil, 50% cobbles/small boulders, 10% pebbles	7.5 yr 4/4 brown; 10 yr 4/4 dark yellowish brown	sandy clay loam	0.0848
354C/10	007-1/8a	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.8	1	6.4	70% soil, 30% (or less) small cobbles/large pebbles	10 yr 5/6 yellowish brown	clay loam	0.0512
354C/11	007-1/8a	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.8	1	11	70% soil, 30% small cobbles/pebbles	10 yr 5/6 yellowish brown	clay loam	0.088
354C/12	007-1/24	EC-LCI	horizontal debris unknown surface/fill - non-domestic (secondary)		cultural	0.8	2	7	90% soil, 10% small cobbles	10 yr 5/6 yellowish brown	clay loam	0.112
354C/13	007-1/8a	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.75	2	6.4	95% soil, 5% cobbles	10 yr 6/6 brownish yellow	clay	0.096
354C/14	007-1/25	LCI	construction fill without rubble - non-domestic (secondary)	mixed (termination debris on plaster)	cultural	0.75	2	3.6	95% soil, 5% small cobbles	10 yr 6/6 brownish yellow	clay	0.054
354C/15	007-1/25	EC-LCI	on floor material - non-domestic (primary)		cultural	0.7	1	4.4	87% soil, 13% small cobbles/ pebbles; mostly artifacts removed.	10 yr 6/6 brownish yellow	clay	0.0308
354C/16	007-1/13	LCI	floor fill - non-domestic (secondary)		cultural	1	1	6	50% pebbles, 50% plaster/soil	brown/grey plaster	plaster	0.06
354C/17	007-1/13	EC-LCI	floor fill - nondomestic (secondary)		cultural	1	1	7	80% large cobbles, 10% soil (yellow brown with grey), 10% pebbles/small cobbles	10 yr 5/6 yellowish brown	clay loam	0.07
354C/18	007-1/13	EC-LCI	floor fill - non-domestic (secondary)		cultural	1	1	7.6	80% soil, 10% small boulders, 10% large cobbles	10 yr 5/6 yellowish brown	clay loam	0.076
354D/1	007-1/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	2	2	15.8	85% soil, 10% small cobbles/pebble, 5% fine roots	7.5 yr 3/4 dark brown	clay loam	0.632
354D/2	007-1/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	natural	2	2	18.2	40% soil, 10% small limestone blocks, 40% large limestone blocks, 8% small roots, 2% large roots	7.5 yr 4/4 brown	clay loam	0.728

354D/3	007-1/4c	LCI	fall - non-domestic (secondary)		cultural	2	2	5.6	10% soil, 90% large cobbles/small boulders; a few fine roots	7.5 yr 4/6 dark yellowish brown	loam	0.224
354D/4	007-1/15	ND	facing stones - non-domestic (secondary)		cultural	0.25	1	19	40% soil, 60% small/medium cobbles	10 yr 6/6 brownish yellow	sandy clay loam	0.0475
354D/5	007-1/15	ND	facing stones - non-domestic (secondary)		cultural	0.25	1	13.8	50% soil, 50% small/med cobbles	10 yr 6/6 brownish yellow	sandy clay loam	0.0345
354D/6	007-1/15	EC	facing stones - non-domestic (secondary)		cultural	0.25	1	27.4	60% small/medium cobbles, 40% soil	10 yr 6/8 brownish yellow	sandy loam	0.0685
354D/7	007-1/16	LCI	backing masonry - non-domestic (secondary)		arbitrary (20)	0.6	1	20	70% large cobbles/boulders, 10% small/medium cobbles, 20% soil	10 yr 6/8 brownish yellow	sandy clay loam	0.12
354D/8	007-1/16	EC-LCI	backing masonry - non-domestic (secondary)		arbitrary (20)	0.4	1	16	74% soil, 5% large cobbles/boulders, 20% small/medium cobbles, 1% fine/thin roots	10 yr 6/8 brownish yellow	sand clay loam	0.064
354D/9	007-1/16	ND	backing masonry - non-domestic (secondary)		arbitrary (20)	0.3	1	19.6	60% soil, 30% medium/large cobbles, 10% small cobbles	10 yr 6/8 brownish yellow	sandy clay loam	0.0588
354D/10	007-1/16	ND	backing masonry - non-domestic (secondary)		cultural	0.2	1	27.6	50% soil, 40% large/medium cobbles, 9% small cobbles/pebbles, 1% fine roots	10 yr 6/8 brownish yellow	sandy clay loam	0.0552
354D/11	007-1/9	EC	core face stones - non-domestic (secondary)		cultural	0.6	1	20.8	60% limestone blocks; 20% cobbles, 17% soil, 3% fine roots	7.5 yr 4/6 strong brown	clay loam	0.1248
354D/12	007-1/10	ND	core face stones - non-domestic (secondary)		cultural	0.3	1	25.2	80% limestone blocks, 18% soil, 1% small/med cobbles, 1% fine roots	7.5 yr 4/6 dark yellowish brown	clay loam	0.0756
354D/13	007-1/8a	LC	construction fill with rubble - non-domestic (secondary)		cultural	0.6	1	20	85% soil, 10% med/large cobbles, 5% limestone blocks	7.5 yr 4/4 brown	clay loam	0.12
354D/14	007-1/17	LP-LCI	core face stones - non-domestic (secondary)		cultural	0.5	1	23.8	40% limestone blocks, 55% soil, 5% small and medium cobbles	10 yr 5/8 yellowish brown	clay loam	0.119
354D/15	007-1/17	PP-LCI	core face stones - non-domestic (secondary)		cultural	0.4	1	48.8	95% limestone blocks, 5% soil	10 yr 5/8 yellowish brown	sandy clay loam	0.1952
354D/16	007-1/17	PP-LCI	core face stones - non-domestic (secondary)		cultural	0.3	1	21.4	70% limestone blocks, 30% soil	10 yr 5/8 yellowish brown	sandy clay loam	0.0642
354D/17	007-1/17	EC-LCI	core face stones - non-domestic (secondary)		cultural	0.4	1	14	60% limestone blocks, 40% soil	10 yr 6/8 brownish yellow	sandy clay loam	0.056
354D/18	007-1/11	EC-LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (20)	0.55	1	15.2	90% soil, 9% cobbles, 1% roots	10 yr 5/8 yellowish brown	sandy clay loam	0.0836

354D/19	007-1/11	LP-LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (20)	0.7	1	21	80% soil, 10% clay rocks(?), 5% small/medium limestone cobbles, 5% small/medium chert cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.147
354D/20	007-1/11	EC-LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (20)	0.7	1	20	95% soil, 3% clay rocks(?), 2% chert med/small cobbles	10 yr 6/8 brownish yellow	silty clay loam	0.14
354D/21	007-1/11	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (20)	0.5	1	39	90% soil, 5% limestone, 5% chert cobbles	10 yr 6/8 brownish yellow	sandy clay loam	0.195
354D/22	007-1/18	EC-LCI	construction fill with rubble - non-domestic (secondary)		cultural	0.5	1	18.4	20% limestone cobbles, 75% soil, 4% small/med chert cobbles, 1% roots	10 yr 6/8 brownish yellow	sandy clay loam	0.092
354D/23	007-1/18	EC-LCI	construction fill with rubble - non-domestic (secondary)		arbitrary (20)	0.5	1	24.4	40% large chert cobbles, 20% small/med chert cobbles, 5% limestone cobbles, 35% soil	10 yr 5/6 yellowish brown	sandy clay loam	0.122
354D/24	007-1/20	PP-LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.5	1	35.2	80% soil, 5% limestone cobbles, 15% chert cobbles	10 yr 5/8 yellowish brown	silty clay loam	0.176
354D/25	007-1/26	PP	construction fill without rubble - non-domestic (secondary)	mixed (buried 'a')	cultural	0.5	1	28	95% soil, 3% clay rocks(?), 2% small cobbles	10 yr 6/8 brownish yellow	silty clay loam	0.14
354D/26	007-1/26	NA	soil horizon - buried 'a'		arbitrary (20)	1	1	13.8	70% brownish yellow soil, 30% yellow soil	10 yr 6/8 brownish yellow to 10 yr 8/8 yellow	silty clay loam to silt	0.138
354D/27	007-1/27a	NA	soil horizon - sterile		arbitrary (10)	1	1	9.2	80% brownish yellow soil, 20% yellow soil	10 yr 6/8 brownish yellow and 10 yr 8/8 yellow	silty clay loam and silt	0.092
354E/1	007-1/1	TC	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	2	2	6	95% soil, 3% cobbles/pebbles, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.24
354E/2	007-1/1	LCII	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	2	2	8.8	95% soil, 3% roots, 2% pebbles/cobbles	7.5 yr 4/4 brown	sandy loam	0.352
354E/3	007-1/1	LCII	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	2	2	6.2	97% soil, 2% cobbles/pebbles, 1% roots	7.5 yr 4/4 brown	sandy clay loam	0.248
354E/4	007-1/1	EC-LCI	modern activity backdirt - non-domestic (secondary)	mixed (humus)	arbitrary (10)	2	2	11.4	90% soil, 7% cobbles/pebbles, 3% roots	7.5 yr 4/4 brown	sandy clay loam	0.456
354E/5	007-1/2b	LC	humus - non-domestic (secondary)	mixed (fall)	arbitrary (10)	2	2	7.8	5% roots, 10% pebbles, 10% cobbles, 75% soil	7.5 yr 4/6 strong brown	sandy clay loam	0.312
354E/6	007-1/2b	ND	humus - non-domestic (secondary)	mixed (fall)	natural	1	1.28	10.2	70% soil, 30% cobbles	2.5 y 6/8 olive yellow	sandy loam	0.13056
354E/7	007-1/2b	ND	humus - non-domestic (secondary)	mixed (fall)	natural	2	2	0.2	70% soil, 30% cobbles	10 yr 5/6 yellowish brown	sandy loam	0.008

354E/8	007-1/4c	LC	fall - non-domestic (secondary)		arbitrary (?)	2	2	5.2	20% soil, 70% cobbles, 10% pebbles	10 yr 5/8 yellowish brown	sandy loam	0.208
354E/9	007-1/4c	LCI	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	2	2	6.6	90% cobbles, 10% soil	10 yr 5/6 yellowish brown	sandy loam	0.264
354E/10	007-1/22e	LCI-III	habitation debris - non-domestic (secondary)		cultural	1.26	2	7.6	90% cobbles, 4% pebbles, 1% roots, 5% soil	10 yr 5/8 yellowish brown	sandy loam	0.19152
354E/11	007-1/6	PP-LC	sascab - non-domestic (secondary)	mixed (habitation debris)	cultural	1	2	4.8	80% soil, 20% cobbles/pebbles	10 yr 6/6 brownish yellow	sandy clay loam	0.096
354E/12	007-1/22e	EC-LCI	habitation debris - non-domestic (secondary)	mixed (buried 'a')	arbitrary (20)	0.8	2	19.4	90% soil, 10% cobbles/pebbles	10 yr 6/8 brownish yellow	silt loam	0.3104
354E/13	007-1/22e	LC	habitation debris - non-domestic (secondary)	mixed (buried 'a')	cultural	0.8	2	4.2	95% soil, 5% cobbles/pebbles	10 yr 6/8 brownish yellow	silt loam	0.0672
354E/14	007-1/27b	NA	soil horizon - sterile		arbitrary (10)	0.8	2	4.4	98% soil, 2% cobbles/pebbles	10 yr 6/8 brownish yellow	silt foam	0.0704
354F/1	007-1/2d	LCI-II	humus - non-domestic (secondary)		arbitrary (10)	1	2	6.8	35% cobbles, 10% roots, 55% soil	7.5 yr 3/3 dark brown	silty loam	0.136
354F/2	007-1/22b	LCI-III	habitation debris - non-domestic (secondary)	mixed (fill)	cultural	1	2	9	40% cobbles, 2% limestone, 3% fine roots, 10% large roots, 45% soil	7.5 yr 4/3 brown	silty clay loam	0.18
354F/3	007-1/7c	EC-LCI	construction fill with rubble - non-domestic (secondary)		cultural	1	1	11.2	40% soil, 50% cobbles/small boulders, 10% pebbles/roots	7.5 yr 4/4 brown	sandy clay loam	0.112
354F/4	007-1/8b	EC-LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	1	1	11.2	75% soil, 25% cobbles	10 yr 5/6 yellowish brown	clay loam	0.112
354F/5	007-1/8b	LC	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	1	1	8.4	75% soil, 25% cobbles	10 yr 5/6 yellowish brown	clay loam	0.084
354F/6	007-1/8b	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	1	1	10.8	75% soil, 25% cobbles	10 yr 5/6 yellowish brown	clay loam	0.108
354F/7	007-1/8b	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	1	1	9.6	95% soil, 5% large cobbles	10 yr 6/8 brownish yellow	clay/silt with marl speckles	0.096
354F/8	007-1/8b	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	1	1	7.8	95% soil, 5% large cobbles	10 yr 6/8 brownish yellow	clay/silt with marl speckles	0.078
354F/9	007-1/8b	ND	construction fill without rubble - non-domestic (secondary)		cultural	1	1	8.6	95% soil, 5% large cobbles	10 yr 6/8 brownish yellow	clay/silt with marl speckles	0.086
354F/10	007-1/8c	NA	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.67	0.74	10.8	95% soil, 5% small cobbles	10 yr 5/6 yellowish brown	clay loam with white marl	0.053546

354F/11	007-1/8c	ND	construction fill without rubble - non-domestic (secondary)		cultural	0.67	0.74	9.6	99% soil, 1% other (marl)	10 yr 5/6 yellowish brown	clay loam with marl flecks	0.047597
354F/12	007-1/8c	ND	construction fill without rubble - non-domestic (secondary)		cultural	0.65	0.74	3.6	99% soil, 1% marl	10 yr 5/6 yellowish brown	silty clay loam	0.017316
354F/13	007-1/20	EC	construction fill without rubble - non-domestic (secondary)		cultural	0.12	0.74	7	90% soil, 10% small cobbles	10 yr 5/6 yellowish brown	clay loam	0.006216
354F/14	007-1/19	PP-EC	floor fill - non-domestic (secondary)		cultural	0.23	0.4	13.2	much plaster/marl; 40% soil, 60% pebbles/small cobbles	10 yr 5/6 yellowish brown	silt clay	0.012144
354G/1	007-1/2d	LCII	humus - non-domestic (secondary)		natural	2	2	12.8	10% cobbles, 20% roots, 10% pebbles, 60% soil	7.5 yr 3/4 dark brown	silty loam	0.512
354G/2	007-1/4b	PP-TC	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (5)	2	2	6.4	50% cobble, 40% soil, 10% roots	7.5 yr 4/3 brown	silty clay loam	0.256
354G/3	007-1/7c	EC-TC	construction fill with rubble - non-domestic (secondary)	mixed (f1 and f2 fill)	cultural	1	1.1	9	10% cobbles, 10% pebbles, 2% roots, 78% soil	10 yr 6/8 brownish yellow	sandy clay loam	0.099
354G/4	007-1/7c	EC-LCII	construction fill with rubble - non-domestic (secondary)		arbitrary (10)	1	1	8	40% soil, 50% cobbles/small boulders, 10% pebbles/roots	7.5 yr 4/4 brown, 10 yr 4/4 dark yellowish brown	sandy clay loam	0.08
354G/5	007-1/7c	LCI	construction fill with rubble - non-domestic (secondary)		cultural	1	1	6.8	50% soil, 40% cobbles, 10% pebbles/roots	7/5 yr 4/4 brown, 10 yr 5/8 yellowish brown	sandy clay loam to clay loam	0.068
354G/6	007-1/8b	LC	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	1	1	8	fewer inclusions than terminal fill with rubble and yellower colour; 70-75% soil, 30-25% cobbles	10 yr 5/6 yellowish brown	clay loam	0.08
354G/7	007-1/8b	LC	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	1	1	5.8	70% soil, 30% cobbles	10 yr 5/6 yellowish brown	clay loam	0.058
354G/8	007-1/8b	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.52	1	12.2	- marl speckles within; 95% soil, 5% large cobbles	10 yr 6/8 brownish yellow	clay silt	0.06344
354G/9	007-1/8b	EC-LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.52	1	9.2	95% soil, 5% large cobbles; marl speckling	10 yr 6/8 brownish yellow	clay silt	0.04784
354G/10	007-1/8b	LC	construction fill without rubble - non-domestic (secondary)		cultural	0.52	1	7.8	95% soil, 5% medium to large cobbles; marl speckling	10 yr 6/8 brownish yellow	silty clay	0.04056
354G/11	007-1/8b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.53	1	35	no marl; 70% small boulders/large cobbles, 30% soil	10 yr 6/8 brownish yellow	clay silt	0.1855

354G/12	007-1/8c	EC-LC	construction fill without rubble - non-domestic (secondary)		cultural	0.71	1	22.2	marl flecks; 99% soil, 1% other	10 yr 5/6 yellowish brown	clay loam	0.15762
354G/13	007-1/14	EC-LCI	floor fill - non-domestic (secondary)		cultural	0.4	1	13.2	40% soil, 60% small cobbles/pebbles	light brown	silty clay	0.0528
354H/1	007-1/2a	EC-LC	humus - non-domestic (secondary)		natural	2	2	12.6	88% soil, 10% roots, 2% pebbles	7.5 yr 4/4 brown	sandy clay loam	0.504
354H/2	007-1/3	LCI-II	fall/colluvium - non-domestic (secondary)	mixed (habitation debris)	cultural	2	2	1.6	nd (same as humus in 354b)	7.5 yr 4/4 brown	sandy clay loam	0.064
354I/1	007-1/2c	EC-TC	humus - non-domestic (secondary)		natural	2	2	9.2	60% soil, 10% roots, 30% cobbles	7.5 yr 4/4 brown	clay loam	0.368
354I/2	007-1/4a	EC-LCI	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (5)	0.5	2	8.4	25% pebbles, 20% cobbles, 5% roots, 40% soil	7.5 yr 4/6 strong brown	clay	0.084
354J/1	007-1/2c	EC-LCII	humus - non-domestic (secondary)		arbitrary (10)	2	2	8	35% cobbles, 5% roots, 60% soil	7.5 yr 4/4 brown	clay loam	0.32
354J/2	007-1/2c	EC-TC	humus - non-domestic (secondary)		arbitrary (10)	2	2	13.4	nd (same as 354j/1)	7.5 yr 4/4 brown	silty clay loam	0.536
354J/3	007-1/4a	EC-LCI	fall - non-domestic (secondary)		arbitrary (10)	2	2	4.4	30% cobbles, 70% soil	7.5 yr 4/6 strong brown	silty clay loam	0.176
354J/4	007-1/22c	EC-LCI	habitation debris - non-domestic (secondary)		arbitrary (10)	0.65	2	12.8	5% roots, 30% cobbles, 65% soil	7.5 yr 4/6 strong brown	silty clay loam	0.1664
354J/5	007-1/22c	EC-LCI	habitation debris - non-domestic (secondary)		arbitrary (10)	0.8	2	17.4	60% cobbles, 35% pebbles, 5% soil	10 yr 5/6 yellowish brown	clay loam	0.2784
354J/6	007-1/22c	EC	habitation debris - non-domestic (secondary)		arbitrary (10)	0.8	2	2.4	5% pebbles/cobbles, 95% soil	10 yr 6/8 brownish yellow	silty clay	0.0384
354J/7	007-1/4a	EC-LCI	fall- non-domestic (secondary)	mixed (fill)	arbitrary (5)	1.25	2	9	68% pebbles/cobbles, 20% large cobbles/small boulders, 12% soil	10 yr 5/6 yellowish brown	sandy clay loam	0.225
354J/8	007-1/22c	ND	habitation debris - non-domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.74	2	11.8	95% soil, 2% pebbles, 3% cobbles	10 yr 6/8 brownish yellow	clay loam	0.17464
354J/9	007-1/27c	NA	soil horizon - sterile		arbitrary (10)	0.74	2	6.6	99% soil, 1% pebbles	10 yr 5/8 yellowish brown	silty clay loam	0.09768
354K/1	007-1/2d	EC-TC	humus - non-domestic (secondary)		arbitrary (10)	2	2	10	10% cobble, 15% root, 75% soil	7.5 yr 3/3 dark brown	clay loam	0.4
354K/2	007-1/4b	EC-LCII	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	2	2	12.4	80% dirt, 5% root, 15% cobbles	7.5 yr 4/3 brown	sandy clay loam	0.496
354K/3	007-patio/6b	EC-TC	unknown/habitation debris? - non-domestic (secondary)		arbitrary (10)	1.55	2	4.8	90% soil, 5% root, 5% cobbles	7.5 yr 4/4 brown	clay loam	0.1488
354K/4	007-patio/6b	EC-LCI	unknown/habitation debris? - non-domestic (secondary)		cultural	1.55	2	3.4	80% cobbles, 15% soil, 5% roots	10 yr 4/4 brown	clay loam	0.1054

354K/5	007-1/7c	EC-LCI	construction fill with rubble - non-domestic (secondary)	mixed (f1 and f2 fill)	cultural	0.55	1	19.6	75% soil, 10% root, 15% cobbles	7.5 yr 4/3 brown	silty clay loam	0.1078
354K/6	007-patio/5b	EC	construction fill with rubble - non-domestic (secondary)		arbitrary (10)	1	1	8.2	5% cobbles, 1% roots, 89% soil, 5% other	10 yr 5/8 yellowish brown	sandy clay	0.082
354K/7	007-patio/8	LCI	soil horizon - buried 'a'	mixed (fill)	arbitrary (10)	1	1	6.6	4% cobbles, 1% roots, 91% soil, 4% other	10 yr 5/8 yellowish brown	sandy clay	0.066
354K/8	007-patio/8	EC	soil horizon - buried 'a'	mixed (habitation debris)	arbitrary (10)	1	1	15.6	1% roots, 2% cobbles, 2% other, 95% soil	10 yr 5/8 yellowish brown	sandy clay	0.156
354K/9	007-patio/8	PP	soil horizon - buried 'a'	mixed (habitation debris)	arbitrary (10)	1	1	11	1% roots, 1% pebbles, 98% soil	10 yr 6/8 brownish yellow	silty clay	0.11
354K/10	007-patio/9a	NA	soil horizon - sterile		arbitrary (10)	1	1	9	1% roots, 1% pebbles, 99% soil	10 yr 6/8 brownish yellow	silty clay	0.09
354L/1	007-1/2c	EC-LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	9.8	60% roots, 38% soil, 2% cobbles	7.5 yr 4/3 brown	sandy loam	0.196
354L/2	007-1/2c	EC-LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	10.8	93% soil, 5% pebbles, 2% roots	10 yr 5/4 yellowish brown	sandy clay loam	0.216
354L/3	007-1/4a	EC-LCII	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	1	2	16.8	80% soil, 3% pebbles, 17% cobbles	10 yr 5/6 yellowish brown	sandy clay loam	0.336
354L/4	007-1/22c	EC-LCI	habitation debris - non-domestic (secondary)		arbitrary (10)	1	2	7.2	8% roots, 15% pebbles, 67% soil, 10% cobbles	10 yr 5/6 yellowish brown	silty clay	0.144
354L/5	007-1/22c	EC-LCI	habitation debris - non-domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.5	2	5.8	98% soil, 2% pebbles	10 yr 6/6 brownish yellow	clay loam	0.058
354L/6	007-1/27c	NA	soil horizon - sterile		arbitrary (10)	0.5	2	7	99% soil, 1% roots	10 yr 6/6 brownish yellow	clay loam	0.07
354M/1	007-1/2d	TC	humus - non-domestic (secondary)	mixed (habitation debris)	natural	1	2	4.4	31% soil, 9% pebbles, 28% roots, 19% cobbles	7.5 yr 4/3 brown	clay loam	0.088
354M/2	007-1/7c	TC	construction fill with rubble - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	0.6	1	9.2	60% soil, 35% cobble, 5% roots	7.5 yr brown	sandy clay loam	0.0552
354M/3	007-1/7c	LCII	construction fill with rubble - non-domestic (secondary)		arbitrary (10)	0.6	1	11.4	80% soil, 18% cobbles, 2% roots	7/5 yr brown	sandy clay loam	0.0684
354M/4	007-1/7c	NA	construction fill with rubble - non-domestic (secondary)		cultural	0.6	1	8.2	75% soil, 23% cobbles, 2% roots	10 yr 5/4 yellowish brown	silty clay	0.0492
354M/5	007-1/8b	ND	construction fill without rubble - non-domestic (secondary)		cultural	0.6	1	18	80% soil, 19% cobbles, 1% roots	10 yr 6/6 brownish yellow	silty clay	0.108
354M/6	007-1/8b	ND	construction fill without rubble - non-domestic (secondary)		cultural	0.6	1	4.6	60% soil, 35% cobble, 5% roots	10 yr 6/6 brownish yellow	silty clay	0.0276

354M/7	007-1/8b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.6	1	16	60% soil, 30% cobbles, 10% other	10 yr 6/6 brownish yellow	silty clay	0.096
354N/1	007-1/2b	LC	humus - non-domestic (secondary)		arbitrary (10)	1	2	10.2	85% soil, 10% pebbles, 5% roots	7.5 yr 3/4 dark brown	clay loam	0.204
354N/2	007-1/2b	LCI-II	humus - non-domestic (secondary)		arbitrary (10)	1	2	8	80% soil, 15% pebbles/small cobbles, 5% roots	7.5 yr 4/4 brown	clay loam	0.16
354N/3	007-1/2b	MP	humus - non-domestic (secondary)		natural	1	2	10.2	80% soil, 15% pebbles/small cobbles, 5% roots	7.5 yr 4/4 brown	clay loam	0.204
354N/4	007-1/4c	LCI	fall - non-domestic (secondary)		cultural	1	2	10.6	25% soil, 70% large and small cobbles, 5% boulders	7.5 yr 4/6 dark yellowish brown	clay loam	0.212
354N/5	007-1/16	LCI	backing masonry - non-domestic (secondary)	mixed (fall)	arbitrary (10)	1	2	7	70% soil, 30% cobbles	7.5 yr 4/6 dark yellowish brown	clay loam	0.14
354O/1	007-1/2b	ND	humus - non-domestic (secondary)		arbitrary (10)	1	2	10.6	95% soil, 3% cobbles/pebbles, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.212
354O/2	007-1/2b	EC-LC	humus - non-domestic (secondary)		arbitrary (10)	1	2	10.2	95% soil, 3% cobbles/pebbles, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.204
354O/3	007-1/2b	LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	10.4	95% soil, 3% cobbles/pebbles, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.208
354O/4	007-1/2b	EC-LCI	humus - non-domestic (secondary)		natural	1	2	9.6	95% soil, 5% cobbles	7.5 yr 4/4 brown	sandy clay loam	0.192
354O/5	007-1/4c	EC-LCI	fall - non-domestic (secondary)		cultural	1	2	13.8	25% soil, 70% large and small cobbles, 5% boulders	7.5 yr 4/6 dark yellowish brown	clay loam	0.276
354O/6	007-1/4c	LCI	fall - non-domestic (secondary)		cultural	1	2	9	looser than actual sascab layer; 90% soil, 10% cobbles	10 yr 5/6 yellowish brown	clay loam	0.18
354O/7	007-1/4c	LCII	fall - non-domestic (secondary)		arbitrary (10)	1	2	6	90% soil, 10% cobbles	10 yr 5/6 yellowish brown	clay loam	0.12
354O/8	007-1/4c	LCI	fall - non-domestic (secondary)		cultural	0.64	2	8.6	90% soil, 10% small cobbles	10 yr 5/6 yellowish brown	clay loam	0.11008
354O/9	007-1/6	LCI	sascab - non-domestic (secondary)	mixed (terminal habitation debris)	arbitrary (10)	0.7	2	7.6	40% small cobbles, 60% soil/sascab mix	10 yr 6/6 brownish yellow	sandy clay loam	0.1064
354O/10	007-1/6	LC	sascab - non-domestic (secondary)	mixed (terminal habitation debris)	cultural	0.7	2	14.2	35% cobbles, 65% soil	10 yr 6/6 brownish yellow	sandy clay loam	0.1988
354O/11	007-1/22e	EC-TC	habitation debris - non-domestic (secondary)		arbitrary (10)	1	2	4.4	90% soil, 10% small cobbles	10 yr 6/8 brownish yellow	silt loam	0.088
354O/12	007-1/22e	LCI	habitation debris - non-domestic (secondary)		arbitrary (10)	1	2	11.4	90% soil, 10% small cobbles	10 yr 6/8 brownish yellow	silt loam	0.228
354O/13	007-1/22e	LCI	habitation debris - non-domestic (secondary)		arbitrary (10)	1	2	12	90% soil, 10% small cobbles	10 yr 6/8 brownish yellow	silt loam	0.24

354O/14	007-1/22e	LC	habitation debris - non-domestic (secondary)	mixed (buried 'a')	arbitrary (5)	1	2	5	90% soil, 10% cobbles	10 yr 6/8 brownish yellow	silt loam	0.1
354O/15	007-1/22e	EC-LCI	habitation debris - non-domestic (secondary)		cultural	0.5	1.4	13.2	red and black burned areas; 99% soil, 1% pebbles and small cobbles	10 yr 6/8 brownish yellow	silty loam	0.0924
354O/16	007-1/23	LC	carbon feature - non-domestic (defacto)		cultural	0.38	0.9	8.2	red and black colouring from burning; 99% soil, 1% pebbles/small cobbles	10 yr 6/8 brownish yellow	silty loam	0.028044
354O/17	007-1/6	LCI-II	sascab - non-domestic (secondary)	mixed (terminal habitation debris)	cultural	0.3	1.8	10.8	65% soil/sascab, 30% small cobbles, 5% thin soft limestone blocks	10 yr 6/6 brownish yellow	sandy clay loam	0.05832
354P/1	007-patio/2a	LCI	humus - non-domestic (secondary)		arbitrary (10)	2	2	8.2	75% soil, 20% pebbles/cobbles, 5% roots	7.5 yr 3/3 dark brown	clay loam	0.328
354P/2	007-patio/2a	EC-TC	humus - non-domestic (secondary)		natural	2	2	8.6	75% soil, 25% pebbles/cobbles	7.5 yr 3/3 dark brown	clay loam	0.344
354P/3	007-patio/3a	EC-TC	fall/colluvium - non-domestic (secondary)		cultural	2	2	3	90% soil, 10% cobbles	7.5 yr 4/4 brown	clay loam	0.12
354P/4	007-patio/6c	EC-TC	habitation debris - non-domestic (secondary)	mixed (fill)	cultural	2	2	5.6	95% soil, 5% cobbles/pebbles	7.5 yr 4/4 brown	clay loam	0.224
354P/5	007-patio/7	LCI	habitation debris/offering? - non-domestic (primary?)	mixed (fill)	cultural	1	1.1	1.8	30% soil, 40% soft limestone blocks, 30% cobbles	10 yr 3/3 dark brown	silty clay loam	0.0198
354Q/1	007-1/2d	LCI-II	humus - non-domestic (secondary)		natural	1	1	8.4	75% soil, 20% small cobbles/pebbles, 5% roots	7.5 yr 3/3 dark brown	sandy clay loam	0.084
354Q/2	007-1/7c	EC-LCI	construction fill with rubble - non-domestic (secondary)	mixed (fall)	arbitrary (20)	1	1	19	60% soil, 40% cobbles/small boulders	7.5 yr 4/4 brown	clay loam	0.19
354Q/3	007-1/4b	ND	fall - non-domestic (secondary)		cultural	0.4	1	4.6	40% soil, 60% large and small cobbles	7.5 yr 4/6 dark yellowish brown	clay loam	0.0184
354Q/4	007-1/4b	LCII	fall - non-domestic (secondary)		cultural	0.4	1	7	80% soil, 20% small cobbles	7.5 yr 4/6 dark yellowish brown	clay loam	0.028
354Q/5	007-1/7c	ND	construction fill with rubble - non-domestic (secondary)		cultural	0.5	1	12	60% soil, 35% cobble, 5% roots	10 yr 5/6 yellowish brown	silty clay	0.06
354Q/6	007-1/5	LCI	slump - non-domestic (secondary)		cultural	0.5	1	11.6	70% soil, 25% cobbles, 5% roots	10 yr 5/6 yellowish brown	silty clay	0.058
354Q/7	007-1/8b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.5	1	8.6	85% soil, 14% cobble, 1% root	10 yr 5/6 yellowish brown	silty clay	0.043
354R/1	007-2/1a	EC-LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	8.6	80% soil, 10% roots, 10% pebbles/small cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.172
354R/2	007-2/1a	LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	7	80% soil, 10% roots, 10% small cobbles/pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.14
354R/3	007-2/1a	LC	humus - non-domestic (secondary)		natural	1	2	7	5% roots, 30% cobbles, 65% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.14

354S/1	007-2/1a	EC	humus - non-domestic (secondary)		arbitrary (10)	1	2	9.6	80% soil, 10% roots, 10% pebbles/small cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.192
354S/2	007-2/1a	LC	humus - non-domestic (secondary)		natural	1	2	6.6	5% roots, 10% cobbles, 85% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.132
354T/1	007-2/1a	LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	8.4	80% soil, 10% small cobbles/pebbles, 10% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.168
354T/2	007-2/1a	EC-LCI	humus - non-domestic (secondary)		natural	1	2	6.2	5% roots, 5% cobbles, 90% soil	10 yr 4/3 brown	silty clay loam	0.124
354T/3	007-2/3a	LCI	fall - non-domestic (secondary)	mixed (fill)	cultural	1	2	4	15% cobbles, 10% roots, 75% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.08
354T/4	007-2/3a	EC-LCI	fall - non-domestic (secondary)	mixed (fill)	arbitrary (5)	0.8	1	6.8	30% cobbles, 5% roots, 65% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.0544
354U/1	007-2/1a	LCI	humus - non-domestic (secondary)		arbitrary (10)	1	2	10.4	10% roots, 10% pebbles, 80% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.208
354U/2	007-2/1a	EC-LCI	humus - non-domestic (secondary)		natural	1	2	5.8	15% roots, 5% pebbles, 5% cobbles, 75% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.116
354U/3	007-2/3a	LCI	fall - non-domestic (secondary)		cultural	1	2	4.4	25% cobbles, 5% roots, 70% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.088
354U/4	007-2/7a	EC-LCI	construction fill without rubble - non-domestic (secondary)	mixed (fall, habitation debris)	arbitrary (10)	1	2	6.6	15% cobbles, 5% roots, 80% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.132
354U/5	007-2/7a	EC-LC	construction fill without rubble - non-domestic (secondary)	mixed (fall, habitation debris)	arbitrary (5)	1	2	4.4	15% cobble, 5% root, 80% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.088
354V/1	007-2/1a	EC	humus - non-domestic (secondary)		arbitrary (10)	2	2	11.6	85% soil, 10% pebbles, 5% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.464
354V/2	007-2/1a	LCI	humus - non-domestic (secondary)		natural	2	2	2.4	85% soil, 10% pebbles/small cobbles, 5% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.096
354V/3	007-2/3a	LC	fall - non-domestic (secondary)		arbitrary (5)	2	2	1.8	10% roots, 5% cobbles, 85% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.072
354V/4	007-2/3a	MP-LCI	fall - non-domestic (secondary)		cultural	2	2	4.4	10% roots, 10% cobbles/ 80% soil	10 yr 5/4 yellowish brown	silty clay loam	0.176
354V/5	007-2/3a	PP-LCI	fall - non-domestic (secondary)	mixed (fill)	cultural	2	2	5.2	5% cobbles, 3% roots, 92% soil	10 yr 4/6 dark yellowish brown	silty clay loam	0.208
354V/6	007-2/7b	LC	construction fill without rubble - non-domestic (secondary)		arbitrary (20)	1	1	15.4	95% soil, 1% cobble, 1% roots, 3% other	10 yr 5/4 yellowish brown	clay loam	0.154
354V/7	007-2/7b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	1	1	9	95% soil, 1% root, 4% other	10 yr 5/6 yellowish brown	sandy clay loam	0.09
354V/8	007-2/14	EC-LC	horizontal debris unknown surface/fill - non-domestic (secondary)	mixed (fill)	cultural	1	1	15.6	95% soil, 1% root, 4% other	10 yr 5/6 yellowish brown	sandy clay loam	0.156

354V/9	007-2/14	LCI	horizontal debris unknown surface/fill - non-domestic (secondary)		cultural	1	1	4.8	95% soil, 1% cobble, 4% other	10 yr 5/4 yellowish brown	silty clay loam	0.048
354V/10	007-2/8	EC	construction fill without rubble - non-domestic (secondary)		arbitrary (5)	0.75	1	2.6	93% soil, 2% cobbles, 5% other	10 yr 5/4 yellowish brown	silty clay loam	0.0195
354V/11	007-2/8	EC	construction fill without rubble - non-domestic (secondary)		arbitrary (5)	0.75	1	2.8	95% soil, 2% cobbles, 3% other	10 yr 5/4 yellowish brown	silty clay loam	0.021
354V/12	007-2/8	LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (5)	0.85	1	2.4	98% soil, 2% other	10 yr 5/4 yellowish brown	silty clay loam	0.0204
354V/13	007-2/15	LCI-II	on floor material - non-domestic (secondary)		cultural	0.85	1	0	no matrix removed	no soil removed	no soil removed	0
354V/14	007-2/9	EC-LC	floor fill/ construction fill without rubble - non-domestic (secondary)		cultural	0.75	1	5.6	92% soil, 5% other, 3% cobbles	10 yr 5/4 yellowish brown	silty clay loam	0.042
354V/15	007-2/16	LCI	on floor material - non-domestic (secondary)		cultural	0.75	1	0	no matrix removed	no soil removed	no soil removed	0
354V/16	007-2/10	LCI	floor fill - non-domestic (secondary)		cultural	0.65	1	2.8	92% soil, 5% other, 3% cobbles	10 yr 5/4 yellowish brown	silty clay loam	0.0182
354V/17	007-2/17	LC	horizontal debris unknown surface/fill - non-domestic (secondary)	mixed (fill)	cultural	0.55	1	1.6	100% soil	10 yr 5/4 yellowish brown	silty clay loam	0.0088
354V/18	007-2/11	EC	construction fill without rubble - non-domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.5	1	23	80% soil, 20% limestone pebbles/small cobbles	10 yr 5/6 yellowish brown	silty clay	0.115
354V/19	007-2/18	PP-EC	habitation debris - non-domestic (secondary)	mixed (buried 'a')	cultural	0.55	1	13.6	80% soil, 20% pebbles	10 yr 5/6 yellowish brown	silty clay	0.0748
354W/1	007-2/1c	LCI	humus - non-domestic (secondary)		arbitrary (10)	2	2	7.8	10% pebbles, 5% roots, 85% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.312
354W/2	007-2/1c	LCI	humus - non-domestic (secondary)		natural	0.98	2	5.2	90% soil, 5% root, 5% pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.10192
354W/3	007-2/3b	EC-LCI	fall - non-domestic (secondary)		cultural	1.3	2	5.6	5% pebbles, 5% roots, 90% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.1456
354W/4	007-2/3b	LC	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (5)	1.25	2	4.6	95% soil, 2.5% cobbles, 2.5 roots	10 yr 4/6 dark yellowish brown	silty clay loam	0.115
354W/5	007-2/6	EC-LC	backing masonry - non-domestic (secondary)	mixed (fall)	cultural	1.25	2	7.8	70% soil, 15% other, 15% cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.195
354W/6	007-2/6	LC	backing masonry - non-domestic (secondary)	mixed (fall)	arbitrary (10)	1.25	2	8.4	70% soil, 15% cobbles, 15% pebbles/others	10 yr 4/4 dark yellowish brown	silty clay loam	0.21
354W/7	007-2/6	ND	backing masonry - non-domestic (secondary)	mixed (fall/debris)	arbitrary (5)	1.25	2	3.2	80% soil, 15% cobbles, 5% roots	10 yr 5/6 yellowish brown	silty clay loam	0.08
354W/8	007-2/6	LC	backing masonry - non-domestic (secondary)	mixed (habitation	arbitrary (10)	1	1.2	10	90% soil, 5% other, 5% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.12

				debris)								
354W/9	007-2/4	MP	slump - non-domestic (secondary)		cultural	0.77	0.95	5.6	97% soil, 2% cobbles, 1% other	10 yr 4/3 brown	silty clay loam	0.04096
354W/10	007-2/6	LC	backing masonry - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	1.41	2	2	90% soil, 5% cobbles, 5% other	10 yr 6/6 yellowish brown	silty clay loam	0.0564
354W/11	007-2/12	EC-LCI	habitation debris - non-domestic (secondary)	mixed (backing masonry)	cultural	1.41	2	8.4	96% soil, 19% cobbles, 3% other	10 yr 5/6 yellowish brown	silty clay loam	0.23688
354W/12	007-2/12	NA	habitation debris - non-domestic (secondary)		cultural	0.7	2	2.4	98% soil, 1% cobbles, 1% other	10 yr 6/6 yellowish brown	silty clay loam	0.0336
354X/1	007-patio/2a	LCI-II	humus - non-domestic (secondary)		arbitrary (10)	1	1	12.4	75% soil, 20% small cobbles/pebbles, 5% roots	7.5 yr 3/3 dark brown	sandy clay loam	0.124
354X/2	007-patio/2a	EC-LCII	humus - non-domestic (secondary)		arbitrary (10)	1	1	5.6	75% soil, 20% small cobbles/pebbles, 5% roots	7.5 yr 3/3 dark brown	sandy clay loam	0.056
354X/3	007-patio/2a	LCII-III	humus - non-domestic (secondary)		natural	1	1	8.4	60% soil, 35% small cobbles/ pebbles, 5% roots	7.5 yr 3/3 dark brown	sandy clay loam	0.084
354X/4	007-patio/3a	LC	fall/colluvium - non-domestic (secondary)		cultural	1	1	2.8	60% soil, 40% small cobbles/pebbles	7.5 yr 3/3 dark brown	sandy clay loam	0.028
354X/5	007-patio/6b	TC	habitation debris - non-domestic (secondary)	mixed (fill)	cultural	1	1	8	95% soil, 5% cobbles/pebbles	7.5 yr 4/4 brown	clay loam	0.08
354Y/1	007-1/2d	LCII	humus - non-domestic (secondary)		arbitrary (10)	1	2	5.8	75% soil, 20% pebbles/small cobbles, 5% roots	7.5 yr 3/3 dark brown	sandy clay loam	0.116
354Y/2	007-1/2d	LC	humus - non-domestic (secondary)		natural	1	2	8	75% soil, 20% pebbles/small cobbles, 5% roots	7.5 yr 3/3 dark brown	sandy clay loam	0.16
354Y/3	007-1/4b	EC-LCII	fall - non-domestic (secondary)	mixed (fill)	arbitrary (5)	1	2	1.8	70% soil, 30% cobbles	7.5 yr 4/4 brown	clay loam	0.036
354Y/4	007-1/4b	LCI-II	fall - non-domestic (secondary)	mixed (habitation debris)	cultural	1	2	3	40% soil, 50% large and small cobbles	7.5 yr 4/6 dark yellowish brown	clay loam	0.06
354Y/5	007-1/4b	EC-LCII	fall - non-domestic (secondary)	mixed (habitation debris, fill)	cultural	1	2	4.6	40% soil, 60% large and small cobbles	7.5 yr 4/6 dark yellowish brown	clay loam	0.092
354Z/1	007-1/2a	LC	humus - non-domestic (secondary)		natural	0.5	1	11.4	95% soil, 3% cobbles/pebbles, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.057
354Z/2	007-1/3	LC	colluvium - non-domestic (secondary)	mixed (fill)	cultural	0.5	1	10.2	40% soil, 50% cobbles/small boulders, 10% pebbles	7.5 yr 4/4 brown	clay loam	0.051
354Z/3	007-1/7a	LCI-II	construction fill with rubble - non-domestic (secondary)		arbitrary (15)	0.4	0.5	17.4	40% soil, 50% cobbles/ small boulders, 10% pebbles	7.5 yr 4/4 brown	clay loam	0.0348

354Z/4	007-1/7a	LCI	construction fill with rubble - non-domestic (secondary)		cultural	0.4	0.5	10.8	40% soil, 50% cobbles/ small boulders, 10% pebbles	7.5 yr 4/4 brown	clay loam	0.0216
354Z/5	007-1/7a	PP-LC	construction fill with rubble - non-domestic (secondary)		cultural	0.4	0.5	19.4	40% soil, 50% cobbles/small boulders	7.5 yr 4/4 brown	clay loam	0.0388
354Z/6	007-1/8a	LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.5	0.85	9.8	90% soil, 10% pebbles/small cobbles	10 yr 5/8 yellowish brown	clay loam	0.04165
354Z/7	007-1/8a	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (5)	0.5	1	5.2	marl speckles; 90% soil, 10% pebbles/cobbles	10 yr 5/8 yellowish brown	clay loam	0.026
354Z/8	007-1/8a	LC	construction fill without rubble - non-domestic (secondary)		arbitrary (5)	0.5	1	5.6	marl speckles; 98% soil, 2% pebbles	10 yr 5/8 yellowish brown	clay/ clay loam	0.028
354Z/9	007-1/25	EC-LCI	construction fill without rubble - non-domestic (secondary)	mixed (termination debris on plaster)	cultural	0.5	1	13	marl speckles; 99% soil, 1% small cobbles/pebbles	10 yr 5/8 yellowish brown	clay/clay loam	0.065
354Z/10	007-1/2a	LC	humus - non-domestic (secondary)		natural	0.7	1	12.4	95% soil, 3% cobbles/pebbles, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.0868
354Z/11	007-1/22a	LC	habitation debris - non-domestic (secondary)	mixed (fill)	cultural	0.5	0.7	3.8	95% soil, 3% cobbles/pebbles, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.0133
354Z/12	007-1/7a	EC-LCII	construction fill with rubble - non-domestic (secondary)		cultural	0.28	0.7	11.2	40% soil, 50% cobbles/small boulders, 10% pebbles	7.4 yr 4/4 brown	sandy clay loam	0.021952
354Z/13	007-1/7b	LCI-II	construction fill with rubble - non-domestic (secondary)		cultural	0.62	0.7	17	70% soil, 20% large cobbles, 10% pebbles	10 yr 4/4 dark yellowish brown	sandy clay loam	0.07378
354Z/14	007-1/8a	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.7	0.9	9.4	80% soil, 20% cobbles (ne corner)	10 yr 4/4 dark yellowish brown	sandy clay loam	0.05922
354Z/15	007-1/8a	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.7	0.9	5.2	90% soil, 10% small cobbles/pebbles	10 yr 5/6 yellowish brown	clay loam	0.03276
354Z/16	007-1/8a	LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.7	0.9	7.2	85% soil, 10% pebbles, 5% small cobbles/ceramics	10 yr 5/6 yellowish brown	clay loam	0.04536
354Z/17	007-1/8a	LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.7	0.9	8.2	70% soil, 30% small cobbles	10 yr 5/6 yellowish brown	clay loam	0.05166
354Z/18	007-1/25	LCI-II	construction fill without rubble - non-domestic (secondary)	mixed (termination debris on plaster)	cultural	0.7	0.9	9.8	90% soil, 10% cobbles/pebbles	10 yr 5/6 yellowish brown	clay loam	0.06174
354Z/19	007-1/21	EC-LCII	unknown - non-domestic (secondary)		natural	0.8	1	43	mixed	mixed humus/fill soils	mixed	0.344

354Z/20	007-1/25	EC-LCI	on floor material - non-domestic (primary)		cultural	1	1.8	10	white marl; 10% soil, 90% small cobbles/pebbles/artifacts	10 yr 6/6 brownish yellow	silty clay	0.18
354Z/21	007-1/25	PP-LCI	on floor material - non-domestic (primary)		cultural	0.8	1.3	7.4	10% soil, 90% small cobbles/pebbles/artifacts	10 yr 6/6 brownish yellow	silty clay	0.07696
354Z/22	007-1/12	EC	floor fill - non-domestic (secondary)		cultural	0.6	0.6	7.4	99% plaster/soil, 1% pebbles	burned grey plaster	undetermined	0.02664
354Z/23	007-1/12	EC	floor fill - non-domestic (secondary)		cultural	0.6	0.6	7	many artifacts; like f3 fill??	brownish yellow	undetermined	0.0252
354AA/1	007-2/1a	EC-LC	humus - non-domestic (secondary)		natural	2	2	6.8	85% soil, 10% pebbles, 5% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.272
354AA/2	007-2/3a	LCI	fall - non-domestic (secondary)	mixed (fill)	cultural	2	2	7	50% soil, 40% cobbles, 10% pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.28
354AB/1	007-1/2a	LC	humus - non-domestic (secondary)		natural	1	1	6.2	85% soil, 10% pebbles, 5% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.062
354AB/2	007-1/3	LCI-II	colluvium - non-domestic (secondary)		cultural	1	1	6	70% soil, 30% cobbles	7.5 yr 4/4 brown	clay loam	0.06
354AC/1	007-2/1a	EC	humus - non-domestic (secondary)		natural	1	2	12.6	80% soil, 10% roots, 10% pebbles/ small cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.252
354AC/2	007-2/2	ND	colluvium - non-domestic (secondary)	mixed (fill)	arbitrary (5)	1	2	3.8	95% soil, 3% roots, 2% pebbles/cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.076
354AC/3	007-2/2	EC	colluvium - non-domestic (secondary)	mixed (fill)	arbitrary (5)	1	1.04	5	85% soil, 5% pebbles, 10% other	10 yr 4/4 dark yellowish brown	silty clay loam	0.052
354AC/4	007-2/2	ND	colluvium - non-domestic (secondary)	mixed (fill)	cultural	1	1.04	1.2	90% soil, 6% cobbles, 4% other	10 yr 4/4 dark yellowish brown	silty clay loam	0.01248
354AC/5	007-2/5a	LCI	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.5	1.04	9.6	95% soil, 5% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.04992
354AC/6	007-2/5a	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.5	1.04	11	95% soil, 1% cobbles, 4% ceramics	10 yr 5/6 yellowish brown	silty clay loam	0.05775
354AC/7	007-2/5a	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.5	1.04	10	98% soil, 1% cobbles, 1% other	10 yr 5/6 yellowish brown	sandy clay loam	0.052
354AC/8	007-2/5b	ND	construction fill without rubble - non-domestic (secondary)		arbitrary (10)	0.5	0.89	14	95% soil, 1% cobbles, 3% other	10 yr 5/4 yellowish brown	silty clay loam	0.0623
354AC/9	007-2/5b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.5	0.69	8.2	98% soil, 1% other, 1% cobbles	10 yr 5/4 yellowish brown	silty clay loam	0.02829
354AD/1	007-2/1a	EC-LCI	humus - non-domestic (secondary)		natural	2	2	8.6	85% soil, 13% roots, 2% pebbles	dark yellowish brown	silty clay loam	0.344
354AD/2	007-2/3a	EC-LCI	fall - non-domestic (secondary)	mixed (fill)	cultural	2	2	6.4	90% soil, 8% roots, 2% cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.256

354AE/1	007-2/1a	EC-LCI	humus - non-domestic (secondary)		natural	2	2	15.2	10% roots, 90% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.608
354AE/2	007-2/3a	EC-LCI	fall - non-domestic (secondary)		cultural	2	2	4.2	15% cobbles, 7% roots, 78% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.168
354AF/1	007-2/1b	ND	humus - non-domestic (secondary)		arbitrary (10)	1	2	7.2	5% roots, 95% soil	10 yr 4/3 brown	silty clay loam	0.144
354AF/2	007-2/1b	ND	humus - non-domestic (secondary)		arbitrary (5)	1	2	1	90% soil, 7% roots, 3% cobbles	10 yr 4/3 brown	silty clay loam	0.02
354AF/3	007-2/1b	LC	humus - non-domestic (secondary)		natural	1	2	10.4	90% soil, 7% roots, 3% cobbles	10 yr 4/3 brown	silty clay loam	0.208
354AF/4	007-2/2	EC-LCI	fall/colluvium - non-domestic (secondary)	mixed (habitation debris)	arbitrary (3)	1	1.23	1.4	93% soil, 5% cobbles, 2% other	10 yr 4/3 brown	silty clay loam	0.01722
354AG/1	007-2/1c	EC-LCI	humus - non-domestic (secondary)		natural	2	2	3	5% cobbles, 10% roots, 85% soil	10 yr 4/2 dark greyish brown	silty clay loam	0.12
354AG/2	007-2/1c	LC	humus - non-domestic (secondary)		arbitrary (10)	2	2	8.8	70% soil, 15% cobbles, 15% other	7.5 yr 3/3 dark brown	sandy clay loam	0.352
354AG/3	007-2/1c	EC-LCI	humus - non-domestic (secondary)		natural	2	2	12.2	5% cobbles, 2.5% roots, 92.5% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.488
354AG/4	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	1.3	2	10.2	5% pebbles/cobbles/roots, 95% soil	10 yr 4/6 dark yellowish brown	silty clay	0.2652
354AG/5	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (habitation debris)	cultural	1	2	13	95% soil, 3% cobbles, 2% other	10 yr 4/6 dark yellowish brown	silty clay	0.26
354AG/6	007-2/13	NA	carbon feature - non-domestic (defacto)		cultural	0.4	0.62	10.2	burned matrix	reddish brown and black	undetermined	0.025296
354AG/7	007-2/4	LCI	slump - non-domestic (secondary)		cultural	0.33	0.62	26.2	93% soil, 2% other, 2% root, 3% cobbles/boulders	10 yr 4/3 brown	silty clay loam	0.053605
354AG/8	007-2/4	EC-LCI	slump - non-domestic (secondary)		cultural	1.02	2	12.2	95% soil, 3% cobbles/boulders, 2% other	10 yr 4/3 brown	silty clay loam	0.24888
354AG/9	007-2/3b	LCI	fall - non-domestic (secondary)	mixed (fill)	arbitrary (5)	0.64	1.32	13.2	98% soil, 1% cobble/boulder, 1% other	10 yr 5/6 yellowish brown	silty clay loam	0.11151
354AG/10	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (fill)	arbitrary (10)	0.64	1.85	20.8	95% soil, 2% cobbles, 3% other	10 yr 5/6 yellowish brown	silty clay loam	0.24627
354AG/11	007-2/3b	LCI	fall - non-domestic (secondary)	mixed (fill)	arbitrary (10)	0.28	1.85	13.2	95% soil, 2% cobbles, 3% other	10 yr 5/6 yellowish brown	silty clay loam	0.068376
354AG/12	007-2/3b	EC	fall - non-domestic (secondary)	mixed (fill)	cultural	0.28	1.95	38.8	95% soil, 2% cobbles, 3% other	10 yr 5/4 yellowish brown	silty clay loam	0.21185
354AG/13	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	1.16	2	6.6	90% soil, 5% cobbles, 5% other	10 yr 5/6 yellowish brown	clay loam	0.15312
354AG/14	007-2/3b	PP-EC	fall - non-domestic (secondary)	mixed (habitation debris)	cultural	0.89	2	18	92% soil, 3% other, 5% cobbles	10 yr 5/6 yellowish brown	clay loam	0.3204

354AH/1	007-2/1c	EC-LC	humus - non-domestic (secondary)		arbitrary (10)	2	2	9.6	5% cobbles, 10% roots, 85% soil	7/5 yr 3/3 dark brown	sandy clay loam	0.384
354AH/2	007-2/1c	EC-LCI	humus - non-domestic (secondary)		natural	1.67	2	5.4	4% cobbles, 2% roots, 94% soil	10 yr 4/3 brown	clay loam	0.18036
354AH/3	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (backing masonry)	arbitrary (10)	1.67	2	5.2	5% roots, 20% cobbles, 75% soil	10 yr 3/4 dark yellowish brown	silty clay loam	0.17368
354AH/4	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (backing masonry)	cultural	2	2	6.4	5% roots, 20% cobbles, 75% soil	10 yr 4/4 dark yellowish brown	clay loam	0.256
354AH/5	007-2/3b	LCI	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (10)	0.97	2	6.4	95% soil, 5% cobbles/pebbles	10 yr 5/4 yellowish brown	silty clay loam	0.12416
354AH/6	007-2/6	EC	backing masonry - non-domestic (secondary)		arbitrary (5)	1	2	5.8	70% soil, 30% cobbles	10 yr 5/4 yellowish brown	silty clay loam	0.116
354AH/7	007-2/3b	LCI	fall - non-domestic (secondary)	mixed (habitation debris)	arbitrary (5)	0.97	2	3.4	90% soil, 10% cobbles	10 yr 5/4 yellowish brown	silty clay loam	0.06596
354AH/8	007-2/12	LCI	habitation debris - nondomestic (secondary)		cultural	1	2	5.8	95% soil, 3% other, 2% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.116
354AI/1	007-1/2d	LC	humus - non-domestic (secondary)		natural	1	1	8.2	85% soil, 10% pebbles, 5% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.082
354AI/2	007-1/7c	LC	construction fill with rubble - non-domestic (secondary)		cultural	1	1	7.6	70% soil, 25% cobble, 5% roots	7.5 yr 4/4 brown	sandy clay loam	0.076
354AI/3	007-1/7c	EC-LC	construction fill with rubble - non-domestic (secondary)		cultural	1	1	0.8	70% soil, 28% cobbles, 2% roots	10 yr 4/4 dark yellowish brown	sandy clay loam	0.008
354AI/4	007-1/7c	EC-LCI	construction fill with rubble - non-domestic (secondary)		cultural	1	1	8.8	70% soil, 28% cobble, 2% roots	7.5 yr 4/4 brown	sandy clay loam	0.088
354AI/5	007-1/7c	EC-LCI	construction fill with rubble - non-domestic (secondary)		cultural	1	1	10.4	80% soil, 15% cobbles, 5% roots	10 yr 5/4 yellowish brown	silty clay	0.104
354AI/6	007-1/8b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	1	1	11.8	75% soil, 24% cobble, 1% roots	10 yr 6/6 brownish yellow	silty clay	0.118
354AI/7	007-1/8b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	0.8	1	6.2	65% soil, 34% cobbles, 1% roots	10 yr 6/6 brownish yellow	silty clay	0.0496
354AI/8	007-1/8b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	1	1	10	60% soil, 40% cobble	10 yr 5/6 yellowish brown	silty clay	0.1
354AI/9	007-1/8b	LCI	construction fill without rubble - non-domestic (secondary)		cultural	1	1	10.8	60% soil, 30% cobbles, 10% other	10 yr 6/6 brownish yellow	silty clay	0.108
354AJ/1	007-2/1c	LCI	humus - non-domestic (secondary)		natural	2	2	4.4	90% soil, 10% roots	10 yr 3/4 dark yellowish brown	silty clay loam	0.176

354AJ/2	007-2/1c	EC-LCI	humus - non-domestic (secondary)		natural	2	2	3.2	90% soil, 10% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.128
354AJ/3	007-2/3b	EC-LCI	fall - non-domestic (secondary)		arbitrary (10)	1.2	2	13.2	95% soil, 3% cobbles, 2% other	10 yr 4/4 dark yellowish brown	silty clay loam	0.3168
354AJ/4	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (habitation debris)	cultural	1.23	2	5	96% soil, 2% other, 3% cobbles	10 yr 5/4 yellowish brown	sandy clay loam	0.123
354AJ/5	007-2/12	EC-LCI	habitation debris - non-domestic (secondary)		cultural	1.23	2	6.4	95% soil, 2% other, 3% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.15744
354AK/1	007-2/1c	EC-LCI	humus - non-domestic (secondary)		natural	1	1	12.2	90% soil, 10% roots	10 yr 3/4 dark yellowish brown	silty clay loam	0.122
354AK/2	007-2/3b	EC-LCI	fall - non-domestic (secondary)	mixed (fill)	cultural	1	1	8.8	75% soil, 25% cobbles/roots	10 yr 3/4 dark yellowish brown	silty clay loam	0.088
355A/1	006-1/1	EC-TC	humus - domestic (secondary)		natural	2	2	7.8	5% pebbles, 3% roots, 92% soil	10 yr 4/4 dark yellowish brown	silty clay loam	0.312
355A/2	006-1/2	LCI-III	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	1.2	83% soil, 10% pebbles, 5% cobbles, 2% roots	10 yr 4/2 dark grayish brown	silty clay loam	0.048
355A/3	006-1/8a	LCI-III	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	0	no matrix removed	no matrix removed	no matrix removed	0
355B/1	006-1/1	EC-TC	humus - domestic (secondary)		natural	2	2	7.8	3% pebbles, 2% cobbles, 89% soil, 5% roots, 1% other	10 yr 3/4 dark yellowish brown	sandy loam	0.312
355B/2	006-1/2	LCI-II	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	0.2	10% pebbles, 5% cobbles, 2% roots, 83% soil	10 yr 4/2 dark grayish brown	silty clay loam	0.008
355B/3	006-1/8a	LCI-II	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	2	10% pebbles, 5% cobbles, 2% roots, 83% soil	10 yr 4/2 dark grayish brown	silty clay loam	0.08
355C/1	006-1/1	LCI	humus - domestic (secondary)		natural	2	2	4.6	90% soil, 3% pebbles, 2% cobbles, 5% roots	10 yr 3/4 dark yellowish brown	sandy loam	0.184
355C/2	006-1/8a	EC-TC	habitation debris - domestic (secondary)	mixed (colluvium)	cultural	2	2	1.4	98% soil, 1% pebbles, 1% cobbles	10 yr 3/4	silty loam	0.056
355C/3	006-1/8a	MP-LCI	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.5	2	0.8	50% pebbles, 50% soil	7/5 yr 3/2 dark brown	clay	0.008
355C/4	006-1/5	EC-TC	construction fill with rubble - domestic (secondary)	mixed (habitation debris)	cultural	1	1	17.8	30% soil, 50% cobbles, 15% pebbles, 5% limestone	2.5 y 4/3 olive brown	sandy clay	0.178
355C/5	006-1/6	EC-LCII	construction fill with rubble - domestic (secondary)		cultural	0.63	1	14.2	50% soil, 45% pebbles, 5% cobbles	2.5 y 4/4 olive brown	sandy clay	0.08946
355C/6	006-1/7	EC-LCI	construction fill without rubble - domestic (secondary)		cultural	0.57	1	24.4	98% soil, 2% pebbles	10 yr 4/4 dark yellowish brown	sandy clay	0.13908
355C/7	006-1/9	ND	soil horizon - buried 'a'	mixed (habitation debris)	arbitrary (20)	0.57	1	20.8	99% soil, 1% pebbles	10 yr 5/6 yellowish brown	silty clay loam	0.11856

355C/8	006-1/10c	NA	soil horizon - sterile		arbitrary (10)	0.57	1	9.6	100% soil	10 yr 5/6 yellowish brown	silty clay loam	0.05472
355D/1	006-1/1	EC-LCI	humus - domestic (secondary)		natural	2	2	12.6	84% soil, 5% pebbles, 3% cobbles, 8% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.504
355D/2	006-1/2	LCI	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	4	75% soil, 10% cobbles, 15% pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.16
355D/3	006-1/8b	LCII-III	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.78	2	17.4	95% soil, 2% cobbles, 3% pebbles	10 yr 3/6 dark yellowish brown	silty clay loam	0.27144
355D/4	006-1/8b	LCI	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.6	2	10	50% soil, 30% pebbles, 20% cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.12
355E/1	006-patio/1a	EC-TC	humus - domestic (secondary)		natural	2	2	10	84% soil, 8% roots, 5% pebbles, 3% cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.4
355E/2	006-patio/2a	EC-TC	colluvium - domestic (secondary)	mixed (humus)	cultural	2	2	7.2	3% roots, 3% cobbles, 89% soil, 5% pebbles	10 yr 3/4 dark yellowish brown	silty loam	0.288
355E/3	006-patio/4a	MP-TC	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	4.6	92% soil, 1% roots, 5% pebbles, 2% cobbles	10 yr 4/3 dark yellowish brown	silty clay loam	0.184
355E/4	006-patio/3	LC	construction fill with rubble - domestic (secondary)		cultural	0.8	1	10.2	35% soil, 40% pebbles, 20% small cobbles, 5% other	10 yr 4/4 dark yellowish brown	silty clay loam	0.0816
355E/5	006-patio/9	ND	soil horizon - buried 'a'		arbitrary (10)	0.8	1	9.6	98% soil, 2% pebbles	7.5 y 5/6 strong brown	silty clay	0.0768
355E/6	006-patio/9	NA	soil horizon - buried 'a'		arbitrary (5)	0.8	1	5.8	98% soil, 2% pebbles	7.5 yr 5/6 strong brown	silty clay	0.0464
355E/7	006-patio/9	NA	soil horizon - buried 'a'		arbitrary (10)	0.4	1	11.6	98% soil, 2% pebbles	7.5 yr 5/6 strong brown	silty clay	0.0464
355E/8	006-patio/10	NA	soil horizon - sterile		arbitrary (10)	0.4	1	14.4	99% soil, 1% pebbles	7.5 yr 5/6 strong brown	silty clay	0.0576
355E/9	006-patio/8	NA	pit fill - domestic (secondary)	mixed (post hole, fill)	cultural	0.19	0.26	28	75% soil, 25% pebbles	7.5 yr 4/6 strong brown	silty clay	0.013832
355F/1	006-patio/1b	LCII-III	humus - domestic (secondary)		natural	2	2	9	90% soil, 5% pebbles, 3% cobbles, 2% roots	10 yr 4/4 dark yellowish brown	sandy clay loam	0.36
355F/2	006-patio/2b	EC-LCI	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	7.8	97% soil, 6% pebbles, 5% cobbles, 2% roots	10 yr 3/4 dark yellowish brown	silty loam	0.312
355F/3	006-patio/4c	LCI	habitation debris - domestic (secondary)	mixed (hearth fill)	cultural	0.52	0.84	4.2	88% soil, 2% pebbles, 10% cobbles	10 yr 3/6 dark yellowish brown	silty loam	0.018346
355F/4	006-patio/5	NA	hearth fill - domestic (primary)		arbitrary (5)	0.36	0.86	4.6	91% soil, 4% carbon, 1% small cobbles/pebbles, 4% other	7.5 yr 5/6 strong brown	silty clay	0.014242
355F/5	006-patio/5	NA	hearth fill - domestic (primary)		arbitrary (5)	0.36	0.86	5.2	91% soil, 4% carbon, 4% other, 1% pebbles/cobbles	10 yr 3/4 dark yellowish brown	silty clay	0.016099
355F/6	006-patio/5	NA	hearth fill - domestic (primary)		arbitrary (5)	0.36	0.68	4	may be into a clay lining; 97% soil, 2% carbon, 0.5% daub, 0.5% pebbles	10 yr 3/6 dark yellowish brown	silty clay to clay	0.009792

355F/7	006-patio/5	NA	hearth fill - domestic (primary)		arbitrary (5)	0.35	0.64	9	96% soil, 2% carbon, 0.5% pebbles, 0.5% other	10 yr 4/6 dark yellowish brown	clay with some silt	0.02016
355F/8	006-patio/5	NA	hearth fill - domestic (primary)		arbitrary (5)	0.4	0.64	2.2	96% soil, 2% carbon, 1% other, 1% pebbles	10 yr 4/6 dark yellowish brown	clay with some silt	0.005632
355F/9	006-patio/5	NA	hearth fill - domestic (primary)		arbitrary (5)	0.4	0.64	2.6	100% soil	10 yr 6/8 brownish yellow	silty clay	0.006656
355F/10	006-patio/5	NA	hearth fill - domestic (primary)		cultural	0.4	0.64	6.6	100% soil	10 yr 4/4 dark yellowish brown	silty clay	0.016896
355F/11	006-patio/4c	LCI	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.88	1.6	3.6	55% cobbles, 2% roots, 43% soil	10 yr 4/4 dark yellowish brown	silty clay	0.050688
355G/1	006-patio/1b	LCI-II	humus - domestic (secondary)		natural	2	2	9.8	89% soil, 10% roots, 1% pebbles	10 yr 4/4 dark yellowish brown	silty loam	0.392
355G/2	006-patio/2b	LCII	colluvium - domestic (secondary)		cultural	2	2	5.4	3% roots, 90% soil, 5% pebbles, 2% cobbles	10 yr 3/6 dark yellowish brown	silty loam	0.216
355G/3	006-patio/4b	LCI-III	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	2.6	97% soil, 3% pebbles/cobbles	10 yr 3/6 dark yellowish brown	silty clay loam	0.104
355G/4	006-patio/4b	LCII	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.3	2	6.6	83% soil, 15% pebbles/cobbles, 2% roots	10 yr 4/4 dark yellowish brown	silty clay	0.0396
355H/1	006-2/1a	LCI-III	humus - domestic (secondary)		natural	2	2	8.2	90% soil, 5% pebbles, 3% cobbles, 2% roots	10 yr 4/4 dark yellowish brown	silt loam	0.328
355H/2	006-2/2	LCII-III	colluvium - domestic (secondary)		arbitrary (10)	2	2	3.6	87% soil, 6% pebbles, 5% cobbles, 2% roots	10 yr 3/4 dark yellowish brown	silty loam	0.144
355H/3	006-2/3a	LCI-II	fall - domestic (secondary)		cultural	0.48	2	3.6	94% soil, 1% pebbles, 5% roots	10 yr 4/4	silty clay loam	0.03456
355H/4	006-2/6b	LCI-III	habitation debris - domestic (secondary)		cultural	0.48	2	15.2	8% cobbles, 2% pebbles, 88% soil, 2% roots	10 yr 4/6 dark yellowish brown	silty clay loam	0.14592
355H/5	006-2/6a	MP-LCII	habitation debris - domestic (secondary)		cultural	0.51	2	8.8	99% soil, 1% other	10 yr 4/6 dark yellowish brown	silty clay loam	0.08976
355H/6	006-2/6b	LCI	habitation debris - domestic (secondary)		arbitrary (5)	0.5	2	11	98% soil, 2% pebbles	10 yr 5/8 yellowish brown	clay	0.11
355H/7	006-2/6a	LCI	habitation debris - domestic (secondary)		arbitrary (10)	0.23	1.5	13	99% soil, 1% pebbles	10 yr 5/6 yellowish brown	clay	0.04485
355H/8	006-2/4	LCI-III	construction fill with rubble - domestic (secondary)	mixed (on-structure debris)	cultural	1	1	22.6	50% cobbles, 10% pebbles, 40% soil	7.5 yr 4/4 brown	silty clay	0.226
355H/9	006-2/6b	LCI	habitation debris - domestic (secondary)		arbitrary (10)	0.5	2	9.8	5% roots, 7% cobbles, 88% soil	10 yr 5/6 yellowish brown	silty clay	0.098
355H/10	006-2/5	LCI-II	construction fill without rubble - domestic (secondary)		cultural	1	1	4.4	85% soil, 15% cobbles	10 yr 5/4 yellowish brown	silty clay	0.044
355H/11	006-2/6d	MP-LCII	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	7.6	85% soil, 13% pebbles, 2% roots	10 yr 5/6 yellowish brown	silty clay	0.076
355H/12	006-2/6d	MP-LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	12.6	95% soil, 3% pebbles, 2% roots	10 yr 5/6 yellowish brown	silty clay	0.126

355H/13	006-2/6d	MP-LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	13.4	97% soil, 2% pebbles, 1% roots	10 yr 5/6 yellowish brown	silty clay	0.134
355H/14	006-2/6d	EC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	8.8	98% soil, 2% pebbles	10 yr 5/6 yellowish brown	silty clay	0.088
355H/15	006-2/6b	PP-EC	habitation debris - domestic (secondary)		arbitrary (10)	0.5	2	5.4	98% soil, 2% pebbles	10 yr 5/6 yellowish brown	silty clay	0.054
355H/16	006-2/7a	NA	soil horizon - sterile		arbitrary (10)	1	1	7.2	98% soil, 2% pebbles	10 yr 5/6 yellowish brown	silty clay	0.072
355I/1	006-2/1a	EC-LCII	humus - domestic (secondary)		arbitrary (10)	2	2	7.2	5% pebbles, 8% cobbles, 79% soil, 8% roots	10 yr 4/4 dark yellowish brown	silt loam	0.288
355I/2	006-2/1a	LCI-III	humus - domestic (secondary)	mixed (colluvium)	natural	2	2	5.2	2% roots, 6% cobbles, 87% soil, 5% pebbles	10 yr 3/6 dark yellowish brown	clay loam	0.208
355I/3	006-2/3a	LCI-II	fall - domestic (secondary)		cultural	1.05	2	5.6	15% pebbles, 68% soil, 15% cobbles, 2% roots	10 yr 4/4	silty clay loam	0.1176
355I/4	006-2/3a	LCI-II	fall - domestic (secondary)	mixed (habitation debris)	arbitrary (10)	0.56	1.33	13.8	90% soil, 5% pebbles, 5% cobbles	2.5 y 4/4 olive brown	silty clay loam	0.10278
355I/5	006-2/3a	LCI-II	fall - domestic (secondary)	mixed (habitation debris)	cultural	0.4	2	3.6	75% soil, 15% pebbles, 8% cobbles, 2% roots	2.5 y 4/4 olive brown	silty clay loam	0.0288
355I/6	006-2/6c	LC	habitation debris - domestic (secondary)		arbitrary (10)	0.18	2	12	1% cobbles, 1% pebbles, 98% soil	10 yr 5/6 yellowish brown	silty clay loam	0.0432
355I/7	006-2/6b	EC-LCII	habitation debris - domestic (secondary)		arbitrary (10)	0.5	2	6.4	5% roots, 8% pebbles, 87% soil	10 yr 4/6 dark yellowish brown	silty clay	0.064
355I/8	006-2/6b	MP-LC	habitation debris - domestic (secondary)		arbitrary (10)	0.5	2	8.4	98% soil, 1% pebbles, 1% roots	10 yr 4/6 dark yellowish brown	silty clay	0.084
355J/1	006-2/1b	LCI-III	humus - domestic (secondary)		arbitrary (10)	2	2	13.6	5% pebbles, 3% cobbles, 87% soil, 5% roots	10 yr 4/4 dark yellowish brown	sandy clay loam	0.544
355J/2	006-2/1b	EC-TC	humus - domestic (secondary)		arbitrary (10)	2	2	5.4	87% soil, 6% pebbles, 5% cobbles, 2% roots	10 yr 3/6 dark yellowish brown	silty clay loam	0.216
355J/3	006-2/1b	LCI-II	humus - domestic (secondary)	mixed (fall, habitation debris)	cultural	2	2	11	85% soil, 8% pebbles, 6% cobbles, 1% roots	10 yr 5/4 yellowish brown	silty clay loam	0.44
355J/4	006-2/3b	EC-TC	fall - domestic (secondary)	mixed (habitation debris)	arbitrary (10)	2	2	5.6	1% roots, 1% cobbles, 1% pebbles, 97% soil	10 yr 5/6 yellowish brown	silty clay loam	0.224
355J/5	006-2/3b	LCI	fall - domestic (secondary)	mixed (habitation debris)	cultural	2	2	1	97% soil, 1% pebbles, 1% cobbles, 1% roots	10 yr 4/6 dark yellowish brown	silty clay loam	0.04
355J/6	006-2/6c	GP-TC	habitation debris - domestic (secondary)		arbitrary (10)	2	2	6.8	98% soil, 1% pebbles, 1% roots	10 yr 5/6 yellowish brown	silty clay loam	0.272
355J/7	006-2/6c	EC-LCII	habitation debris - domestic (secondary)		arbitrary (10)	2	2	8.4	96% soil, 3% pebbles/cobbles, 1% roots	10 yr 5/6 yellowish brown	silty clay loam	0.336
355J/8	006-2/6c	LC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	2	3.8	97% soil, 3% pebbles/cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.076

355J/9	006-2/6c	LC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	2	6.6	100% soil	2.5 y 6/6 olive yellow	silty clay loam	0.132
355J/10	006-2/6c	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	1	2	5.8	100% soil	2.5 y 6/6 olive yellow	silty clay loam	0.116
355J/11	006-2/6c	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	1	2	4.6	100% soil	2.5 y 6/6 olive yellow	silty clay loam	0.092
355J/12	006-2/7b	NA	soil horizon - sterile		arbitrary (5)	1	2	4.4	100% soil	5 y 8/6 yellow	silty clay loam	0.088
355K/1	006-patio/1c	LCI	humus - domestic (secondary)		natural	1	2	8.4	90% soil, 8% roots, 2% pebbles	10 yr 3/4 dark yellowish brown	silty loam	0.168
355K/2	006-patio/2c	LCI-II	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	1	2	4.8	95% soil, 2% pebbles, 3% roots	10 yr 4/4 dark yellowish brown	silty loam	0.096
355K/3	006-patio/4e	LCI	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	2	4.2	92% soil, 1% roots, 5% pebbles, 2% cobbles	10 yr 4/3 dark yellowish brown	silty clay loam	0.084
355L/1	006-3/1a	LC	humus - domestic (secondary)		natural	1	2	5.8	90% soil, 8% roots, 2% pebbles/cobbles	10 yr 3/4 dark yellowish brown	silty loam	0.116
355L/2	006-3/2	EC-LCI	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	1	2	7.4	75% soil, 10% cobbles, 2% roots, 13% pebbles	7.5 yr 4/3 brown	silty clay	0.148
355M/1	006-3/1a	EC	humus - domestic (secondary)		natural	1	2	6.4	90% soil, 8% roots, 2% pebbles	10 yr 3/4 dark yellowish brown	silty loam	0.128
355M/2	006-3/2	EC-LCII	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	1	2	1.8	95% soil, 2% pebbles/cobbles, 3% roots	10 yr 4/4 dark yellowish brown	silty loam	0.036
355N/1	006-3/1a	LCI-II	humus - domestic (secondary)	mixed (colluvium)	natural	1	2	5.2	90% soil, 2% roots, 8% pebble/cobble	10 yr 3/4 dark yellowish brown	silty loam	0.104
355N/2	006-3/4	LCI-II	construction fill with rubble - domestic (secondary)	mixed (habitation debris)	arbitrary (20)	1	1	23.2	94% soil, 2% roots, 2% pebbles, 2% cobbles	10 yr 4/6 dark yellowish brown	silty clay	0.232
355N/3	006-3/6	LCI	soil horizon - buried ‘a’		arbitrary (10)	1	1	11.4	95% soil, 4% pebbles, 1% roots	10 yr 4/6 dark yellowish brown	silty clay	0.114
355O/1	006-patio/1b	LCI-II	humus - domestic (secondary)		natural	2	2	8.6	82% soil, 10% roots, 5% pebbles, 3% small roots	7/5 yr 3/3 dark brown	clay	0.344
355O/2	006-patio/2b	LC	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	14.4	90% soil, 5% roots, 3% pebbles, 2% daub	7.5 yr 4/3 brown	silty clay	0.576
355O/3	006-patio/4d	NA	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	0.6	95% soil, 5% pebbles	7/5 yr 4/3 brown	silty clay	0.024
355O/4	006-patio/6	NA	daub feature - domestic (defacto)		arbitrary (5)	0.77	1	1.2	60% daub, 37% soil, 3% other	7/5 yr 3/3 dark brown	silty clay	0.00924
355O/5	006-patio/6	NA	daub feature - domestic (defacto)		arbitrary (5)	0.45	1	3.6	63% daub, 35% soil, 2% other	7.5 yr 3/3 dark brown	silty clay to clay	0.0162
355O/6	006-patio/6	NA	daub feature - domestic (defacto)		arbitrary (5)	0.45	1	3.2	70% soil, 27% daub, 3% other	7.5 yr 3/3 dark brown	silty clay	0.0144
355O/7	006-patio/6	NA	daub feature - domestic (defacto)		arbitrary (5)	0.25	0.6	14.8	60% daub, 37% soil, 3% other	7.5 yr 3/3 dark brown	silty clay	0.0222

355O/8	006-patio/6	NA	daub feature - domestic (defacto)		arbitrary (5)	0.25	0.6	3.6	63% daub, 35% soil, 2% other	7.5 yr 3/3 dark brown	silty clay	0.0054
355O/9	006-patio/6	NA	daub feature - domestic (defacto)		arbitrary (5)	0.25	0.6	9	55% daub, 5% cobbles, 37% soil, 3% other	7.5 yr 3/3 dark brown	silty clay	0.0135
355P/1	006-3/1a	LCI-III	humus - domestic (secondary)		natural	1	2	6	15% large roots, 20% pebbles/small cobbles, 5% small roots, 60% soil	7.5 yr 4/3 brown	clay	0.12
355P/2	006-3/3	EC-TC	fall - domestic (secondary)		arbitrary (10)	1	2	8.2	80% soil, 10% cobbles, 5% roots, 5% pebbles	7.5 yr 4/3 brown	silty clay	0.164
355P/3	006-3/3	LC	fall - domestic (secondary)		arbitrary (10)	1	1.5	6.4	30% soil, 10% roots, 30% pebbles, 25% cobbles, 5% boulders/large limestone blocks	7.5 yr 4/3 brown	silty clay	0.096
355P/4	006-3/3	LCII-III	fall - domestic (secondary)	mixed (habitation debris)	arbitrary (10)	1	1	16	85% soil, 10% pebbles, 5% roots	7.5 yr 4/3 brown	clay	0.16
355P/5	006-3/3	PP	fall - domestic (secondary)	mixed (habitation debris)	cultural	1	1	6	80% soil, 3% roots, 17% pebbles/cobbles	10 yr 4/4 dark yellowish brown	clay	0.06
355P/6	006-3/5	LCI-III	habitation debris - domestic (secondary)	mixed (fill)	cultural	0.5	1	17.2	80% soil, 15% cobbles, 5% pebbles	7.5 yr 4/3 brown	silty clay	0.086
355Q/1	006-3/1b	TC	humus - domestic (secondary)		arbitrary (10)	1	2	6.6	80% soil, 7% roots, 5% pebbles, 8% cobbles	7.5 yr 4/3 brown	clay loam	0.132
355Q/2	006-3/1b	LCI-III	humus - domestic (secondary)		natural	1	2	3.6	80% soil, 15% cobbles, 5% pebbles	7.5 yr 4/3 brown	clay	0.072
355Q/3	006-3/3	LCI	fall - domestic (secondary)		cultural	0.4	1	7.4	90% soil, 10% cobbles	7.5 yr 4/3 brown	silty clay	0.0296
355Q/4	006-3/3	LCII-III	fall - domestic (secondary)	mixed (habitation debris)	arbitrary (10)	1	1.5	15.8	93% soil, 5% pebbles, 2% roots	7.5 yr 4/4 brown	clay	0.237
355Q/5	006-3/3	LCI-III	fall - domestic (secondary)	mixed (habitation debris)	cultural	1	1.5	9	95% soil, 5% pebbles	10 yr 5/4 yellowish brown	clay	0.135
355Q/6	006-3/5	LCI-III	habitation debris - domestic (secondary)		arbitrary (10)	1	1	14.4	98% soil, 2% pebbles	10 yr 5/4 yellowish brown	silty clay	0.144
355Q/7	006-3/5	LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	1	1	5.4	99% soil, 1% pebbles	10 yr 5/4 yellowish brown	silty clay	0.054
355Q/8	006-3/5	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	10	100% soil	10 yr 5/8 yellowish brown	silty clay	0.1
355Q/9	006-3/5	ND	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (5)	1	1	7	100% soil; marl speckling	10 yr 5/8 yellowish brown	silty clay	0.07
355Q/10	006-3/7	NA	soil horizon - sterile		arbitrary (5)	1	1	5	99% soil, 2% large roots	10 yr 5/8 yellow brown	silty clay	0.05
355R/1	006-patio/1b	TC	humus - domestic (secondary)		natural	1	2	7.4	90% soil, 5% roots, 2% pebbles, 3% daub	7.5 yr 3/2 dark brown	silty clay	0.148
355R/2	006-patio/4d	TC	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	2	6		7.5 yr 3/2 dark brown	silty clay 95% soil, 3% roots, 2%	0.12

											pebbles	
355R/3	006-patio/4d	LCI-II	habitation debris - domestic (secondary)	mixed (carbon feature)	cultural	0.85	1.2	1.6	98% soil, 2% roots	7.5 yr 3/2 dark brown	silty clay	0.01632
355R/4	006-patio/7	NA	carbon feature - domestic (defacto)		cultural	0.33	0.77	10.4	undetermined	7.5 yr 4/3 brown	silty clay	0.026426
355R/5	006-patio/7	NA	carbon feature - domestic (defacto)		cultural	0.5	1	9.6	no matrix removed	no matrix removed	no matrix removed	0.048
355R/6	006-patio/6	NA	daub feature - domestic (defacto)		cultural	0.1	0.36	9.8	undetermined	7.5 yr 4/3 brown	undetermined	0.003528
355S/1	006-1/1	LC	humus - domestic (secondary)		arbitrary (10)	1	2	12.8	97% soil, 2% pebbles, 1% roots	7.5 yr 4/2 brown	silty clay	0.256
355S/2	006-1/1	LCII-III	humus - domestic (secondary)		natural	1	1	10	95% soil, 3% roots, 2% pebbles	7.5 yr 4/3 brown	silty clay	0.1
355S/3	006-1/3	LC	fall - domestic (secondary)		cultural	1	1	10.8	95% soil, 5% pebbles	7.5 yr 4/4 brown	silty clay	0.108
355S/4	006-1/8d	EC-TC	habitation debris - domestic (secondary)		arbitrary (10)	1	1	11.2	90% soil, 8% pebbles, 2% roots	7.5 yr 4/4 brown	silty clay	0.112
355S/5	006-1/8d	GP-LC	habitation debris - domestic (secondary)		arbitrary (10)	1	1	6.4	95% soil, 3% pebbles, 2% roots	7.5 yr 4/4 brown	silty clay	0.064
355S/6	006-1/10b	NA	soil horizon - sterile		arbitrary (5)	1	1	4.4	100% soil	10 yr 5/6 yellowish brown	silty clay	0.044
356A/1	004-1/1e	EC-TC	humus - domestic (secondary)		arbitrary (10)	2	2	7.8	3% roots, 2% pebbles, 1% cobbles, 94% soil	7.5 yr 4/3 brown	silty clay loam	0.312
356A/2	004-1/1e	EC-TC	humus - domestic (secondary)		natural	2	2	4	2% roots, 5% pebbles/cobbles, 93% soil	7.5 yr 4/3 brown	silty clay loam	0.16
356A/3	004-1/4e	MP-TC	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	9.6	3% roots, 4% cobbles, 91% soil, 2% pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.384
356B/1	004-1/1e	LCII	humus - domestic (secondary)		arbitrary (10)	2	2	6	3% roots, 2% pebbles, 1% cobbles, 94% soil	7/5 yr 3/3 dark brown	silty clay loam	0.24
356B/2	004-1/1e	TC	humus - domestic (secondary)		natural	2	2	7	2% roots, 5% pebbles/cobbles, 93% soil	7.5 yr 3/3 dark brown	silty clay loam	0.28
356B/3	004-1/4e	EC-TC	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	3.6	83% soil, 10% cobbles, 5% roots, 2% pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.144
356C/1	004-1/1a	PP-LCII	humus - domestic (secondary)		arbitrary (10)	2	2	9.8	3% roots, 95% soil, 1% pebbles, 1% cobbles	7.5 yr 3/2 dark brown	silty clay loam	0.392
356C/2	004-1/1a	LCII	humus - domestic (secondary)		natural	2	2	7.6	85% soil, 8% roots, 3% pebbles, 4% cobbles	7.5 yr 3/2 dark brown	silty clay loam	0.304
356C/3	004-1/4a	EC-LCI	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	1.6	5% roots, 85% soil, 10% cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.064
356C/4	004-1/12	EC-LCII	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	9.8	77% soil, 3% pebbles, 10% roots, 10% cobbles	10 yr 3/4 dark yellowish brown	silty clay loam	0.392

356D/1	004-1/1a	EC-LCII	humus - domestic (secondary)		arbitrary (10)	2	2	2.8	10% small roots, 5% cobbles, 20% pebbles, 60% soil, 5% large roots	7.5 yr 3/3 dark brown	silty clay loam	0.112
356D/2	004-1/1a	EC-LCII	humus - domestic (secondary)		natural	2	2	9	5% small roots, 5% cobbles, 10% pebbles, 80% soil	10 yr 4/3 brown	sandy clay loam	0.36
356D/3	004-1/4a	LCI	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	0.79	2	11.4	75% soil, 25% cobbles/roots	7/5 yr 4/4 brown	silty loam	0.18012
356D/4	004-1/4a	MP-LCII	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	8.6	31% soil, 5% large roots, 14% medium/fine roots, 35% small cobbles, 15% cobbles/boulders	10 yr 4/4 dark yellowish brown	silty clay loam	0.344
356E/1	004-1/1a	LC	humus - domestic (secondary)		arbitrary (10)	2	2	8.4	5% small roots, 95% soil	7.5 yr 4/4 brown	silty clay loam	0.336
356E/2	004-1/1a	LCI-II	humus - domestic (secondary)		natural	2	2	11.2	96% soil, 2% roots, 2% pebbles	10 yr 3/4 dark yellowish brown	silty clay	0.448
356E/3	004-1/4a	EC-LCI	colluvium - domestic (secondary)		arbitrary (5)	2	2	7.4	60% soil, 35% cobbles, 5% roots	7.5 yr 4/4 brown	silty clay loam	0.296
356E/4	004-1/4a	EC-TC	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	1.33	2	9.4	5% roots, 15% cobbles, 80% soil	7.5 yr 4/3 brown	silty clay loam	0.25004
356F/1	004-1/1a	EC-LCII	humus - domestic (secondary)		natural	2	2	9.8	3% roots, 1% pebbles, 1% cobbles, 95% soil	7.5 yr 3/3 dark brown	silty clay loam	0.392
356F/2	004-1/4a	EC-LCII	colluvium - domestic (secondary)		cultural	2	2	2	20% cobbles, 5% boulder, 75% soil	7.5 yr 4/2 brown	silty clay loam	0.08
356F/3	004-1/13	MP-TC	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	3	55% cobble, 10% root, 35% soil	7.5 yr 4/5 brown	silty clay loam	0.12
356F/4	004-1/13	MP-TC	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	8	40% cobble, 15% pebbles, 40% soil, 5% roots	7.5 yr 4/3 brown	silty clay loam	0.32
356G/1	004-1/1c	LCI-III	humus - domestic (secondary)		natural	2	2	11.6	3% roots, 1% pebbles, 1% cobbles, 95% soil	7.5 yr 3/3 dark brown	silty clay loam	0.464
356G/2	004-1/4c	LCI-III	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	2	2	1.6	50% cobbles, 15% roots, 35% soil	7.5 yr 4/2 brown	silty clay loam	0.064
356G/3	004-1/11	LCI-III	habitation debris - domestic (secondary)	mixed (fill)	cultural	2	2	1.2	10% cobble, 90% soil	7.5 yr 4/2 brown	silty clay loam	0.048
356H/1	004-1/1d	ND	humus - domestic (secondary)		arbitrary (10)	1	2	5.4	3% roots, 3% pebbles, 94% soil	10 yr 3/4 dark yellowish brown	silty clay loam	0.108
356H/2	004-1/1d	ND	humus - domestic (secondary)		arbitrary (10)	1	2	4	90% soil, 10% roots	10 yr 3/4 dark yellowish brown	silty clay loam	0.08
356H/3	004-1/1d	LCI	humus - domestic (secondary)		arbitrary (10)	1	1	4	95% soil, 5% cobbles	10 yr 3/4 dark yellowish brown	silty clay loam	0.04
356H/4	004-1/1d	EC-LCII	humus - domestic (secondary)		arbitrary (10)	1	1	6	85% soil, 15% cobbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.06

356H/5	004-1/1d	LCI-II	humus - domestic (secondary)		natural	0.42	1	20.4	95% soil, 3% roots, 2% cobbles	10 yr 3/4 dark yellowish brown	silty clay loam	0.08568
356H/6	004-1/4d	EC-LC	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	1	1.39	17.8	90% soil, 6% cobble, 4% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.24742
356H/7	004-1/13	TC	habitation debris - domestic (secondary)	mixed (fill)	arbitrary (10)	0.6	1	17	10% cobbles, 75% soil, 8% fine roots, 7% large roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.102
356H/8	004-1/6	LCI-III	unknown/construction fill with rubble - domestic (secondary)		arbitrary (10)	1	2	5.2	80% soil, 10% cobbles, 1% roots	10 yr 4/4 dark yellowish brown	silty clay loam	0.104
356I/1	004-1/1a	EC-LCI	humus - domestic (secondary)		natural	1	2	3.8	8% roots, 91% soil 1% pebbles	10 yr 4/3 dark yellowish brown	silty clay loam	0.076
356I/2	004-1/4a	LCI-III	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	1	2	12	3% roots, 5% cobbles, 91% soil, 1% pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.24
356J/1	004-1/1a	LCII	humus - domestic (secondary)		natural	1	2	5	3% roots, 2% cobbles, 94% soil, 1% pebbles	10 yr 3/4 dark yellowish brown	silty clay loam	0.1
356J/2	004-1/4a	LCII	colluvium - domestic (secondary)		cultural	1	2	6	4% roots, 8% cobbles, 88% soil	10 yr 3/3 yellow brown	silty clay loam	0.12
356J/3	004-1/10	EC-LCII	habitation debris - domestic (secondary)	mixed (colluvium)	arbitrary (5)	1	2	3.4	30% cobbles, 1% roots, 69% soil	10 yr 4/4 yellow brown	silty clay loam	0.068
356J/4	004-1/10	NA	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	2	3.4	15% roots, 10% cobbles, 83% soil, 2% pebbles	10 yr 4/4 dark yellowish brown	silty clay loam	0.068
356K/1	004-1/1b	EC-TC	humus - domestic (secondary)		natural	1	2	5.8	5% cobbles, 5% pebbles, 10% roots, 80% soil	7.5 yr 3/3 dark brown	silty clay loam	0.116
356K/2	004-1/1b	EC-LCII	humus - domestic (secondary)		natural	1	2	7.2	10% pebbles, 10% cobbles, 5% roots, 75% soil	7.5 yr 3/3 dark brown	silty clay loam	0.144
356K/3	004-1/4b	LCI-III	colluvium - domestic (secondary)	mixed (habitation debris)	cultural	1	2	2.4	10% roots, 45% cobbles, 45% soil	10 yr 4/4 yellow brown	silty clay loam	0.048
356K/4	004-1/10	MP-TC	habitation debris - domestic (secondary)		arbitrary (10)	1	1.5	11.4	15% root, 45% cobbles, 45% soil	7.5 yr 3/4 dark brown	silty clay loam	0.171
356L/1	004-1/1e	LC	humus - domestic (secondary)		natural	1	2	8.8	3% roots, 3% pebbles, 94% soil	10 yr 3/4 dark yellowish brown	silty clay loam	0.176
356L/2	004-1/4e	ND	colluvium - domestic (secondary)		cultural	1	2	1.2	3% roots, 3% pebbles, 93% soil, 1% cobbles	10 yr 3/4 dark yellowish brown	silty clay loam	0.024
356L/3	004-1/14	LCI-II	habitation debris - domestic (secondary)	mixed (colluvium)	cultural	1	2	1.6	93% soil, 2% roots, 3% cobbles, 2% pebbles	10 yr 4/3 dark yellowish brown	silty clay loam	0.032
356M/1	004-1/2	EC-LCII	plough zone - domestic (secondary)	mixed (various)	arbitrary (15)	1	1	11.4	50% small cobbles, 10% large cobbles, 40% soil	10 yr 4/3 brown	sandy clay loam	0.114
356M/2	004-1/2	LCII	plough zone - domestic (secondary)	mixed (various)	arbitrary (10)	1	1	10.4	undetermined	10 yr 4/3 brown	sandy clay loam	0.104

356M/3	004-1/8	LC	construction fill with rubble - domestic (secondary)		arbitrary (10)	1	1	9.4	10% large cobbles, 40% cobbles/pebbles, 20% other, 30% soil	10 yr 4/4 dark yellowish brown	sandy clay	0.094
356M/4	004-1/8	LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	1	1	9.6	undetermined	10 yr 4/4 dark yellowish brown	sandy clay	0.096
356M/5	004-1/8	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	1	1	7.8	50% small cobbles, 50% soil	10 yr 5/3 yellowish brown	sandy clay	0.078
356M/6	004-1/8	NA	construction fill with rubble - domestic (secondary)		cultural	1	1	0.6	undetermined	10 yr 5/3 yellowish brown	sandy clay	0.006
356M/7	004-1/9	MP-LC	construction fill without rubble - domestic (secondary)		arbitrary (5)	1	1	1.8	5% cobbles, 20% pebbles, 75% soil	10 yr 5/6 yellowish brown	sandy clay	0.018
356M/8	004-1/9	ND	construction fill without rubble - domestic (secondary)		cultural	1	1	7.2	2% small cobbles, 2% large cobbles, 96% soil	10 yr 5/8 yellowish brown	clay	0.072
356M/9	004-1/15	MP-EC	habitation debris - domestic (secondary)	mixed (fill, buried 'a')	cultural	1	1	7.6	undetermined	10 yr 5/8 yellowish brown	clay	0.076
356M/10	004-1/17	EC	soil horizon - unknown lens		arbitrary (10)	1	1	10	2% roots, 5% pebbles, 93% soil	10 yr 4/2 dark grayish brown	clay	0.1
356M/11	004-1/17	ND	soil horizon - unknown lens		arbitrary (20)	1	1	16.2	99% soil, 1% pebbles	10 yr 4/3 dark grayish brown	silty clay	0.162
356M/12	004-1/17	ND	soil horizon - unknown lens		natural	1	1	17	99% soil, 1% pebbles	10 yr 4/3 dark grayish brown	silty clay	0.17
356M/13	004-1/18	MP	soil horizon		arbitrary (20)	1	1	17.4	100% soil	10 yr 4/2 dark grayish brown	silty clay	0.174
356M/14	004-1/18	NA	soil horizon		natural	1	1	14.2	100% soil	10 yr 4/2 dark grayish brown; 10 yr 5/4 yellowish brown	silty clay	0.142
356M/15	004-1/19	NA	soil horizon - sterile		arbitrary (20)	1	1	20	marl speckles; 100% soil	10 yr 5/4 yellowish brown	clay	0.2
356M/16	004-1/9	ND	construction fill without rubble - domestic (secondary)		cultural	0.5	0.5	5	undetermined	10 yr 4/4 dark brown	silty clay	0.0125
356N/1	004-1/2	EC-LCII	plough zone - domestic (secondary)	mixed (various)	arbitrary (20)	1	1	18.4	60% small cobbles, 15% other, 25% soil	10 yr 3/3 dark brown	sandy clay	0.184
356N/2	004-1/2	ND	plough zone - domestic (secondary)	mixed (various)	cultural	1	1	3.2	undetermined	10 yr 4/4 dark yellowish brown	sandy clay	0.032
356O/1	004-1/2	LCI	plough zone - domestic (secondary)	mixed (various)	cultural	1	1	13.8	25% cobbles, 26% other, 49% soil	10 yr 3/3 dark brown	sandy clay	0.138
356O/2	004-1/8	LC	construction fill with rubble - domestic (secondary)		cultural	1	1	5.2	15% pebbles, 5% cobbles, 10% boulders, 5% ceramics, 65% soil	10 yr 3/3 dark brown	sandy clay	0.052

356O/3	004-1/8	LC	construction fill with rubble - domestic (secondary)		cultural	1	1	2.2	5% boulders, 25% cobbles, 70% soil	10 yr 4/4 dark yellowish brown	sandy clay	0.022
356O/4	004-1/8	LCI	construction fill with rubble - domestic (secondary)		cultural	1	1	12.2	1% root, 10% cobbles, 30% boulders, 59% soil	10 yr 3/3 dark brown	sandy clay	0.122
356P/1	004-1/2	EC-LCI	plough zone - domestic (secondary)	mixed (various)	arbitrary (10)	1	1	9.2	40% cobbles, 60% soil	10 yr 3/3 dark brown	sandy clay	0.092
356P/2	004-1/2	ND	plough zone - domestic (secondary)	mixed (various)	cultural	1	1	1.6	30% cobbles, 70% soil	10 yr 3/3 dark brown	sandy clay	0.016
356P/3	004-1/8	LC	construction fill with rubble - domestic (secondary)		cultural	1	1	4.2	15% cobbles, 15% boulders, 70% soil	10 yr 4/4 dark yellowish brown	sandy clay	0.042
356P/4	004-1/8	LCI-II	construction fill with rubble - domestic (secondary)		cultural	1	1	4.2	20% boulders, 15% cobbles, 65% soil	10 yr 4/4 dark yellowish brown	sandy clay	0.042
356Q/1	004-1/2	EC-TC	plough zone - domestic (secondary)	mixed (various)	cultural	1	1	25	30% cobbles, 20% other, 5% boulders, 45% soil	10 yr 3/3 dark brown	sandy clay	0.25
356Q/2	004-1/8	LCI	construction fill with rubble - domestic (secondary)		cultural	0.5	1	10.4	15% cobbles, 25% other, 1% boulders, 35% eroded limestone	10 yr yellowish brown	sandy clay	0.052
356R/1	004-1/2	EC-TC	plough zone - domestic (secondary)	mixed (various)	cultural	1	1	20.8	40% cobbles, 5% boulders, 55% soil	10 yr 3/3 dark brown	sandy clay	0.208
356R/2	004-1/2	LC	plough zone - domestic (secondary)	mixed (various)	cultural	1	1	6.6	40% cobbles, 5% boulders, 55% soil	10 yr 3/3 dark brown	sandy clay	0.066
356R/3	004-1/8	LCI-II	construction fill with rubble - domestic (secondary)		arbitrary (10)	1	1	6	40% cobbles, 20% other, 30% soil	10 yr 3/3 dark brown	sandy clay	0.06
356R/4	004-1/8	LCI	construction fill with rubble - domestic (secondary)		cultural	1	1	6	25% cobbles, 20% boulders, 55% soil	10 yr 4/4 dark yellowish brown	sandy clay	0.06
356R/5	004-1/9	EC-LCI	construction fill without rubble - domestic (secondary)		arbitrary (10)	1	1	13.2	15% cobbles, 10% boulders, 75% soil	10 yr 4/4 dark yellowish brown	sandy clay	0.132
356R/6	004-1/9	LCI	construction fill without rubble - domestic (secondary)		cultural	1	1	4.8	15% small cobbles, 1% large cobbles, 84% soil	10 yr 4/4 dark yellowish brown	sandy clay	0.048
356R/7	004-1/9	EC-LC	construction fill without rubble - domestic (secondary)		arbitrary (10)	1	1	7.4	15% small cobbles, 1% large cobbles, 2% boulders, 82% soil	10 yr 5/6 yellowish brown	clay	0.074
356R/8	004-1/9	LC	construction fill without rubble - domestic (secondary)	mixed (buried 'a')	cultural	1	1	1.6	2% roots, 1% small cobbles, 97% soil	10 yr 5/6 yellowish brown	clay	0.016
357A/1	160-1/1	LCI-III	surface collection/midden - domestic (secondary)		natural/ cultural	1	1	0	surface collection only	surface collection only	surface collection only	0
357A/2	160-1/2	LCI-III	midden - domestic (secondary)		arbitrary (10)	1	1	10.4	30% ceramics, 70% soil	7/5 yr 4/4	loamy sand	0.104

357A/3	160-1/2	LCII	midden - domestic (secondary)		arbitrary (5)	1	1	7.6	2% cobbles, 10% ceramics, 78% soil	7/5 yr 4/6 strong brown	loamy sand	0.076
357A/4	160-1/2	LCII	midden - domestic (secondary)		arbitrary (5)	1	1	6.2	5% ceramic, 95% soil	7.5 yr 4/6 strong brown	loamy sand	0.062
357A/5	160-1/2	LCII	midden - domestic (secondary)		arbitrary (5)	1	1	4.2	10% ceramic, 2% cobbles, 88% soil	10 yr 4/6 dark yellowish brown	loamy sand	0.042
357A/6	160-1/2	LCI-II	midden - domestic (secondary)		arbitrary (5)	1	1	4.6	30% ceramics, 1% cobbles, 69% soil	10 yr 4/6 dark yellowish brown	loamy sand	0.046
357A/7	160-1/3	LCI-III	midden - domestic (secondary)		arbitrary (5)	1	1	3.8	1% cobbles, 35% ceramics, 64% soil	10 yr 5/8 yellowish brown	silty clay	0.038
357A/8	160-1/3	LCII-III	midden - domestic (secondary)		arbitrary (5)	1	1	5.8	20% ceramics, 1% cobbles, 89% soil	10 yr 5/8 yellowish brown	silty clay	0.058
357A/9	160-1/4	LCII	midden - domestic (secondary)	mixed (buried ‘a’)	arbitrary (10)	1	1	10.2	5% ceramic, 95% soil	10 yr 5/8 yellowish brown	silty clay	0.102
357A/10	160-1/4	TC	midden - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	10.4	0.5% cobbles, 99.5% soil	10 yr 5/8 yellowish brown	silty clay	0.104
357A/11	160-1/4	LC	midden - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	10.6	1% cobbles, 1% ceramics, 98% soil	10 yr 5/6 yellowish brown	silty clay	0.106
357A/12	160-1/4	ND	midden - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	1	1	10.8	0.5% cobbles. 99.5% soil	10 yr 5/8 yellowish brown	silty clay	0.108
357A/13	160-1/5	NA	soil horizon - sterile		arbitrary (10)	1	1	10.2	100% soil	10 yr 5/8 yellowish brown	silty clay	0.102
357A/14	160-1/5	NA	soil horizon - sterile		arbitrary (10)	1	1	10.8	100% soil	10 yr 5/8 yellowish brown	silty clay	0.108
357B/1	160-1/1	LCI-III	surface collection/midden - domestic (secondary)		natural/ cultural	3.8		0	surface collection only	surface collection only	surface collection only	0
358A/1	060-1/1c	LC	humus - domestic (secondary)		natural	1	2	4	30% roots, 10% small cobbles, 60% soil	10 yr 3/4 dark yellowish brown	loamy sand	0.08
358B/1	060-1/1b	LC	humus - domestic (secondary)		natural	1	2	6.8	20% cobbles, 30% other, 50% soil	10 yr 4/3 brown	clay loam	0.136
358C/1	060-1/1b	LCI	humus - domestic (secondary)		natural	1	2	2.2	30% roots, 10% small cobbles, 60% soil	10 yr 3/4 dark yellowish brown	loamy sand	0.044
358C/2	060-1/4	EC-LCII	construction fill with rubble - domestic (secondary)		arbitrary (10)	1	1	7.2	39% soil, 50% cobbles, 10% other, 1% roots	10 yr 4/3 brown	sandy clay loam	0.072
358C/3	060-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	1	1	5.4	50% cobbles, 40% soil, 10% other	10 yr 4/3 brown	silty clay loam	0.054
358C/4	060-1/4	MP-LCI	construction fill with rubble - domestic (secondary)		cultural	1	1	22.8	50% soil, 20% other, 30% cobbles	10 yr 5/4 yellowish brown	clay loam	0.228
358C/5	060-1/8	LCI	horizontal debris unknown surface/fill - domestic (secondary)		cultural	1	1	0	100% ceramics	10 yr 5/4 yellowish brown	clay loam	0
358C/6	060-1/5	LCI	construction fill with rubble - domestic		cultural	1	1	1.2	60% soil, 30% cobbles, 10% other	10 yr 5/4 yellowish brown	clay loam	0.012

			(secondary)										
358C/7	060-1/9	LCI	horizontal debris unknown surface/fill - domestic (secondary)		cultural	1	1	0	100% ceramics	undetermined	undetermined	0
358C/8	060-1/6	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	1	1	3.4	60% soil, 30% cobbles	10 yr 5/4 yellowish brown	clay loam	0.034
358C/9	060-1/10	EC-LCI	on floor material - domestic (secondary)		cultural	1	1	4.2	100% ceramics	undetermined	undetermined	0.042
358C/10	060-1/7	MP, LCI, TC	construction fill without rubble - domestic (secondary)		cultural	1	1	8.4	80% soil, 10% cobbles, 10% other	10 yr 5/4 yellowish brown	clay loam	0.084
358C/11	060-1/7	LCI, TC	backing masonry - domestic (secondary)		arbitrary (10)	0.25	1	13.6	80% soil, 10% cobble, 10% ceramic	10 yr 5/4 yellowish brown	clay loam	0.034
358C/12	060-1/7	EC	construction fill without rubble - domestic (secondary)		arbitrary (10)	0.37	1	13.4	80% soil, 10% cobble, 10% ceramic	10 yr 5/4 yellowish brown	clay loam	0.04958
358C/13	060-1/7	EC-LCI	construction fill without rubble - domestic (secondary)		cultural	0.37	1	6.6	80% soil, 10% cobble, 10% ceramic	10 yr 5/4 yellowish brown	clay loam	0.02442
358C/14	060-1/11	EC-LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	cultural	0.37	1	0	undetermined	10 yr 4/5 yellowish brown	undetermined	0
358C/15	060-1/11	LCI-II, TC	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.37	1	2.6	100% soil	10 yr 4/5 yellowish brown	silty clay	0.00962
358C/16	060-1/11	EC-LCI	habitation debris - domestic (secondary)	mixed (buried 'a')	arbitrary (10)	0.37	1	14.2	100% soil	10 yr 4/5 yellowish brown	silty clay	0.05254
358D/1	060-1/1b	ND	humus - domestic (secondary)		natural	1	2	5	20% roots, 30% cobbles, 50% soil	10 yr 3/4 dark yellowish brown	sandy loam	0.1
358D/2	060-1/3	EC-LCII	fall - domestic (secondary)		arbitrary (3)	1	2	2.8	50% cobbles, 30% soil, 20% other	10 yr 3/4 dark yellowish brown	sandy loam	0.056
358D/3	060-1/4	EC-LCII	construction fill with rubble - domestic (secondary)		arbitrary (5)	1	1.13	2.6	30% cobbles, 30% soil, 40% other	10 yr 3/4 dark yellowish brown	silty clay loam	0.02938
358D/4	060-1/4	LCI	construction fill with rubble - domestic (secondary)		arbitrary (5)	1	1.13	6	30% cobbles, 50% other, 30% soil	10 yr 3/4 dark yellowish brown	silty clay loam	0.0678
358D/5	060-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (5)	1	1.13	5	20% cobbles, 20% other, 60% soil	10 yr 3/4 dark yellowish brown	silty clay loam	0.0565
358D/6	060-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	0.87	1	11.4	95% soil, 3% cobbles, 2% other	10 yr 5/4 brown	clay loam	0.09918
358D/7	060-1/4	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	1	1.04	9.6	95% soil, 3% cobbles, 2% other	10 yr 5/4 brown	clay loam	0.09984

358D/8	060-1/8	EC-LCI	habitation debris - domestic (secondary)		cultural	0.96	1	0	undetermined	undetermined	undetermined	0
358E/1	060-patio/1a	ND	humus - domestic (secondary)		natural	1	2	8.2	20% small roots, 80% soil, 10% other	10 yr 5/4 yellowish brown	silty clay loam	0.164
358E/2	060-patio/2	LCI	colluvium - domestic (secondary)	mixed (fill)	arbitrary (5)	1	1.51	3	60% cobbles, 30% soil, 10% other	10 yr 5/4 yellowish brown	silty clay loam	0.0453
358E/3	060-patio/2	NA	colluvium - domestic (secondary)	mixed (fill)	arbitrary (3)	1	1.51	3.2	3% other, 3% cobbles, 94% soil	10 yr 5/4 yellowish brown	silty clay loam	0.04832
358F/1	060-patio/1b	EC-LCI	humus - domestic (secondary)		natural	1	2	7.8	80% soil, 20% small cobbles	10 yr 3/4 dark yellowish brown	loamy sand	0.156
358F/2	060-patio/3a	LC	construction fill with rubble - domestic (secondary)		cultural	1	1	2.8	75% soil, 5% other, 20% cobbles	10 yr 5/4 yellowish brown	clay loam	0.028
358F/3	060-patio/4	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	1	1	8	70% soil, 10% other, 20% cobbles	10 yr 5/4 yellowish brown	clay loam	0.08
358F/4	060-patio/6b	LCI	soil horizon - buried 'a'	mixed (fill)	cultural	1	1	3.4	90% soil, 6% other, 4% cobbles	10 yr 5/4 yellowish brown	clay loam	0.034
358F/5	060-patio/4	EC	construction fill with rubble - domestic (secondary)		cultural	1	1	3.6	1% other, 96% soil, 3% cobbles	10 yr 5/4 yellowish brown	clay loam	0.036
358F/6	060-patio/6b	EC-LC	soil horizon - buried 'a'	mixed (fill)	cultural	1	1	7.2	99% soil, 1% other	10 yr 5/6 yellowish brown	clay loam	0.072
358F/7	060-patio/6b	ND	soil horizon - buried 'a'		arbitrary (5)	1	1	6.6	100% soil	10 yr 5/4 yellowish brown	clay loam	0.066
358F/8	060-patio/6b	ND	soil horizon - buried 'a'		arbitrary (10)	0.53	0.93	12.2	99% soil, 1% other	10 yr 5/4 yellowish brown	silty loam	0.06
358F/9	060-patio/5	NA	carbon feature - domestic (defacto)		cultural	0.13	0.3	10.4	undetermined	10 yr 5/4 yellowish brown	silty loam	0.003744
358F/10	060-patio/6b	ND	soil horizon - buried 'a'		arbitrary (10)	0.53	0.93	10	100% soil	10 yr 5/4 yellowish brown	silty loam	0.04929
358G/1	060-3/1a	LC	humus - domestic (secondary)		natural	1	2	7.4	80% soil, 20% small cobbles	10 yr 4/5 brown	clay loam	0.148
358G/2	060-3/2a	EC-LC	colluvium - domestic (secondary)		arbitrary (5)	0.5	1.2	4.8	90% soil, 5% cobble, 5% other	10 yr 4/5 brown	clay loam	0.0288
358G/3	060-3/3	EC-LCII	construction fill with rubble - domestic (secondary)		cultural	1	1.2	4.8	85% soil, 6% cobbles, 9% other	10 yr 4/3 brown	silty clay	0.0576
358G/4	060-3/4	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.9	1	8.2	40% cobbles, 10% other, 50% soil	10 yr 4/5 brown	clay loam	0.0738
358H/1	060-3/1b	EC	humus - domestic (secondary)		natural	1	2	7	20% cobbles, 10% roots, 70% soil	2/5 y 5/3 light olive brown	silty loam	0.14
358H/2	060-3/2b	EC-LCI	colluvium - domestic (secondary)		cultural	1	1.2	4.2	30% other, 20% cobbles, 50% soil	2.5 y 5/4 light olive brown	silty clay loam	0.0504
358H/3	060-3/2b	EC-LCI	colluvium - domestic (secondary)	mixed (fill)	cultural	0.8	1	1.8	10% other, 20% cobbles, 70% soil	2.5 y 5/4 light olive brown	silty clay loam	0.0144

358H/4	060-3/6	ND	pit fill - domestic (secondary)		cultural	0.3	0.61	14.6	97% soil, 2% other, 1% cobbles	10 yr 5/4 brown	clay loam	0.026718
358H/5	060-3/5	LCI	construction fill with rubble - domestic (secondary)	mixed (pit fill)	arbitrary (5)	0.3	0.61	5	40% cobbles, 10% other, 50% soil	10 yr 5/4 brown	clay loam	0.00915
358H/6	060-3/5	ND	construction fill with rubble - domestic (secondary)	mixed (pit fill)	arbitrary (5)	0.3	0.61	5.8	40% cobbles, 10% other, 50% soil	10 yr 5/4 brown	clay loam	0.010614
358H/7	060-3/7	EC-LCI	habitation debris - domestic (secondary)	mixed (fill)	cultural	1	1.8	0	no matrix removed	no matrix removed	no matrix removed	0
358I/1	060-1/1c	LCI-II	humus - domestic (secondary)		natural	1	2	6.4	30% roots, 10% small cobbles, 60% soil	10 yr 3/4 dark yellowish brown	loamy sand	0.128
358I/2	060-1/3	LCI-II	fall - domestic (secondary)		arbitrary (10)	1	2	8	50% cobbles, 30% soil, 20% other	10 yr 4/3 brown	clay loam	0.16
358J/1	060-patio/1b	LC	humus - domestic (secondary)		natural	1	2	7	90% soil, 5% other, 3% roots	2.5 y 5/3 light olive brown	clay loam	0.14
358J/2	060-patio/3b	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	0.5	2	16.2	85% soil, 10% cobbles, 5% other	10 yr 5/4 brown	clay loam	0.162
358K/1	060-patio/1b	ND	humus - domestic (secondary)		natural	1	2	6.4	90% soil, 5% roots, 5% other	2.5 y 5/3 light olive brown	clay loam	0.128
358K/2	060-patio/3b	EC-LCII	construction fill with rubble - domestic (secondary)		cultural	0.5	2	14	85% soil, 10% cobbles, 5% other	10 yr 5/4 brown	clay loam	0.14
358K/3	060-patio/3b	LCI	construction fill with rubble - domestic (secondary)		cultural	0.5	1	7.8	85% soil, 10% cobbles, 5% other	10 yr 5/4 brown	clay loam	0.039
358L/1	060-patio/1c	EC	humus - domestic (secondary)		natural	1	2	9.6	97% soil, 1% roots, 2% other	10 yr 3/3 brown	silty clay loam	0.192
358L/2	060-patio/3c	LCI	construction fill with rubble - domestic (secondary)		cultural	0.5	0.5	8.8	90% soil, 5% other, 5% cobbles	10 yr 5/4 brown	clay loam	0.022
358M/1	060-3/1b	LCI-II	humus - domestic (secondary)		natural	2	2	6.6	95%b soil, 3% cobbles, 2% other	10 yr 5/3 brown	silty clay loam	0.264
358M/2	060-3/2b	EC-LCI	colluvium - domestic (secondary)		cultural	0.73	2	5.4	95% soil, 3% other, 2% cobbles	10 yr 5/3 brown	silty clay loam	0.07884
358M/3	060-3/2b	EC-LCI	colluvium - domestic (secondary)		cultural	0.5	1.3	8.2	95% soil, 3% other, 2% cobbles	10 yr 5/3 brown	silty clay loam	0.0533
358N/1	060-patio/1c	ND	humus - domestic (secondary)		natural	1	2	13.2	97% soil, 2% other, 1% roots	10 yr 5/3 brown	silty clay loam	0.264
358O/1	060-2/1	EC-LCI	humus - domestic (secondary)		natural	1	2	9	97% soil, 2% other, 1% roots	10 yr 5/3 brown	silty clay loam	0.18
358P/1	060-2/1	LCI	humus - domestic (secondary)		natural	1	2	9.4	97% soil, 2% other, 1% roots	10 yr 5/3 brown	silty clay loam	0.188
358P/2	060-2/3	EC	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.5	2	3.6	40% cobbles, 10% other, 50% soil	10 yr 4/5 brown	clay loam	0.036

358Q/1	060-1/1c	LCI-II	humus - domestic (secondary)		natural	2	2	5.6	95% soil, 1% cobbles, 1% roots, 3% other	10 yr 5/3 brown	clay loam	0.224
358Q/2	060-1/3	EC-LCII	fall - domestic (secondary)	mixed (fill)	arbitrary (10)	2	2	2.6	94% soil, 3% cobbles, 3% other	10 yr 4/5 brown	clay loam	0.104
358R/1	060-3/1b	LCI	humus - domestic (secondary)		natural	1	2	6	93% soil, 5% other, 2% roots, 1% cobbles	10 yr 5/4 yellowish brown	silty clay loam	0.12
358S/1	060-2/1	ND	humus - domestic (secondary)		natural	1	2	9	97% soil, 2% other, 1% roots	10 yr 5/3 brown	silty clay loam	0.18
358S/2	060-2/2	ND	colluvium - domestic (secondary)	mixed (fill)	arbitrary (5)	1	2	3	96% soil, 2% cobbles, 2% other	10 yr 5/3 brown	clay loam	0.06
358S/3	060-2/2	EC-LCI	colluvium - domestic (secondary)	mixed (fill)	cultural	1	2	8	96% soil, 2% cobbles, 2% other	10 yr 4/5 brown	clay loam	0.16
358T/1	060-patio/1c	LC	humus - domestic (secondary)		natural	1	2	10.6	96% soil, 2% cobbles, 25 other	10 yr 5/4 brown	clay loam	0.212
358U/1	060-1/1b	ND	humus - domestic (secondary)		natural	1	1	2	96% soil, 1% cobbles, 1% roots, 2% other	10 yr 4/5 brown	clay loam	0.02
358V/1	060-1/1a	LCI	humus - domestic (secondary)		natural	1	2	4.4	1% cobbles, 1% roots, 2% other, 96% soil	10 yr 4/5 brown	clay loam	0.088
358W/1	060-1/1a	LCI	humus - domestic (secondary)		natural	1	2	6.8	1% cobbles, 96% soil, 1% roots, 2% other	10 yr 4/5 brown	clay loam	0.136
358X/1	060-3/1b	LCI	humus - domestic (secondary)		natural	1	2	9.6	97% soil, 2% cobbles, 1% other	10 yr 5/4 brown	clay loam	0.192
358X/2	060-3/2b	EC-LCII	colluvium - domestic (secondary)	mixed (fill)	cultural	1	2	3.4	90% soil, 1% roots, 2% other, 7% cobbles	10 yr 5/4 yellowish brown	clay loam	0.068
358Y/1	060-1/1a	LC	humus - domestic (secondary)		natural	1	2	5.6	1% cobbles, 96% soil, 1% roots, 2% other	10 yr 5/4 brown	clay loam	0.112
358Z/1	060-1/1b	NA	humus - domestic (secondary)		natural	2	2	6.4	95% soil, 3% cobbles, 1% roots, 1% other	10 yr 4/5 brown	clay loam	0.256
358AA/1	060-1/1a	LCI	humus - domestic (secondary)		natural	2	2	5	2% roots, 3% cobble, 2% other, 93% soil	10 yr 4/5 brown	clay loam	0.2
358AB/1	060-3/1a	ND	humus - domestic (secondary)		natural	1	1	3.6	2% roots, 3% cobble, 2% other, 93% soil	10 yr 5/4 brown	clay loam	0.036
358AB/2	060-3/3	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	1	1	7.2	45% soil, 46% cobbles, 9% other	10 yr 4/3	silty clay loam	0.072
358AB/3	060-3/4	EC-LCI	construction fill with rubble - domestic (secondary)		arbitrary (10)	0.5	1	10.2	45% soil, 46% cobbles, 9% other	10 yr 4/3	silty clay loam	0.051
358AB/4	060-3/4	EC-LCI	construction fill with rubble - domestic (secondary)		cultural	0.5	1	7.2	45% soil, 46% cobbles, 9% other	10 yr 4/3	silty clay loam	0.036
358AB/5	060-3/8	EC	soil horizon - buried 'a'		arbitrary (20)	0.5	1	16.4	100% soil	10 yr 5/4 yellowish brown	silty clay	0.082
359A/1	077-1/1a	LCII	humus - domestic (secondary)		natural	1	2	12.8	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.256

359A/2	077-1/4a	LCII	habitation debris - domestic (secondary)		cultural	1	2	10.8	99% soil, 1% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.216
359B/1	077-1/1c	LCII	humus - domestic (secondary)		natural	1	2	16	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.32
359B/2	077-1/4b	LCII	habitation debris - domestic (secondary)		cultural	1	1.15	11.6	99% soil, 1% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.1334
359C/1	077-1/1a	PP-LCII	humus - domestic (secondary)		natural	1	2	5.6	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.112
359D/1	077-1/1d	LCII	humus - domestic (secondary)	mixed (fall)	natural	1	2	15	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.3
359D/2	077-1/4c	LCI-II	habitation debris - domestic (secondary)	mixed (fall)	cultural	1	2	8.4	98% soil, 2% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.168
359E/1	077-1/1a	LC	humus - domestic (secondary)		natural	1	2	6	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.12
359E/2	077-1/3	EC-LCII	construction fill with rubble - domestic (secondary)		arbitrary (20)	1	1	16.2	80% cobbles, 20% soil. typical LCII fill	10 yr 5/6 yellowish brown	sandy clay loam	0.162
359E/3	077-1/3	LCI-II	construction fill with rubble - domestic (secondary)		cultural	1	1	16.2	50% cobbles, 20% large cobbles/boulders, 30% soil	10 yr 5/8 yellowish brown	silty clay	0.162
359E/4	077-1/5	LC	soil horizon - buried 'a'	mixed (fill, penultimate debris)	arbitrary (20)	1	1	21.4	100% soil	10 yr 5/6 yellowish brown	silty clay	0.214
359E/5	077-1/5	ND	soil horizon - buried 'a'	mixed (fill, penultimate debris)	arbitrary (10)	1	1	15.2	100% soil	10 yr 6/8 brownish yellow	silty clay	0.152
359F/1	077-1/1b	ND	humus - domestic (secondary)		natural	1	1	18	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.18
359F/2	077-1/4a	LCI	habitation debris - domestic (secondary)		cultural	1	1	16	100% soil	10 yr 5/6 yellowish brown	silty clay loam	0.16
359G/1	077-1/1e	EC-LC	humus - domestic (secondary)		natural	1	2	14.2	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.284
359H/1	077-1/1a	LCI-II	humus - domestic (secondary)		natural	1	1	7.8	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.078
359I/1	077-1/1d	EC-LCII	humus - domestic (secondary)	mixed (fall)	natural	2	2	20.6	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.824
359I/2	077-1/4b	LCII	habitation debris - domestic (secondary)		cultural	2	2	3.6	98% soil, 2% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.144
359J/1	077-1/1c	LCII	humus - domestic (secondary)		natural	2	2	19.6	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.784
359J/2	077-1/4b	LC	habitation debris - domestic (secondary)		cultural	2	2	4.4	98% soil, 2% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.176
359K/1	077-1/1a	EC	humus - domestic (secondary)		natural	1	2	18.2	90% soil, 3% cobbles, 2% pebbles, 5% roots, etc.	10 yr 4/3 brown	silty clay loam	0.364
359K/2	077-1/4a	EC-LCII	habitation debris - domestic (secondary)		cultural	0.45	2	18.8	98% soil, 2% cobbles	10 yr 5/6 yellowish brown	silty clay loam	0.1692

Table AI. 4: MVAP Operation 350 lot group descriptions.

Lot Group	Context		Location	Individual Lots	Date	Vol. (m^3)
	primary	secondary				
003-1/1	modern backdirt-domestic (secondary)		on mound	350A/1, A/2, A/3, B/1, C/1, C/2, C/3, C/4	EC-LCII	1.938
003-1/2	habitation debris-domestic (secondary)	fill	on terrace	350A/4	LC	0.041
004-1/1b	humus-domestic (secondary)		north side of mound	350D/1	MP-LC	0.196
004-1/1c	humus-domestic (secondary)		east side of mound	350E/1, G/1	EC-LC	0.106
004-1/3	fall-domestic (secondary)		north terrace	350D/2, D/3, D/4, D/5	EC-LCII	0.168
004-1/4c	colluvium-domestic (secondary)		east terrace	350E/2	LC	0.112
004-1/5	construction fill with rubble-domestic (secondary)		north terrace	350D/8, D/9, D/10	EC	0.172
004-1/7	construction fill with rubble-domestic (secondary)	habitation debris	on mound	350E/3	LCII/TC	0.000
004-1/10	habitation debris-domestic (secondary)		north terrace	350D/6, D/7	LCI-LCII	0.075
004-1/11	habitation debris-domestic (secondary)		east terrace	350G/2	LCII/TC	0.042
004-1/16	soil horizon - buried 'a' and sterile-domestic (secondary)		below north terrace	350D/11, D/12	ND/NA	0.083
005-1/1	humus-domestic (secondary)			350H/1, J/1	EC-LCI	0.156
005-1/2a	fall-domestic (secondary)	habitation debris	on mound	350H/2	EC-LC	0.044
005-1/2b	fall-domestic (secondary)	habitation debris	off mound	350J/2, J/3, J/4, J/5	MP-LCI	0.115
005-2/1	humus-domestic (secondary)			350I/1, I/2	LC	0.334

005-2/2	fall-domestic (secondary)			350I/3, I/4, I/5	MP-LCI	0.087
005-2/3	habitation debris-domestic (secondary)	buried 'A'	off mound	350I/6, I/7, I/9, I/12, I/13, I/14, I/15	LCI-LCII	0.313
005-2/4	slump-domestic (secondary)		on mound	350I/10	EC-LCI	0.050
005-2/5	construction fill with rubble-domestic (secondary)		on mound	350I/8, I/11	LCI	0.037
005-2/6	soil horizon - sterile		off mound	350I/16	NA	0.063
006-1/1	humus-domestic (secondary)			350K/1, L/1	LC	0.376
006-1/3	fall-domestic (secondary)		off mound	350K/2, L/2, L/5	LCI-TC	0.285
006-1/4	slump-domestic (secondary)	habitation debris	on mound	350L/6	TC	0.002
006-1/8c	habitation debris-domestic (secondary)	buried 'A'	off mound	350L/3, L/4, L/7, L/8	LCII-TC	0.225
006-1/10a	soil horizon - sterile		off mound	350L/9	NA	0.070
007-1/1	modern backdirt- non-domestic (secondary)			350Q/1, Q/2, T/1, V/1, V/2	EC-TC	1.088
007-1/2b	humus- non-domestic (secondary)			350Q/3, Q/4, Q/6, T/2, T/3, V/3, V/4	EC-TC	0.989
007-1/4c	fall- non-domestic (secondary)		off mound	350Q/5, Q/7, Q/9, T/4, V/5, V/7	EC-TC	1.247
007-1/6	sascab- non-domestic (secondary)		off mound	350V/8	LCII-TC	0.049
007-1/22d	habitation debris- non-domestic (secondary)		off mound above sascab	350V/6	LCI-LCII	0.176
007-1/22e	habitation debris- non-domestic (secondary)	buried 'A'	off mound	350Q/8	LCI	0.179
007-2/1c	humus- non-domestic (secondary)			350R/1, U/1	LCI	0.336
007-2/3b	fall- non-domestic (secondary)			350R/2, R/3, U/2	EC-LCI	0.578

007-2/12	habitation debris- non-domestic (secondary)		off mound	350R/4, U/3, U/4, U/5	EC-LCI	0.310
007-patio/1	modern backdirt- non-domestic (secondary)			350Y/1, Y/2, Y/3, Y/4, Y/5, Y/6, Y/7, AA/1, AA/2	EC-LCI	1.600
007-patio/2b	humus- non-domestic (secondary)			350AA/3	EC-LCII	0.180
007-patio/4	fall- non-domestic (secondary)		off patio	350AA/4	EC-LCII	0.080
007-patio/6a	habitation debris- non-domestic (secondary)	buried 'A'	off patio	350AA/5, AA/6, AA/7, AA/8	LCI-LCII	0.346
007-patio/9b	soil horizon - sterile		off patio	350AA/9	NA	0.090
033-3/1	humus-domestic (secondary)			350F/1	LC	0.216
033-1/2	colluvium-domestic (secondary)	habitation debris		350F/2, F/3	LCI-LCII	0.115
033-1/3	construction fill with rubble-domestic (secondary)	habitation debris	terrace	350F/4, F/5, F/6, F/11	LCI	0.097
033-1/4	soil horizon - buried 'a'	fill	below terrace	350F/7, F/8, F/9	LCI	0.139
033-1/5	soil horizon - sterile		below terrace	350F/10	NA	0.017
034-1/1	humus-domestic (secondary)			350X/1, X/2, X/3, AC/1, AF/1	MP-PP	0.587
034-1/2	habitation debris-domestic (secondary)	buried 'A'	off mound	350X/4, X/5	MP	0.229
034-1/3	soil horizon - sterile		off mound	350X/6	NA	0.104
034-1/4	construction fill with rubble-domestic (secondary)		terminal mound fill	350AC/2, AC/3, AC/5, AF/2	LP	0.113
034-1/6	construction fill without rubble-domestic (secondary)		penultimate mound fill	350AC/4, X/7	MP	0.063
034-1/5	grave - simple/simple		penultimate mound fill	350AC/6, AC/7, AC/8, AC/9	LP	0.009
035-1/1	humus-domestic (secondary)			350O/1	LCI-LCII	0.120

035-1/2	fall-domestic (secondary)			350O/2, O/3, O/5	EC-TC	0.335
035-1/3	habitation debris-domestic (secondary)		terminal, off mound	350O/4	LCI-LCII	0.036
035-1/4	fall-domestic (secondary)		BURNED FALL OFF MOUND	350O/8	EC-LCII	0.010
035-1/5	soil horizon - sterile		off mound	350O/13	NA	0.148
035-1/6	construction fill with rubble-domestic (secondary)		terminal mound fill	350O/14	LCII	0.057
035-1/7	habitation debris-domestic (secondary)		penultimate, off mound	350O/6, O/7, O/9, O/10, O/11, O/12	MP-LCII	0.530
036-1/1a	humus-domestic (secondary)		east side of mound	350M/1, S/1, S/4	EC-LCII	0.234
036-1/1b	humus-domestic (secondary)		west side of mound	350N/1, N/2	LCI-LCII	0.200
036-1/2	colluvium-domestic (secondary)		east side of mound	350M/2, S/2	ND	0.111
036-1/3a	habitation debris-domestic (secondary)	fill	east terrace	350M/3, S/3	EC-LCII	0.039
036-1/3b	habitation debris-domestic (secondary)		off west side of mound	350N/6, N/7, N/8, N/9, N/10	EC-LCII	0.291
036-1/4a	construction fill with rubble-domestic (secondary)		terminal, east terrace fill	350M/4, M/5, M/6, M/7, S/5	LCII	0.086
036-1/5	fall-domestic (secondary)		off west side of mound	350N/3, N/4, N/5	EC-LCII	0.239
036-1/6	soil horizon - buried 'a'	fill	below east terrace	350S/7, S/8	ND	0.047
036-1/7a	soil horizon - sterile		below east terrace	350S/9	NA	0.012
036-1/7b	soil horizon - sterile		off west side of mound	350N/11	NA	0.170
036-1/8	construction fill with rubble-domestic (secondary)		penultimate, east terrace fill	350S/6	ND	0.016

060-1/1b	humus-domestic (secondary)		south side of mound	350AB/1	LCI	0.108
060-1/2	colluvium-domestic (secondary)	fill, habitation debris	south side of mound	350AB/2	EC-LCI	0.100
060-1/5	construction fill with rubble-domestic (secondary)		penultimate mound fill	350AB/8	LCI	0.029
060-2/1	humus-domestic (secondary)			350AD/1, AD/3, AE/1	EC-LCI	0.471
060-2/2	colluvium-domestic (secondary)			350AD/2, AE/2, AE/3	EC-LCI	0.480
060-2/3	construction fill with rubble-domestic (secondary)		terminal mound fill	350AD/4	EC	0.022
060-2/4	habitation debris-domestic (secondary)	colluvium	off mound	350AE/4, AE/5, AE/6, AE/7, AE/8, AE/9, AE/10, AE/11	EC-LCI	0.521
060-2/5	soil horizon - sterile		off mound	350AE/12	NA	0.022
060-patio/3a	construction fill with rubble-domestic (secondary)		terminal, north side	350AB/3	LCI	0.070
060-patio/4	construction fill with rubble-domestic (secondary)		penultimate, north side	350AB/4	LCI	0.220
060-patio/6a	soil horizon - buried 'a'	fill	below north side of patio	350AB/5, AB/6, AB/7	MP-LCI	0.322
060-patio/7	soil horizon - sterile		below north side of patio	350AB/9	NA	0.126
077-1/1d	humus-domestic (secondary)		south side of mound	350Z/1	LCI	0.188
077-1/2	fall-domestic (secondary)		off south side of mound	350Z/2, Z/3	LCI-LCII	0.256
077-1/4c	habitation debris-domestic (secondary)	buried 'A'	off south side of mound	350Z/4	LCI-LCII	0.133
077-1/6	soil horizon - sterile		off south side of mound	350Z/5	NA	0.058
086-1/1	humus-domestic (secondary)			350AH/1, AH/2, AH/3, AK/1	EC-LCI	0.612

086-1/2	fall-domestic (secondary)			350AH/4, AK/2	EC-LCI	0.105
086-1/3	construction fill with rubble-domestic (secondary)		terminal mound fill	350AH/5, AH/6	LCII	0.149
086-1/4	construction fill with rubble-domestic (secondary)		penultimate mound fill	350AH/7	LCI	0.012
086-1/5a	habitation debris-domestic (secondary)		off mound	350AH/8, AH/9, AK/3, AK/4, AK/5, AK/6, AK/7	EC-LCI	0.369
086-1/5b	burned debris pile- domestic (secondary)		off mound	350AH/10, AH/11, AH12, AK/8, AK/9	EC-LCI	0.299
086-1/6	soil horizon - sterile		off mound	350AH/13	NA	0.023
087-1/1	humus-domestic (secondary)			350AI/1, AI/2	LCI-LCII	0.200
087-1/2	fall-domestic (secondary)		east terrace	350AI/3, AI/4, AI/5, AI/6, AI/7, AI/12	EC-LCII	0.424
087-1/3	habitation debris-domestic (secondary)	fill	east terrace	350AI/8, AI/9	PP-LCI	0.245
087-1/4	construction fill with rubble-domestic (secondary)		east terrace	350AI/10	LCI	0.082
087-1/5	soil horizon - buried 'a'		below east terrace	350AI/11	ND	0.056
091-1/1	humus-domestic (secondary)			350AM/1, AN/1	EC-LCI	0.140
091-1/2	colluvium-domestic (secondary)			350AM/2, AN/2, AN/3	EC-LCI	0.628
091-1/3	habitation debris-domestic (secondary)			350AM/3, AM/5	EC-LCI	0.085
091-1/4	construction fill with rubble-domestic (secondary)			350AM/4, AM/6, AM/7, AN/5, AN/6	EC-LCI	0.326
091-2/1	humus-domestic (secondary)			350AP/1	EC-LCI	0.060
091-2/2	colluvium-domestic (secondary)			350AP/2	EC-LCI	0.172
091-2/3	construction fill with rubble-domestic (secondary)			350AN/4	EC-LCI	0.059

091-patio/1	humus-domestic (secondary)			350AQ/1	LCII	0.022
091-patio/2	colluvium-domestic (secondary)			350AQ/2, AQ/3	EC-LCII	0.144
091-patio/3	habitation debris-domestic (secondary)			350AQ/4	ND	0.010
100-1/1	humus-domestic (secondary)			350AL/1, AO/1	EC-LCI	0.260
100-1/2	construction fill with rubble-domestic (secondary)	mixed		350AL/2, AL/3, AL/4, AL/5, AO/2, AO/3	LCI	0.671

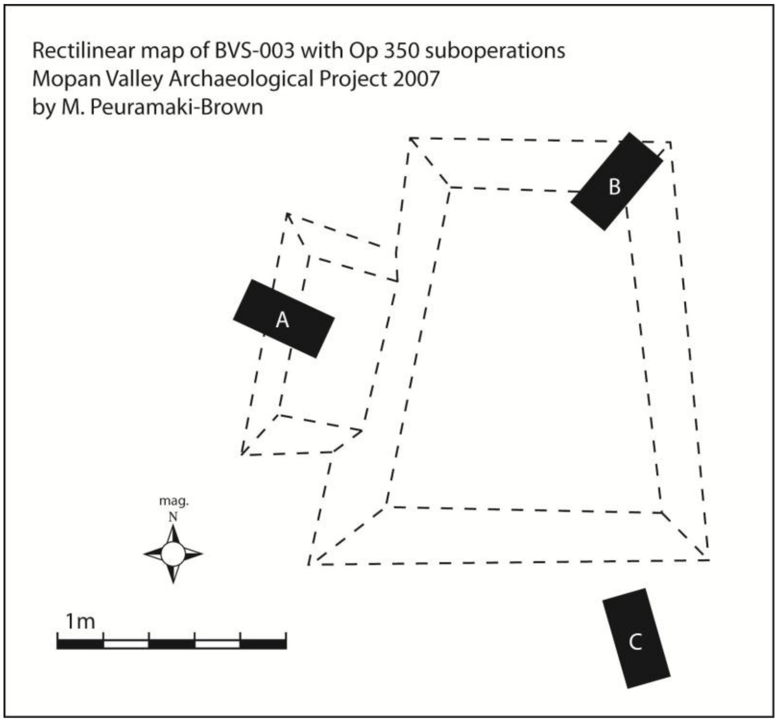

Figure AI. 1: Op 350 suboperations at BVS-003.

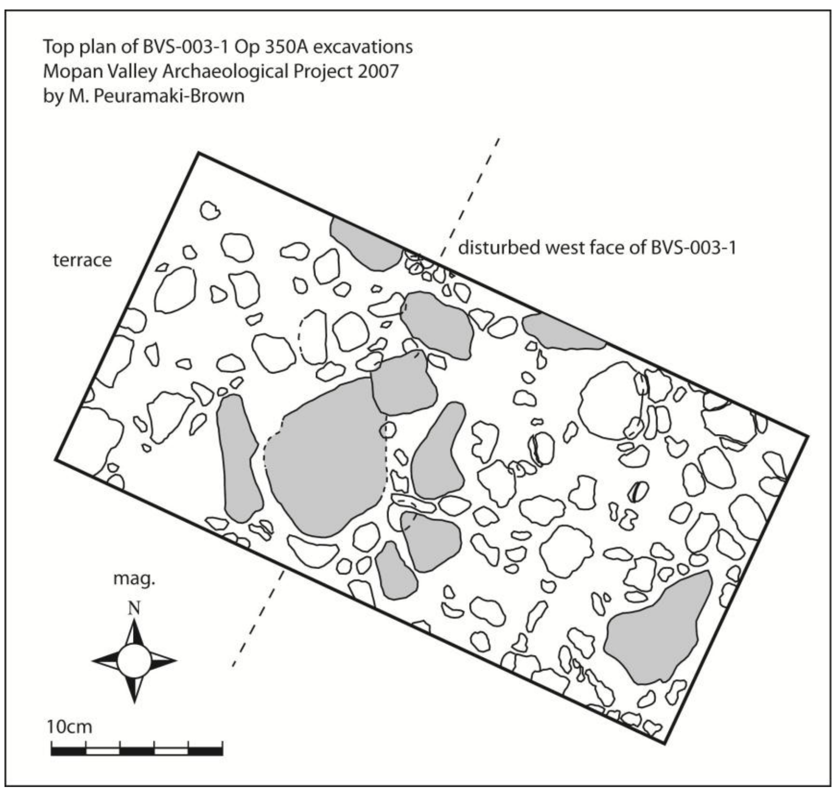

Figure AI. 2: Top plan of BVS-003-1 Op 350A, terminal architecture

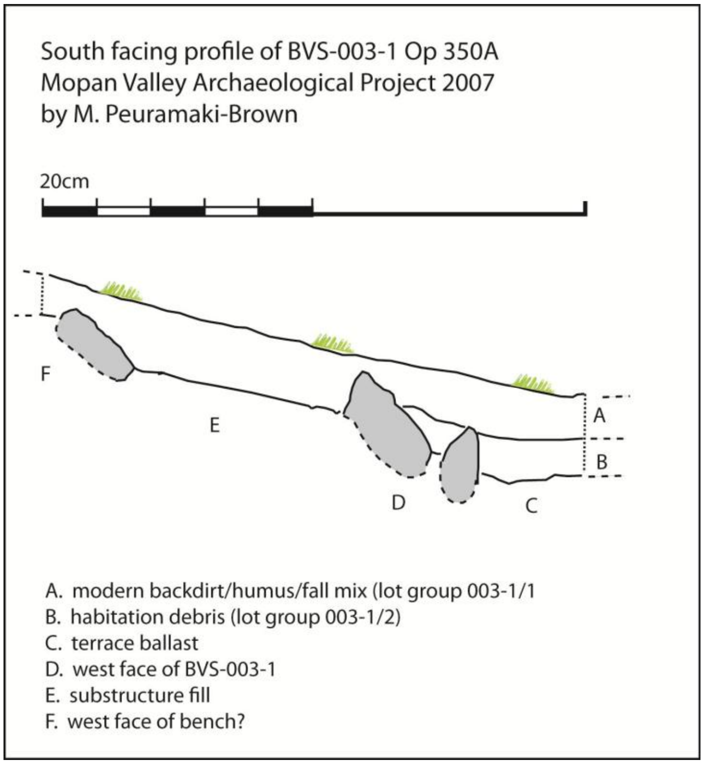

Figure AI. 3: Profile of Op 350A at BVS-003.

Figure AI. 4: Pile of masonry material possibly from modern looting activity, Op 350C at BVS-003.

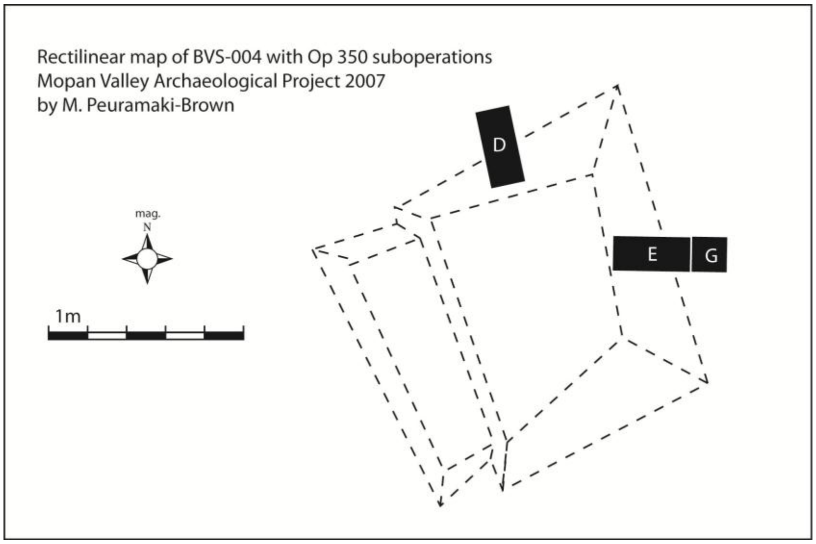

Figure AI. 5: Op 350 suboperations at BVS-004.

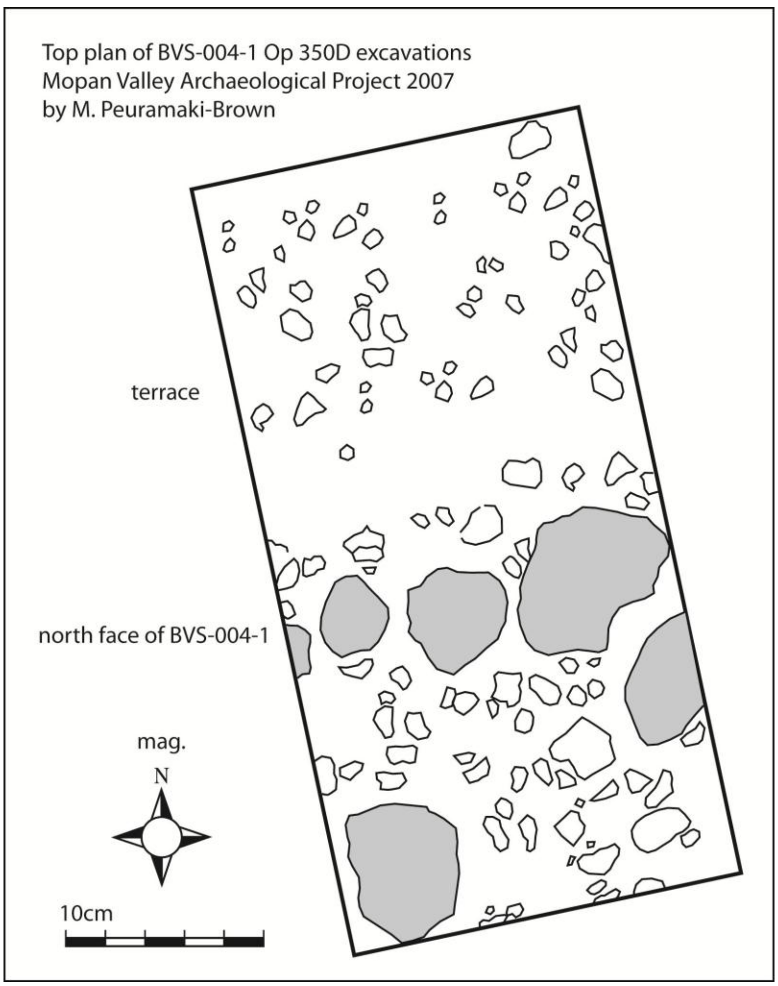

Figure AI. 6: Top plan of Op 350D at BVS-004, terminal architecture.

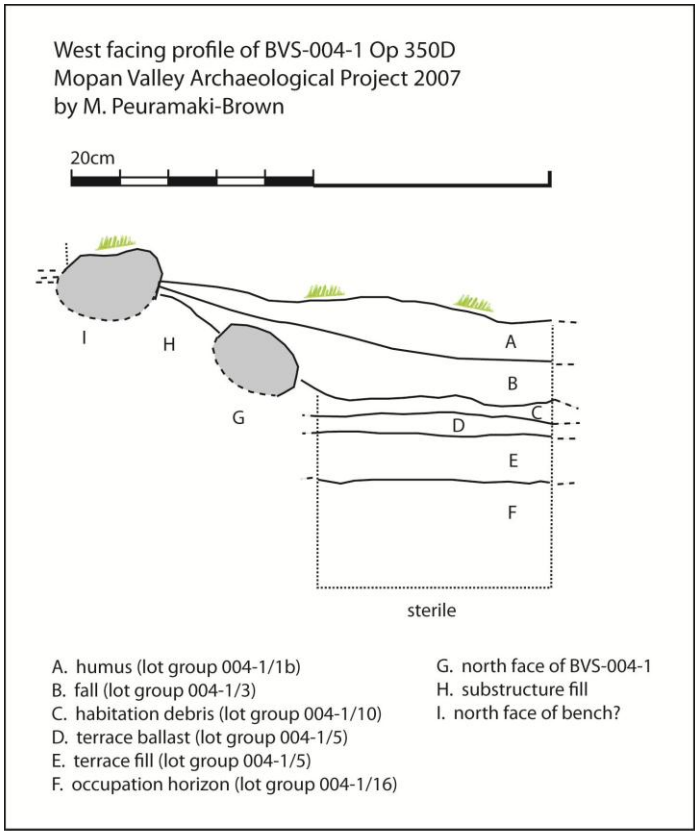

Figure AI. 7: Profile of Op 350D at BVS-004.

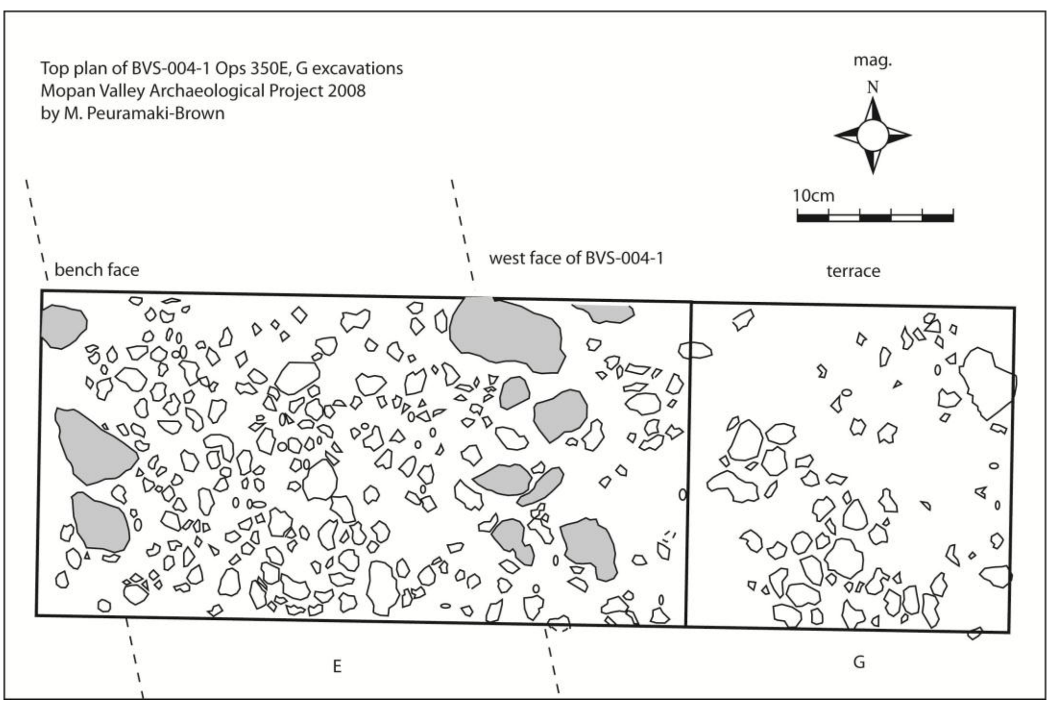

Figure AI. 8: Top plan of Ops 350E and G at BVS-004, terminal architecture.

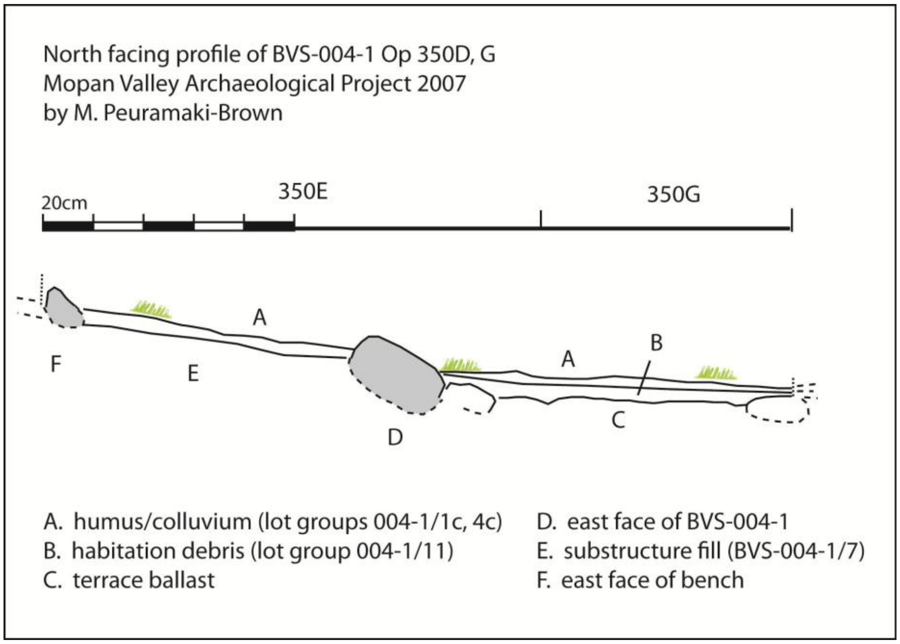

Figure AI. 9: Profile of Ops 350E and G at BVS-004.

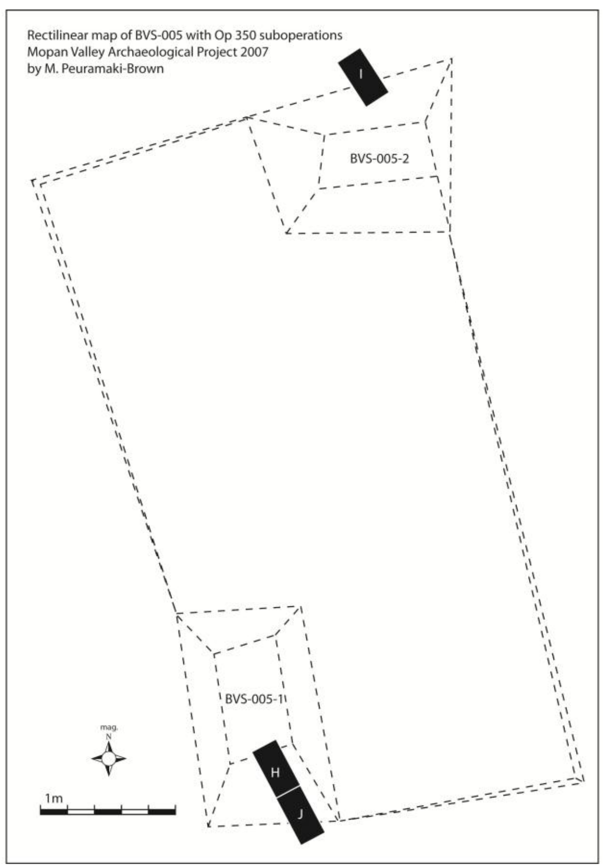

Figure AI. 10: Op 350 suboperations at BVS-005.

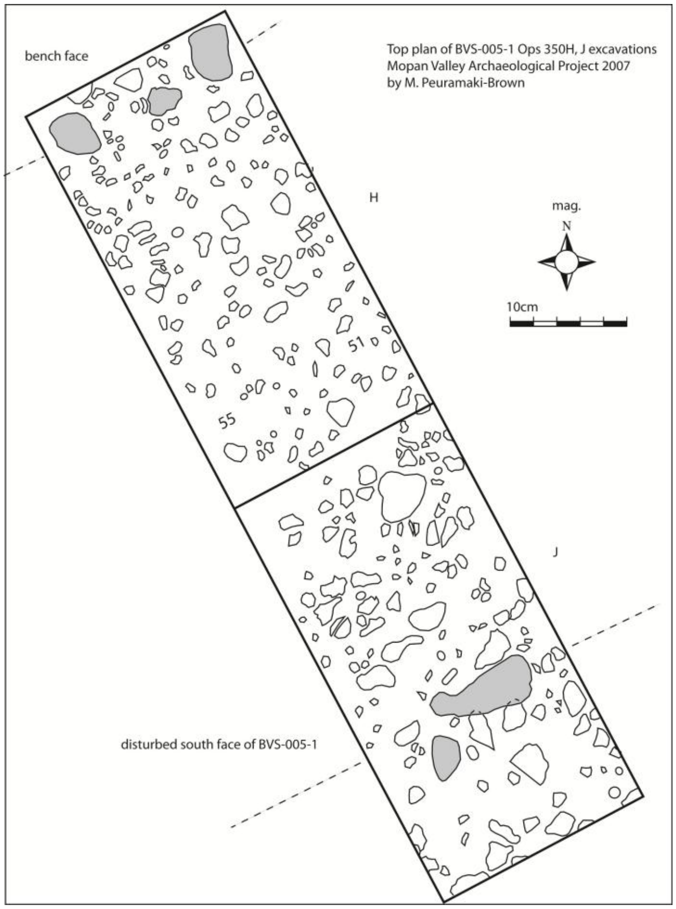

Figure AI. 11: Top plan of Ops 350H and J at BVS-005-1, terminal architecture.

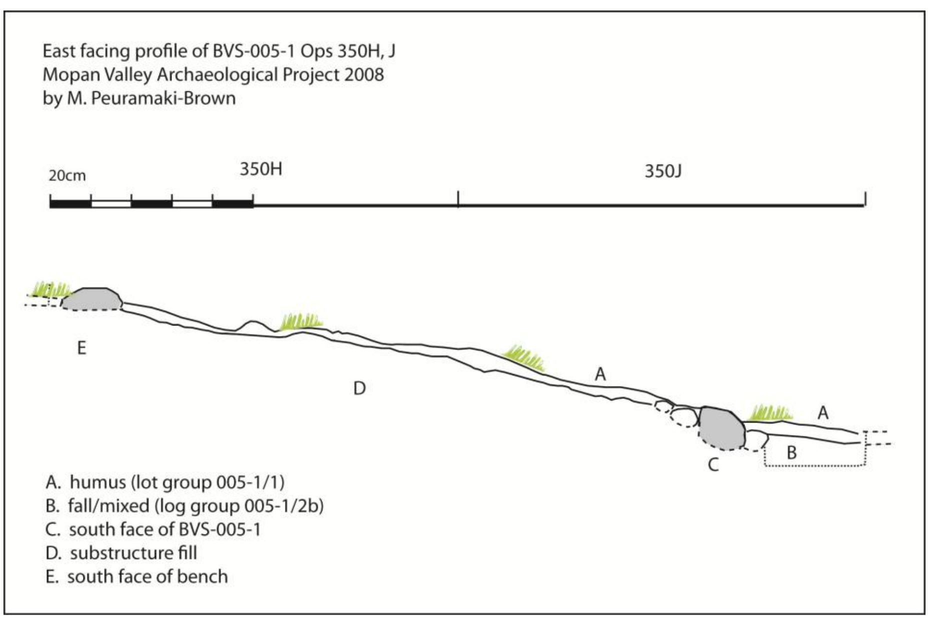

Figure AI. 12: Profile of Ops 350H and J at BVS-005-1.

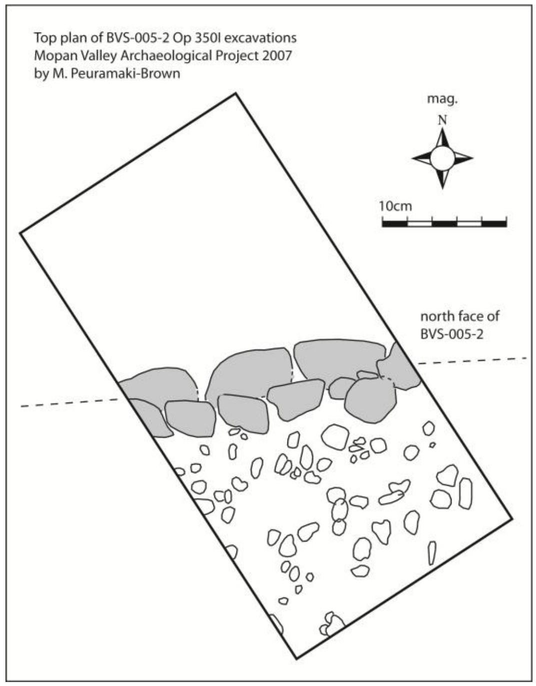

Figure AI. 13: Top plan of Op 350I at BVS-005-2, terminal architecture.

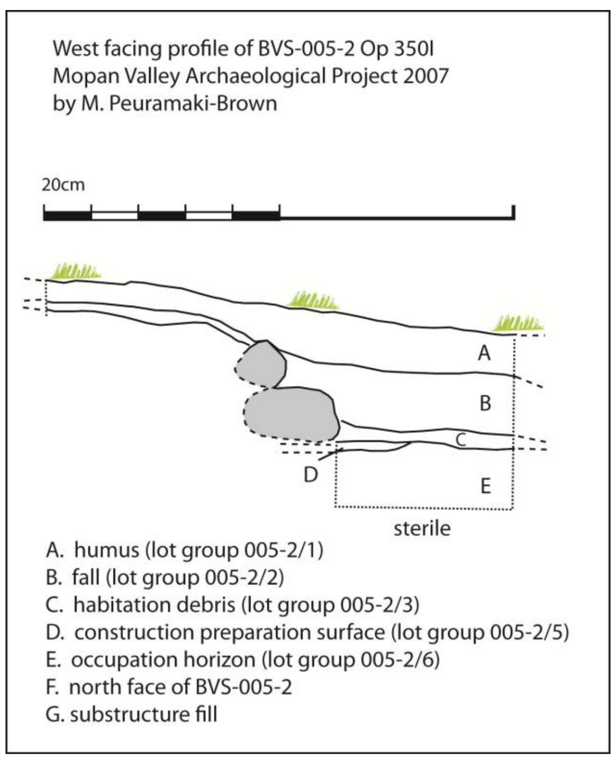

Figure AI. 14: Profile of Op 350I at BVS-005-2.

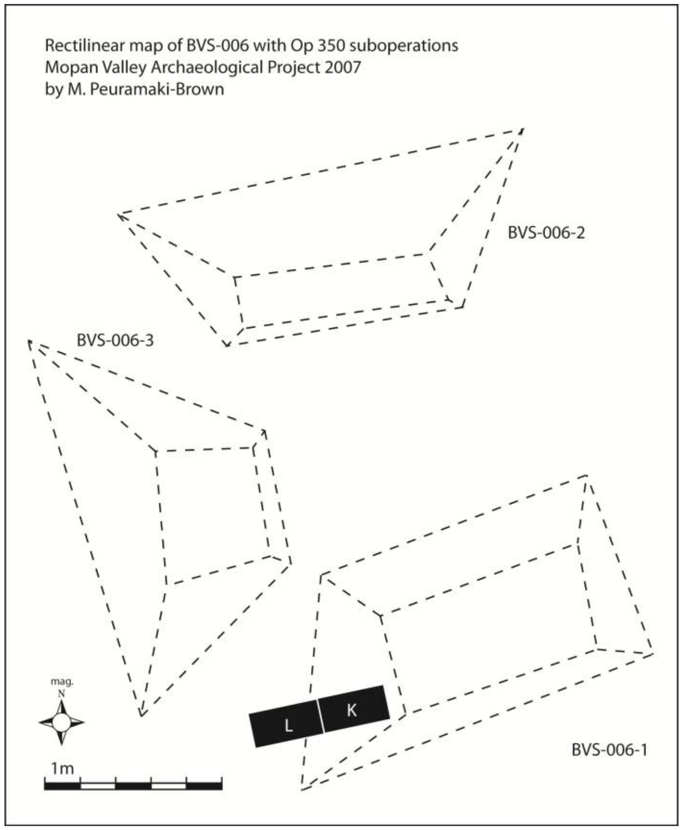

Figure AI. 15: Op 350 suboperations at BVS-006.

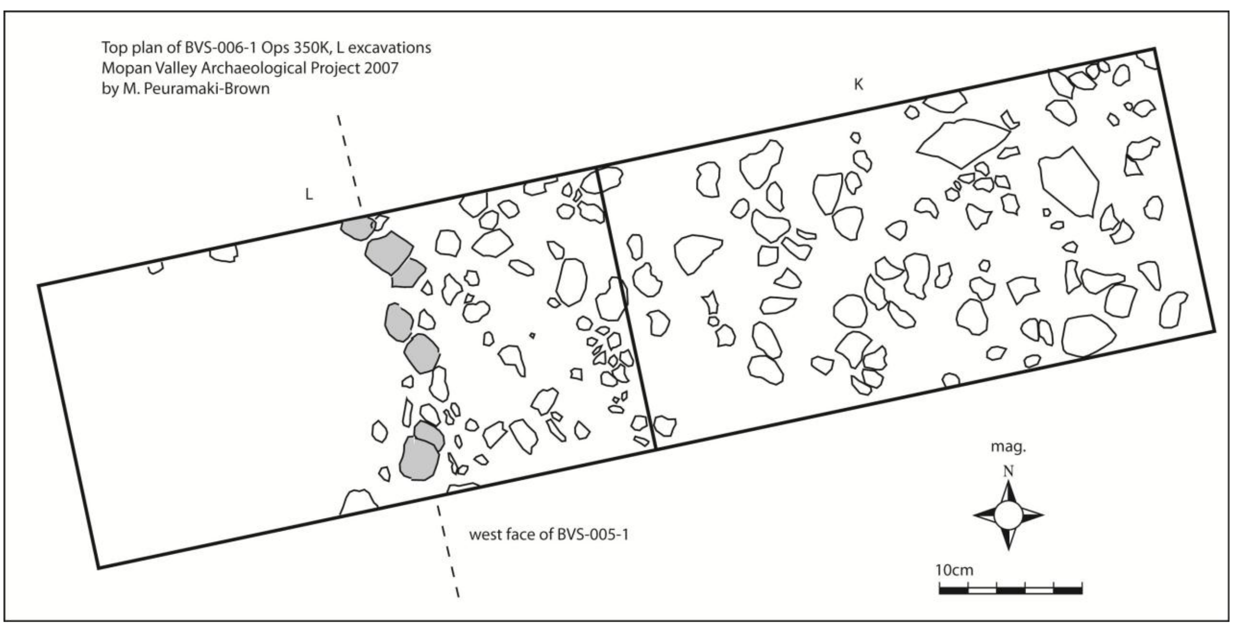

Figure AI. 16: Top plan of Ops 350K and L at BVS-006-1, terminal architecture.

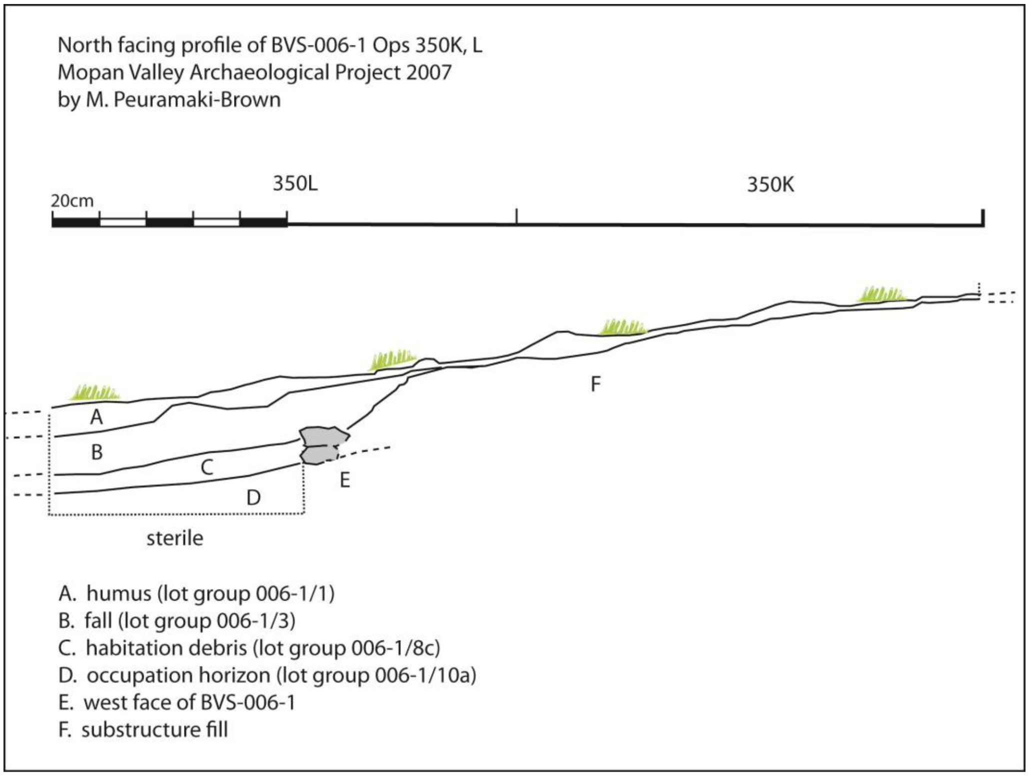

Figure AI. 17: Profile of Ops 350K and L at BVS-006-1.

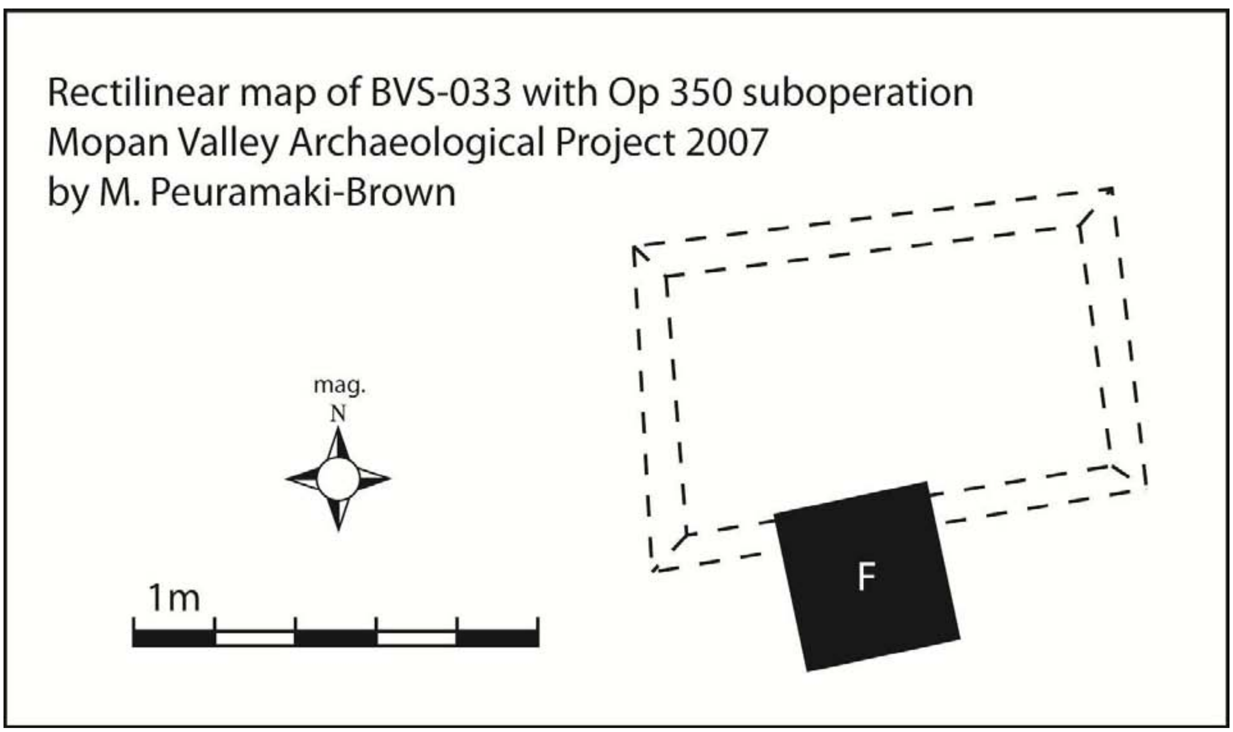

Figure AI. 18: Op 350 suboperation at BVS-033.

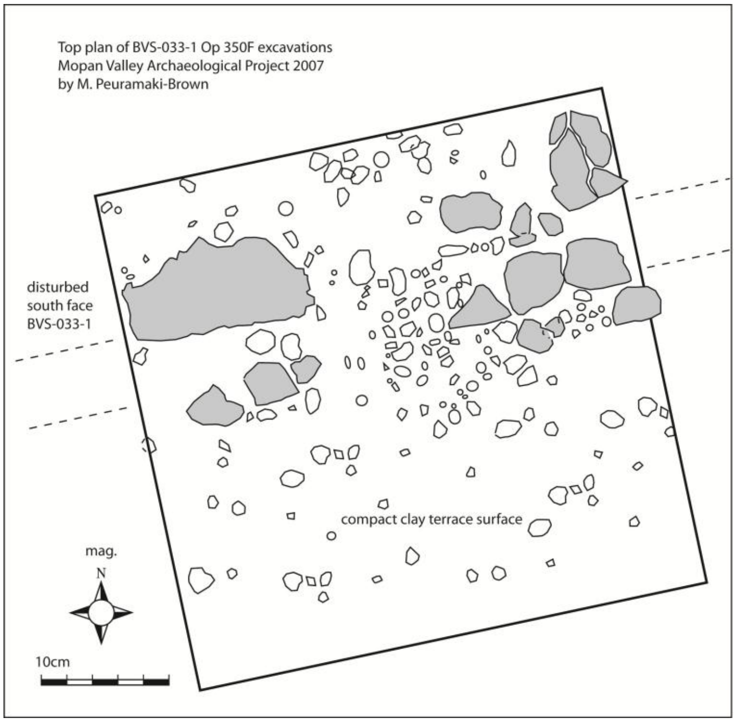

Figure AI. 19: Top plan of Op 350F at BVS-033, terminal architecture.

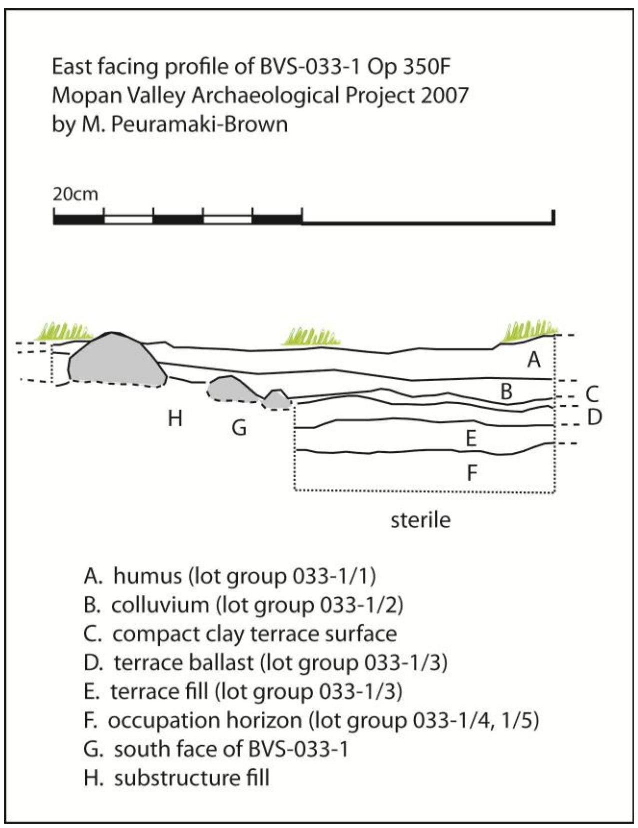

Figure AI. 20: Profile of Op 350F at BVS-033.

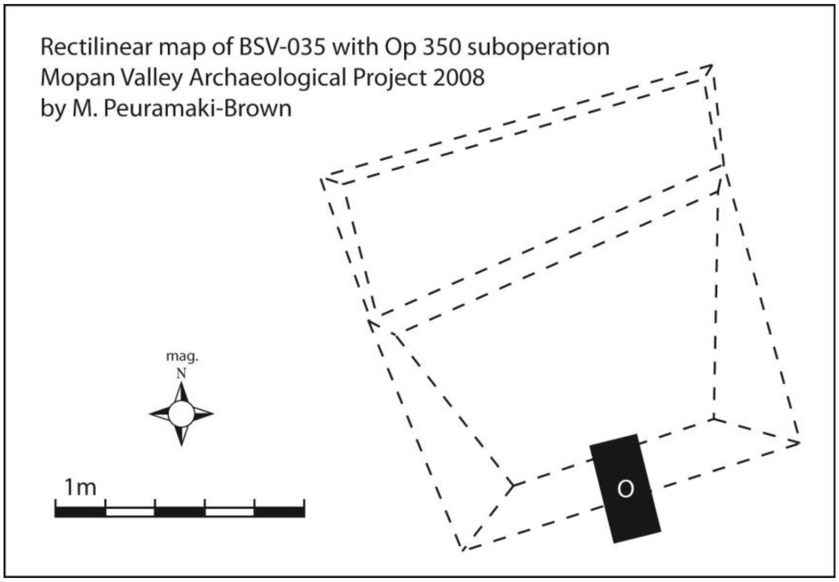

Figure AI. 21: Op 350 suboperation at BVS-035.

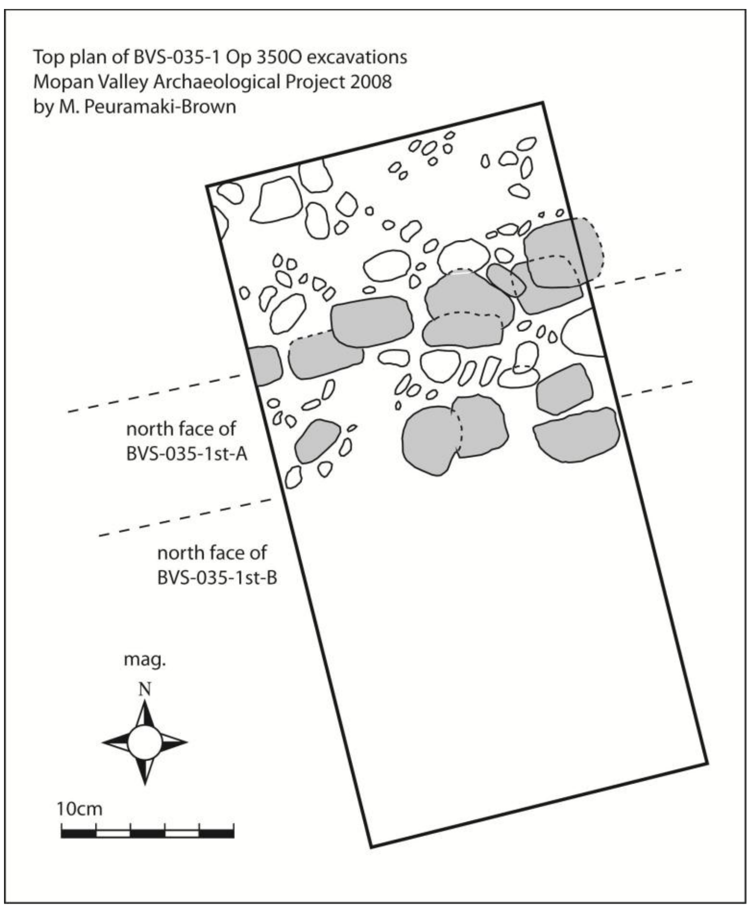

Figure AI. 22: Top plan of Op 350O at BVS-035, terminal architecture.

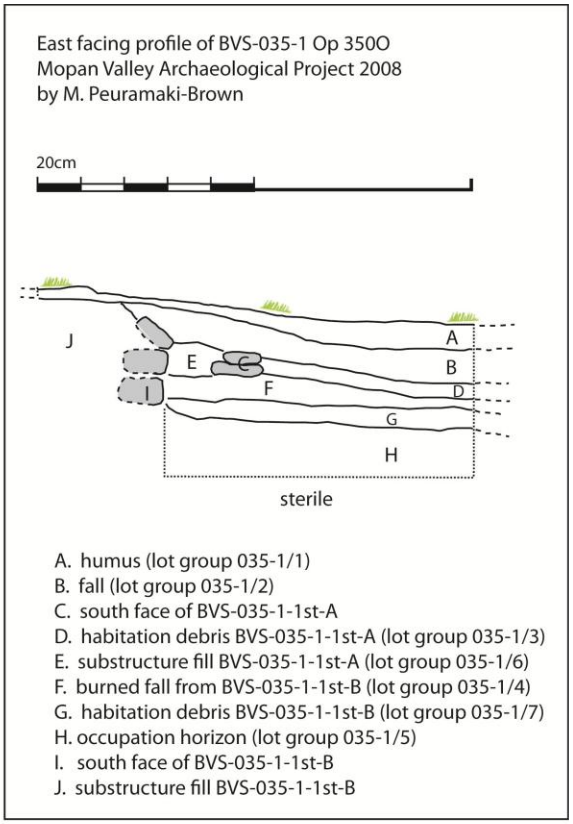

Figure AI. 23: Profile of Op 350O at BVS-035.

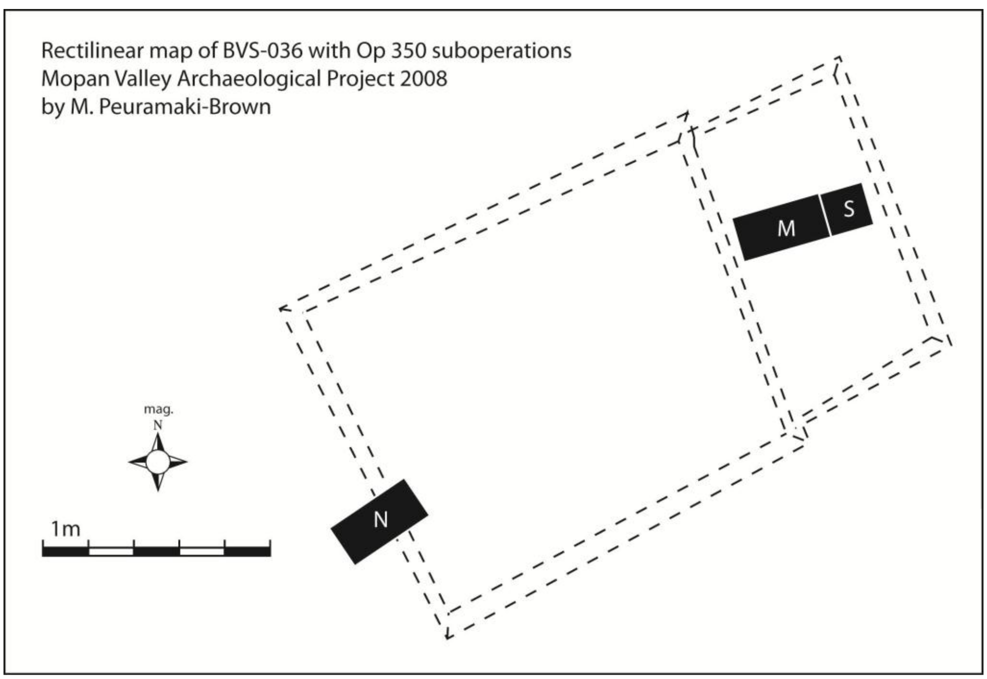

Figure AI. 24: Op 350 suboperations at BVS-036.

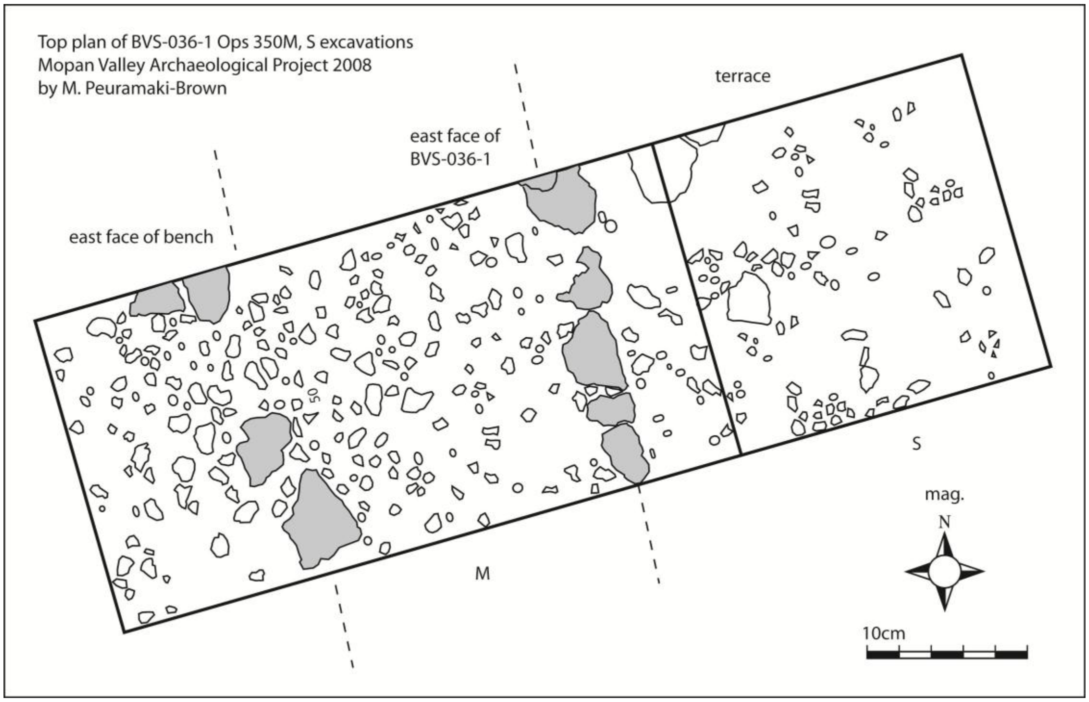

Figure AI. 25: Top plan of Ops 350M and S at BVS-036, terminal architecture.

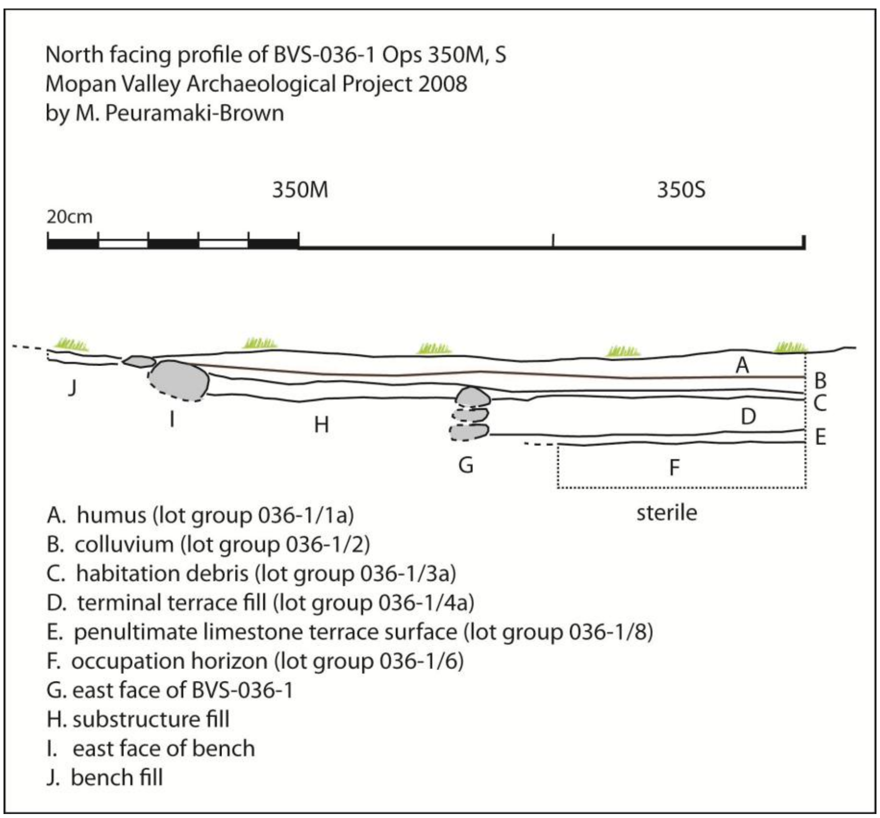

Figure AI. 26: Profile of Ops 350M and S at BVS-036.

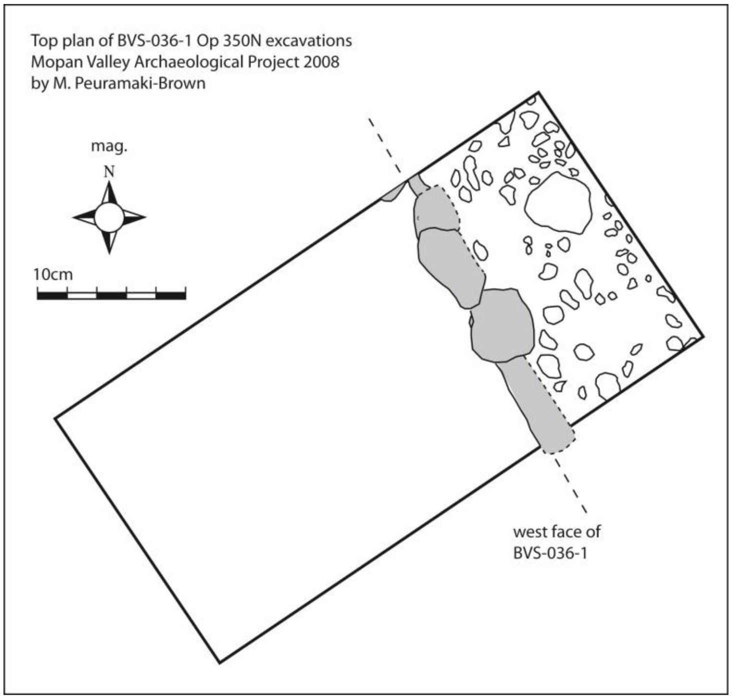

Figure AI. 27: Top plan of Op 350N at BVS-036, terminal architecture.

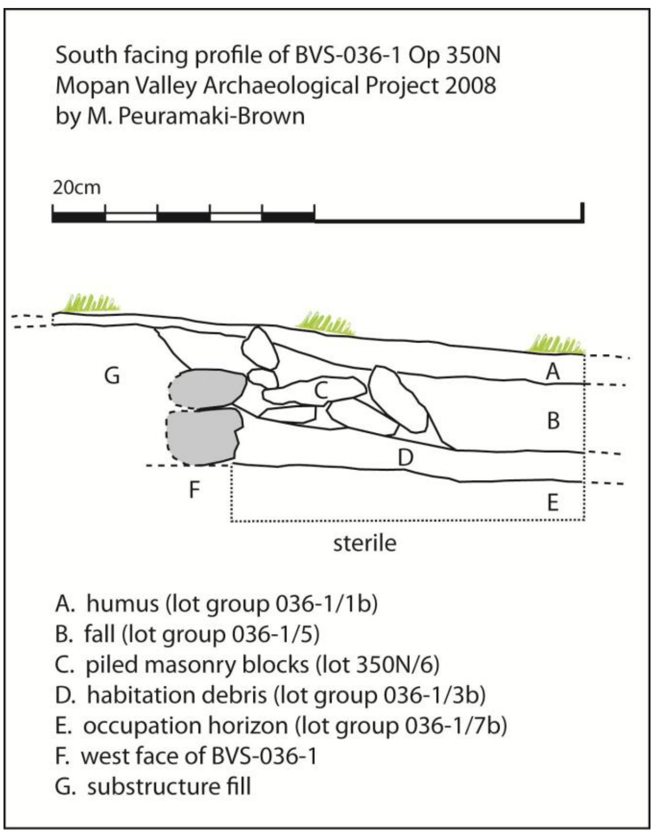

Figure AI. 28: Profile of Op 350N at BVS-036.

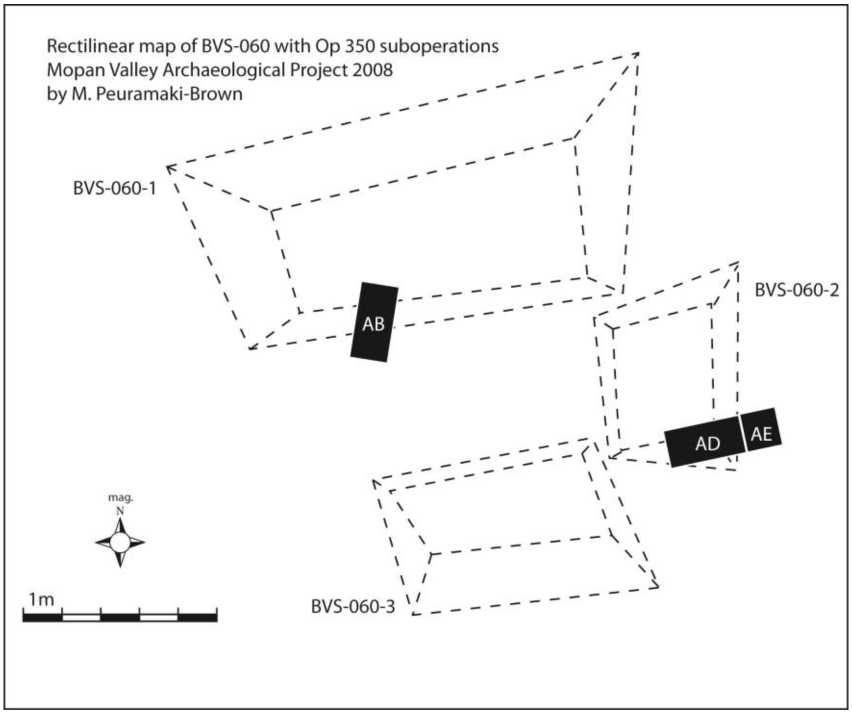

Figure AI. 29: Op 350 suboperations at BVS-060.

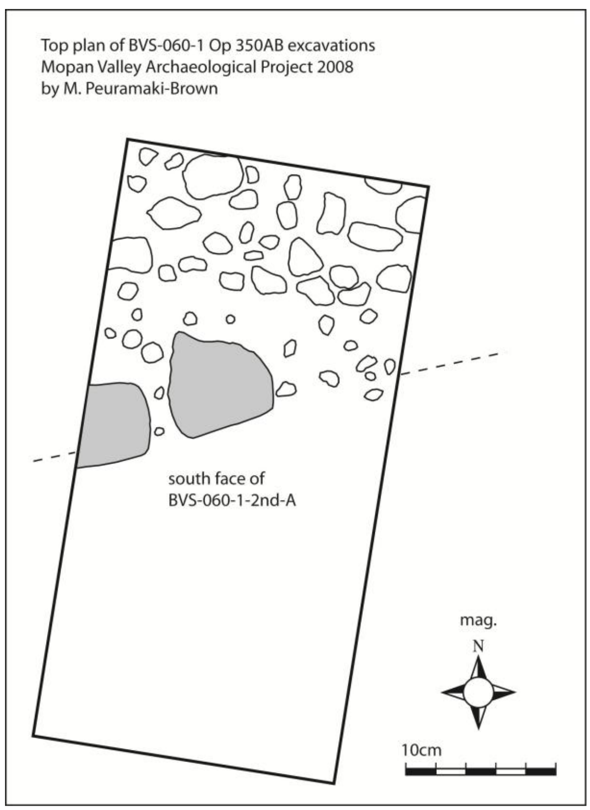

Figure AI. 30: Top plan of Op 350AB at BVS-060-1, terminal architecture.

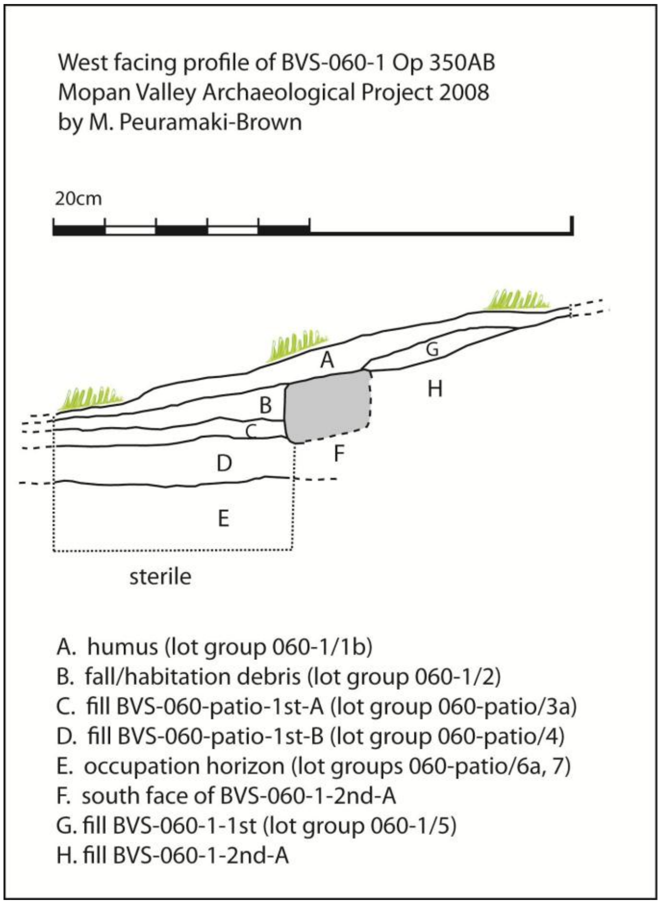

Figure AI. 31: Profile of Op 350AB at BVS-060-1.

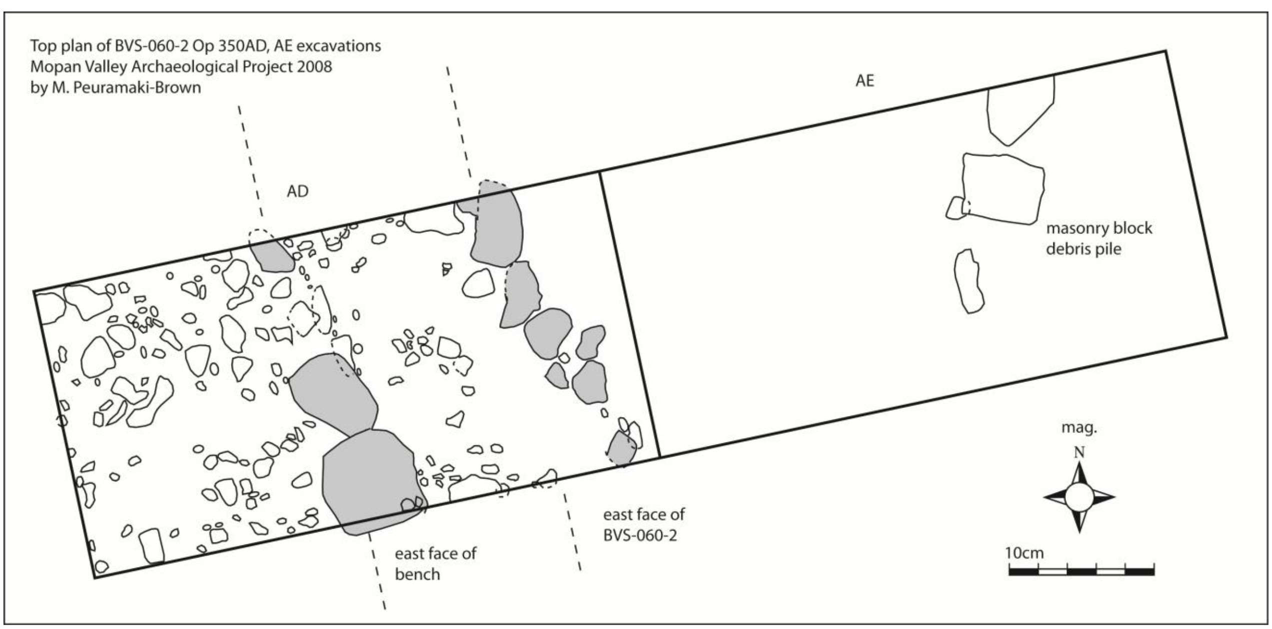

Figure AI. 32: Top plan of Ops 350AD and AE at BVS-060-2, terminal architecture.

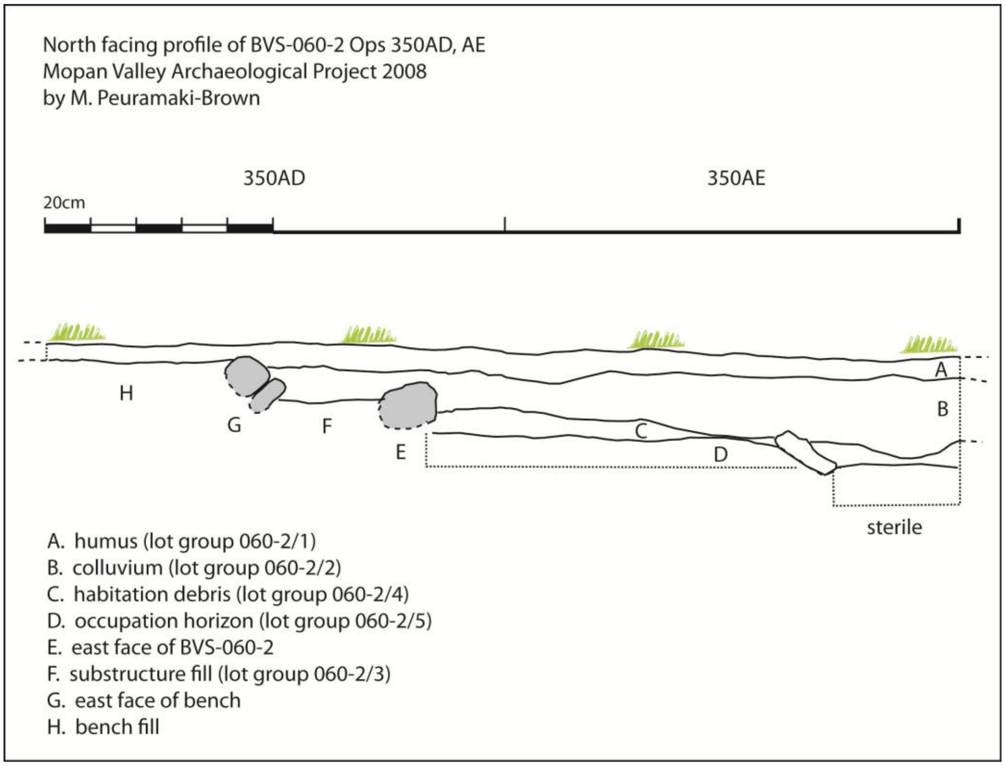

Figure AI. 33: Profile of Ops 350AD and AE at BVS-060-2.

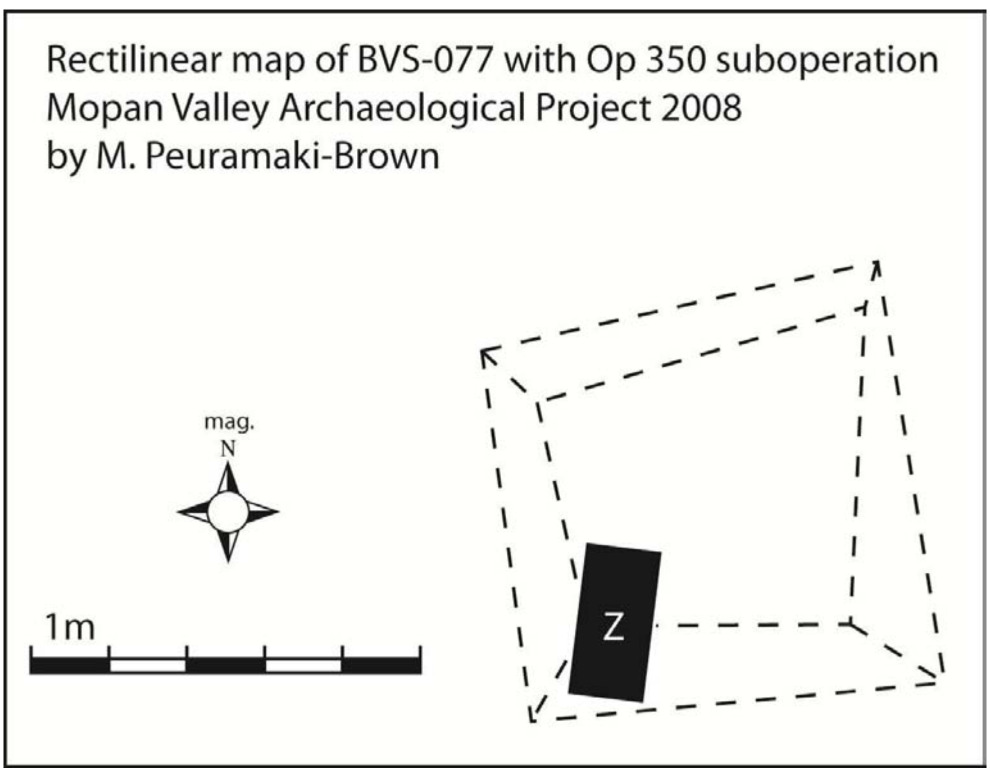

Figure AI. 34: Op 350 suboperation at BVS-077.

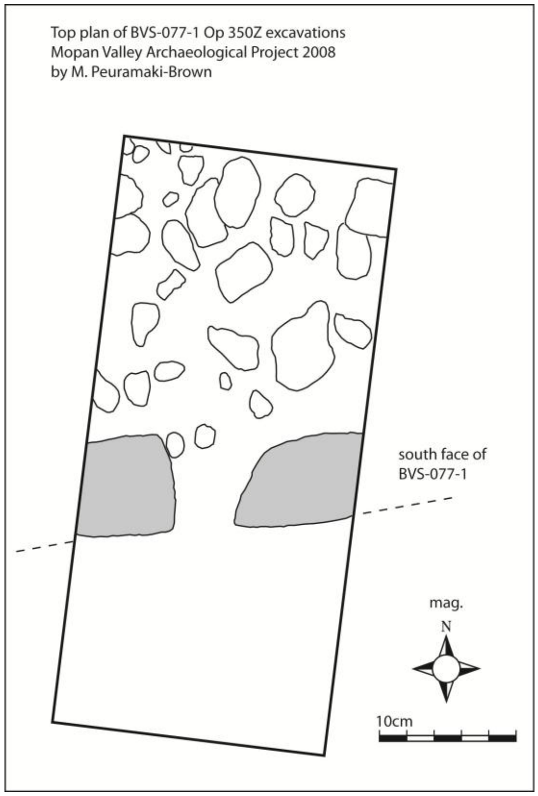

Figure AI. 35: Top plan of Op 350Z at BVS-077, terminal architecture.

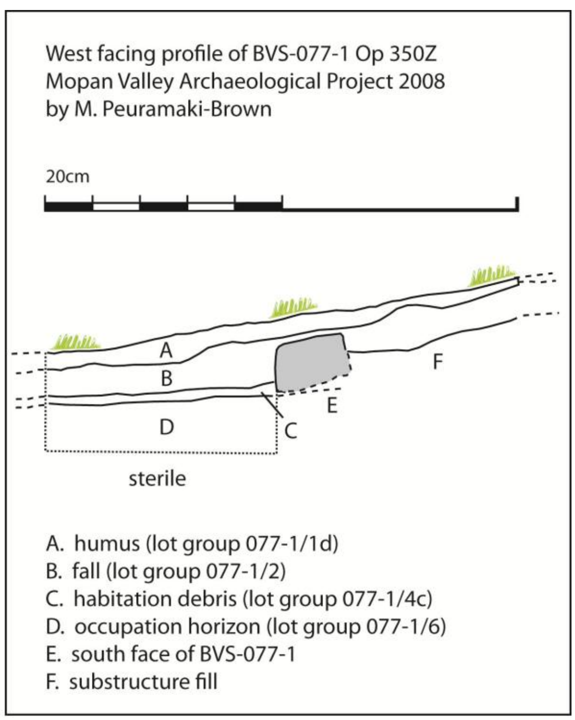

Figure AI. 36: Profile of Op 350Z at BVS-077.

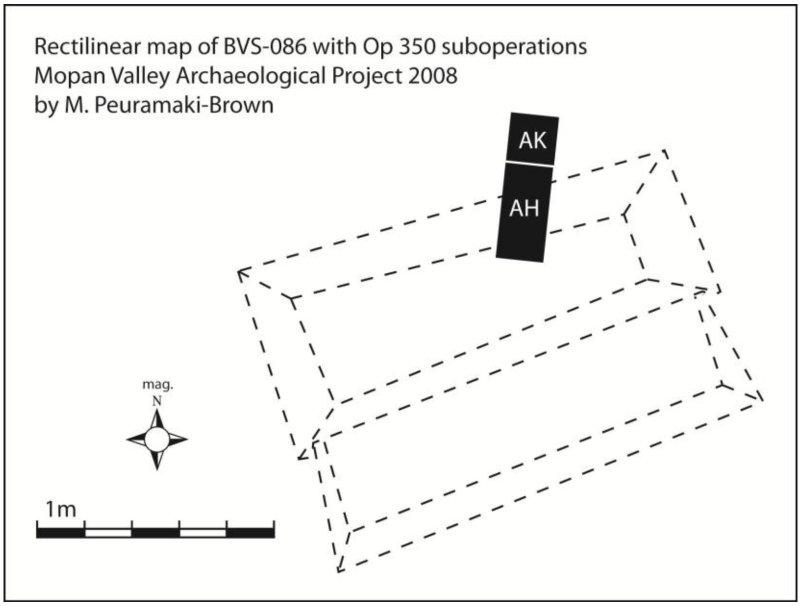

Figure AI. 37: Op 350 suboperations at BVS-086.

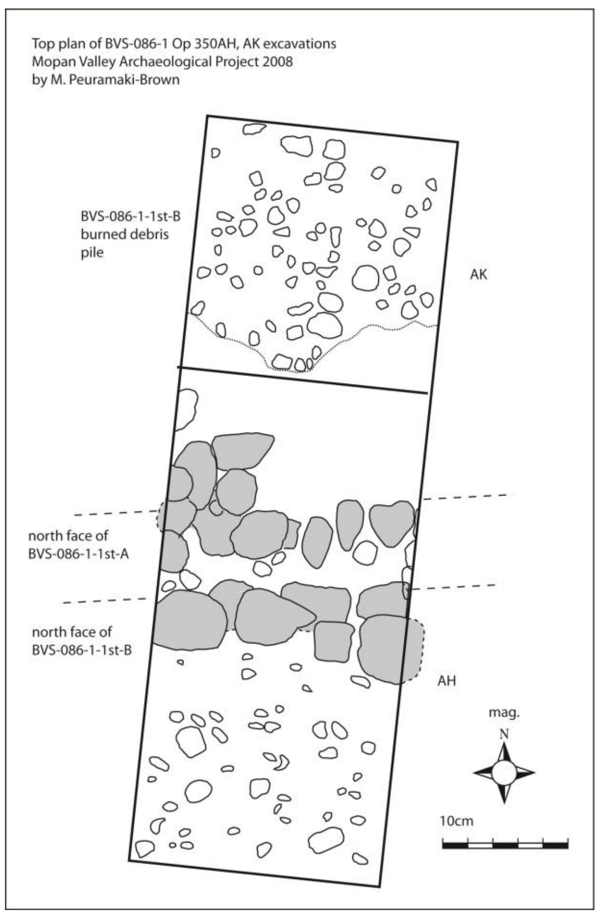

Figure AI. 38: Top plan of Ops 350AH and AK at BVS-086, terminal architecture.

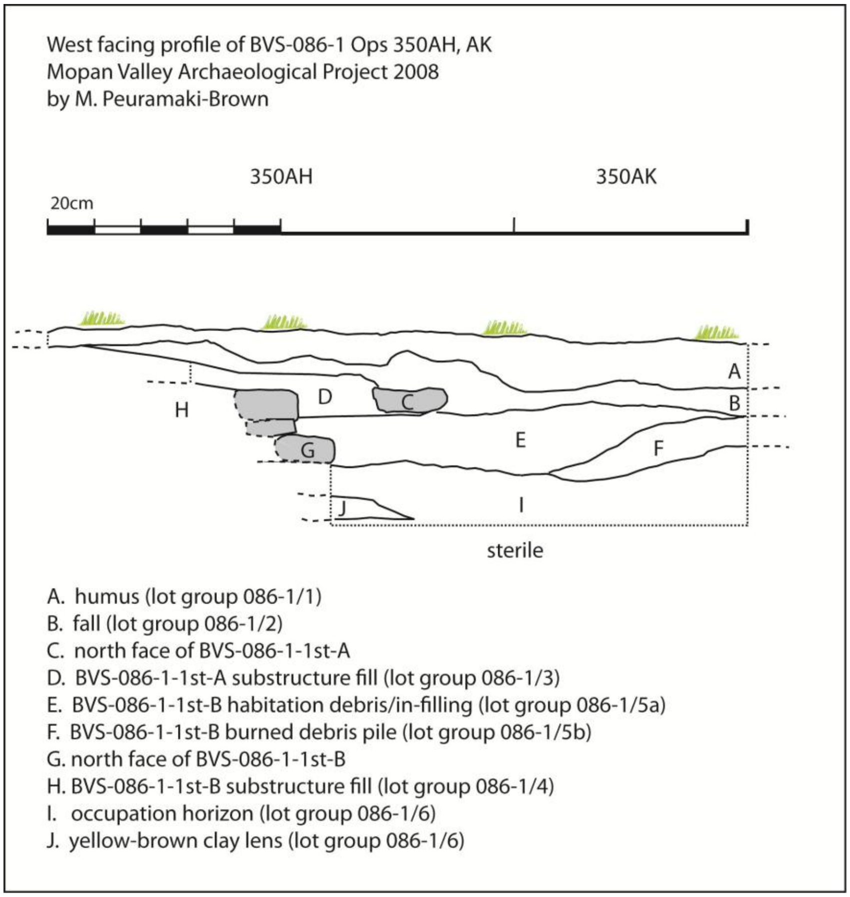

Figure AI. 39: Profile of Ops 350AH and AK at BVS-086.

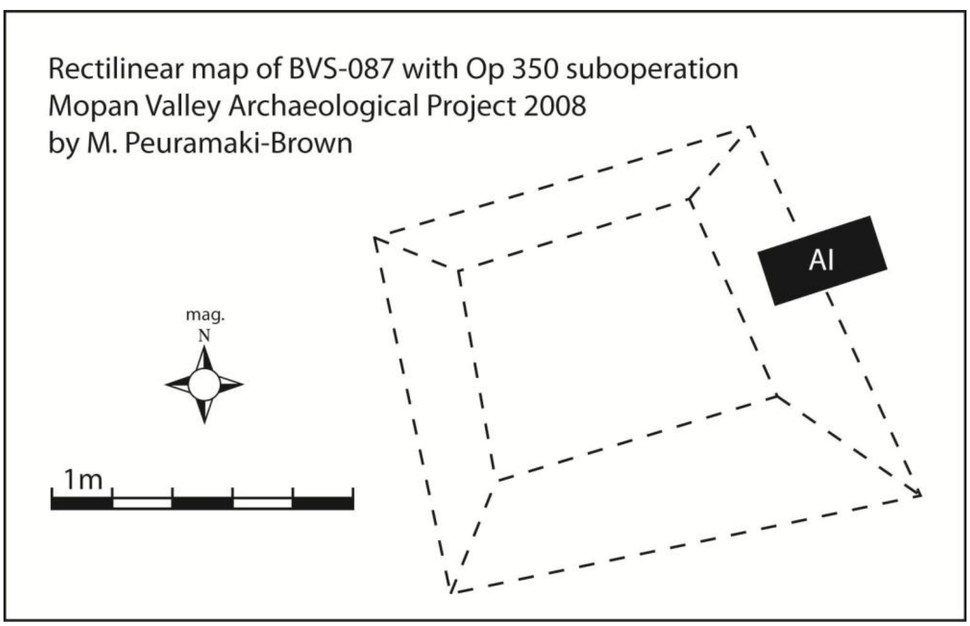

Figure AI. 40: Op 350 suboperation at BVS-087.

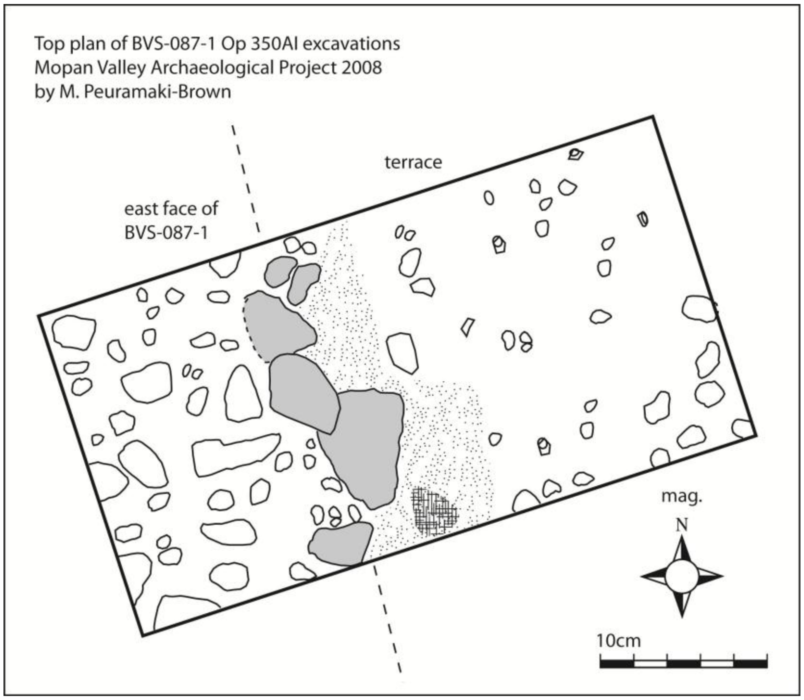

Figure AI. 41: Top plan of Op 350AI at BVS-087, terminal architecture.

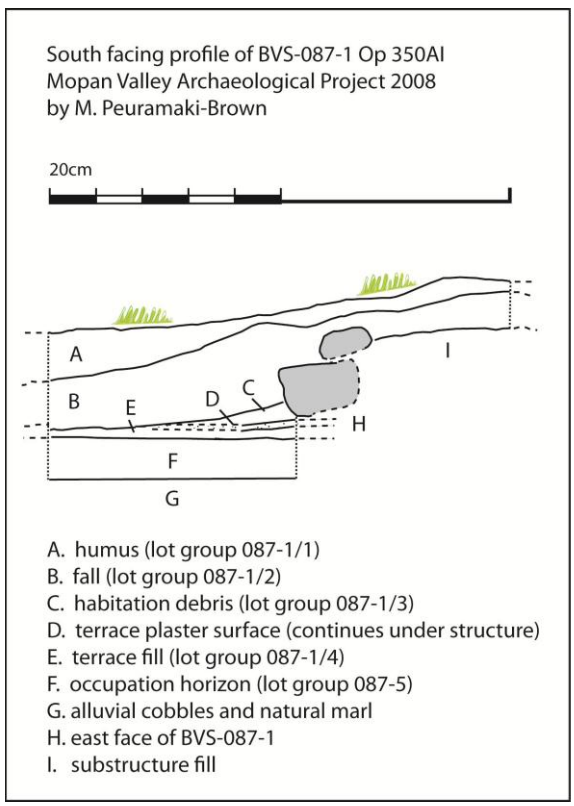

Figure AI. 42: Profile of Op 350AI at BVS-087.

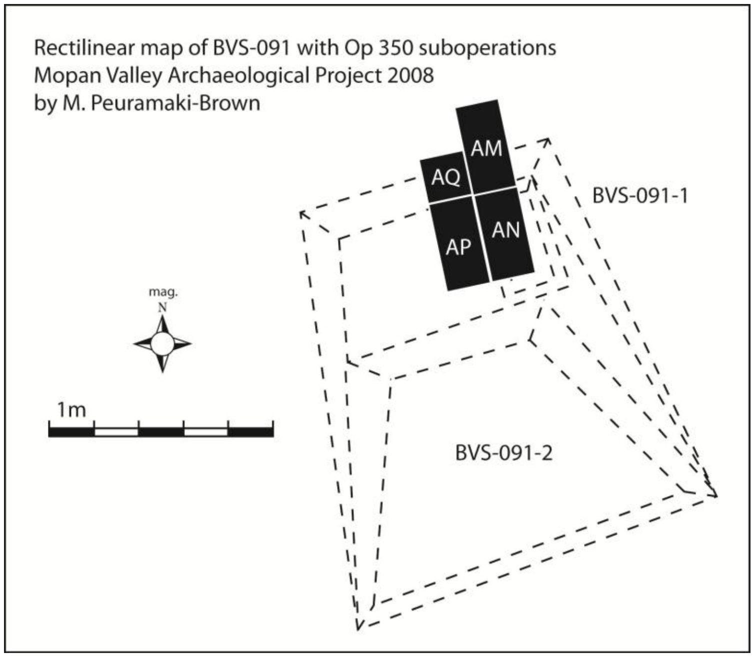

Figure AI. 43: Op 350 suboperations at BVS-091.

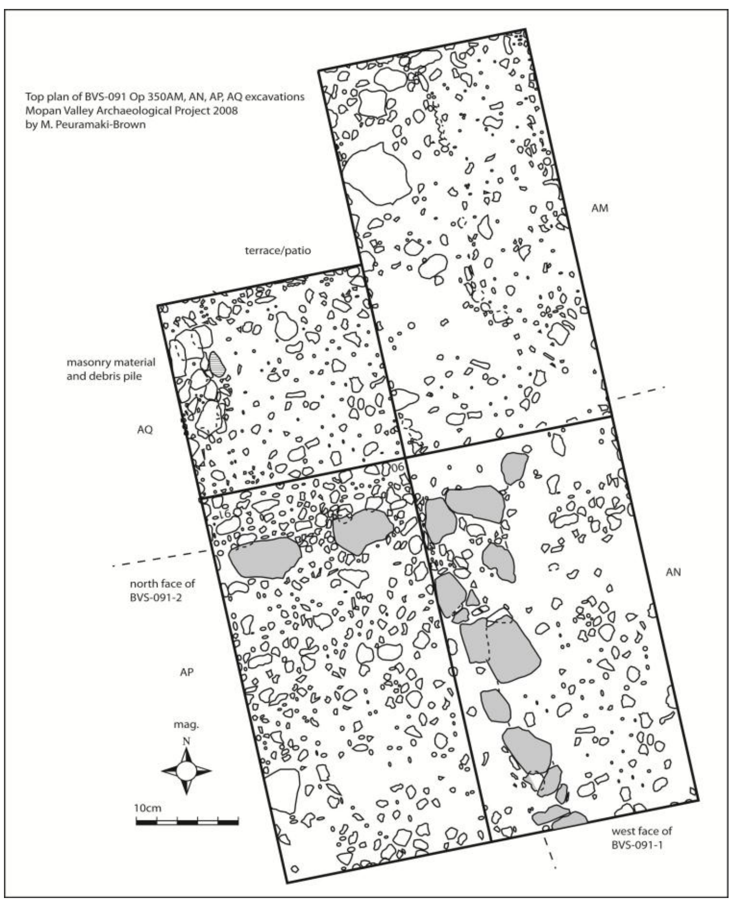

Figure AI. 44: Top plans of Op 350AM, AN, AP, AQ at BVS-091, terminal architecture.

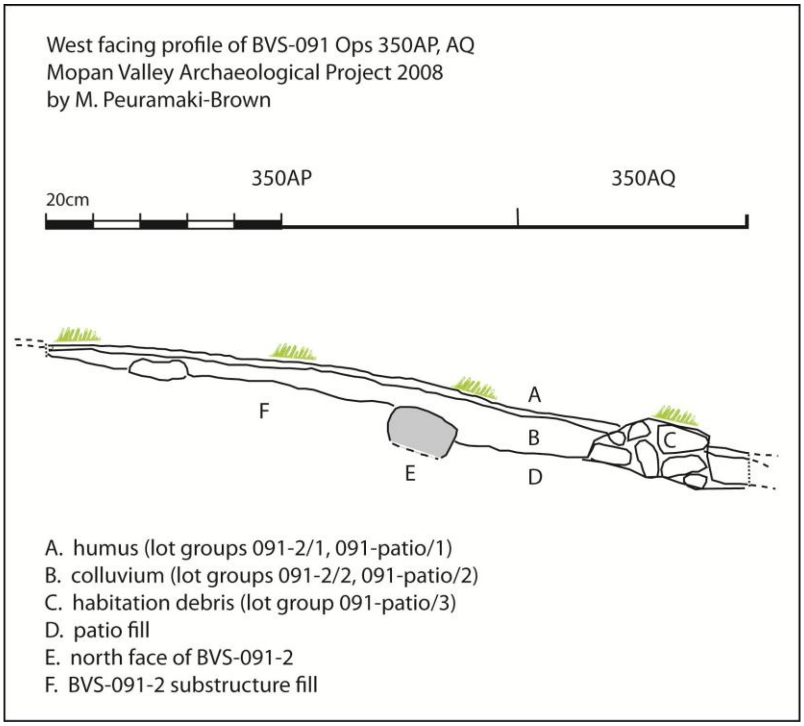

Figure AI. 45: Profile of Ops 350AP and AQ at BVS-091.

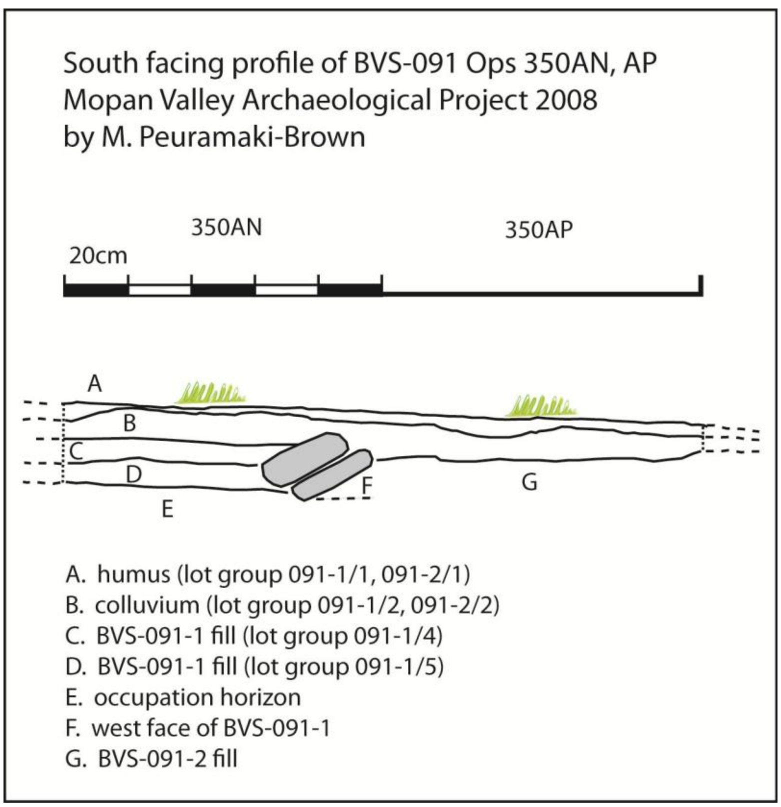

Figure AI. 46: Profile of Ops 350AN and AP at BVS-091.

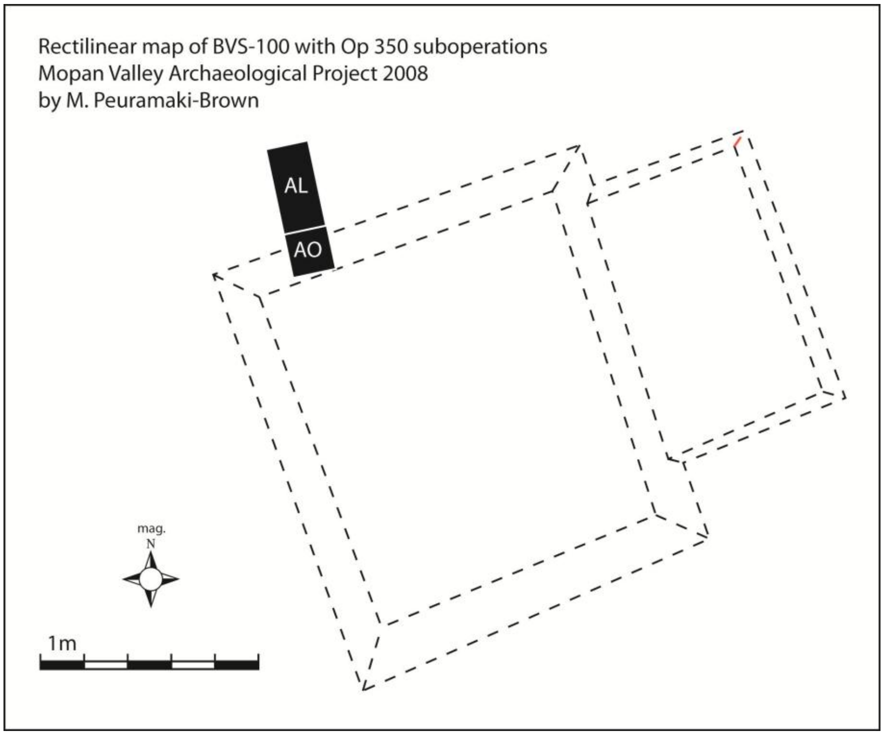

Figure AI. 47: Op 350 suboperations at BVS-100.

Figure AI. 48: Op 350AL profile, facing east.

Table AI. 5: Phase 3 excavation lot group descriptions (including associated Phase 2 lots).

Lot groups highlighted in green/blue are use-debris deposits.

Lot Group	Context		Location	Individual Lots	Date	Vol. (m^3)
	primary	secondary				
004-1/1a	humus - domestic (secondary)		on mound	356C/1, C/2, D/1, D/2, E/1, E/2, F/1, I/1, J/1	PP-LCII	2.520
004-1/1b	humus - domestic (secondary)		off north face	350D/1; 356K/1, K/2	MP-TC	0.456
004-1/1c	humus - domestic (secondary)	fall	off east face	350E/1, G/1; 356G/1	EC-TC	0.570
004-1/1d	humus - domestic (secondary)	colluvium	off south face	356H/1, H/2, H/3, H/4, H/5	EC-LCII	0.374
004-1/1e	humus - domestic (secondary)		off west face	356A/1, A/2, B/1, B/2, L/1	EC-TC	1.168
004-1/2	plough zone - domestic (secondary)	general mix	on mound	356M/1, M/2, N/1, N/2, O/1, P/1, P/2, Q/1, R/1, R/2	EC-TC	1.204
004-1/3	fall - domestic (secondary)	habitation debris	off north face	350D/2, D/3, D/4, D/5	EC-LCII	0.168
004-1/4a	colluvium - domestic (secondary)	habitation debris	on mound	356C/3, D/3, D/4, E/3, E/4, F/2, I/2, J/2	MP-TC	1.574
004-1/4b	colluvium - domestic (secondary)	habitation debris	off north face	356K/3	LCI-TC	0.048
004-1/4c	colluvium - domestic (secondary)	habitation debris	off east face	350E/2; 356G/2	LCI-TC	0.176
004-1/4d	colluvium - domestic (secondary)	habitation debris	off south face	356H/6	EC-LC	0.247
004-1/4e	colluvium - domestic (secondary)	habitation debris	off west face	356A/3, B/3, L/2	MP-TC	0.552
004-1/5	construction fill with rubble - domestic (secondary)	habitation debris	north terrace	350D/8, D/9, D/10	EC	0.172
004-1/6	construction fill with rubble - domestic (secondary)	habitation debris	south terrace	356H/8	TC	0.104
004-1/7	construction fill with rubble - domestic (secondary)	habitation debris	east terrace	350E/3	TC	0.000
004-1/8	construction fill with rubble - domestic (secondary)		centre Str. 1-1st-A/B; F1 fill	356M/3, M/4, M/5, M/6, O/2, O/3, O/4, P/3, P/4, Q/2, R/3, R/4	LCI/II	0.726

004-1/9	construction fill without rubble - domestic (secondary)		centre Str. 1-1st-C/D; F2 fill	356M/7, M/8, M/16, R/5, R/6, R/7, R/8	EC/LCI	0.373
004-1/10	habitation debris - domestic (secondary)	construction fill	on north terrace	350D/6, D/7; 356J/3, J/4, K/4	EC-TC	0.382
004-1/11	habitation debris - domestic (secondary)	construction fill	on east terrace	350G/2; 356G/3	TC	0.090
004-1/12	habitation debris - domestic (secondary)	construction fill	on south terrace	356C/4	TC	0.392
004-1/13	habitation debris - domestic (secondary)	construction fill	southeast corner; on south and east terraces	356F/3, F/4, H/7	TC	0.542
004-1/14	habitation debris - domestic (secondary)	construction fill	on west terrace	356L/3	LCI-LCII	0.032
004-1/15	habitation debris - domestic (secondary)	construction fill	below entire structure	356M/9	MP-EC	0.076
004-1/16	soil horizon - buried 'A'		below north terrace	350D/11, D/12	NA	0.083
004-1/17	habitation debris - domestic (secondary)	soil horizon - unknown lens	below entire structure and early habitation debris	356M/10, M/11, M/12	EC	0.432
004-1/18	habitation debris - domestic (secondary)	soil horizon	below unknown lens	356M/13, M/14	MP	0.316
004-1/19	soil horizon - sterile		below buried 'C'	356M/15	NA	0.200
006-1/1	humus - domestic (secondary)		mound area	350K/1, L/1; 355A/1, B/1, C/1, D/1, S/1, S/2	EC-TC	2.044
006-1/2	colluvium - domestic (secondary)	habitation debris	on mound	355A/2, B/2, D/2	LCI-TC	0.216
006-1/3	fall - domestic (secondary)	habitation debris	off south and west face	350K/2, L/2, L/5; 355S/3	LCI-TC	0.393
006-1/4	slump - domestic (secondary)	habitation debris	off west face	350L/6	TC	0.002
006-1/5	construction fill with rubble - domestic (secondary)	habitation debris	north-centre; Str. 1-1st-A; F1 fill	355C/4	TC	0.178
006-1/6	construction fill with rubble - domestic (secondary)		north-centre; Str. 1-1st-B; F1a fill	355C/5	LCII	0.089

006-1/7	constructions fill without rubble - domestic (secondary)		north-centre; Str. 1-1st-C; F2 fill	355C/6	EC/LCI	0.139
006-1/8a	habitation debris - domestic (secondary)	fill	on structure bench	355A/3, B/3, C/2, C/3	TC	0.144
006-1/8b	habitation debris - domestic (secondary)	fill	on south terrace	355D/3, D/4	TC	0.391
006-1/8c	habitation debris - domestic (secondary)	fall	off west face	350L/3, L/4, L/7, L/8	LCII-TC	0.225
006-1/8d	habitation debris - domestic (secondary)	soil horizon - buried 'A'	off south face	355S/4, S/5	GP-TC	0.176
006-1/9	habitation debris - domestic (secondary)	soil horizon - buried 'A'	below str 1	355C/7	ND	0.119
006-1/10a	soil horizon - sterile		off west face	350L/9	NA	0.070
006-1/10b	soil horizon - sterile		off south face	355S/6	NA	0.044
006-1/10c	soil horizon - sterile		below str 1	355C/8	NA	0.055
006-2/1a	humus - domestic (secondary)	colluvium	on mound	355H/1, I/1, I/2	EC-TC	0.824
006-2/1b	humus - domestic (secondary)	fall	off north side	355J/1, J/2, J/3	EC-TC	1.200
006-2/2	colluvium - domestic (secondary)		on structure	355H/2	LCII-TC	0.144
006-2/3a	fall - domestic (secondary)	habitation debris	off east side	355H/3, I/3, I/4, I/5	LCI-LCII	0.284
006-2/3b	fall - domestic (secondary)	habitation debris	off south side	355J/4, J/5	EC-TC	0.264
006-2/4	construction fill with rubble - domestic (secondary)		Str. 2-1st-A; centre-east	355H/8	TC	0.226
006-2/5	constructions fill without rubble - domestic (secondary)		Str. 2-1st-B; centre-east	355H/10	LCII	0.044
006-2/6a	habitation debris - domestic (secondary)		off south face	355H/5, H/7	MP-LCII	0.135
006-2/6b	habitation debris - domestic (secondary)		off east face	355H/4, H/6, H/9, H/15, I/7, I/8	PP-TC	0.556
006-2/6c	habitation debris - domestic (secondary)	buried 'A'	off north face	355I/6, J/6, J/7, J/8, J/9, J/10, J/11	GP-TC	1.067
006-2/6d	habitation debris - domestic		below str.2	355H/11, H/12, H/13, H/14	MP-LCII	0.424

	(secondary)					
006-2/7a	soil horizon - sterile		below str.2	355H/16	NA	0.072
006-2/7b	soil horizon - sterile		off north face	355J/12	NA	0.088
006-3/1a	humus - domestic (secondary)	colluvium	on mound	355L/1, M/1, N/1, P/1	EC-TC	0.468
006-3/1b	humus - domestic (secondary)		off west side	355Q/1, Q/2	LCI-TC	0.204
006-3/2	colluvium - domestic (secondary)	habitation debris, fill	on mound	355L/2, M/2	EC-LCII	0.184
006-3/3	fall - domestic (secondary)	habitation debris	off west side	355P/2, P/3, P/4, P/5, Q/3, Q/4, Q/5	PP-TC	0.882
006-3/4	construction fill with rubble - domestic (secondary)		centre; Str. 3-1st	355N/2	LCII	0.232
006-3/5	habitation debris - domestic (secondary)		off west side	355P/6, Q/6, Q/7, Q/8, Q/9	LCI-TC	0.454
006-3/6	soil horizon - buried 'A'		below str. 3	355N/3	LCI	0.114
006-3/7	soil horizon - sterile		off west side	355Q/10	NA	0.050
006-patio/1a	humus - domestic (secondary)		north side of str. 1	355E/1	EC-TC	0.400
006-patio/1b	humus - domestic (secondary)		centre, around features	355F/1, G/1, O/1, R/1	LCI-III	1.244
006-patio/1c	humus - domestic (secondary)		east side of str. 3	355K/1	LCI	0.168
006-patio/2a	colluvium - domestic (secondary)	habitation debris	north side of str. 1	355E/2	EC-TC	0.288
006-patio/2b	colluvium - domestic (secondary)	habitation debris	centre, around features	355F/2, G/2, O/2	EC-LCII	1.104
006-patio/2c	colluvium - domestic (secondary)	habitation debris	east side of str. 3	355K/2	LCI-LCII	0.096
006-patio/3	construction fill with rubble - domestic (secondary)		patio-1st; centre area	355E/4	LCI/II?	0.082
006-patio/4a	habitation debris - domestic (secondary)	fill	south side near str. 1	355E/3	LCII-TC	0.184
006-patio/4b	habitation debris - domestic (secondary)	fill	north side near str. 2	355G/3, G/4	LCII-TC	0.144

006-patio/4c	habitation debris - domestic (secondary)	fill	centre, near hearth and diagonal alignment	355F/3, F/11	LC	0.069
006-patio/4d	habitation debris - domestic (secondary)	fill	centre, near daub and carbon	355O/3, R/2, R/3	LCII-TC	0.160
006-patio/4e	habitation debris - domestic (secondary)	fill	west side near str. 3	355K/3	LC	0.084
006-patio/5	hearth fill - domestic (secondary)	buried 'A'	Feature 1: firing feature	355F/4, F/5, F/6, F/7, F/8, F/9, F/10	ND	0.089
006-patio/6	daub feature - domestic (de facto)		Feature 2: daub	355O/4, O/5, O/6, O/7, O/8, O/9, R/6	ND	0.084
006-patio/7	carbon feature - domestic (de facto)		Feature 3: carbonized wood	355R/4, R/5	ND; RC date	0.074
006-patio/8	pit fill - domestic (secondary)		Feature 4: post hole	355E/9	ND	0.014
006-patio/9	soil horizon - buried 'A'		north side of str. 1	355E/5, E/6, E/7	ND	0.170
006-patio/10	soil horizon - sterile		north side of str. 1	355E/8	NA	0.058
007-1/1	modern activity backdirt - non-domestic (secondary)		off north side	350Q/1, Q/2, T/1, V/1, V/2; 354D/1, D/2, E/1, E/2, E/3, E/4	EC-TC	3.744
007-1/2a	humus - non-domestic (secondary		on mound	354B/1, C/1, C/2, H/1, Z/1, Z/10, AB/1	EC-TC	2.406
007-1/2b	humus - non-domestic (secondary		off north side	350Q/3, Q/4, Q/6, T/2, T/3, V/3, V/4; 354E/5, E/6, E/7, N/1, N/2, N/3, O/1, O/2, O/3, O/4	EC-TC	2.824
007-1/2c	humus - non-domestic (secondary		off west side	354I/1, J/1, J/2, L/1, L/2	EC-TC	1.636
007-1/2d	humus - non-domestic (secondary		on and slightly off south side	354F/1, G/1, K/1, M/1, Q/1, Y/1, Y/2, AI/1	EC-TC	1.578
007-1/3	colluvium - non-domestic (secondary)	habitation debris, fill	on mound	354B/2, C/3, H/2, Z/2, AB/2	EC-TC	0.671
007-1/4a	fall - non-domestic (secondary)	habitation debris	off west side	354I/2, J/3, J/7, L/3	EC-LCII	0.821
007-1/4b	fall - non-domestic (secondary)	habitation debris, fill	on south side	354G/2, K/2, Q/3, Q/4, Y/3, Y/4, Y/5	PP/EC-LCII	0.986

007-1/4c	fall - non-domestic (secondary)	habitation debris	off north side	350Q/5, Q/7, Q/9, T/4, V/5, V/7; 354D/3, E/8, E/9, N/4, O/5, O/6, O/7, O/8	EC-TC	2.841
007-1/5	slump - non-domestic (secondary)	fill	south face	354Q/6	LCI	0.058
007-1/6	sascab	habitation debris	off north face	350V/8; 354E/11, O/9, O/10, O/17	LCI-TC	0.508
007-1/7a	construction fill with rubble - non-domestic (secondary)	habitation debris	Str. 1-1st-B; centre (below perished bench); F1 fill	354C/4, C/8, C/9, Z/3, Z/4, Z/5, Z/12	LCII	0.648
007-1/7b	construction fill with rubble - non-domestic (secondary)	habitation debris	Str. 1-1st-B; between core face and south bench face; F1 fill	354Z/13	LCII	0.074
007-1/7c	construction fill with rubble - non-domestic (secondary)	F2 FILL; habitation debris (some TC material in top lots)	Str.1-1st-A;F1 fill; south terrace/face	354F/3, G/3, G/4, G/5, K/5, M/2, M/3, M/4, Q/2, Q/5, AI/2, AI/3, AI/4, AI/5	LCII/TC	1.166
007-1/8a	construction fill without rubble - non-domestic (secondary)		Str. 1-2nd-A; centre; F2a-1/2 fills	354C/5, C/10, C/11, C/13, D/13, Z/6, Z/7, Z/8, Z/14, Z/15, Z/16, Z/17	LCI	0.932
007-1/8b	construction fill without rubble - non-domestic (secondary)		Str.1-2nd-A;F2a fills; south terrace/face	354F/4, F/5, F/6, F/7, F/8, F/9, G/6, G/7, G/8, G/9, G/10, G/11, M/5, M/6, M/7, Q/7, AI/6, AI/7, AI/8, AI/9	LCI	1.690
007-1/8c	construction fill without rubble - non-domestic (secondary)		Str. 1-2nd-B?; south terrace; F2c fill	354F/10, F/11, F/12, G/12	EC-LC	0.276
007-1/9	core face stones - non-domestic (secondary)		first course from top; Str. 1-2nd-A; north face	354D/11	EC?	0.125
007-1/10	core face stones - non-domestic (secondary)		2nd, 3rd course from top; Str. 1-3rd-A; north face	354D/12	ND	0.076
007-1/11	construction fill without rubble - non-domestic (secondary)		Str. 1-3rd-A; F2b fill; north side on str.	354D/18, D/19, D/20, D/21	LCI	0.566

007-1/12	floor fill - non-domestic (secondary)		Str. 1-3rd-A south terrace; P4 plaster surface	354Z/22, Z/23	EC	0.052
007-1/13	floor fill - non-domestic (secondary)		Str. 1-3rd-A main platform; P3 plaster surface	354C/16, C/17, C/18	LCI	0.206
007-1/14	floor fill - non-domestic (secondary)		Str. 1-3rd-A adjoined paved surface south side; P2 plaster surface	354G/13	LCI	0.053
007-1/15	facing stones - non-domestic (secondary)		Str. 1-3rd-B/C? north face	354D/4, D/5, D/6	EC?	0.151
007-1/16	backing masonry - non-domestic (secondary)		Str. 1-3rd-B/C? north face	354D/7, D/8, D/9, D/10, N/5	LCI	0.438
007-1/17	core face stones - non-domestic (secondary)		4th-7th course from top; Str. 1-3rd-B/C?; north face	354D/14, D/15, D/16, D/17	LCI	0.434
007-1/18	construction fill with rubble - non-domestic (secondary)		Str. 1-3rd-B/C? north side of structure; F3 fill	354D/22, D/23	LCI	0.214
007-1/19	floor fill - non-domestic (secondary)		Str. 1-3rd-B/C? adjoined paved surface south side; P1 plaster surface	354F/14	EC	0.012
007-1/20	construction fill without rubble - non-domestic (secondary)		Str. 1-4th on structure; F4 fill	354D/24, F/13	EC/LCI	0.182
007-1/21	unknown - non-domestic secondary	all levels; from tree fall	Str. 1 top centre	354Z/19	EC-LCII	0.344
007-1/22a	habitation debris - non-domestic (secondary)	fill	Str. 1-1st-A/B top structure	354B/3, Z/11	LCII	0.141
007-1/22b	habitation debris - non-domestic (secondary)	fill	Str. 1-1st-A north terrace	354F/2	LCII-TC	0.180
007-1/22c	habitation debris - non-domestic (secondary)		off west face	354J/4, J/5, J/6, J/8, L/4, L/5	EC-LCI	0.860

007-1/22d	habitation debris - non-domestic (secondary)		off north face, above sascab = cluster of fallen on structure material	350V/6	LCI-II	0.176
007-1/22e	habitation debris - non-domestic (secondary)		off north face	350Q/8; 354E/10, E/12, E/13, O/11, O/12, O/13, O/14, O/15	EC-TC	1.497
007-1/23	carbon feature - non-domestic secondary (de facto)		off north face	354O/16	TC; AMS date	0.028
007-1/24	horizontal debris unknown surface - non-domestic (secondary)		Str. 1-2nd-A/B?; centre	354C/12	LCI	0.112
007-1/25	on floor material/offering - non-domestic (primary)	loose fill above	Str. 1-3rd-A on P3 and P4 surfaces	354C/6, C/7, C/14, C/15, Z/9, Z/18, Z/20, Z/21	PP-LCI: heirloom pieces?	0.545
007-1/26	soil horizon - buried 'A'		under Str. 1	354D/25, D/26	PP?	0.278
007-1/27a	soil horizon - sterile		under Str. 1	354D/27	NA	0.092
007-1/27b	soil horizon - sterile		off north face	354E/14	NA	0.070
007-1/27c	soil horizon - sterile		off west face	354J/9, L/6	NA	0.168
007-2/1a	humus - non-domestic (secondary	clay fill	on mound	354R/1, R/2, R/3, S/1, S/2, T/1, T/2, U/1, U/2, V/1, V/2, AA/1, AC/1, AD/1, AE/1	EC-LCI	3.428
007-2/1b	humus - non-domestic (secondary		on north terrace area	354AF/1, AF/2, AF/3	LC	0.372
007-2/1c	humus - non-domestic (secondary	clay fill	off south side	350R/1, U/1; 354W/1, W/2, AG/1, AG/2, AG/3, AH/1, AH/2, AJ/1, AJ/2, AK/1	EC-LCI	2.700
007-2/2	colluvium - non-domestic (secondary)		on north terrace area	354AC/2, AC/3, AC/4, AF/4	EC-LCI	0.158
007-2/3a	fall - non-domestic (secondary)	clay fill	on mound	354T/3, T/4, U/3, V/3, V/4, V/5, AA/2, AD/2, AE/2	PP?, EC-LCI	1.382

007-2/3b	fall - non-domestic (secondary)	clay fill, habitation debris	off south side	350R/2, R/3, U/2; 354W/3, W/4, AG/4, AG/5, AG/9, AG/10, AG/11, AG/12, AG/13, AG/14, AH/3, AH/4, AH/5, AH/7, AJ/3, AJ/4, AK/2	EC-LCI	3.623
007-2/4	slump - non-domestic (secondary)		along south face	354W/9, AG/7, AG/8	EC/LCI	0.343
007-2/5a	construction fill without rubble - non-domestic (secondary)		north terrace; F1 fill; Str. 2-1st-A	354AC/5, AC/6, AC/7	LCI	0.160
007-2/5b	construction fill without rubble - non-domestic (secondary)		north terrace; F2 fill; Str. 2-1st-B?	354AC/8, AC/9	LCI	0.091
007-2/6	backing masonry - non-domestic (secondary)		Str. 2-1st-A/B south face	354W/5, W/6, W/7, W/8, W/10, AH/6	EC-LC	0.777
007-2/7a	construction fill without rubble - non-domestic (secondary)		Str. 2-1st-A; west end of str	354U/4, U/5	LCI	0.220
007-2/7b	construction fill without rubble - non-domestic (secondary)		Str. 2-1st-A; centre of str	354V/6, V/7	LCI	0.244
007-2/8	construction fill without rubble - non-domestic (secondary)	informal surface?	Str. 2-2nd-A; centre of str; T1 surface	354V/10, V/11, V/12	LCI	0.061
007-2/9	floor fill/ construction fill without rubble - non-domestic (secondary)		disturbed plaster (P1) surface; Str. 2-2nd-B; centre of str	354V/14	LC	0.042
007-2/10	floor fill - non-domestic (secondary)		limestone cobble surface (C1); Str. 2-2nd-C; centre of str	354V/16	LCI	0.018
007-2/11	construction fill without rubble - non-domestic (secondary)	informal surface?	Str. 2-2nd-D; centre of str; &2 surface	354V/18	EC	0.115
007-2/12	habitation debris - non-domestic (secondary)		off south face	350R/4, U/3, U/4, U/5; 354W/11, W/12, AH/8, AJ/5	EC-LCI	0.854

007-2/13	carbon feature/ habitation debris - non-domestic (secondary)		off south face; may be associated with Precolumbian looting	354AG/6	ND	0.025
007-2/14	horizontal debris unknown surface - non-domestic (secondary)	fill	Str. 2-2nd-A on surface (T1 surface)	354V/8, V/9	LCI	0.204
007-2/15	on floor material - non-domestic (secondary)	fill	Str. 2-2nd-B on plaster surface (P1)	354V/13	LCI, LCII (codex-style sherd)	0.000
007-2/16	on floor material - non-domestic (secondary)		Str. 2-2nd-C on limestone surface (C1)	354V/15	LCI	0.000
007-2/17	horizontal debris unknown surface - non-domestic (secondary)	fill	Str. 2-2nd-D on surface (T2)	354V/17	LCI	0.009
007-2/18	habitation debris - non-domestic (secondary)		on buried 'A' occupation surface below structure	354V/19	PP-EC	0.075
007-patio/1	modern activity backdirt - non-domestic (secondary)	humus	off south edge of formal paved area	350Y/1, Y/2, Y/3, Y/4, Y/5, Y/6, Y/7, AA/1, AA/2	EC-LCI	1.600
007-patio/2a	humus - non-domestic (secondary		on formal paved area near south side Str. 1	354P/1, P/2, X/1, X/2, X/3	EC-TC	0.936
007-patio/2b	humus - non-domestic (secondary		off south edge of formal paved area	350AA/3	EC-LCII	0.180
007-patio/2c	humus - non-domestic (secondary	backdirt	on west side of formal paved area	354A/1, A/2	EC-LCI	0.592
007-patio/3a	colluvium - non-domestic (secondary)		on formal paved area near south side Str. 1	354P/3, X/4	EC-TC	0.148
007-patio/3b	colluvium - non-domestic (secondary)	habitation debris	on west side of formal paved area	354A/3	EC-LCI	0.184
007-patio/4	fall - non-domestic (secondary)		off south edge of formal paved area	350AA/4	EC-LCII	0.080

007-patio/5a	construction fill with rubble - non-domestic (secondary)	buried 'A'	on west side of formal paved area	354A/4, A/5, A/6	LCI	0.341
007-patio/5b	construction fill with rubble - non-domestic (secondary)		on formal paved area near south side Str. 1	354K/6	EC?	0.082
007-patio/6a	habitation debris - non-domestic (secondary)	fall	off south edge of formal paved area	350AA/5, AA/6, AA/7, AA/8	LCI-LCII	0.346
007-patio/6b	habitation debris - non-domestic (secondary)		on formal paved area near south side Str. 1	354K/3, K/4, X/5	LCI-TC	0.334
007-patio/6c	habitation debris - non-domestic (secondary)		near rock "altar" on formal paved area near south side Str. 1	354P/4	EC/LCI-TC	0.224
007-patio/7	habitation debris/ offering - non-domestic (secondary)		within "rock altar"	354P/5	LCI	0.020
007-patio/8	soil horizon - buried 'A'		below paved area near south side Str. 1	354K/7, K/8, K/9	PP(?)-LCI	0.332
007-patio/9a	soil horizon - sterile		below paved area near south side Str. 1	354K/10	NA	0.090
007-patio/9b	soil horizon - sterile		off south edge of formal paved area	350AA/9	NA	0.090
060-1/1a	humus - domestic (secondary)		southeast corner	358V/1, W/1, Y/1, AA/1	LCI	0.536
060-1/1b	humus - domestic (secondary)		centre and south side	350AB/1; 358B/1, C/1, D/1, U/1, Z/1	LCI	0.664
060-1/1c	humus - domestic (secondary)		southwest corner	358A/1, I/1, Q/1	LCI-LCII	0.432
060-1/2	colluvium - domestic (secondary)	habitation debris, fill	off south face	350AB/2	EC-LCI	0.100
060-1/3	fall - domestic (secondary)	fill	centre and southwest corner	358D/2, I/2, Q/2	EC-LCII	0.320
060-1/4	construction fill with rubble - domestic (secondary)		centre Str. 1-1st; F1 fill	358C/2, C/3, C/4, D/3, D/4, D/5, D/6, D/7	LCII	0.707

060-1/5	construction fill with rubble - domestic (secondary)		centre Str. 1-2nd; F2 fill	350AB/8; 358C/6	LCI	0.041
060-1/6	construction fill with rubble - domestic (secondary)		centre Str. 1-3rd-A; F3 fill	358C/8	LCI	0.034
060-1/7	construction fill without rubble - domestic (secondary)	mix F3(358c/11) and F4 fill	centre Str. 1-3rd-B; F4 fill	358C/10, C/11, C/12, C/13	EC/LCI, TC (intrusive pit)	0.192
060-1/8	habitation debris - domestic (secondary)		informal surface; centre Str. 1-2nd	358C/5, D/8	LCI	0.000
060-1/9	habitation debris - domestic (secondary)		informal surface; centre Str. 1-2nd	358C/7	LCI	0.000
060-1/10	on floor material - domestic (secondary)		plaster (P1, P2) surface; centre Str. 1-3rd-A	358C/9	EC/LCI	0.042
060-1/11	habitation debris - domestic (secondary)	buried 'A'	centre below str. 1; T3 surface	358C/14, C/15, C/16	EC/LCI	0.062
060-2/1	humus - domestic (secondary)		on mound	350AD/1, AD/3, AE/1; 358O/1, P/1, S/1	EC-LCI	1.019
060-2/2	colluvium - domestic (secondary)	fill	on mound	350AD/2, AE/2, AE/3; 358S/2, S/3	MP, LCI	0.700
060-2/3	construction fill with rubble - domestic (secondary)		east side of structure; Str. 2-1st; F1 fill	350AD/4; 358P/2	EC	0.058
060-2/4	habitation debris - domestic (secondary)	fall, fill	off east face	350AE/4, AE/5, AE/6, AE/7, AE/8, AE/9, AE/10, AE/11	EC-LCI	0.521
060-2/5	soil horizon - sterile		off east face	350AE/12	NA	0.022
060-3/1a	humus - domestic (secondary)		on mound	358G/1, AB/1	LC	0.184
060-3/1b	humus - domestic (secondary)		off south side	358H/1, M/1, R/1, X/1	EC-LCII	0.716
060-3/2a	colluvium - domestic (secondary)	habitation debris, fill	oh mound	358G/2	EC-LC	0.029
060-3/2b	colluvium - domestic (secondary)	habitation debris, fill	off south side	358H/2, H/3, M/2, M/3, X/2	EC-LCII	0.265

060-3/3	construction fill with rubble - domestic (secondary)		Str. 3-1st-A; F1 fill	358G/3, AB/2	LCII	0.130
060-3/4	construction fill with rubble - domestic (secondary)		Str. 3-1st-B; F2 fill	358G/4, AB/3, AB/4	LCI	0.161
060-3/5	construction fill with rubble - domestic (secondary)		south terrace; F2 fill	358H/5, H/6	LCI	0.020
060-3/6	pit fill - domestic (secondary)	habitation debris	Feature 2 on south terrace	358H/4	ND	0.027
060-3/7	habitation debris - domestic (secondary)	fill	Around Feature 2; south terrace	358H/7	LCI	0.000
060-3/8	soil horizon - buried 'A'	fill	below Str. 3	358AB/5	EC	0.082
060-patio/1a	humus - domestic (secondary)		south side of str. 1	358E/1	ND	0.164
060-patio/1b	humus - domestic (secondary)		north side of str. 3	358F/1, J/1, K/1	EC-LCI	0.424
060-patio/1c	humus - domestic (secondary)		west side	358L/1, N/1, T/1	EC-LC	0.668
060-patio/2	colluvium - domestic (secondary)	fill	north side of str. 1	358E/2, E/3	LCI	0.094
060-patio/3a	construction fill with rubble - domestic (secondary)	habitation debris	patio-1st-A; south of str. 1	350AB/3	LCI/II	0.098
060-patio/3b	construction fill with rubble - domestic (secondary)	habitation debris	patio-1st-A; north of str. 3	358F/2, F/3, F/5, J/2, K/2, K/3	LCI/II	0.341
060-patio/3c	construction fill with rubble - domestic (secondary)	habitation debris	patio-1st-A; west side	358L/2	LCI/II	0.022
060-patio/4	construction fill with rubble - domestic (secondary)		patio-1st-B; south of str. 1; terrace	350AB/4	LCI	0.336
060-patio/5	pit fill - domestic (secondary)	habitation debris	Feature 1; centre of patio	358F/9	ND	0.004
060-patio/6a	soil horizon - buried 'A'	fill	south side of str. 1	350AB/5, AB/6, AB/7	MP, EC-LCI	0.322
060-patio/6b	soil horizon - buried 'A'	fill	centre	358F/4, F/6, F/7, F/8, F/10	EC-LCI	0.281
060-patio/7	soil horizon - sterile		south side of str. 1	350AB/9	NA	0.126

077-1/1a	humus - domestic (secondary)	fill, habitation debris	on mound	359A/1, C/1, E/1, H/1, K/1	EC-LCII	0.930
077-1/1b	humus - domestic (secondary)	habitation debris	off north face	359F/1	ND	0.180
077-1/1c	humus - domestic (secondary)	habitation debris	off west face	359B/1, J/1	LCII	1.104
077-1/1d	humus - domestic (secondary)	fall	off south face	350Z/1; 359D/1, I/1	EC-LCII	1.312
077-1/1e	humus - domestic (secondary)		off east face	359G/1	EC-LC	0.284
077-1/2	fall - domestic (secondary)	habitation debris	off south face	350Z/2, Z/3	LCI-LCII	0.256
077-1/3	construction fill with rubble - domestic (secondary)	west-centre	west-centre of structure (F1 fill)	359E/2, E/3	LCI/LCII	0.324
077-1/4a	habitation debris - domestic (secondary)		off north face	359A/2, F/2, K/2	EC-LCII	0.545
077-1/4b	habitation debris - domestic (secondary)		off west face	359B/2, I/2, J/2	LCII	0.453
077-1/4c	habitation debris - domestic (secondary)		off south face	350Z/4; 359D/2	LCI-LCII	0.301
077-1/5	habitation debris - domestic (secondary)	fill and soil horizon - buried 'A'	below structure; prepared construction surface (T1)	359E/4, E/5	ND	0.366
077-1/6	soil horizon-sterile		off south face	350Z/5	NA	0.058
160-1/1	surface collection/midden - domestic (secondary)		3.8m radius circle	357A/1, B/1	LCI-TC	0.000
160-1/2	plough zone/midden - domestic (secondary)			357A/2, A/3, A/4, A/5, A/6	LCI-TC	0.330
160-1/3	midden - domestic (secondary)			357A/7, A/8	LCI-TC	0.096
160-1/4	midden - domestic (secondary)	buried 'A'		357A/9, A/10, A/11, A/12	LCI-TC	0.420
160-1/5	soil horizon-sterile			357A/13, A/14	NA	0.210

Independent Excavation Reports

The following are a series of independently written reports by MVAP project members that have direct implications on the work done in the BVS zone and presented in this dissertation. Full permission was gained from each author to reproduce the reports. Additional reports are found in Appendix II and VI.

Independent Report #1:

<u>BVS-037 - Investigations of a Daub structure</u>

Christina Dykstra, University of Wisconsin-Madison

Pottery sherds and lithics are the most common artifacts at most archaeological sites, and thus they are important sources of information about the past on topics including craft production, economy, trade relations, domestic activities, social signaling, and affiliation for ancient civilizations like the Maya. Studies of Maya decorated ceramics has focused on their role as markers of elite status, their use in gift exchanges, and their utility for building ceramic chronologies (Gifford 1976; Lincoln 1985; Smith 1955). We have recovered very little archaeological evidence of ceramic production locales in the Maya lowlands (Lucero 2001) and more research is needed on the organization of craft production in the Maya lowlands, specifically into the relation of craft production and urban centers and their role in the larger political economy. Excavations during the summer field season of 2008 were undertaken with the goal of recovering more data about the exact nature of ceramic production. The settlement region around Buenavista del Cayo was thought to be promising locale for this research, given the proximity of the household region to the ceremonial and political center of the site. A number of features were recorded during excavations in the settlement area around the center of the site, including what appeared to be a daub structure, a few distinctively clustered groups of artifacts, a very large cluster of artifacts that likely represented a midden, and evidence of restricted firing activity. A number of functional possibilities were suggested for the site and this report will evaluate each of the possibilities in light of the data that was recovered during excavation and the subsequent analysis.

<u>Functional Possibilities</u>

A number of possibilities for the daub structure and surrounding features were considered. Functions suggested include use as a ceramic kiln, an area for the heat-treating of lithic materials, use as a household oven, use as an oven for multiple households, or the existence of the structure as a result of a catastrophic or natural burn. A number of correlates were established for each of these functions and excavations and analyses were undertaken in an effort to identify which correlates might be present and what the structure under investigation may have been.

If the structure served as a kiln for the firing of ceramics, a number of material correlates were identified as a method for evaluating this function (Stark 1985; Underhill 2003). While there have not but a lot of kilns found in the region, the few excavated thus far a possible blueprint for the layout of a kiln structure (Lopez Varela et al. 2001). The necessary raw materials, specifically clay and water, should be located within close proximity. Among the material remains, the presence of a kiln is often indicated by a high number of wasters (the remains of vessels that failed during the firing process), ceramics sherds, and possibly the tools that would have been used to work the clay, such as burnishing stones, molds or bases, paddles, etc. Finally, if the stratigraphy has been relatively well preserved, there should be a layer of ash or charcoal left behind as a result of the use of organic materials as kiln fuel.

The second possibility, that the structure served as a center for the heat-treating lithics was also considered. If the site served as a locus for treating lithics certain material correlates could also be expected. Raw material sources need not be located nearby but there should be some evidence of raw materials or cores transported to the site prior to heating. Lithics exhibiting the characteristics of heat-treatment should be present, such as a greasy or slightly opaque luster on the surface. Lithic material and debitage that had been heat-treated should also have more uniformity in cleavage patterns (Epstein 1979; Flenniken and Garrison 1975). Finally, if any sort of lithic production or pre-production treatment was going on, the site should have a fairly high proportion of lithic debitage and/or evidence of unsuccessful heating attempts, which can result in the explosion or disintegration as a result of direct exposure to fire (Purdy 1982).

The possibility of the structure serving as an oven, either for a single household or a group of households, should be identifiable through similar correlates. In both cases, ash or charcoal should be preserved in the stratigraphy as a result of the application of organic-based fuels. It was also expected that there should be some ceramic and lithic remains that would have served in both the processing and cooking of food resources. If the structure served as a household oven then there should be a household in close proximity. If it served as an oven for group of households it should be located in an area that would have made it accessible to a number of different households. It is also possible that if any trash or middens were associated with the structure they would reflect the number of users of an oven, with the likelihood that a midden associated with a single household being smaller than a midden associated with a number of households.

Finally, the likelihood that the structure was not the result of deliberate action was also considered. If the daub was solidified as a result of the catastrophic burning of a structure then this should be evidenced by the material remains, with a high mixing of a number of artifact classes and their arrangement in a fashion that would suggest the structure burned suddenly and without an opportunity to clear out any possessions that might have been located within. It was also possible that, in this case, some sort of architectural remains should be present. Finally, the evidence of burning should be spread over a wider area, since in a catastrophic or natural burn there would have been no opportunity to control the flames.

In order to evaluate all of these possibilities, horizontal and vertical excavation of the area were undertaken, with a total of three 2 x 2 units opened up (Op 350 P, Op 350 W, Op 350 AG). The excavation of three 2 x 2 units allowed for the full exposure of the daub structure and the surrounding area so that any features associated with the daub could be identified and analyzed as well (Fig. 1.). All artifacts collected were categorized, weighed and counted in order to get an idea about the types of activities the structure represented. Chemical analyses of the daub, ceramics and some soil samples are ongoing in order to get a more fine-grained understanding of the firing technologies utilized and how it may relate to the activities that occurred at this site.

Excavation Methods

Early excavations at the site identified the presence of high concentrations of daub and an associated concentration of raw clay in very close proximity. The area in question was located approximately 200 m from the center of Buenavista del Cayo and previous survey and excavations had identified a number of possible house mounds in the area (Peuramaki-Brown

2008). All operations were excavated using arbitrary levels or until a soil change was noted and all matrix was screened using ¼ inch mesh.

Operation 350 P

This was the original 2 x 2 operation in which the presence of a daub anomaly was first identified. When early lots uncovered the presence of a daub outline in the southern half of the operation, the decision was made to split the unit into two 1 x 2 units, in order to concentrate on fully uncovering what was represented by the daub. After the surrounding matrix was removed it became clear that the southern 1 x 2 held the majority of the daub, forming a ¼ circle arc, moving from the west wall to the south wall of the unit. The structure stretched out approximately 60 cm from the SW corner and approximately 120 cm north of the southwest corner. The structure appeared to be solid daub all the way through with the exception of a 15 x 15 cm void located directly in the SW corner (Fig 2). This void at the center of the daub structure was defined as a feature and excavated as a separate lot in order to see if there was anything indicative of firing activity, acting on the assumption that if the entire daub structure represented a formal kiln or oven this area would have been the firing chamber.

In order to identify the nature of the daub, the decision was made to put in a trench along the southern wall of the unit. This allowed for the determination of the depth of the daub, the identification of the amount of variety that might have existed within the daub itself and the definition of the stratigraphy. All daub removed from the trench was collected, with very few other artifact types being recovered, with the exception of a few examples of carbonized materials, possibly burnt daub. The only artifact of note collected from the trench, other than daub, were two metate fragments. The profile revealed by the trenching established the that the daub structure was approximately 25 to 30 cm in height and that there appeared to be a few different types of daub present. The outer layer of the daub structure was composed of material that exhibited a light orangish-red color and did not break apart easily. Additionally, this daub was also more likely to present as separate chunks of material that had been compressed together to form the outer layer of the structure. As the daub moved more toward the SW corner it took on a much stronger reddish hue and become much more solid in context but would also crumble much more easily with the application of pressure. Between the inner and outer layers was a more transitional layer that tended to be a light red color and represented a mixture of textures and forms from the two layers that bracketed it. The inner layer was tentatively identified as more in-situ daub and we began to remove the daub horizontally in an effort to identify the extent of this possibly in-situ material.

As mentioned previously, the southwest corner was excavated separately from the larger daub structure, in order to determine if evidence was present that could indicate whether or not it served as a firing chamber of some sort. Artifacts of all classes were very scarce, with the most notable aspect of the feature consisting of a soil change, with the upper portion consisting of a brownish clay-y soil (Munsell 7.5 YR 4/2), consistent with the surrounding matrix, transitioning to a much more silty grayish soil (Munsell 2.5 Y 7/1) and eventually bottoming out in a darker gray soil (10 YR 4/2). A limited amount of artifacts were collected throughout the excavation of the feature, including ceramics, lithics and some carbonized materials/daub.

Excavations also revealed a concentration of yellowish clay at the midpoint along the east wall, arranged in a very circular, almost ball-like, pattern. Samples of the clay were collected for further analysis.

Operation 350 W

Operation 350 W was opened up directly south of Op 350 P. The goal of this operation was to determine if the daub structure continued south and to discover if there was anything associated with the structure along its southern border. A number of possible features presented themselves fairly early in the excavations including a concentration of cobbles along the west wall and northwest corner of the unit (an area adjacent to the feature in the southwest corner of Op 350 P), the beginnings of a daub outline along the north wall (adjacent to the southern border of the daub structure in Op 350 P), and a heavy concentration of a yellowish-brownish clay-like (Munsell 10 YR 5/4) material in the southwest corner of the unit (Fig. 3). Early lots in this unit recovered more artifacts then had been found in comparable levels of OP 350 P, including a ceramic cluster and a ceramic and daub cluster, located approximately 80 cm south of the northwest corner. As a result of these artifact clusters, the beginning presence of daub and the concentration of cobbles in the west/northwest corner of the unit the decision was made to divide the unit and focus on a 1 x 2 area along the north wall, beginning with Lot 3.

Through subsequent lots it became apparent that while there was daub along the north wall of the unit it was not arranged in any sort of discernible pattern and it did not exhibit the contiguous nature as the daub in Op 350 P. The excavations along the north wall confirmed the extent of the daub was largely limited to Op 350 P, with the daub in Op 350 W likely representing some sort of slump or wall fall brought about by formation processes. As a result of being able to successfully define the outline of the daub structure the subsequent excavation of the unit focused on the clay in the southwest corner, the cobbles along the west wall and efforts to discover if any of the materials in the northwest corner of OP 350 W could be associated with the possible firing chamber entrance of the daub structure from the southwest corner of Op 350 P.

As excavations continued in Op 350 W it quickly became apparent that the cluster of cobbles identified in the north wall were arranged both horizontally and vertically. Cobbles of differing sizes and materials were embedded in the west wall, extending approximately 70 cm south from the northwest corner before beginning to slope down and ending at approximately 130 cm from the northwest corner. The materials primarily of non-descriptive cherts, several pieces of limestone and quartz, and a few cobbles that appeared to be burnt and fire-cracked, with ceramics interspersed throughout the cobbles. The cobbles, while clearly clustered along the west wall, were not arranged in any sort of linear pattern or suggestive of a wall of any sort. Additionally, a few different soil types were present, with an area of blackish soil in the upper northwest corner (7.5 YR 2.5/1) and a grayish lens (10 YR 6/2) near the bottom, set in a larger brownish matrix (10 YR 5/3).

The intrusive appearing yellowish clay material in the southwest corner was excavated starting with Lot 7. By the time all the material was removed it was determined that the clay material extended approximately 60 cm. Only a very limited amount of ceramics and lithics were recovered from the upper portion of the clay, with no artifacts being recovered from the bottom portion.

Overall, the stratigraphy of the west wall was complex (Fig. 4). The brownish matrix in which the cobbles were mostly embedded sloped down with the cobbles and ended rather abruptly at 120 cm out from the north wall. At the base it butted up against a olive-yellow clay-y soil (2.5 Y 6/6) and higher up in the wall against a yellowish-brown clay-y loam (10 YR 5/4). Both of these soil types blended into another change at approximately 165 cm south of the northwest corner – a brown silty loam (10 YR 5/3) that had been revealed with the excavation of the clay pile in the southwest corner.

The final goal of OP 350 W was to see if there was any material in the northwest corner that appeared to be directly related to the possible firing chamber identified in Op 350 P and if those materials could assist in either confirming or denying the function of the structure. Other than the ceramic cluster and burnt rocks referred to earlier and found some distance away from the north wall, nothing else was recovered. However, the removal of the matrix along the north wall did allow for a clearer view of the microstratigraphy of the area directly below the firing chamber to be achieved, showing several different layers of ash and burnt materials intersperses between layers of daub (Fig. 5).

Operation 350 AG

Op 350 AG was opened up along the west wall of Op 350 P to see if the daub feature continued west and to identify any other associated features. Within the first 10 cm it began to appear as if there were associated finds. A large layer of cobbles and rocks came up across the entire 2 x 2, with the greatest concentration in the east half, the portion directly adjacent to Op 350 P. Because of the extent of the cobbles (and the fast approaching end of the field season), the decision was made to focus on a 1 x 2 area along the east wall of Op 350 AG. This would allow for a more focused investigation of the daub into Op 350 AG and any materials directly associated with it.

This strategy allowed for the definition of the daub in the unit. The structure appeared to continue in the circular pattern first identified in OP 350 P, extending out approximately 25 cm from the east wall before curving back to the southeast corner, ending 15 to 20 cm before the southeast corner and roughly aligning with the void in the daub identified in Op 350 P. Additionally, the matrix that was removed from the southeast corner of the unit was similar in color (5 Y 2.5/1) with that identified in the southwest corner of OP 350 P. A few ceramics and lithics were recovered from the southeast corner but, as with the southwest corner of Op 350 P, the area seemed to be primarily a soil fill with a few pieces of carbonized daub, along with some small limestone fragments and a few burnt rock fragments at the base of the southeast corner. As excavations continued down in the southeast corner it also became clear that the same matrix transitions first identified in the southwest corner of Op 350 P were present in the southeast corner of OP 350 AG, with a silty, grayish soil present (2.5 Y 7/2).

At the same time, excavations continued in an effort to more clearly define the border and nature of the daub in Op 350 AG. Excavations along the western border of the daub in OP 350 AG recovered a large number of artifactual remains, easily the largest such concentration of remains found thus far. Along with the expected loose pieces of daub, ceramics, lithics, groundstone fragments, burnt cobbles, and a few fragments of obsidian were all recovered (Fig. 6). Excavations along the western border of the daub continued until the bottom of the structure could be identified, which was determined to be roughly equivalent with the bottom of the daub structure as defined in OP 350 P. Additionally, the high concentration of artifacts from the area decreased and eventually petered out as the bottom of the daub structure was reached.

With the complete outline of the daub determined and the number of remains recovered in association with it, the decision was made to try and bring the rest of OP 350 AG to the same level as the bottom of the daub structure to ensure that no other associated features or remains were overlooked. This proved to a fortuitous choice as yet another soil anomaly was identified in the northern half of Op 350 AG. An area of heavily carbonized soil, located approximately 80 cm west of the east wall of Op 350 AG became apparent. Excavation revealed a circular burn area approximately 25 cm in diameter and 20 cm in height, the bottom of which was roughly equivalent in elevation with the bottom of the daub structure. Quite a few ceramics and lithics came from the upper portion of the burned matrix, gradually decreasing at the bottom of the feature was reached.

Artifact Analysis

Daub:

The daub represents the largest category of material collected from Op 350 P and Op 350 W, with a few different permutations of daub being recovered, with differences identified both in terms of color and texture. The outer layer of daub collected from Op 350 P and all the daub collected from Op 350 W was yellowish-red in color (5 YR 7/6), with a rough, almost popcorn-kernel like appearance. All of the daub of this color and form was located along the perimeter of the daub structure. In Op 350 P the daub transitioned to a type that was more light red in color (2.5 YR 6/8), representing an inner zone between the outer perimeter of the structure and the layer immediately adjacent to the firing chamber. The last layer, the one directly surrounding the inner chamber tended to be a much deeper and consistently red color (2.5 YR 5/8). This material was less irregular in appearance and was siltier in texture, crumbling to the touch in a way that the two other types of daub did not. Throughout all the different types of daub, specimens with burning were present, with the highest proportion of burnt daub being located in the inner most layer. The majority of the daub collected came from Op 350 P, where the majority of the structure was located, with over 42,000 gr of daub collected from that unit alone. By comparison, a little over 6000 gr of daub was collected from Op 350 W and significantly less from Op 350 AG.

Ceramics:

For all three units, the majority of ceramics collected were non-diagnostic body sherds. Additionally, most of the sherds appear to be calcite tempered, with very large-grained petrofabrics and very few ash-tempered wares present. Very few ceramics (less than 100) were collected from the entire excavation of Op 350 P. More ceramics were collected from both Op 350 W and 350 AG, with the majority of ceramics for Op 350 W collected from the area just south of opening for the firing chamber identified in Op 350 P, although it should be noted that the majority of the ceramics that were collected from Op 350 W were located at an elevation that would have been several centimeters above the bottom of the daub structure or in association with the large cobble concentration identified along the west wall of the unit.

As a result of the non-diagnostic nature of most of the sherds and the recovery of the majority of ceramics in association with the midden, no chronology can be assigned to the site on the basis of ceramics. Additionally, the inability to assign any types to the majority of the sherds limits the ability to analyze whether any particular types are over-represented in the recovered ceramics. Additional analysis of the ceramics also failed to identify any sherds that could be classified as sherds, base molds or any other types of production tools.

Lithics

The majority of lithics recovered came from Op 350 W and Op 350 AG. For OP 350 W the highest proportion of lithic material was recovered in association with the cobbles in the West wall. Preliminary analysis of the lithics recovered from OP 350 W failed to identify any formal tools, with the lithic assemblage being composed overwhelmingly of debitage and assorted flakes. The same situation held true for Op 350 AG, with the majority of the lithics recovered from the area directly west of the border of the daub structure identified in that unit. As with ceramics, few lithics were recovered from Op 350 P. A small amount of heat treated lithics were recovered, primarily from Op 350 W but those were the exception and all were very closely associated with what has since been identified as the center of the firing chamber.

Groundstone

A total of six groundstone fragments were recovered. Two metate fragments were recovered from the trenching that was done into the daub structure in OP 350 P, one was recovered from Op 350 W, recovered from the same lot that featured the greatest number of ceramics and lithics recovered from that unit, and two metate fragments and one mano fragment were recovered from the large cluster of material on the western edge of the daub structure in Op 350 AG.

Obsidian

Obsidian was categorized and analyzed separately from the other lithics. Throughout all three units, two pieces of obsidian were identified. Both were recovered from Op 350 AG and were associated with the cluster along the western border of the daub,. The first was a small black obsidian debitage flake and the second a piece of green obsidian, which was identified as the medial portion of an obsidian blade.

<u>Discussion</u>

Based on the evidence collected and analyzed thus far some preliminary interpretations of the different features identified in the three operations can be offered. It is clear that the daub represents a formal structure of some sort, with the center area serving as a firing chamber. The majority of activities that did take place at the site appear to have taken place to the south of the daub structure, in OP 350 W. The large concentration of artifacts located along its western border, in OP 350 AG, was most likely a midden. Finally, it is possible that the circular carbonized area identified in the northern half of OP 350 AG represents an associated prep area. The question remains, however, is what specific function did the daub structure serve and how does that relate to the other associated features that have been identified?

In order to evaluate function the results of the excavations and analyses were examined in light of the expected correlates for different activities. The easiest possibilities to eliminate at this point are that the site represents the results of either a catastrophic or a natural burn. Correlates for a catastrophic burn include a mix of many different artifact types, in a largely in-situ context as a sudden burn would not have allowed for materials to be removed, and widespread evidence of burning. None of these conditions are present. The artifacts that were recovered from the three operations were overwhelming concentrated in two areas – the areas just south of the structure, near the opening of the firing chamber, and in the large midden located just west of the structure. Additionally, all evidence of burning is restricted to one very specific area, namely the center of the daub of the firing chamber, with the exception of carbonized area in the northern half of Op 350 AG, which will be addressed in more depth later. Additionally, experiments done while in the field indicate that the formation and compaction of the daub was not a natural event. The soil in the area is very clay-y and does naturally form daub when fire is applied. However, the daub formed through such processes is much different than the daub recovered from the site. Examples of daub that was formed at the site after fire moved through the area were very different from the daub recovered from OP 350 P, 350 W and 350 AG. The daub that formed naturally was a much darker brown (7.5 YR 4/3), was naturally much smaller in size and crumbled easily at the touch, all characteristics that do not apply to the daub recovered during excavations.

The next possibility that was evaluated was whether the structure served as a ceramic kiln. If the structure served as a kiln, expected correlates include a structure conducive to the firing of ceramics, nearby resources, the presence of tools associated with ceramic production, the presence of wasters as a result of failures in the firing processes and clear evidence of burning. Very few of these correlates are actually present at the structure. The raw clay identified in OP 350 P and OP 350 W clearly could have served as a raw material source and the firing chamber presents evidence for multiple firing episodes but those are the only correlates that are met. The interior firing chamber of the structure is not as large as one would expect if the structure represented a formal kiln structure, measuring approximately 25 to 30 cm at its widest. Given the amount of time and labor investment the construction of a kiln represents, such a small firing chamber was unlikely to be an efficient way to fire ceramics. Additionally, analysis of the artifacts did not identify any items that could have been used as tools in ceramic production – no burnishing stones or other finishing implements, no base molds, etc. Analysis of the ceramics also did not identify any wasters. Even if these things were not recovered from the possible work area in front of the structure or from the base of the firing chamber, one would expect to find some evidence of ceramic production activity in the large midden directly associated with the structure and this simply was not the case. Therefore, given the current evidence, it is unlikely that the structure served as a kiln for ceramic firing.

The next functional possibility suggested was that the structure served as a locus for the heat-treatment of lithic material, with expected correlates including the presence of raw materials, lithic fragments presenting the greasy luster that comes with the application of heat, a high proportion of debitage in association with secondary lithic production and evidence of failures in the heat treatment of materials, represented by highly fractured raw materials as a result of explosions. There is a bit more evidence to support this possibility, although it is not clear-cut. The amount of cobbles in the west wall of OP 350 W and in the midden of OP 350 AG, certainly could represent the stockpiling of raw materials. However, although some heat-treated lithics were recovered, this was a fairly small proportion of the overall lithic assemblage, all recovered in direct association with the firing chamber. There is also some evidence of failures during in the heat treatment processes in the presence of fire-cracked rocks and the high degree of very small debitage that was recovered from the midden in Op 350 AG. Still the amount of material present does not suggest that the daub structure was used primarily as a lithic treatment center. It is more likely that some heating of lithics was done here but probably as a secondary function.

Finally, the possibility that the structure served as an oven, either for a household or for a group of households, was evaluated. Correlates associated with those functions include the presence of ceramic and lithic remains, repeated evidence of firing activity and the presence of a disposal area for trash. If the structure served as an oven for a single household, there would likely be a house located in very close proximity. Conversely, if the structure served as a cooking locus for many households, it should not be associated with any one structure but instead centrally located amidst a number of household groups. The ceramic and lithic remains recovered do suggest a limited activity and disposal area associated with the structure and while there is not a single household group associated with the structure it is located in the center of a household area, with several household mounds identified nearby. The stratigraphy of the firing chamber also suggests multiple uses, with several different layers of burning and ash represented. Finally, the ceramic materials that were recovered are predominantly calcite wares and undecorated, most likely representing utilitarian wares that could have been used in the preparation and cooking of food. If the structure did represent an oven, then the area of carbonized soil that was identified in the northern half of OP 350 AG likely served as an ancillary preparation area.

Conclusion

The daub structure discussed in this report clearly represents a formal structure and activity area. When taking all of the different features together, it is possible that the structure served primarily as a shared oven for a group of households, with a limited amount of food preparation activities taking place in the area south of the structure and northwest of the structure, where a second, smaller and less formal cooking area was located. It is also possible that the structure served a secondary function as area for heat treating lithics. If this was an oven that was shared among multiple households it is likely that the majority of the preparation work was done at the different household areas, which would explain why there is only limited evidence for prep work actually associated with the daub structure. Clay resources were kept nearby in case repairs were needed and trash was disposed of along the western edge of the structure. The presence of the midden directly against the western edge of the structure and the build-up of daub along the eastern and northern ends served as ways to preserve heat and control the spread of the flames, limiting the majority of the burning activity to the central firing chamber. At this point these functional interpretations are still tentative. As more data becomes available and chemical analyses of the raw clay, daub and ceramics continues in an effort to determine the nature and technology of the firing processes represented by the daub and ceramics these interpretations may change. It is hoped that the chemical analysis will contribute to shedding further light on the number of activities and the nature of the structure and its relationship to its surrounding features and to the larger household groups that located nearby.

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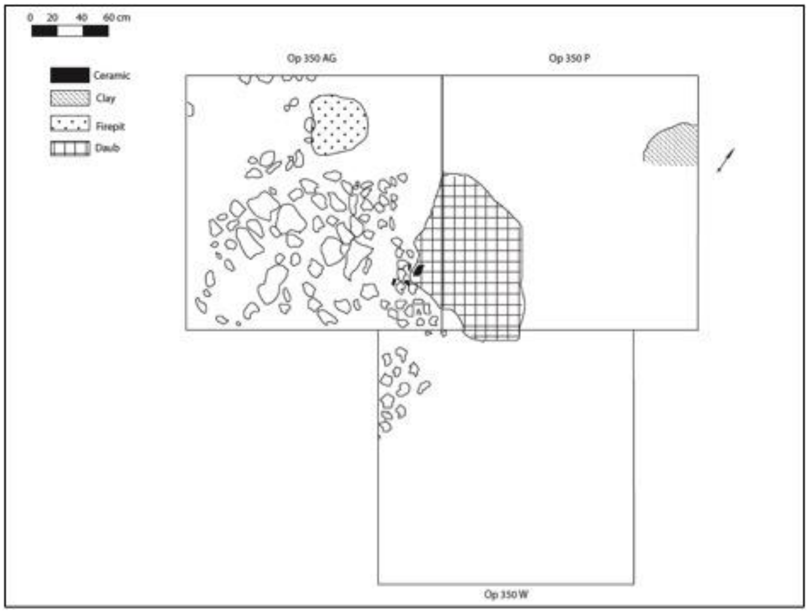

Figure 1: Op 350P, W, and AG, top plan view.

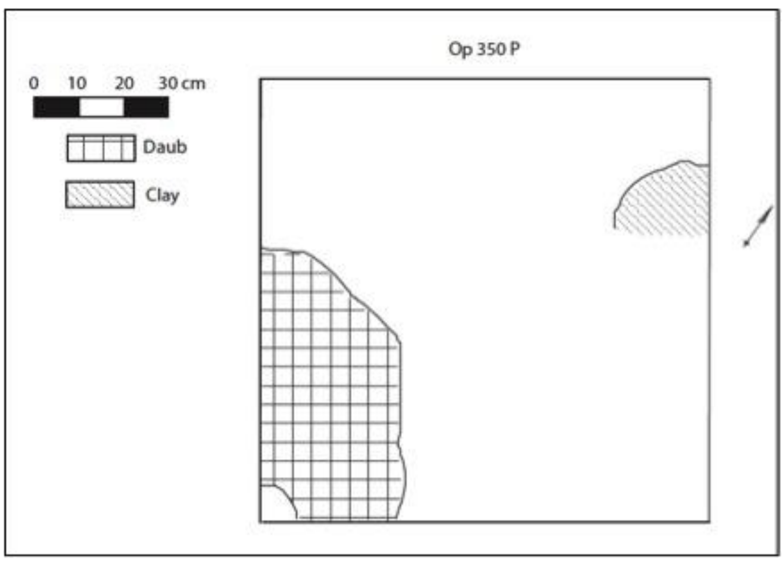

Figure 2: Op 350P, top plan view.

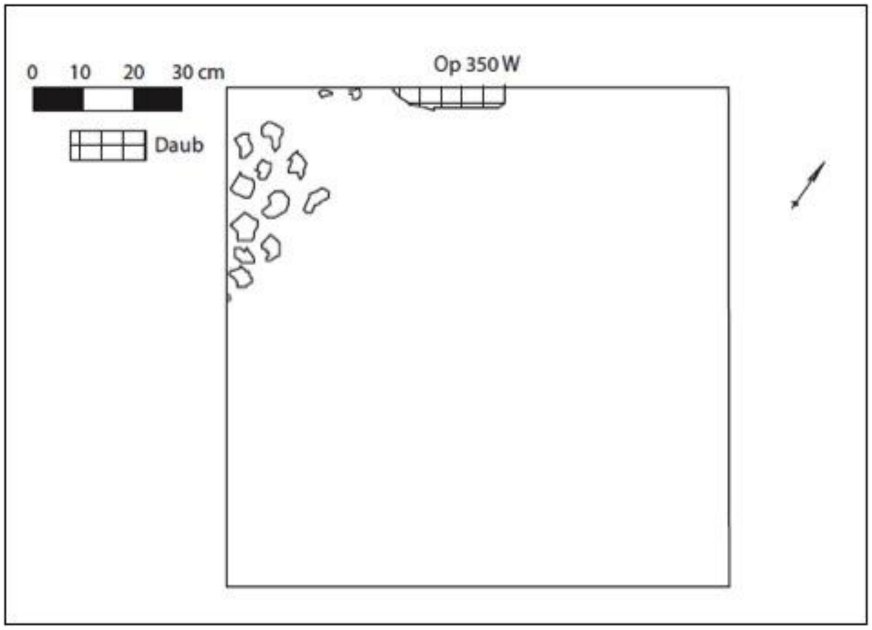

Figure 3: Op 350W, top plan view.

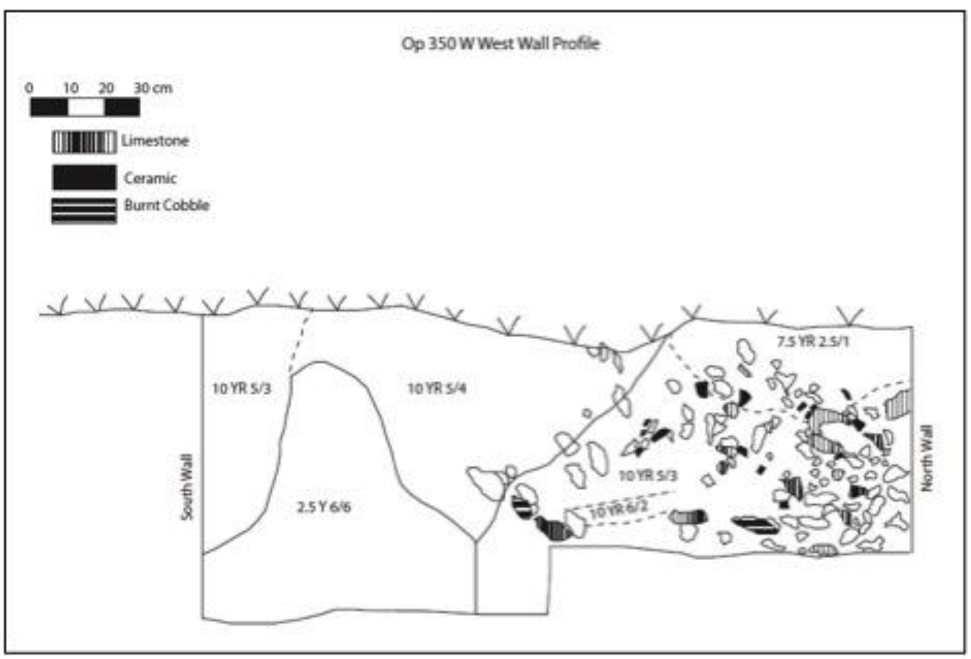

Figure 4: Op 350W, west wall profile.

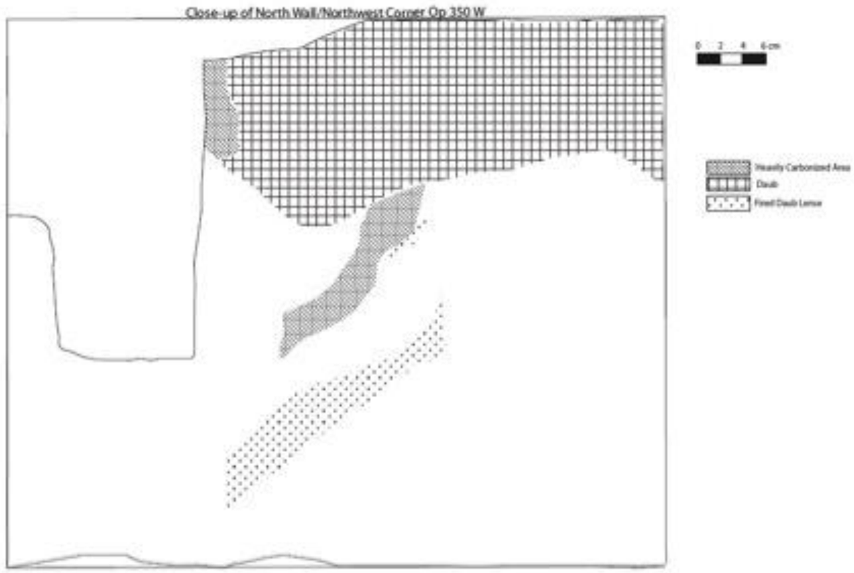

Figure 5: Op 350W, close up on northwest wall and northwest corner.

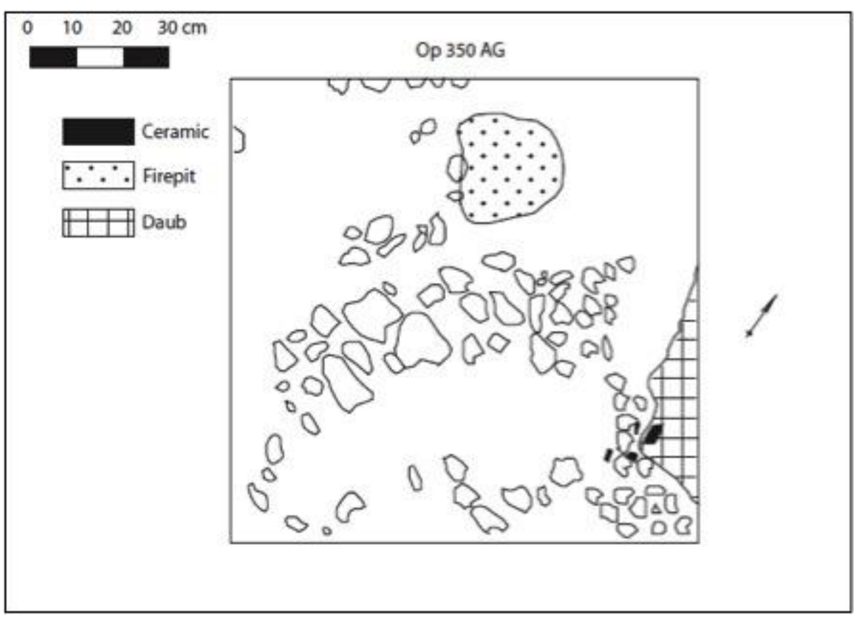

Figure 6: Op 350AG, top plan view.

Independent Report #2:

Geophysical Investigations in BVS Cluster 1

Bryan S. Haley, University of Mississippi

A geophysical survey was conducted in two areas during the 2008 summer field season at Buena Vista, located in the Mopan River Valley of western Belize. The first area was an expansion of the 2007 survey of the East Plaza in order to offer a more complete coverage. The second survey area was placed in a settlement zone outside the central architectural core of the site. As during the 2007 field season, ground penetrating radar (GPR) and electromagnetic induction (EMI) techniques were used. This report summarizes results of investigations in the second survey area located in the Buenavista South (BVS) settlement zone.

Geophysical Methods

GPR

Ground penetrating radar (GPR) utilizes an antenna that sends a radar pulse into the ground that is reflected by subsurface targets and a receiver that measures the travel time and strength of the reflection (Conyers and Goodman 1997:23; Weymouth 1986:371). A control unit displays and records these parameters in the form of a two dimensional profile. The strength of the reflection is determined by the contrast in relative dielectric permittivity (RDP), which ranges from 1 for air to 81 for water (Conyers and Goodman 1997:34; Geophysical Survey Systems Inc. 1999:36). By estimating the RDP, the travel time can be used to estimate the depth to any target contained in the data.

The depth penetration of a GPR is related to both the antenna frequency and the RDP of the subsurface material (Reynolds 1997:688). In general, lower frequency antennas allow greater depth penetration, but with lower vertical resolution (Geophysical Survey Systems Inc. 1999:56). For the Buena Vista survey, a Geophysical Survey Systems Incorporated (GSSI) SIR2000 was used with a 400Mhz antenna. This system is designed for investigating depths of up to 2.5 meters, although this may be greatly reduced by soils with high RDP values such as clays.

GPR has been used to detect a number of archaeological features including pits, trenches, hearths, stone foundations, kilns, buried living surfaces, metal objects, voids, burials, tombs, and tunnels (Conyers and Goodman 1997:23, 197-200). Archaeological features that are unlikely to be detected using GPR include very thin stratigraphic layers, features within a rock lined burial, small clay or stone artifacts, and any feature below a wet clay layer (Conyers and Goodman 1997:197-200).

Because of the complex nature of GPR data, processing is more complex than other geophysical techniques. For archaeological applications, the raw data profiles are generally used to make plan view reflection amplitude maps that cover various depth ranges. Three-dimensional renderings may then be created to help understand how anomalies change with depth.

EMI

Electromagnetic induction (EMI) instruments use a transmitter coil that generates an electromagnetic field and a receiver coil that reads the response of the field on the soil (Heimmer and De Vore 1995:34). Two quantities can be measured during this procedure: soil conductivity and magnetic susceptibility.

Conductivity, obtained by using an out-of-phase signal, is closely related to the amount of moisture contained in the subsurface material, which in soil is primarily related to grain size (Weymouth 1986:319, Clark 1996:27). Generally, clays have high conductivity, sands low conductivity, and most rocks will have very low conductivity. Unlike GPR, only a single reading is collected over a range of depths and this is a function of the coil separation. The most common instrument, the Geonics EM38, achieves a maximum sensitivity at about .4 meters and gradually reduced sensitivity to a depth of about 1.5 meters. The types of archaeological features that may be detected as a conductivity contrast include ditches, buried walls, foundations, tombs, voids, compacted floors, daub concentrations, and shell deposits (Aitken 1961:71, Weymouth 1986:321).

Magnetic susceptibility, the in-phase component of EMI, measures the ability of a target to become magnetized when a magnetic field is induced. For archaeological applications, biological processes acting on certain anthropogenic soils increase their magnetic susceptibility. Features that may be delineated with magnetic susceptibility include middens, pits, and organic-rich soils (Haley and Johnson 2006). Magnetic susceptibility depth sensitivity is much more limited than conductivity, perhaps to a maximum depth of .5 meters (Dalan 2006:167).

EMI instruments allow rapid data collection, especially with models that allow simultaneous collection of conductivity and magnetic susceptibility. One such instrument is the Geonics EM38B, which was used for the Buena Vista survey. One drawback is that EMI is sometimes affected by large metal objects, overhead power lines, and lighting.

<u>Buenavista South Settlement Zone</u>

A geophysical survey was conducted in a settlement zone at the site in order to locate architecture that is invisible from the surface. The survey was placed across and beyond small mounded architectural features (Figure 1). At the beginning of the survey, the area was covered in heavy brush that required a considerable effort to clear.

Conductivity

The conductivity results (Figure 2) from the settlement zone show a number of features that may be related to either visible or invisible architecture. As with Area 4 in the East Plaza, there were deep water puddles in the low sections of the survey area. Some high conductivity anomalies are certainly caused by these surface features.

Magnetic Susceptibility

The primary purpose of the magnetic susceptibility data was once again to delineate midden areas. The results (Figure 3) show a number of small high magnetic susceptibility anomalies that flank the visible architecture. If these are middens, they could reveal important information about the associated architecture.

Ground Penetrating Radar

The ground penetrating radar was processed into three time slices, each with a thickness of approximately 44 centimeters. An estimate of the actual depths of the three are Depth 1: 0 – 44 centimeters, Depth 2: 39 – 83 centimeters, and Depth 3: 77 – 122 centimeters. As with the 2007 survey, data below 122 centimeters were significantly degraded due attenuation and geometric spreading of the radar wave. One caution when interpreting anomalies in the GPR data is to watch for areas with tree roots or other surface obstacles that can cause decoupling of the system’s antenna.

As established from previous surveys at Buena Vista and other sites, GPR can be effective in delineating buried architecture. A number of anomalies are visible in the results (Figure 4) that could be caused by visible and invisible architecture. Generally, however, the anomalies are much less regular than the conductivity data from the same area. One cause of this is that the surface remained very rough, even after clearing.

Conclusions

The 2008 geophysical survey at Buena Vista accomplished several goals. New anomalies were delineated which can guide future investigation. This additional ground-truthing will provide greater insight into how the geophysical techniques are responding to features at the site. This is especially true in the settlement zone, where there is currently scant subsurface data to evaluate the performance of the techniques.

Another lesson learned from the analysis of the 2008 data is that the condition of the ground surface is of primary importance. Buena Vista is located in a very challenging environment for geophysical survey with dense vegetation over most of the site. Even after huge efforts to clear brush, the ground surface is generally far from ideal. This is especially true for GPR, which requires a flat, smooth surface to couple the antenna. Another problem is ground moisture, especially in the rainy season. By considering these problems in advance of survey, it is possible to collect better quality data.

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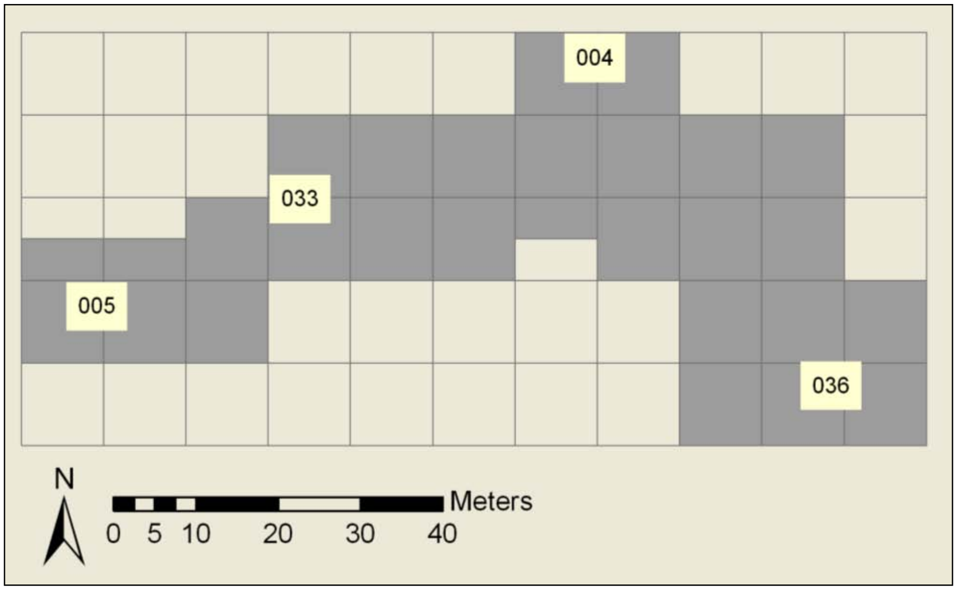


Figure 1. The location of the 2008 geophysical surveys of the settlement zone at Buena Vista. The approximate locations of structures are shown with BVS designation numbers.

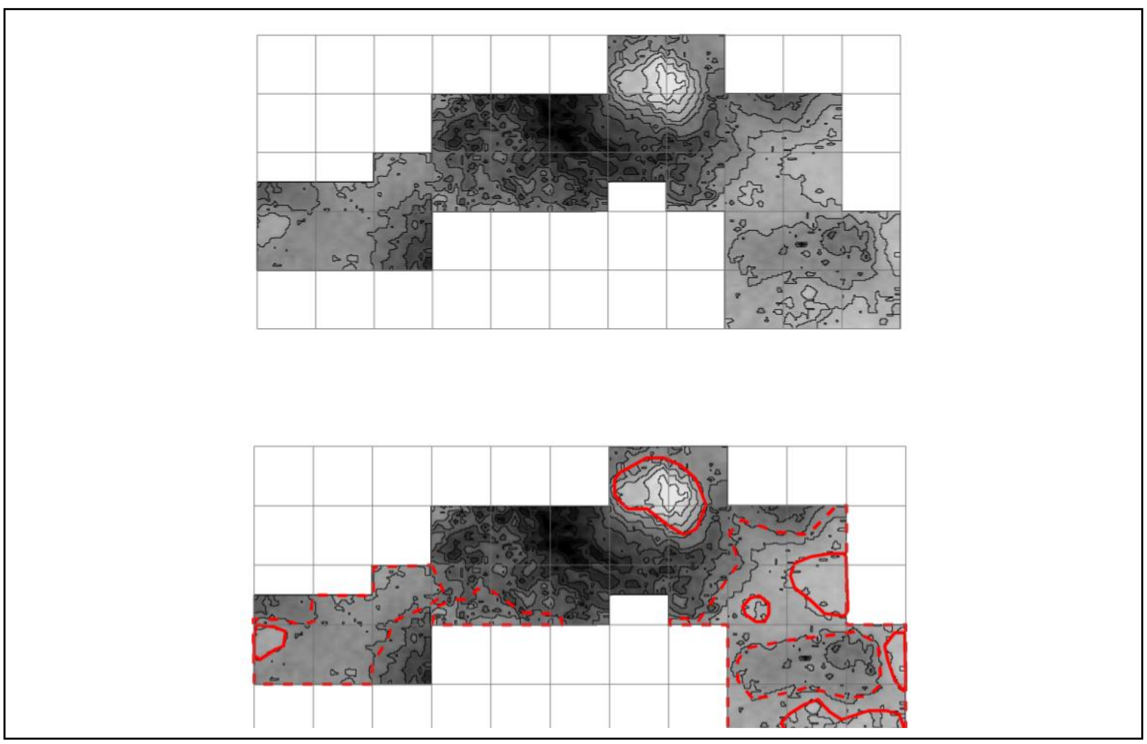


Figure 2. Conductivity results from settlement zone. Significant anomalies are marked in red. Dashed lines indicate more subtle anomalies.

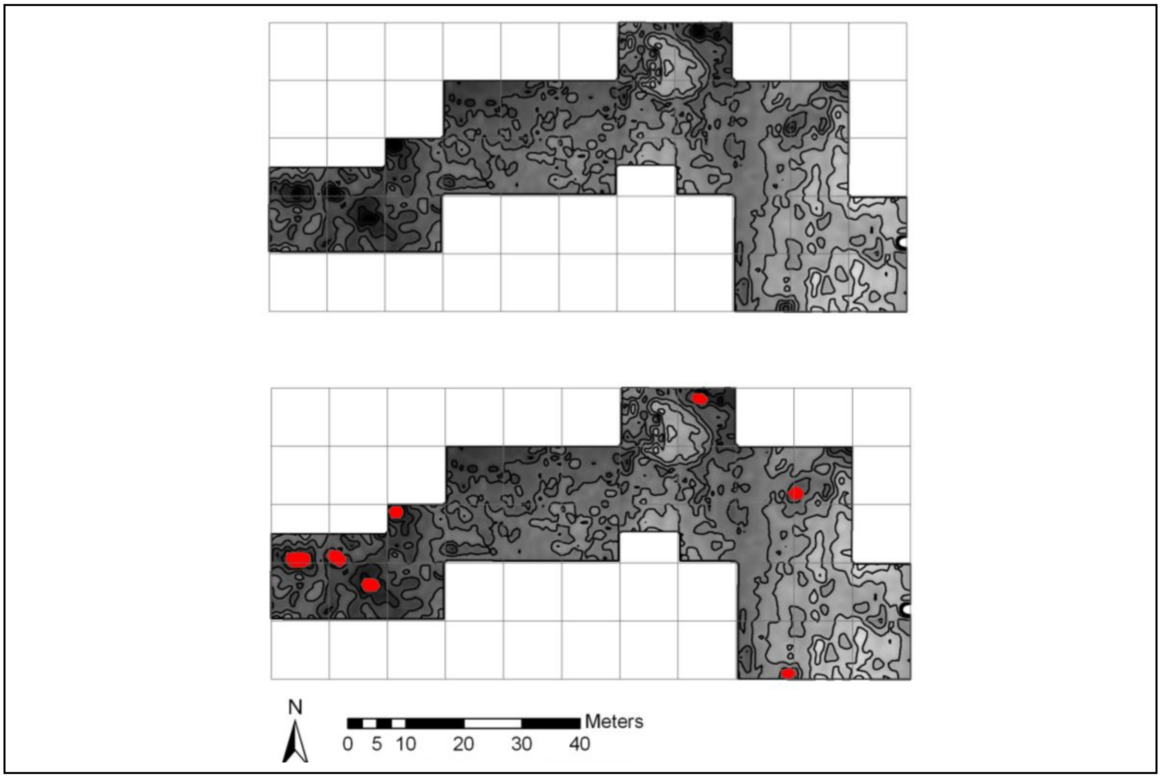


Figure 3. Magnetic susceptibility results from settlement zone. Significant anomalies are marked in red. Dashed lines indicate more subtle anomalies.

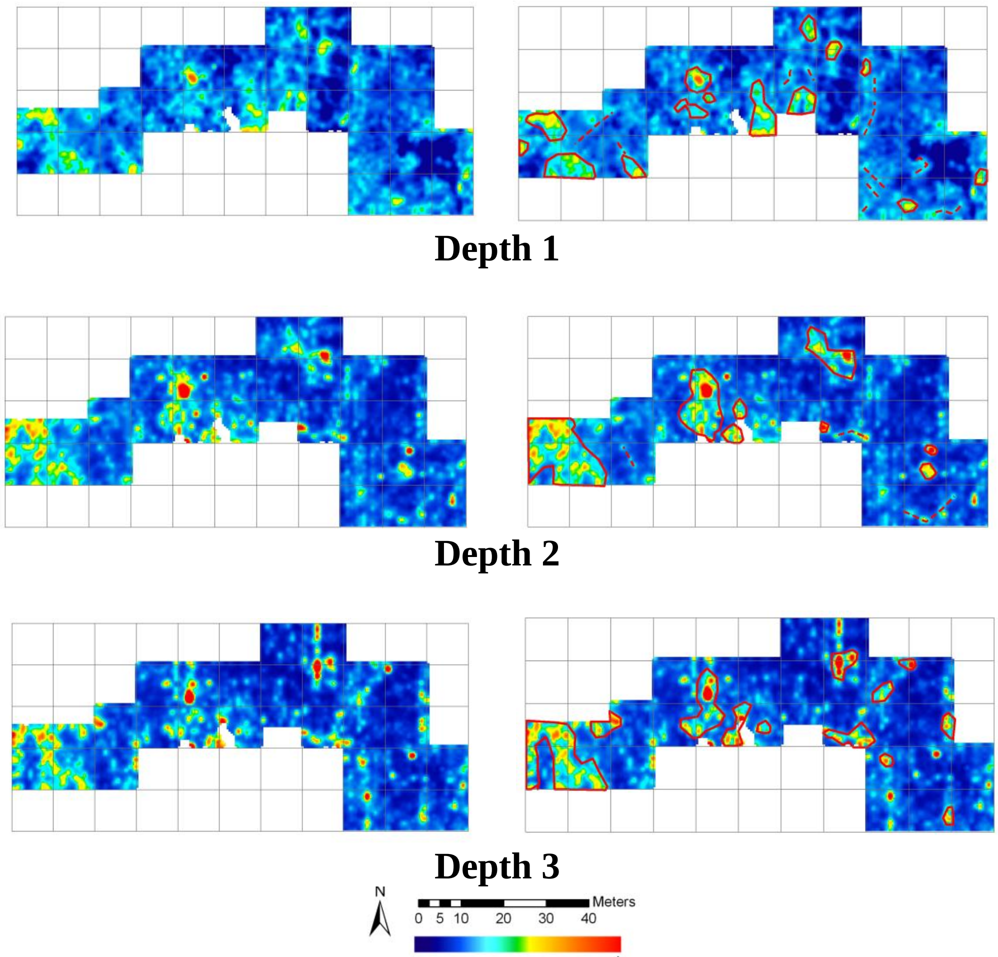


Figure 4. GPR results for the settlement zone. Significant anomalies are marked in red. Dashed lines indicate more subtle anomalies.

Independent Report #3:

Ground-Truthing in BVS Cluster 1 (Operation 353)

Bailey Hudacin, University of Calgary

During the 2008 field season, ground-penetrating radar and conductivity analysis was conducted in the Buenavista South (BVS) settlement zone by Dr. Bryan Haley of the University of Mississippi. During the 2009 field season, I carried out a shovel- testing program, designated Operation 353, in order to determine the accuracy of geophysical techniques in identifying buried cultural features. Geophysical methods are very difficult to assess in determining which types of environments, weather conditions, and topography make for ideal conditions of success. Ground-truthing is a very important step in order for researchers to know how valuable and/or reliable geophysics is to archaeology in locating new archaeological sites. This paper summarizes results of the ground-truthing program. The paper concludes with a comparison of the geophysical data and the distribution of archaeological remains found during the course of the study.

Methodology

During the 2009 season, I excavated 126 shovel test pits across the areas of BVS-004, 005, 033 and 036. In order to match the shovel test locations to anomalies identified in the GPR analysis, the testing grid followed Haley's original GPR grid. Using a total station the corners of the original GPR grid were relocated. After the corners of the grid were positioned, a 30metre cloth- measuring tape was used to position a shovel test pit every five meters throughout the grid, marked with a pin-flag or wooden stake. Traveling in an easy-to-follow serpentine- pattern, each shovel test pit was named with a letter of the alphabet, starting at A and repeating through the alphabet until DX. (Figures 1 and 2).

Each day, my two workers and I averaged excavating ten shovel test pits. The shovel test pits were positioned with the pit's center where the pin-flag or stake was located. The shovel test pits were pre-determined to be roughly the width and length of a shovel and about two-times those sizes so as the walls would not cave in. The same dimensions were used during the 2008 ground-truthing in the East Plaza. The shovel test pits in the settlement area averaged a width of

39cm, length of 45cm, and a depth of 44 cm. Due to the clay soil of the area, the shovel test pits took about thirty minutes each to complete.

All of the artifacts found in each shovel test pit were placed into one large artifact bag. After the artifacts arrived in the lab, they were washed up and placed into new plastic bags, separated by material type: ceramics, lithics, groundstone, obsidian, lithic-quartz, shell, and daub. After the field season, I took each bag of material type from each shovel test pit and counted and weighed each in order to know which shovel test pit contained what amount of material type. (Figures 3, 4, and 5).

Ground-Truthing and Interpretations

Ground-penetrating radar and conductivity analysis are both still in their testing stages in order to determine which conditions they can get their best results. Ground-truthing allows for these two geophysical techniques to be tested and analyzed in different conditions. During the 2008 field season, Bryan Haley conducted the geophysical techniques as the rainy season was starting throughout Sites 004, 005, 033, and 036.

The 2008 ground-penetrating radar analysis clearly defined 14 anomalies and 6 with poorly defined edges (Figure 6). The raw GPR files were downloaded onto a computer and processed to create three plan-view amplitude maps. In order to calculate the approximate depth and thickness of each map, a hyperbola fit test was used to calculate the soil velocity. A vector overlay was created for each map to help identify the important anomalies. During the 2009 field season, I examined 10 of the clear anomalies and 5 of the 6 poorly defined anomalies. The 4 clear and 1 poor anomalies were not examined because they are located on mounds and will be excavated at a further date. It should be stated that, although shovel test pits were only excavated to a depth of 50 cm below the surface, the GPR was able to record anomalies as deep as 122cm.

GPR Anomaly A

Shovel test pits Op353 D, E, and F were placed within this anomaly but did not reveal a buried archaeological feature. All three- shovel tests contained ceramic and lithic artifacts. Shovel test pit D also contained several shell artifacts and one daub artifact while E contained one obsidian artifact to go with the lithics and ceramics. These shovel test pits are located just off the slope of a mound (Site 005). This location may have affected the results of the ground-penetrating radar signal. If the GPR instrument is not flush with the ground surface, it can impede radar coupling, which restricts accurate results.

GPR Anomaly B

This anomaly is also located just off the sloped edge of a mound, site 005, and continues ten meters east and correspond with shovel test pits Op353 B, G, H, I, and J. The conductivity analysis (EMI) also detected an anomaly in this same area but the anomaly it detected was much larger than that from the GPR analysis. Each shovel test contained ceramic and lithic artifacts. STPs B and J each contained an obsidian artifact. STPs G, and H, each contained a fragment of daub.

Shovel test pit Op353 I revealed a large root 24cm below the surface. It is possible that Ground-penetrating radar anomaly is due to the presence of root. Unfortunately, the ground-truthing exposes no evidence of buried architecture or cobble fill in the other shovel test pits. As with GPR Anomaly A, this false result may be a result of the GPR antenna not being able to be flush with the ground due to the unevenness of the area and abundance of long grasses and small shrubs and trees. The result of the conductivity analysis not detecting an archaeological feature may be a result of the uneven ground as well. If the instrument is not passed along a consistent height off the ground, this greatly affects the results.

GPR Anomaly C

This anomaly is quite small. Shovel test pit Op353AC is positioned directly on the anomaly, while STP S was placed along its edge. Neither shovel test revealed any archaeological remains. This anomaly is also located within site 005 but it is in an area where the clay soil had begun to expand and contract creating a very uneven ground surface full of holes. During the rainy season, these holes would have filled up with pools of water and the clay soil of the area would have held the water. Water attenuates the radar wave that is sent out from the GPR so standing water can be disastrous (Bryan Haley, personal communication, 2009).

GPR Anomaly D

This anomaly is located in site 033 and is also characterized by extremely uneven ground due to the expansion and contraction of clay soil. Again, this unevenness allows for an abundance of standing water and can greatly affect and alter the results of the GPR. This area is also full of long grasses and, before the area was cleared with machetes, tall thin trees. This vegetation can also affect the GPR signal because it limits how close and flat the antenna can be to the ground in order to have straight and grouped radar waves. The shovel test pits (Op353 AL and AO) revealed no buried architecture or cobble fill. AL only contained eight lithic artifacts and no ceramic artifacts while AO contained no artifacts whatsoever.

GPR Anomaly E

This anomaly is also located in Site 033. Shovel test pits Op353 AJ, AK, AP, and AQ are all positioned within this anomaly. None of these shovel tests revealed any archaeological material responsible for the GPR anomaly. These shovel tests are still located in an area full of uneven ground and long grasses and is subject to the same issues as GPR Anomalies C and D. All four- shovel tests contained both ceramic and lithic artifacts except AP, which only contained lithic artifacts. AQ also contained one daub fragment to go along with the ceramics and lithics.

GPR Anomaly F

Anomaly F is the last anomaly located at site 033 and is still full of uneven ground, long grasses, and prone to standing puddles of water after a rainfall. Shovel test pits Op353 AX, AY, AZ, BH, and BI are all placed within this anomaly and not one reveals buried architecture, cobble fill or any other type of anomaly. Op353 BH does contain several large roots but nothing more significant than that. Shovel test pits Op353 AX, AY, and AZ contain both ceramic and lithic artifacts, while BH, and BI do not contain any ceramics. AY and AZ both revealed one piece of obsidian each and BH contained three fragments of daub. None of the shovel test pits contained a large number of artifacts so it is interesting to see that even though the GPR detected an anomaly, there was not even an abundance of artifacts to possibly supplement for the lack of anomaly.

GPR Anomaly G

Shovel test pits Op353 BJ, BK, BO, and BP were all positioned in order to ground-truth Anomaly G. No cultural anomalies were exposed in any of these shovel test pits but BK did contain some large roots and it is possible that the GPR detected them as a small anomaly. Op353 BJ, BK, and BO all contain ceramic and lithic artifacts, BJ also contained one fragment of daub and shovel test Op353 BP did not contain any artifacts at all. These shovel tests are all located about five to ten meters off a mound, site 004. It is curious as to why these shovel test pits contain so few artifacts. The inaccuracy of the GPR may be due to this position off the slope of the mound. Water rolls down the slope and accumulates once the ground levels off. This area, as well, is just as full of long grasses as are Sites 005 and 033 and affects the results of the GPR since it is difficult to get the antenna flush to the ground for straight and accurate radar waves.

GPR Anomaly H

This anomaly is also located in Site 004 and shovel test pits Op353 BW and CL were positioned within this anomaly. These two shovel tests are located just off the slope of the mound but CL may only be in the position to catch the edge of the anomaly. Unfortunately, this anomaly proved to be non-existent as well. Both shovel tests came up with very little artifacts and no buried architecture or cobble fill. Being so close to the mound, water possibly ran off the mound and accumulated where these shovel tests are and pooled for a short while after the rain. The conductivity analysis also detected an anomaly in this same area. The false results of this technique were probably due to the amount of water in the area. Water does not affect the results of EMI. This geophysical technique maps the water, creating a false result.

GPR Anomaly I

Shovel test pits Op353 CU and CX are positioned within this anomaly, as well as the anomaly that EMI detected. CU contained no artifacts while CX had only one lithic artifact. No archaeological feature was revealed. This anomaly is located within Site 036 and contains more trees and long grasses than any of the three previous sites. Around this anomaly, the ground is still uneven and full of holes for rainwater to pool and settle and disturb the results of the GPR and conductivity analyses. \

GPR Anomaly J

This anomaly is the last excavated in Op353 and was ground-truthed through shovel test pit DV with DQ possibly catching the edge of the anomaly. Both shovel test pits contained ceramic artifacts and DV contained a lithic-quartz artifact. No anomaly was exposed in either of these shovel test pits. This negative result may be a result of all the grasses and trees in the area that would have disrupted the GPR and its ability to be flush to the ground. This GPR anomaly falls within an anomaly that was detected by conductivity analysis. This unevenness and presence of water is damaging for EMI results as well. Conductivity analysis maps water and explains the presence of an anomaly.

<u>Other Archaeological Features</u>

Shovel test pits Op353 CY, CZ, DK, and DQ all showed the presence of an archaeological anomaly discovered by the GPR and EMI results. This particular anomaly was faintly detected by the GPR and was only able to identify a rough outline. These shovel test pits showed the presence of cobble fill not far below the ground surface. Shovel test pit Op353 DL also showed the presence of cobble fill and was a continuation of the previously stated located cobble fill but was not detected in the GPR results. These shovel test pits fall within site 036 where the ground is more level than the other areas and the water did not pool for long after the rain. This level ground and lack of water allowed the GPR and EMI to have more accurate results than in the other areas. The cobble fill not being tightly spaced may have been the reason as to why the GPR was not able to detect the archaeological feature with definitive results. Had the cobble fill been more tightly spaced, the GPR may have had better results, even though the high amount of vegetation would still have been an issue.

There were several shovel test pits that exposed archaeological anomalies that neither the GPR nor the EMI were able to detect. Shovel test pits Op353 U, Z, AR, BA, and BE all contained cobble fill while Op353 AS contained a large piece of eroded plaster. As stated above, it is most likely that the GPR missed the cobble fill because they were not spaced tightly together. As for the eroded plaster, it was only about thirty centimeters by twenty centimeters, so it is possible that it was too small for either geophysical technique to detect. These shovel test pits were located in Site 033 where the ground is very uneven and full of vegetation and would have made it difficult for the GPR instrument to stay flush with the ground and the EMI from staying a consistent height above the ground.

Overall, there were shovel test pits that had positive results for buried archaeological features and some that were negative. Shovel test pits that revealed archaeological features were, in Site 033, U, Z, AR, BA, and BE with cobble fill; Site 033, AS contained eroded plaster; and Site 036, with CY, CZ, DK, and DQ with cobble fill. There were many shovel test pits that showed no archaeological features where the Ground-penetrating radar detected anomalies due to various causes. In areas with uneven ground and pools of water, shovel test pits S, AC (Anomaly C), AL, AO (Anomaly D), AJ, AK, AP, AQ (Anomaly E), AX, AY, AZ, BH, BI (Anomaly F), BJ, BK, BO, BP (Anomaly G), CU, CX (Anomaly I), and DV (Anomaly J) revealed no evidence of archaeological features. Areas with heavy vegetation also found shovel test pits with no archaeological features. These shovel test pits were AL, AO (Anomaly D), AJ, AK, AP, AQ (Anomaly E), AX, AY, AZ, BH, BI (Anomaly F), BJ, BK, BO, BP (Anomaly G), CU, CX (Anomaly I), and DV (Anomaly J). Lastly, there may have been discrepancies caused by those shovel test pits located close to the edge of a mound. These are D, E, F (Anomaly A), B, G, H, I, J (Anomaly B), BW, and CL (Anomaly H). The closer to the edge of a mound the GPR instrument is, the less even it is to the ground causing difficulty with the coupling of the radar waves.

The conductivity analysis was able to detect anomalies but, once excavated with shovel test pits, these anomalies were revealed to contain no archaeological features. These shovel test pits were B, H, I, and J (Anomaly B).

There were shovel test pits that did not reveal archaeological features where the GPR and EMI detected an anomaly but they did contain a natural anomaly consisting of large roots. Three shovel test pits contained large roots: I (Anomaly B), BH (Anomaly F), and BK (Anomaly G).

Maximizing the Usefulness of Geophysical Techniques

One can attempt at limiting inaccuracy issues by not conducting Ground-penetrating radar in the Upper Belize River Valley during the rainy season. The dry season would keep the radar waves from bending when being sent into the ground, as well as when they are reflected off the anomaly and returning to the GPR instrument.

It is interesting, in some instances, both Ground-penetrating radar and the conductivity analysis detected anomalies in the same areas but, once ground-truthed, showed no presence of an archaeological feature. Water affects both techniques and is a main cause as to the misleading results. The water attenuates the radar waves of the GPR, creating difficulty for coupling of the waves in order to gain accurate results. For the conductivity analysis, EMI maps the pooled water, so where anomalies are being detected may just be an abundance of water.

In areas that are not full of water, the high amount of vegetation may be the main reason for inconsistencies. The vegetation impedes the ability of both geophysical instruments to stay flush to the ground and a consistent height above the ground surface. The only way to severely decrease this obstacle is to thoroughly cut down the vegetation, even burning the area to get as little resistance as possible may be something for the archaeologist to consider in an attempt to get the most accurate results as possible.

Conclusions

Many more ground-truthing pursuits need to be conducted in order to determine how valuable Ground-penetrating radar and conductivity analysis are, together and separate. There are many conditions and variables that affect both techniques so it is important to get as much testing done as possible in order to determine if either technique is worth its time and money when attempting to locate new archaeological sites. It is important to know which areas and which conditions are best for the techniques.

Further excavations need to be pursued in Site 005 in Buenavista del Cayo's settlement area in order to determine if the Ground-penetrating radar and the conductivity analysis were accurate. The excavation of Site 004, a household mound, had begun during the 2009 field season by Meaghan Peuramaki-Brown and will be completed during the 2010 field season. Once excavations are complete, more comparisons to the geophysical techniques can be done to further determine their accuracy and value.

Based on my 2009 ground-truthing, Ground-penetrating radar and conductivity analysis did not prove to be very accurate or valuable. Conducting either technique during the dry season would most likely provide more accurate results since there would be no water to attenuate the radar waves of the GPR and no water for the EMI to map. As for the vegetation in an area, all one can do is clear the area as best as possible. It is not always possible to burn an area every season so as close as one can cut the grass to the ground the better. Unfortunately, there is not much one can do about uneven ground due to the expansion and contraction of clay soils, as seen in Sites 033, 004, and 036. All the user can do is walk slowly across the area and do his or her best to keep the antenna as flush to the ground as possible.

With rain and the majority of vegetation taken out of the equation, hopefully the archaeologist will get better results with both the Ground-penetrating radar and the conductivity analysis. Unfortunately for this study, there was no way of knowing which anomaly was an archaeological or natural feature. It is possible that with obstacles being decreased, the anomalies may become more defined in the three-dimensional picture that is created and the feature itself will become clearer. It will take more research and ground-truthing to decide how well Ground-penetrating radar and Conductivity analysis (EMI) are when looking for invisible mounds however, in this study, they were not overly helpful. The shovel test pits revealed more helpful information than the geophysical techniques and should be conducted no matter what when a new settlement of low-lying mounds is to be studied.

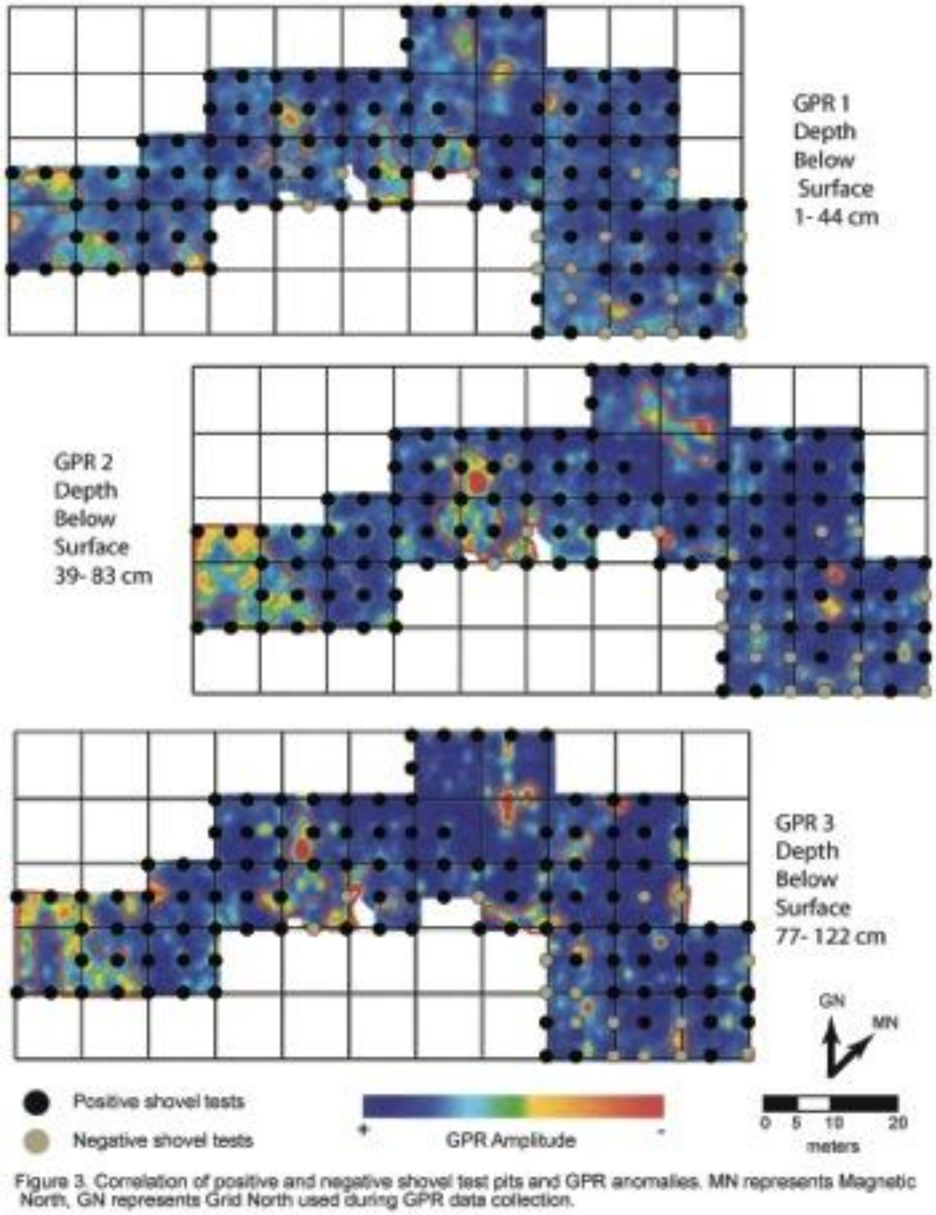
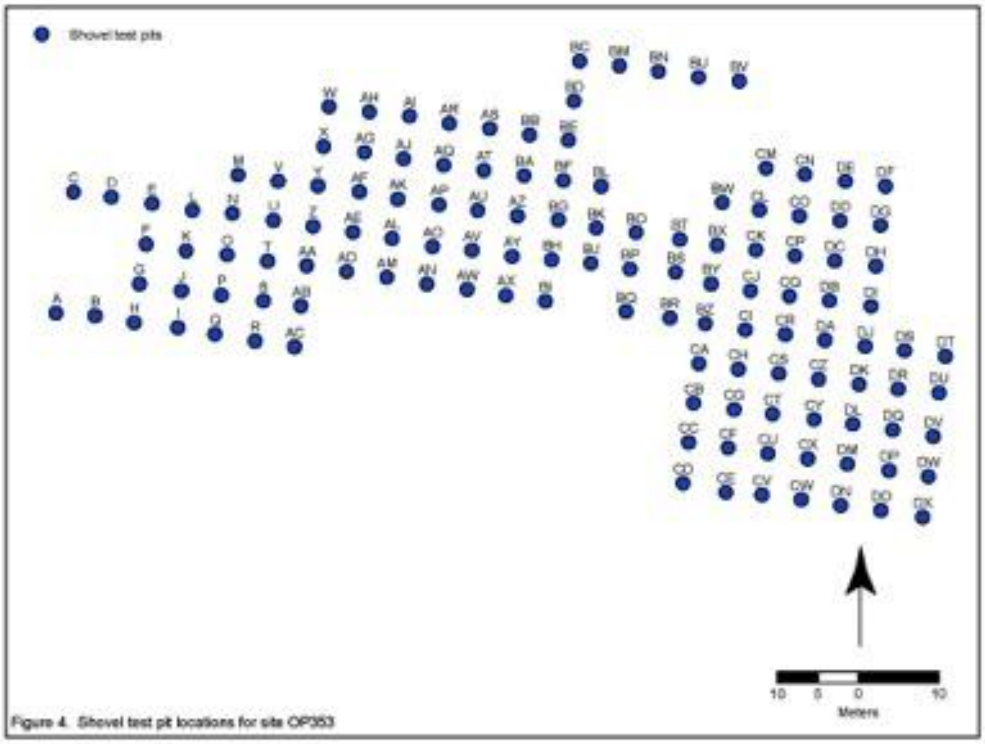


Figure 1: Correlation of positive and negative shovel test pits and GPR anomalies



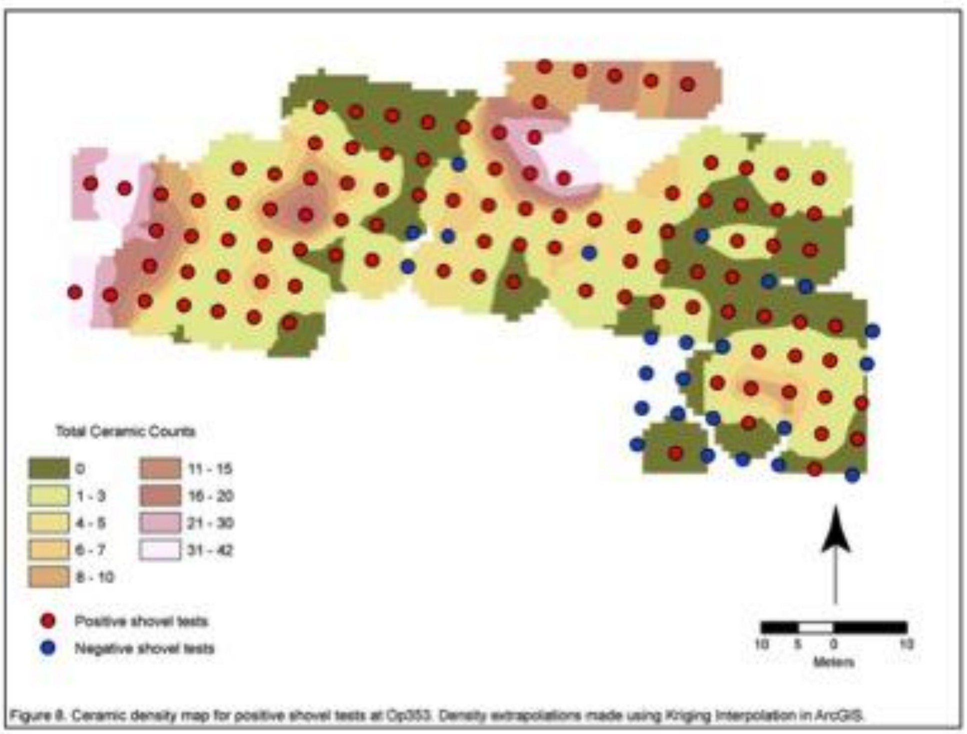


Figure 2: Shovel test pit locations for Operation 353.
Figure 3: Ceramic density map for positive shovel tests Op 353.

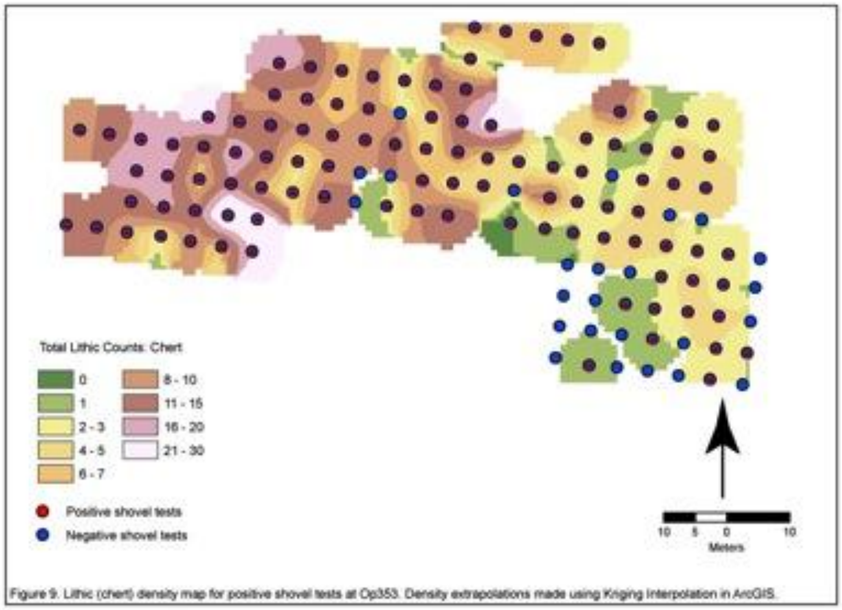


Figure 9. Lithic (chert) density map for positive shovel tests at Op353. Density extrapolations made using Kriging Interpolation in ArcGIS.

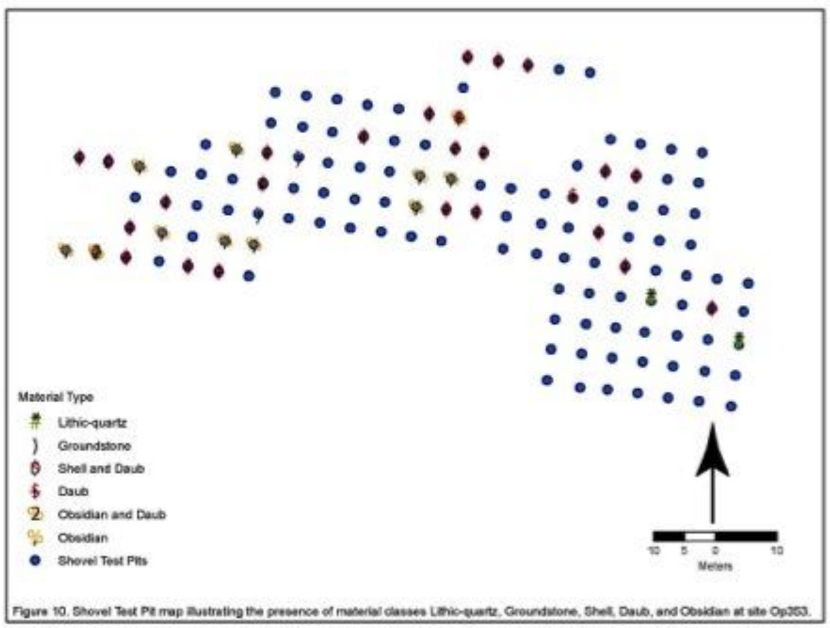


Figure 10. Shovel Test Pit map illustrating the presence of material classes Lithic-quartz, Groundstone, Shell, Daub, and Obsidian at site Op353.

Figure 4: Lithic (chert) density map for positive shovel tests in Operation 353.
Figure 5: Shovel test pit map illustrating the presence of material classes – Lithic-quartz, Groundstone, Shell, Daub, and Obsidian.

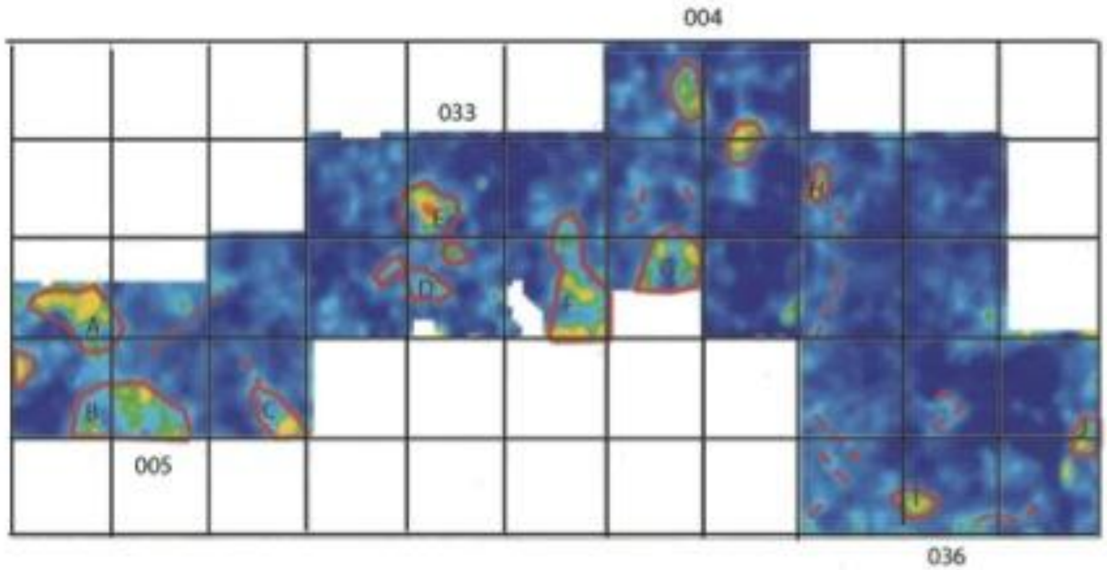


Figure 6: Ground-penetrating radar anomalies. Provided by Bryan Haley, University of Mississippi, 2008.

APPENDIX II: CERAMIC ARTIFACTS

Four seasons of investigation at BVS Cluster 1 produced a large quantity of cultural materials, the majority of which are fragments of ceramic vessels. The ceramic sample from BVS Cluster 1 totals 159, 472 sherds, weighing just over 1.3 metric tons (1340.13 kg) (Table AII.1).

My ceramic analysis consisted of three primary goals: (1) A close analysis of sherds aimed to outline and compare the occupation histories, and associated life-histories, of each settlement site, assisted particularly through the use of the microseriation (discussed below) of diagnostic modes developed by LeCount (1996, 1999; LeCount et al 2002); (2) The distribution of vessel forms would allow me to potentially define activity areas within and between settlement sites, permitting the assessment of function and activity differences at the structure, household, and community levels. To best address questions of function and activity areas, ceramic data is complemented by analyses of all other artifact classes; (3) Finally, the analysis of the BVS Cluster 1 ceramic material is also of importance to the larger Mopan Valley Archaeological Project goals, including the development of a broader understanding of settlement and polity rise, *denouement*, and decline in the Lower Mopan Valley region.

Material Preservation

The general preservation of sherds in BVS Cluster 1 is very good. This is particularly true when contrasted with the very poorly preserved ceramic material recovered by Cap (2013) in the East Plaza area. Even materials from unsealed contexts close to the modern ground surface in the settlement zone are very well preserved, with little to no pocking or erosion and much original surface treatment remaining. This relatively high degree of preservation may be due to the thicker clay and silt-based alluvial soils that exist throughout the zone that likely inhibit water percolation. These matrixes tend to “coat” the sherds, requiring much more of an effort in the washing stage to remove the caked on material. However, this ensured in many instances that finished surfaces were highly preserved. This was the case for many of the sherds with surviving glyphic and painted decorative elements. The soils in the East Plaza on the other hand, are likely more acidic and not composed of clay-based sediments, leading to much poorer preservation (Cap 2013).

With regard to overall sizes of individual sherds, these tend to be smaller in the upper humus and fall lots (<5cm wide) and larger in sealed or secure habitation debris and fill lots (>5cm wide). On occasion, sherds from some fill deposits were very small and highly eroded (e.g. BVS-060 and BVS-100). This was presumed to be the result of the use of materials from midden contexts that had been exposed to more extensive weathering and different soil/moisture conditions prior to being sealed as part of architectural construction matrices.

Most diagnostic rim sherds represent 5-10% of a vessel, but if significantly more or less this was noted for individual lots in the comments. For example, material from Op 357, excavation of the midden, involved rim sherds of greater representative percentage. Debris from areas immediately adjacent structures (provisional discard zones, Hayden and Cannon 1983) are also represented by typically larger pieces (more than 5cm width and greater than 5% of vessel rim circumference) and were typically better preserved than other materials. On-patio surface materials were, however, typically smaller and less well preserved, likely as these are more active areas of use and subject to regular cleaning/maintenance and heavier foot traffic. Fall material tended to be a mixture of better and more poorly preserved materials: emphasizing the mixed nature of such contexts. Due to the overall positive preservation of material, the sherds from refuse and *in situ* deposits in BVS Cluster 1 are generally more amenable to detailed analysis than sherds from other contexts and locales at Buenavista.

Assemblage Comparability

My analysis and frequency calculations are based closely on those conducted by LeCount (1996), Preziosi (2003), and in particular Yaeger (2000a) (with minor modifications) for their respective dissertation investigations conducted under the auspices of the Xunantunich Archaeological Project. These projects all make use of the microseriation sequence developed by LeCount and building from previous observations at Xunantunich.

Although a sequence of ceramic phases was previously established by Ball for Buenavista, Cahal Pech, and Las Ruinas de Arenal (Ball and Taschek 2003; Taschek and Ball 1999, 2003), it was decided the sequence developed for Xunantunich would be adopted for greater comparative purposes within MVAP and beyond (Chapter 3: Tab. 3.1). The criteria for phase assignment of sherds is also clearly outlined by LeCount (1996), building from a previous excellent sequence developed by Gifford (1976) for Barton Ramie and ceramic commentary from the Xunantunich area provided by Thompson (1940), and allows for much easier cross-site comparison with other research in the Lower Mopan and Belize River Valley proper (Chapter 4: Tab. 4.9). LeCount's sequence is also useful as it is based on non-elite, domestic, settlement site ceramic deposits in addition to ceramic deposits from large monumental architecture (elite and ceremonial contexts), and tied in to radiocarbon (radiometric and accelerated mass spectrometry) dates from the same contexts. This microseriation is based on temporally sensitive attribute analysis that allows the monitoring of small-scale diachronic trends, in contrast to the long established sequences that predated radiocarbon testing at Uaxactun, San José, Seibal, and Barton Ramie that use burial and cache assemblages tied in to epigraphic dating assessments (LeCount et al. 2002:46).

LeCount's work involved the recognition of a modal change over time, centred particularly on the change of rim/lip form of Mount Maloney constricted bowls, that previous work by Gifford had not fully recognized (LeCount et al 2002). This allowed for a split of Gifford's (1976:225-289) Spanish Lookout complex into a Late Classic II (LCII) and a Terminal Classic or Late Classic III phase (TC or TC). In some cases, LeCount could further identify modes temporally specific to the earlier and later facets of the LCII (LCIIa and LCIIb), although there has been debate concerning the division within XAP over the years, and I have opted to largely ignore this division for the Buenavista materials.

Assisting in the degree of comparability of the BVS material are the analyses of large collections of ceramic materials from settlement site contexts in the larger Buenavista area, the Lower Mopan, the Belize Valley proper, and the neighbouring Vaca Plateau, that have also adopted the joint sequences of LeCount and Gifford (Blackmore 2010; Connell 2000; Longstaffe 2010; Preziosi 2003; Robin 1999; Yaeger 2000a, etc.). This has secured a large body of data to which BVS Cluster 1 assemblages might easily be compared.

LeCount's coding protocol formed the basis for most of the subsequent ceramic analyses by XAP project members, with some modifications to adapt the system to the particular questions addressed by each investigator. My research adopts a similar coding system (Table AII.2). Lisa LeCount and Jason Yaeger provided assistance early on in the research stage, helping me to identify types and varieties at Buenavista and providing insight on possible differences between Xunantunich and BVS materials. Also of assistance were M. Kathryn Brown, Christophe Helmke, Jaime Awe, Lauran Sullivan, Laura Kosakowski, and Becky

Shelton, who all provided guidance and insight in my analysis and responses to particular questions along the way.

I personally conducted all formal analyses from 2007-2010, therefore issues of comparability that might appear with multiple analysts assessing the same collection is not an issue. Prior to formal analyses, I also had a limited amount of time to view the XAP ceramic type collection compiled by LeCount. This was particularly helpful for identification of later phase materials (LCII-TC). I relied heavily on Gifford's 1976 type descriptions in my identification of ceramics from the Preclassic periods and the Early Classic period; still poorly understood in the Belize Valley (LeCount 1996:90). I also discussed and compared different ceramic finds, as well as other field and laboratory analysis results, with Julie Hoggarth who is conducting her PhD research on settlement sites at Baking Pot. While conducting my analyses I also began to establish a type collection for MVAP.

Material Analysis

I began analyzing the BVS Cluster 1 ceramic material in June/July 2007 following the initiation of Phase 2 testing, continuing in July 2008, and on and off from July to December 2009, and August to December 2010 (along with analyses of all other material classes). During 2009 and 2010 Selene Camal, a local Maya woman from the village of San Jose Succotz, assisted me with washing and basic weighing and sorting (diagnostic from body sherds) of ceramic materials. Marla Peuramaki and Glenn Brown also assisted with some basic weighing and sorting, as well as illustration of individual sherds. Shawn Morton assisted with illustration and photography.

A number of goals and limits were established at the inception of my analysis. Although I have a degree of training as a ceramicist, my Master's research having focused heavily on the technological aspects of ceramic manufacture (Peuramaki-Brown 2012), I did not set out to revise the ceramic sequence or to define new types at Buenavista. Instead, I hoped to reconstruct the occupation history for each of the settlement sites investigated, using the temporally sensitive modes identified by LeCount and others to chart the founding, use, and abandonment of each site. This would permit the reconstruction of a settlement and population landscape, and the charting of the life history for the cluster as a whole. I also aimed to identify different patterns of activity, production, and consumption between settlement sites within the Cluster, relative to my discussion concerning knowledge bases. I chose which lots to analyze accordingly.

Sort types

To accomplish these goals, I made use of three levels of analysis: Initial, Basic, and Standard Sorts.

I used an Initial Sort (Sort Level 0) on ceramic materials recovered during the GPR ground-truthing of Phase 2 (see Chapter 4), involving a separate count and weight of sherds from every test pit. Initial sorting of all lot materials involved the separation of general ceramic vessel sherds (Bulk Ceramic) from special ceramic finds such as figurines, spindle whorls, adornments, etc. (Small Finds coded CR-###).

I used the Basic Sort (Sort Level 1) primarily in my analyses of humus, colluvium, fall, and fill contexts from which I wanted only chronological information. As much of my research was concerned with the decline of Buenavista, I felt a chronological assessment of all lots, including the mixed humus and fall materials, was particularly crucial for BVS sites as most remains were typically encountered less than 10cm below ground surface. At most sites, much terminal occupation material, and even architecture, is located in such upper level layers as the humus layer (Elizabeth Graham, personal communication, 2007). Materials from these layers are often ignored by many projects in their artifact analyses. In the Basic Sort, I arranged diagnostic sherds by ware and ceramic group, as defined by LeCount (1996) and Yaeger's (2000a) codes, by type:variety, and by chronologically relevant modes when possible. I then counted and weighed each group of sherds with shared characteristics. I ignored temporally insignificant formal information, although I did note vessel form when possible.

Ceramic materials from habitation debris, *in situ*, and other use-related contexts were subject to a Standard Sort (Sort Level 2). This level included identification of standard ware, group, and type:variety identification of the Basic Sort, but added more detailed analysis of certain formal attributes of the sherds. All specially catalogued ceramic small finds, regardless of lot group context, were subject to the Standard Sort, as well as additional notation of dimensions, rim diameter, and percentage if applicable. A fourth more detailed level of analysis (Yaeger's abandoned "Detailed Sort") involving more quantitative measures was considered, but

I too abandoned such a level of analysis because of the amount of time required and the nature of my research questions.

In the Basic and Standard Sort levels, diagnostic sherds (rims, bases, decorative elements, etc.) were separated from basic body sherds. In the Basic Sort, only diagnostic sherds were fully analysed while body sherds were simply counted and weighed. In the Standard Sort, body sherds were further separated based on paste and slip presence. I attempted to distinguish unslipped calcite body sherds from eroded calcite body sherds, but this was too difficult in many instances. Therefore, they are classified as "eroded/unslipped calcite" (01). When calculating type frequencies plain body sherds are factored out. Most of the data noted during analysis does not factor into this dissertation, but will appear in upcoming publications.

Method

The ceramic sample from BVS Cluster 1 consists almost entirely of sherds, with only one complete restorable vessel and some relatively complete vessels. This is due to the fact that most of the contexts excavated were either fill, secondary refuse, and transported primary contexts. The restorable vessel came from a primary cache-burial context (350-B1 at BVS-034), while the near complete vessels came from various less transposed contexts.

I began my analysis in the same manner as that conducted by Yaeger (2000a:1012). I placed lot sherds on a table and sorted them first by ware and group, and then into ever-smaller piles using more and more specific criteria. When each pile was no longer further divisible, I coded the sherds' attributes in a single row of an Excel spreadsheet and then weighed the pile and counted the sherds. Where fresh breaks obviously fit together, I counted the connected pieces as a single sherd. Sherd counts were not altered for old breaks but these were considered when assessing vessel frequencies. I felt that weighing and counting the sherds were both important because the weight:count ratios give important clues as to the post-depositional context of the sherds. All analysis was conducted in Belize and was primarily macroscopic. On occasion I was assisted with the use of a magnifying loop and a 40x magnification field microscope.

Assigning sherds to a ware and group required paste descriptions, typically some well-preserved slip, and a sense of the vessel's original form. On occasion a very distinctive slip or form/mode, could allow for immediate categorization (e.g. diagnostic slip of Paso Caballo Waxy

Wares). Type:varieties are based on paste, slip and decoration, and form. Ware and Group nomenclature comes almost entirely from Gifford's work at Barton Ramie, with a few exceptions.[17]

Ashwares

Ashwares, those pastes tempered with large quantities of volcanic ash, are not necessarily solely tempered with volcanic ash. Testing of pastes with HCl acid provides evidence for calcite tempering or natural inclusions within ash bodies. Many Belize Red forms in the neighbouring Vaca Plateau appear to be homogenous ashwares, when in fact many are a mix of volcanic ash and calcite tempering (Chartrand 2005; Sunahara 2003). Although I did verify calcite content in some controversial sherds using the HCl test, I did not do this for all ashware designations. If the clean sherd left a "chalky" streak when its broken edge was rubbed against my hand or another soft surface, it was assumed to be a true ashware.

Due to much overlap in paste colour between British Honduras Volcanic Ashware and Vinaceous Tawny Ashware, assignment to a specific category was only possible if surviving slip was present. If volcanic ash sherds displayed eroded surfaces, with no surviving slip, they were coded as "unknown ash" (30). If slipped red, they were classified as part of the "Belize Group" (31). If slipped orange they were classified as part of the "Chunhuitz Group" (unknown, monochrome, or polychrome/Benque Viejo).

Common finds and issues

Most observations regarding ceramic frequencies are addressed in Chapters 4, 6, and 7. Here I will briefly mention a few overarching trends noted in the collection that are relative to other ceramic assemblage analyses.

<u>Highest frequencies</u>

The three largest ceramic groups represented in BVS Cluster 1 settlement site occupation deposits are the Belize, Mount Maloney, and Cayo Groups. The red-slipped Belize Group

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[17] Jeremy Sabloff (1975) provides type descriptions for the Cambio, Tinaja, and Altar Ceramic groups, and LeCount (1996) first defined the San Lorenzo Ceramic Group, Opaque Carbonate Ware, and the Chial Ceramic Group, and the Macaw Bank Ceramic Group.

ashwares are more prevalent at Buenavista than at neighbouring Xunantunich, which falls in line with observations previously made by Gifford (1976), Preziosi (2003), etc. However, the black slipped Mount Maloney are much more common at Buenavista than further downstream at sites such as Baking Pot (Julie Hoggarth, personal communication, 2010). This is addressed briefly in Chapter 8.

Cayo Group

Like LeCount and Yaeger, I often found it difficult to distinguish the various types and varieties of the Cayo Ceramic Group, and even at times the groups within Uaxactun Unslipped Ware, as defined by Gifford. Likely many of my "Cayo" designated jars found in predominantly LCI contexts are smaller, and therefore may represent Zibal Group type:varieties (smaller versions of the larger Cayo and Alexanders; did not notice distinction until December 2010). Size and lip form for many vessels also seemed more diagnostic than paste colour: for example the Alexanders Unslipped:Alexanders Variety are identified as the large jars with squared and grooved lips within the Cayo Group.

There is also a distinct deep bowl or "cauldron" form with thick, wedge-shaped flaring rims. LeCount assigns these to the Alexanders Unslipped:Beaverdam variety, but I agree with Yaeger (2000a:1018) that their paste seems finer than that of the Beaverdam jars. In the BVS assemblage they are consistently light to medium grey brown (10YR 5/2) at their core and have unslipped reddish yellow surfaces (5 YR 6/6). I typically classified them as unslipped calcite, although Yaeger coded the San Lorenzo samples as unspecified Cayo Ceramic Group.

Mount Maloney Group

Descriptions of Mount Maloney pastes differ somewhat between those in the Buenavista zone, and those further upstream at Xunantunich. Ball and Taschek have previously described the pastes as composed of red clays, and my observations of this group also suggest more consistently reddish pastes. While in LeCount's sample and Yaeger's sample, they are consistently described as more beige. Material from Chan (Laura Kosakowski, personal communication, 2009) also appears slightly more reddish, more similar to the clays of the occupation horizon in the Buenavista area. This difference is also reflected in the colour coding

(Munsell) provided for all collections mentioned. It is possible this difference may represent variations in manufacture locales and raw material sources.

<u>Form</u>

Form designations are based on the standard set by Sabloff (1975). Like Yaeger, I was conservative about assigning form and I tried not to interpret beyond the sherd itself. Plates are those vessels with a height of less than or equal to 1/5 of the diameter. A dish is a vessel with a height that is greater than 1/5 the diameter but less than or equal to 1/3 of the diameter. A bowl is a vessel with a height that is greater than 1/3 the diameter but less than or equal to the diameter. Finally, a vase is a vessel with a height greater than the diameter.

Their significantly incurving rims distinguish constricted bowls from other bowl forms, and they are usually necked. Cauldrons are large, open bowls that seem to have distinct, wedge-shaped rims (Yaeger 2000a:1020). Many identified miscellaneous lids and clay cones are almost certainly part of the composite incensario complex defined by Stephen F. Borhegyi (1959; Rice 1999), although may also be part of ritual and domestic/utilitarian functioning braziers discussed by Ball and Taschek (2007). I also noted, and illustrated, some of the medium-sized, slightly flaring to slightly incurving bowls, slipped red-orange on the exterior and interior, described by Yaeger (2000a:1025-1026).   The lips of these bowls are rounded or bevelled out, and there is often a wide, shallow groove on the interior just below the lip. The vessels' exteriors are also often grooved and sometimes chamfered.

From form, primary functional categories were assigned, conforming in large part to designations outlined by LeCount. Utilitarian vessels include all calcite open (bowl, dish, plate) and closed forms. Serving vessels include volcanic ash open forms (bowl, dish, plate) and rarer closed forms. Finally, ceremonial vessels include all vases and thin walled open forms and incensarios.

<u>Chronological markers</u>

As mentioned above, my assignment of certain diagnostic modes and type:varieties to a given time period follows LeCount (1996). These are listed in Chapter 4: Table 4.8.

Additional recording

General comments were made for each lot and lot group during analysis, noting general sherd size, preservation, edge wear, etc. I, along with Shawn Morton, Marla Peuramaki, and Glenn Brown drew various sherds, particularly those exhibiting important classificatory mode variants. We also drew and photographed many sherds that could not be securely identified. I did not feel compelled to draw a large representative sample of the assemblage, given the extensive corpus of illustrations of sherds that exist for the Upper Belize Valley. I made all drawings at a 1:1 scale, and they minimally show the sherd's profile; many also show exterior and interior views. I noted the rim diameters and rim percentages where appropriate on all illustrated sherds, along with notes concerning decoration and paste.

Finally, Christophe Helmke performed preliminary analysis of the hieroglyphic and pseudo-glyphic decorations found on various sherds from BVS. Various points made in his analysis have been communicated in Chapters 4 and 6 when relevant to the discussion in this dissertation, and his full report can be found at the end of this appendix.

Sort Type	**Count**	**%**	**Weight (g)**	**%**
Initial (0)	586	0%	3482.9	0%
Basic (1)	124802	78%	984942.0	73%
Standard (2)	34670	22%	351702.5	26%
TOTAL	**159472**	100%	**1340127.4**	100%

Table AII. 1: Total ceramic materials collected and analyzed from Phase 2 and 3 investigations.

Table AII.2: Coding attribute system for ceramic materials (based on LeCount 1996 and Yaeger 2000a).

A. **Year**
B. **Operation**
C. **Suboperation**
D. **Lot**
E. **Sort Type**
    0. Initial
    1. Basic
    2. Standard
F. **Diagnostic/Non-diagnostic**
G. **Small find #/Catalogue #**
H. **Frequency: total** [new breaks counted as single]
I. **Frequency: vessel**
J. **Weight** (0.0g)
K. **Ware/Group**
    0. Unknown/unspecified
        0. unknown/unspecified
        1. eroded/unslipped calcite
        2. calcite polychrome
        3. calcite bichrome
        4. calcite monochrome
        5. unknown/eroded fine paste (not ash)
        6. black slipped calciteware
        7. red/orange slipped calciteware
        8. tan/buff/brown slipped calciteware
        9. orange fine calcite ware, no slip/eroded
        10. black paste calcite ware (added MPB 1 Sept 2010)
    1. Uaxactun Unslipped Ware
        0. unknown
        1. Cayo Group
        2. Tu-Tu Camp Group
        3. Jones Camp Group
        4. White Cliff Group
        5. Zibal Group
        6. Mopan Group
        7. Socotz Group
        8. Jocote Group
        9. Other (specify in T-V codes)
    2. Pine Ridge Carbonate Ware
        0. unknown
        1. Dolphin Head Group
        2. Vaca Falls Group
        3. Mount Maloney Group
        4. Garbutt Creek Group
        5. Mountain Pine Group

    6. Saturday Creek Group
    7. Unknown Polychrome
3. Ash Ware (British Honduras Volcanic and Vinaceous Tawny)
    0. unknown
    1. Belize Group
    2. Chunhuitz Group
    3. Chunhuitz Group – Monochrome [not used]
    4. Chunhuitz Group – Polychrome
    5. unslipped polychrome
    6. cream slip
    7. unknown polychrome
    8. glossy brown/black slip
    9. orange (added 10 Aug 2010)
4. Peten Gloss Ware
    0. unknown
    1. unknown polychrome
    2. Late Classic Groups
    3. Minanha Group
    4. Dos Arroyos Group
    5. Balanza Group
    6. Pucte Group
    7. Aguila Group
    8. Holmul Group
    9. other
5. Waxy Wares (Paso Caballo Waxy Ware and Flores Waxy Ware)
    0. unknown Red slip
    1. unknown orange slip
    2. unknown cream slip
    3. unknown black slip
    4. Sierra Group
    5. Flor Group
    6. Joventud Group
    7. Polvero Group
    8. Pital Group
    9. other
6. Mars Orange Ware
    0. unknown
    1. Savana Group
7. Holmul Orange Ware
    0. unknown
    1. Aguacate Group
8. Other Semi-Waxy Red and Orange (Gale Creek Red Ware)
    0. unknown
    1. Hillbank Group
    2. Vaquero Creek Group
9. Other Wares and Groups with Unspecified Wares

1. Opaque Carbonate Ware (Chial Group)
2. Micaceous course/Tumbac Unslipped Ware (Chan Pond and Macaw Bank Groups)
3. Fine Orange Ware (Altar Group)
4. Sotero Group
5. Macal Group
6. Yaha Group
7. Fowler Group
8. sandyware (from LeCount 1996:383)

L. Type-Variety (*coding from LeCount 1996 and Yaeger 2000a)

NONE SPECIFIED/UNKNOWN

0 None specified/unknown

NEW TOWN CERAMIC COMPLEX

Ware Unspecified

0100 Augustine Ceramic Group
0110 Augustine Red: Augustine Variety
0120 Ramsey Incised: Ramsey Variety
0130 Mauger Gouged-incised: Mauger Variety
0140 Swallow Black-on-red: Swallow Variety
0150 Pek Polychrome: Pek Variety
0200 Paxcaman Ceramic Group
0210 Paxcaman Red: Paxcaman Variety
0220 Bluefield Gouged-incised: Bluefield Variety
0230 Ixpop Polychrome: Ixpop Variety
0300 Daylight Ceramic Group
0310 Daylight orange: Daylight Variety
0320 Daylight orange: Darknight Variety
0330 White Creek Incised: White Creek Variety
0340 Amberhead Black-on-orange: Amberhead Variety

Chaple Unslipped Ware

0400 Maskall Ceramic Group
0410 Maskall Unslipped: Maskall Variety

Uaxactun Unslipped Ware

0500 More Force Ceramic Group
0510 More Force Unslipped: More Force Variety
0520 More Force Unslipped: Variety Unspecified-yellow
0530 More Force Unslipped: Variety Unspecified-Red filmed

Calabash Unslipped Ware

0600 Rio Juan Ceramic Group
0610 Rio Juan Unslipped: Variety Unspecified
0620 Rio Juan Unslipped: Rio Juan Variety

SPANISH LOOKOUT CERAMIC COMPLEX

Pine Ridge Carbonate Ware

1000 Dolphin Head Ceramic Group
1010 Dolphin Head Red: Dolphin Head Variety
1020 Silver Creek Impressed

1100 Garbutt Creek Ceramic Group
1110 Garbutt Creek Red: Garbutt Creek Variety
1120 Garbutt Creek Red: Variety Unspecified (Brown-interior)
1130 Garbutt Creek Red: Paslow Variety
1140 Rubber Camp Brown: Rubber Camp Variety
1200 Vaca Falls Ceramic Group
1210 Vaca Falls Red: Vaca Falls Variety
1220 Kaway Impressed: Kaway Variety
1230 Kaway Impressed: Callar Creek Variety
1240 Duck Run Incised: Duck Run Variety
1250 Roaring Creek Red: Roaring Creek Variety
1300 Mount Maloney Ceramic Group
1310 Mount Maloney Black: Mount Maloney Variety
1400 Yalbac Ceramic Group
1410 Yalbac Smudged-brown: Yalbac Variety

British Honduras Volcanic Ash Ware

1500 Belize Ceramic Group
1510 Belize Red: Belize Variety
1511 Belize Red: Incised Variety (LeCount 1996:401)
1520 Platon Punctated-incised: Platon Variety
1530 McRae Impressed: McRae Variety
1540 Gallinero Fluted: Gallinero Variety
1550 Martins Incised: Martin Variety
1560 Puhui-zibal Composite: Puhui-zibal Variety
1570 Montego Polychrome: Montego Variety
1580 Frenchman's composite
2800 San Lorenzo Black Group
2810 San Lorenzo Black

Vinaceous Tawny Ware

1600 Chunhuitz Ceramic Group
1610 Chunhuitz Orange: Variety Unspecified
1620 Xunantunich Black-on-orange: Variety Unspecified
1630 Benque Viejo Polychrome: Variety Unspecified

Uaxactun Unslipped Ware

1700 Tu-Tu Camp Group
1710 Tu-Tu Camp Striated: TuTu Camp Variety
1720 Tu-Tu Camp Striated: Tzimin Variety
1730 Tu-Tu Camp Striated: Variety Unspecified-Appliquéd
1740 Tu-Tu Camp Striated: Variety Unspecified-Beaverdam
1800 Cayo Ceramic Group
1810 Cayo Unslipped: Cayo Variety
1820 Cayo Unslipped: Variety Unsp. (Buff-Appliquéd)
1830 Cayo Unslipped: Variety Unsp. (Red-Appliquéd)
1840 Cayo Unslipped: Variety Unsp. (Red slipped)
1850 Alexanders Unslipped: Alexanders Variety
1860 Alexanders Unslipped: Croja Variety

1870 Alexanders Unslipped: Beaverdam Variety

Peten Gloss Ware

2000 Meditation Ceramic Group

2010 Meditation Black: Meditation Variety

2100 Achote Ceramic Group

2110 Achote Black: Variety Unspecified

2120 Cubeta Incised: Variety Unspecified

2200 Palmar Ceramic Group

2210 Palmar Orange-polychrome: Variety Unspecified

2220 Zacatel Cream-polychrome: Variety Unspecified

2230 Paixban Buff-polychrome: Variety Unspecified

2240 Yuhactal Black-on-Red: Variety Unspecified

2250 Tunich Red-on-orange: Tunich Variety

2300 Danta Ceramic Group

2310 Joyac Cream-polychrome: Variety Unspecified

2400 Asote Ceramic Group

2410 Torres Incised: Variety Unspecified

2500 Tialipa Ceramic Group

2510 Tialipa Brown: Variety Unspecified

2520 Canoa Incised: Varieties Unspecified

2530 Calabaso Gouge-Incised: Varieties Unspecified

2600 Nanzal Ceramic Group

2610 Corozal Incised: Varieties Unspecified

2900 Opaque Carbonate Ware/Chial Ceramic Group (MPB 2010 added)

2910 Chial Orange-red type

TIGER RUN CERAMIC COMPLEX

Pine Ridge Carbonate Ware

3000 Mountain Pine Ceramic Group

3010 Mountain Pine Red: Mountain Pine Variety

3020 Guana Creek Impressed: Guana Creek Variety

3030 Mountain Pine Red: Old Jim Variety

3040 San Pedro Impressed: San Pedro Variety

3050 Rosario Incised: Rosario Variety

3060 Mount Pleasant Red: Mount Pleasant Variety

3070 Pascua Impressed: Pascua Variety

3100 Saturday Creek Ceramic Group

3110 Saturday Creek Polychrome: Saturday Creek Variety

3120 Saturday Creek Polychrome: Variety D

3130 Saturday Creek Polychrome: Variety F

Peten Gloss Ware

3200 Tasital Ceramic Group

3210 Gloria Impressed: Variety Unspecified

3300 Molino Ceramic Group

3310 Molino Black: Variety Unspecified

3400 Teakettle Bank Ceramic Group

3410 Teakettle Bank Black: Variety Unspecified

3420 Teakettle Bank Black: Teakettle Bank Variety
3430 Mangrove Brown-black: Mangrove Variety
3440 Limon Black-cream: Limon Variety
3500 Saxche Ceramic Group
3510 Saxche Orange-polychrome: Variety Unspecified
3520 Uacho Black-on-orange: Variety Unspecified
3520 Sibal Buff-polychrome: Variety Unspecified
3530 Juleki Cream-polychrome: Variety Unspecified

Ware Unspecified

3600 Sotero Ceramic Group
3610 Sotero Red-brown: Sotero Variety
3620 Silkgrass Fluted: Silkgrass Variety
3630 Orange-walk Incised: Orange-walk Variety
3640 Orange-walk Incised: Banana Bank Variety
3700 Macal Ceramic Group
3710 Macal Orange-red: Macal Variety
3720 Chambers Incised: Chambers Variety

Uaxactun Unslipped Ware

3800 Jones Camp Ceramic Group
3810 Jones Camp Striated: Jones Camp Variety
3900 White Cliff Ceramic Group
3910 White Cliff Striated: Variety Unsp.-Brown
3920 White Cliff Striated: Variety Unsp.-Dark Brown
3930 White Cliff Striated: Variety Unsp.-Red
4000 Zibal Ceramic Group
4010 Zibal Unslipped: Zibal Variety
4020 Zibal Unslipped: Variety Unsp.-Brown
4030 Zibal Unslipped: Variety Unsp.-Buff

HERMITAGE CERAMIC COMPLEX

Ware Unspecified

4500 Fowler Ceramic Group
4510 Fowler Orange-red: Fowler Variety
4520 Fowler Orange-red: Spring Camp Variety
4530 San Ignacio Red-on-brown: San Ignacio Variety

Peten Gloss Ware

4600 Minanha Ceramic Group
4610 Minanha Red: Minanha Variety
4620 Minanha Red: Rio Frio Variety
4630 St. Herman Impressed: St Herman Variety
4700 Dos Hermanos Ceramic Group
4810 Dos Hermanos Red: Variety Unspecified
4920 Mahogany Creek Incised: Mahogany Creek Variety
5000 Balanza Ceramic Group
5010 Balanza Black: Variety Unspecified
5020 Balanza Black: Cadena Creek Variety
5030 Lucha Incised: Variety Unspecified

5040 Lucha Incised: Gallo-blanco Variety
5050 Paradero Fluted: Oak-burn Variety
5060 Eastern Branch Plain: Eastern Branch Variety
5100 Pucte Ceramic Group
5110 Pucte Brown: Variety Unspecified
5120 Santa Teresa Incised: Santa Teresa Variety
5130 Chorro Fluted: Chorro Variety
5200 Actuncan Ceramic Group
5210 Actuncan Orange-polychrome: Actuncan Variety
5220 Actuncan Orange-polychrome: Blancaneau Variety
5230 Batellos Black-on-red: Variety Unspecified
5240 Boleta Black-on-orange: Variety Unspecified
5300 Dos Arroyos Ceramic Group
5310 Dos Arroyos Orange-polychrome: Dos Arroyos Variety
5320 Dos Arroyos Orange-polychrome: Variety A and H
5330 Dos Arroyos Orange-polychrome: Variety B
5340 Dos Arroyos Orange-polychrome: Variety E and E-2
5350 Dos Arroyos Orange-polychrome: Variety K
5360 Dos Arroyos Orange-polychrome: Variety L
5370 Caldero Buff-polychrome: Variety Unspecified
5380 Yaloche Cream-polychrome: Variety Unspecified
5400 Aguila Ceramic Group
5410 Aguila Orange: Variety Unspecified
5420 Pita Incised: Variety Unspecified

Uaxactun Unslipped Ware

5500 Mopan Ceramic Group
5510 Mopan Striated: Mopan Variety
5520 Mopan Striated: Variety White
5530 Mopan Striated: Variety Black, reed impressed
5600 Socotz Ceramic Group
5610 Socotz Striated: Varieties Unspecified
5620 Socotz Striated: Socotz Variety
5630 Socotz Striated: Variety Dark Brown
5640 Socotz Striated: Variety Buff
5650 Socotz Striated: Variety Gray
5660 Socotz Striated: Variety White
5670 Socotz Striated: Variety White appliquéd
5700 White Cliff Group
5710 White Cliff Striated: White Cliff Variety
5720 White Cliff Striated: Variety White

Ware Unspecified

5800 Hewlett Bank Ceramic Group
5810 Hewlett Bank Unslipped: Hewlett Bank Variety

FLORAL PARK CERAMIC COMPLEX

Holmul Orange Ware

6200 Aguacate Ceramic Group

6210 Aguacate Orange: Variety Unspecified
6220 Aguacate Orange: Aguacate Variety
6230 Aguacate Orange: Variety Thick-walled
6240 Aguacate Orange: Variety Matte finished
6250 Aguacate Orange: Ramonal Variety
6260 Aguacate Orange: Holja Variety
6270 Aguacate Orange: Privaccion Variety
6300 Aguacate Ceramic Group
6310 Guacamallo Red-on-orange: Guacamallo Variety
6320 Guacamallo Red-on-orange: Camalote Variety
6330 Gavilan Black-on-orange: Gavilan Variety
6340 Gavilan Black-on-orange: Sakan Variety
6350 Ixcanrio Orange-polychrome: Ixcanrio Variety
6360 Ixcanrio Orange-polychrome: Tikan Variety
6370 Coquericot Buff-polychrome: Coquericot Variety
Uaxactun Unslipped Ware
6400 Monkey Falls Ceramic Group
6410 Monkey Falls Striated: Variety Unspecified
6420 Monkey Falls Striated: Monkey Falls Variety
6430 Monkey Falls Striated: Variety Brown
6440 Monkey Falls Striated: Variety Red
6450 Monkey Falls Striated: Variety Orange
Tumbac Unslipped Ware
6500 Chan Pond Ceramic Group
6510 Chan Pond Unslipped: Variety Unspecified
6520 Chan Pond Unslipped: Chan Pond Variety
6530 Negroman Punctated-incised: Negroman Variety
MOUNT HOPE CERAMIC COMPLEX
Paso Caballo Waxy Ware
6900 Quacco Creek Ceramic Group
6910 Quacco Creek Red: Quacco Creek Variety
7000 San Felipe Ceramic Group
7010 San Felipe Brown: San Felipe Variety
7020 San Antonio Golden-brown: San Antonio Variety
7030 San Antonio Golden-brown: Variety Orange-interior
7100 Sarteneja Ceramic Group
7110 Savannah Bank Usulutan: Savannah Bank Variety
7120 Sarteneja Usulutan: Variety Unspecified
7200 Escobal Ceramic Group
7210 Escobal Red-on-buff: Variety Unspecified
Gale Creek Red Ware
7300 Vaquero Creek Ceramic Group
7310 Vaquero Creek Red: Vaquero Creek Variety
7320 Vaquero Creek Red: Variety Thin-walled
7330 Bullet Tree Red-brown: Bullet Tree Variety
Uaxactun Unslipped Ware

7400 Stumped Creek Ceramic Group
7410 Stumped Creek Striated: Varieties Unspecified
7420 Stumped Creek Striated: Stumped Creek Variety
7500 Old River Ceramic Group
7510 Old River Unslipped: Variety Unspecified
7520 Old River Unslipped: Old River Variety

BARTON CREEK CERAMIC COMPLEX

Paso Caballo Waxy Ware

7900 Sierra Ceramic Group
7910 Sierra Red: Varieties Unspecified
7920 Sierra Red: Orange-paste Variety
7930 Sierra Red: Buff-paste Variety
7940 Sierra Red: Maroon Variety
7950 Sierra Red: Orange-double slip Variety
7960 Sierra Red: Society Hall Variety
8000 Sierra Ceramic Group
8010 Alta Mira Fluted: Variety Unspecified
8020 Laguna Verde Incised: Variety Unspecified
8030 Correlo Incised-dichrome: Variety Unspecified
8040 Repasto Black-on-red: Variety Unspecified
8100 Happy Home Orange Ceramic Group
8110 Happy Home Orange: Happy Home Variety
8200 Flor Ceramic Group
8210 Flor Cream: Varieties Unspecified
8220 Flor Cream: Variety H-3
8230 Flor Cream: Variety H-3, Black-paste
8240 Flor Cream: Variety H-4
8250 Accordian Incised: Variety Unspecified
8260 Mateo Red-on-cream: Variety Unspecified
8270 Iguana Creek White: Iguana Creek Variety
8300 Polvero Ceramic Group
8310 Polvero Black: Varieties Unspecified
8320 Polvero Black: Variety G-2
8330 Polvero Black: Variety G-3
8340 Polvero Black: Variety G-4
8350 Polvero Black: Variety G-7
8360 Lechugal Incised: Macaw Bank Variety
8370 Never Delay Impressed-black: Never Delay Variety

Gale Creek Red Ware

8400 Hillbank Ceramic Group
8410 Hillbank Red: Variety Unspecified
8420 Hillbank Red: Hillbank Variety
8430 Hillbank Red: Variety Brown
8440 Hillbank Red: Variety Smudged-orange
8450 Hillbank Red: Variety White-striped
8460 Hillbank Red: Rockdondo Variety

8470 Starkey Incised: Starkey Variety

Uaxactun Unslipped Ware

8500 Sapote Ceramic Group

8510 Sapote Striated: Variety Unspecified

8520 Sapote Striated: Sapote Variety

8530 Sapote Striated: Variety Black-rimmed

8540 Sapote Striated: Variety Red-rimmed

8550 Sapote Striated: Variety Impressed

8560 Sapote Striated: Variety Impressed-appliquéd

8570 Sapote Striated: Variety Deep Striated

8600 Paila Ceramic Group

8610 Paila Unslipped: Varieties Unspecified

8620 Red Bank Appliquéd: Red Bank Variety

8630 Caves Branch Unslipped: Caves Branch Variety

JENNY CREEK CERAMIC COMPLEX

Uaxactun Unslipped Ware

8900 Jocote Ceramic Group

8910 Jocote Orange-brown: Varieties Unspecified

8920 Jocote Orange-brown: Jocote Variety

8930 Jocote Orange-brown: Amergris Variety

8940 Chacchinic Red-on-brown: Variety Unspecified

8950 Chacchinic Red-on-orange-brown: Chacchinic Variety

8960 Palma Daub: Variety Unspecified

8970 Palma Daub: Palma Variety

9000 Sayab Ceramic Group

9010 Sayab Daub-striated: Sayab Variety

9020 Sayab Daub-striated: Hulse Variety

9030 Cooma Striated: Cooma Variety

Mars Orange Ware

9100 Savana Ceramic Group

9110 Savana Orange: Variety Unspecified

9120 Savana Orange: Rejolla Variety

9130 Savana Orange: Savana Variety

9140 Reforma Incised: Variety Unspecified

9150 Reforma Incised: Mucnal Variety

9160 Reforma Incised: Reforma Variety

Flores Waxy Ware

9200 Joventud Ceramic Group

9210 Sampoperro Red: Variety Unspecified

9220 Sampoperro Red: Samporperro Variety

9230 Joventud Red: Variety Unspecified

9240 Black Rock Red: Black Rock Variety

9250 Pinola Creek Incised: Variety Unspecified

9260 Pinola Creek Incised: Pinola Creek Variety

9300 Pital Ceramic Group

9310 Pital Cream: Variety Unspecified

9320 Paso Danto Incised: Varieties Unspecified
9400 Chunhinta Ceramic Group
9410 Chunhinta Black: Variety Unspecified
9420 Deprecio Incised: Deprecio Variety

SEIBAL TYPE VARIETIES

Uaxactun Ware

9500 Cambio Ceramic Group
9510 Pedregal Modeled: Appliquéd Head Variety
9520 Miseria Appliquéd: Variety Unspecified
9530 Miseria Appliquéd: Hollow Handle Variety

Peten Gloss Ware

9700 Tinaja Red Ceramic Group
9710 Tinaja Red: Variety Unspecified
9720 Subin Red: Variety Unspecified
9730 Pantano Impressed: Pantano Variety
9740 Pantano Impressed: Stamped Variety
9750 Chaquiste Impressed: Variety Unspecified

Fine Orange Ware

9900 Altar Ceramic Group
9910 Pabellon Modeled-carved: Pabellon Variety
9920 Islas Gouged-incised: Islas Variety
9930 Cedro Gadrooned: Cedro Variety

M. Chronological Assessment

0. Unknown/not recorded
1. Colonial/modern (M)
2. Late Postclassic (LPC)
3. Early Postclassic (EPC)
4. Terminal Classic (TC)
5. Late Classic IIb (LCIIB)*rarely used
6. Late Classic II (LCII)
7. Late Classic IIa (LCIIA)*rarely used
8. Late Classic I (LCI)
9. Indeterminate Late to Terminal Classic (LC)
10. Early Classic (EC)
11. Protoclassic (PP)
12. Late Preclassic (LP)
13. Middle Preclassic (MP)
14. General Preclassic (GP)

N. Exterior Slip Colour [body sherds: use to indicate slip, interior NA unless other]

0. no slip/unknown
1. eroded
2. black
3. orange to red
4. light orange/light brown-tan
5. brown
6. white or cream

7. smudge (black/gray)
8. brown to red with black mottling (sierra red)
9. gray
10. burned (cannot determine)

O. Interior Slip Colour (*same as above)

P. Primary Form

- 00. unknown
  - 01. body only
  - 02. neck only
  - 03. unknown rim
  - 04. jar rim or pedestal base
  - 05. base
  - 06. spout
  - 07. handle
  - 08. foot
  - 09. unknown appendage
- 10. open form (unspecified)
  - 11. plate (height less than 1/5 diameter)
  - 12. dish (height between 1/3 and 1/5 diameter)
  - 13. unconstricted bowl
  - 14. constricted bowl
  - 15. vase (unrestricted or simple restricted)
  - 16. thin walled open form (either bowl or vase)
  - 17. cauldron
  - 18. canteen
  - 19. brandy snifter
- 20. closed form (unspecified-likely jar)
  - 21. restricted jar
  - 22. unrestricted jar
  - 23. tecomate (rarely used; def. Yaeger 2000a:1020; likely in with neckless olla)
  - 24. neckless olla
  - 25. bucket
- 30. specialty form
  - 31. comal
  - 32. incensario (spiked, flanged, modelled)
  - 33. drum
  - 34. incensario grate (body with hole)
  - 35. chocolate pot
  - 36. ear spool
  - 37. grater bowl or dish
  - 38. whistle
  - 39. mould
- 40. lid (unspecified)
  - 41. flat
  - 42. truncated-conical
  - 43. scutate

44. conical
45. basin
46. round
47. incensario lid with handle
48. possible incensario lid

50. miniature form (unspecified)
    51. plate
    52. dish
    53. bowl
    54. vase
    55. jar
    56. effigy
    57. censer

60. figurine
    61. anthropomorphic
    62. unknown modelled body part
    63. unknown modelled piece, probably figurine or incensario fragment
    64. mould(?) made face: hollow figurine or vessel appendage (added MPB Dec 2010)
    65. modelled-piece face: hollow figurine or vessel appendage (added MPB Dec 2010)

70. worked sherd
    71. pendant (with hole)
    72. sherd with prefired hole
    73. modified round disk (lid?)
    74. spindle whorl (with hole)
    75. bead
    76. worked edge (tool)
    77. modelled spindle whorl with prefire incised decoration
    78. ornament
    79. modified round disk with postfire hole (ornament or spindle whorl)

80. Baked clay mass
    81. raw clay chunk

90. geometric shape
    91. column with outcurving end (Thompson's "masher")
    92. small round ball (foot rattle)
    93. long cone, slightly outcurving
    94. short, straight cone
    95. large cylindrical tube
    96. ladle
    97. conical section, tip missing
    98. censer plug/prong with partial burning (possibly 3-pronged censer)

100. other
    101. formal plano-convex spindle whorl

Q. Secondary: chronologically diagnostic rim, lip, and other forms

00. none/not specified
01. LCI Mt. Mal. incurved bowl
02. LCIIa Mt. Mal. Incurved bowl

03. LCII Mt. Mal. Incurved bowl
04. LCIIb Mt. Mal. Incurved bowl
05. TC Mt. Mal. Incurved bowl
06. LCI pinched lip/simple rounded lip jar, Mt. Mal. or other
07. LCII Mt. Mal. Jar: outcurved neck, squared lip
08. TC Mt. Mal. Jar: vertical, then everted neck
09. TC Mt. Mal. Constricted bowl: recurved, everted rim
10. LCIIb/TC flaring lipped jars
11. TC piecrust flaring lipped jars
12. EC ring base
13. PC scroll foot
14. EC basal flange
15. LPC medial flange
16. EC cauldron
17. EC/LCI red-slipped grooved bowls (Yaeger 2000a:1025-1026)
18. EC arrow-head rim jar
19. LP outcurving buckets/bowls/dishes
20. LCI lateral ridge forms
21. PP Z-angle

R. Secondary Form: flanges, ridge, angle

00. absent
01. flange
02. medial flange
03. basal flange
04. z-angle
05. basal angle
06. lateral ridge
07. labial flange
08. unknown flange
09. unknown ridge
10. basal ridge (added MPB Dec 2010)

S. Secondary Form: Curvature

0. unknown/unspecified
1. flared
2. outcurved
3. simple silhouette
4. vertical/direct
5. incurved
6. inflared
7. closed
8. barrel-shaped/tecomate
9. round/hemispherical (not incurved)

T. Secondary Form: Spout

0. absent
1. unknown
2. supported

3. unsupported
4. open
5. tubular, support unknown
6. nubbin
7. effigy

U. Secondary Form: Handle

0. absent
1. unknown
2. strap (vertical or horizontal)
3. rounded
4. conical nubbin with groove (not perforated)
5. nubbin with perforation
6. incensario ladle handle
7. modelled
8. nubbin without perforation/incomplete perforation
9. basket

V. Secondary Form: foot or support/base

00. absent
10. solid foot or support
    11. nubbin/pinched
    12. conical
    13. slab
    14. tau-shaped
    15. pedestal base
    16. ring base
    17. columnar base
    18. truncated-cone (tall)
    19. truncated-cone (short)
20. hollow foot
    21. mammiform
    22. hemispherical
    23. bell-shaped
    24. oven-shaped
    25. conical
    26. bulbous
    27. nubbin
    28. cylindrical columnar
    29. effigy
30. other
    31. hollow slab foot
    32. tall, solid slab foot
    33. scroll foot

W. Secondary Form: base

0. none
1. unknown
2. flat

3. round
4. incurved
5. truncated-conical
6. flat with thickened basal angle
7. vase base only
8. countersunk circle

X. Decoration: Primary

- 00. absent
- 10. carving
    - 11. plano-relief carving (low relief, cutting out clay as background for design)
    - 12. model carving (deeply cut with design embellished by incising or modelling)
    - 13. gouge-incising (cutting/gouging out areas to create pattern)
- 20. incising
    - 21. shallow, sharp, prefire
    - 22. groove, prefire
    - 23. scratching, postfire
    - 24. deep, sharp incision, prefire
    - 25. incise-impressing: postfire
    - 26. internal groove, prefire
    - 27. groove, postfire (added MPB Dec. 2010)
- 30. impressing
    - 31. punctuating
    - 32. notching
    - 33. stamping
    - 34. perforating, prefire
    - 35. patterned impressing
    - 36. cane stamping
    - 37. thumbnail impressing
    - 38. thumbprint impressing/piecrust
    - 39. perforating, postfire (mendholes, etc.) (added MPB Aug. 2010)
- 40. painting
    - 41. positive
    - 42. negative
    - 43. postfire
- 50. appliquéing
    - 51. spike
    - 52. thin raised line
    - 53. winged face, hand-modelled
    - 54. ridge with notching
    - 55. ridge with incising
    - 56. ridge with incising and notching
    - 57. fillet
    - 58. impressed fillet
    - 59. impressed and smeared fillet
- 60. tooling
    - 61. chamfering

- 62. fluting
- 63. gadrooning
- 70. modelling
  - 71. handmade
  - 72. mouldmade
- 80. texturing
  - 81. striations
  - 82. irregular to regular drag marks
  - 83. stuccoed surface
- 90. additional technique
  - 91. wide, shallow grooves or ripples
  - 92. appliquéd pinch/piecrust
  - 93. large, tooled ridge
  - 94. smoothed/shaped
  - 95. sawn (added MPB Dec. 2010)
  - 96. appliquéd bosse (added MPB Dec. 2010)

Y. Decoration: secondary (*same as above)

Z. Decoration: style

- 00. absent
- 01. indeterminate
- 10. single element
  - 11. linear-continuous
  - 12. linear-segment
  - 13. curvilinear
  - 14. zig-zag
  - 15. closed form
  - 16. circular
  - 17. rectangular
  - 18. square
- 20. simple repetitive
  - 21. linear
  - 22. linear-segments
  - 23. checker-board
  - 24. closed form
  - 25. circular
- 30. abstract/geometric
  - 31. linear
  - 32. linear and closed form combination
  - 33. circle appliqué (added MPB 7 Sept. 2010)
- 40. representative
  - 41. toad
  - 42. serpent
  - 43. unknown face
  - 44. old god face
  - 45. unknown zoomorphic (added MPB 18 Aug. 2010)
- 50. pseudo-glyph

60. composite of pseudo-glyph and geometric
70. codex-style scene
80. complex representative
90. bands and representative
100. glyphic

AA. General Lot Comments

General sherd size, preservation, edge wear, mend holes, burning, etc.

AB. Lot Date

AC. General Unit comments

AD. Date Analyzed

AE. Analyst

AF. Photo

AG. Drawing

AH. Length (mm) (only Small Finds)

AI. Width (mm) (only Small Finds)

AJ. Thickness (mm) (only Small Finds)

AK. Rim Diameter (cm) (only Small Finds)

AL. Rim Percentage (only Small Finds)

Independent Report #4:

Preliminary Comments on the Glyphic Sherds of Buenavista del Cayo

Christophe Helmke, University of Copenhagen

The present report presents some preliminary comments on decorated sherds and fragmentary glyphic texts represented on ceramics found at Buenavista del Cayo. These specimens were recovered as part of the archaeological investigations of the Mopan Valley Archaeological Project, under the direction of Jason Yaeger, during the 2010 field season. I had the opportunity to inspect and photograph the sherds in July and October of 2010 and this report is based on the data then gathered.

Each of the sherds has been assigned a provisional designation and will be presented according to ascending numerical label that matches the sequence of their recovery. This provisional designation follows that which was implemented by Stephen Houston and his colleagues (1992) as part of their initial treatment of the glyphic texts from Buenavista del Cayo. Eventually, this provisional sequence will be superseded by "Miscellaneous Texts" designations (abbreviated as MT), following the nomenclature in use at Tikal for texts on portable objects and artefacts (in keeping with the standards of the University of Pennsylvania Tikal Project; see Coe & Haviland 1982). Thus the first non-monumental text discovered at a site is designated as MT. 1, the second as MT. 2, *ad infinitum*. The investigations of the Mopan Valley Archaeological Project were preceded by the San Diego State University Mopan-Macal Triangle Project under the direction of Joseph Ball and Jennifer Taschek (which operated between 1984 and 1989). As a result several non-monumental glyphic texts have been found at the site during these initial investigations. At present Joseph Ball (pers. comm. 2010) is still arranging the inventory of the glyphic texts from the site according to MT designations. Once his inventory is complete the finds made by the Mopan Valley Archaeological Project will be appended and the new designations implemented.

Sherd 5 (Op. 354 C/14, Small Find # CR-035)

Sherd 5 (Figure 1) represents the remains of three glyph blocks that are preserved along the rim of a hemispherical Saxche Orange-polychrome bowl that can be assigned to the Tiger

Run ceramic complex, dating to the Late Classic I phase (c. A.D. 600-670) (see Gifford 1976; LeCount 1992, 1996; LeCount et al. 2002). The outlines of the glyphs were rendered in a thick line, with internal diagnostic features executed with an elegant thin line, below a dark brown line, the rim itself embellished with a band of black slip, the whole on an orange background. The paint that was used to render the glyphs varies from dark brown to black and matches the coloration and quality of the slip that was applied along the rim. The vessel evidently broke and was repaired in antiquity as is indicated by the remains of mend hole that was drilled above the glyphic text. Overall the sherd is moderately well preserved, but exhibits minor flaking of the smooth and highly-burnished exterior.

The size of the glyphs and their placement along the rim suggest that these once formed part of what can be termed a Primary Standard Sequence, following the terminology established by Michael D. Coe (1973). More recently such texts have been dubbed the Standard Dedicatory Sequence (Boot 2003; Stuart 2005). Despite these variable designations these still refer to the same type of glyphic clauses, which are typically headed by an introductory segment that provides a type of dedicatory incantation, followed by a reference to the vessel type, its intended contents or function, the whole being closed by the names and titles of the original owner, or patron of the vessel, the individual who commissioned the vessel, or for whom it was made (see MacLeod 1990; MacLeod & Reents-Budet 1994; Stuart 2005).

In the present case only three glyph blocks remain. Since the sequence is fragmentary these have been designated as pX1, pY1 and pZ1, from the reader's left to the reader's right, according to original reading order (according to the standards and nomenclature of the Corpus of Maya Hieroglyphic Inscriptions; see Graham 1975).

The two better-preserved glyph blocks (pX1 and pY1) appear, at first sight, to share the same internal configuration: a large squared main sign, a bipartite superfix, and a rounded rectangular subfix. This configuration as well as the overall similarities of the internal diagnostic elements of the various signs could suggest that we are looking at repeated signs, and as such it can be surmised that more or less the same glyph block was applied sequentially around the rim. If this were the case then the text should be considered pseudoglyphic, in which the author of the text was illiterate, or only partly literate, and wanted to convey something resembling a viable glyphic text, without actually providing any coherent phonetic or semantic content. Such pseudoglyphic texts are usually found later in Maya history at a time when demand for high elite goods increased within sectors of society that traditionally did not have access to such prestige items. Several implications stem from this conclusion. First, that literacy was in fact highly restricted within Maya society (and based on present evidence may have been limited to the royal segments). Second, that sumptuary laws appear to have controlled the production, dissemination, acquisition and usage of objects with glyphs during the majority of the Classic period and that it was only during periods of social restructuration and diminished centralized control that access to such goods was available, at least partly so.

Nevertheless, since the text is fragmentary the possibility still remains that it represents the remains of a fully-viable glyphic clause, since the examples rendered may be sufficiently idiosyncratic to require more of the text to determine its content via its syntactic context. Below the glyphic signs are examined for their usual written values (rendered in boldface – termed transliteration) and their assumed reading (rendered in lowercase and italic font – termed transcription) (using the standard methods of epigraphy; see Kettunen & Helmke 2010: 13-14). References are made to the Thompson catalog of glyphs (1962) in which individual sings are assigned discrete numeric labels with a T as prefix. Treating the text as viable we can identify the subfix of pX1 as the syllabogram **li** (T24), or a rarer form of the undeciphered 'celt' logogram (possibly **LEM**, T121v), whereas the main might represent an archaic (i.e. Early Classic) form of the logogram **TE'** (T518v), 'tree, wood' (see Taube 2003: 291, Fig. 11.10e-f). The identity of the superfix remains blurred since it might form part of the full-form of the logogram **TE'** representing part of a foliation that tops the main sign (T78). Alternatively the superfix may provide the logogram **NAL** (T86), which is usually set behind the main sign and as such would be read in final position as the locative suffix *-nal* 'place'. Too little of the prefix to pX1 remains to identify it.

The prefix of pY1 is clearly the logogram **K'AK'** (T122), read *k'ahk'* 'fire'. Although the identity of the superfix remains problematic it could form part of the logogram **AJAW** (T168), which here would be represented in full geometric form with the main sign T518. The latter, when it occurs in isolation, is usually read **TE'**, but here the two signs seem to form the complete geometric form of the logogram **AJAW** 'lord, king'. The subfix of pY1 is partly eroded and hard to make out, but resembles the syllabogram **ki** (T100).

The part of pZ1 that remains may represent the profile of the head-variant of the logogram **TI'** (T128v), 'mouth, lip, edge'.

Whereas this preliminary review of each of the individual signs might seem promising, at present the glyphs do not form a coherent reading. In addition the paleography of the two **TE'** main signs (in pX1 and pY1) does not agree, since one is contemporary to the date of the vessel and the other is a considerable archaism. Nevertheless, the elements that can be tentatively identified as *ti'*, *-nal*, and the possible title *k'ahk' ajaw*, all form part of what might be expected to be found in a nomino-titular section of a text. As such if the text is indeed viable it seems most likely that we are faced with a segment of the nomino-titular section of the text and considering its context would render the name of the original owner of the vessel. What is promising here is that the title *k'ahk' ajaw* is known from an unprovenanced panel (Figure 2a), where it follows an anthroponym that can be read in part as **AK'AB?-KOJ? / BAK-**T1013. Intriguingly, as has been first pointed out by Houston and his colleagues (1992: 507) part of the same nominal is found on a Chinos Black-on-cream sherd (Figure 2b) found within the so-called palace dump at Buenavista (see Reents-Budet et al. 2000). Together this evidence suggests that the title *k'ahk' ajaw* may well be a local one, either in exclusive use at Buenavista or at several sites in the vicinity. All the more intriguing is another example found on Ixkun Stela 1, wherein a captive is captioned in the accompanying text as a *k'ahk' ajaw* (S1), although unfortunately the rest of the text is weathered. As such it also follows that the text of Sherd 5, although idiosyncratic, is viable and records the nomino-titular section of what may well be a local individual. Nevertheless, considering the fragmentary state of the text it is warranted that this conclusion be treated as provisional and subject to reinterpretation were more of the text or additional evidence brought to bear on the matter.

<u>Sherd 6</u> (Op. 358D/6, Small Find # CR-053)

Sherd 6 (Figure 3) is a rim sherd of a shallow Tiger Run dish, most likely attributable to the Saturday Creek type: Var. Unspec. (Gifford 1976: 198-201). The small medial ridge is preserved on the unslipped exterior of the sherd and the interior design preserves a series of red parallel lines that frame two black-painted and fragmentary glyphic collocations.

Since the text is incomplete these are again designated as pY1 and pZ1. Of the first collocation only the main sign subsists that is considerably weathered. The circular outline and what may a series of smaller interior circles, in the lower portion of the sign, can, however, be readily discerned. For collocation pZ1 the main sign is clearly the syllabogram **bi** (T585), and the superfix remains unclear. Considering the various possibilities at hand, it seems probable that the sign **bi** serves to spell an instrumental suffix *–ib* seen in the context of the Primary Standard Sequence in reference to particular vessel types (e.g. *uk'-ib* 'drinking-implement' and *we'-ib* 'eating-implement'). In this respect it is interesting to note that Erik Boot has recently identified a distinct emic vessel type designation for shallow dishes, especially those dating to the so-called Middle Classic (Boot 2004). In their most common form the vessel type designation of these dishes is rendered in two glyph blocks as **ya-ja / ji-bi** (Figure 4). Although fragmentary, the glyphic elements that remain on Sherd 6 may have recorded **…ja / {ji}-bi** and thereby designate the dish with the same exact vessel type designation. Since some of the key parts of the glyphic elements are eroded it is difficult to ascertain with any degree of certainty that this segment actually recorded the vessel type designation. Nevertheless, considering the presence of the syllabogram **bi** it seems highly plausible that this is the case. Furthermore, vessels with clear archaeological provenance with this vessel type designation stem from Piedras Negras and Tikal (Boot 2004) and finding an example of this vessel type at Buenavista is therefore not inconceivable since this vessel type appears to be found throughout the central Lowlands.

<u>Sherds 7 & 8</u> (Op. 354 V/13, Small Find # CR-051 and Op. 354O/7, Small Find # CR-054)

Sherd 7 (Figure 5) is an exceptional find at Buenavista del Cayo. The reason for this is that this is a sherd of a Late Classic II Codex-style vase, attributable to the Zacatel ceramic group: cream-ground Codex-style type (Ball 1994: 364-365). This specimen stands in contrast to the other sherds of Chinos Black-on-cream ceramics that have been discovered at the site (see Reents-Budet et al. 2000: 101-107) that are painted in solid black on a uniform lithographic cream background. In contrast, Codex-style ceramics make use of light beige background and dark brown slip for painted designs and often also make use of diluted light brown washes to accentuate details of the iconographic scenes. It is all the latter features that are represented on Sherd 7, setting it apart from the Chinos Black-on-cream specimens that have been discovered at Buenavista to date. Whereas Chinos appears to have been produced predominantly at workshops in the northeastern Peten, especially at Xultun and Río Azul, Codex-style ceramics find their origin in workshops farther afield in the Mirador Basin of the northern Peten and southern Campeche. This is substantiated by the high incidence of archaeologically recovered Codex-

style ceramics at Calakmul and Nakbe as well as an extensive program of neutron action analyses (see Hansen et al. 1991; Reents-Budet et al. 2010). As a result there can be little doubt that the vessel to which Sherd 7 belonged was originally produced in the Mirador Basin and as such represents either an item of long-distance trade or gifting. If this vessel represents the product of gifting then it may well suggest some kind of connection between Buenavista and the lords of the so-called Snake kingdom, centered on Calakmul, where this ceramic type was commonly utilized. Another similar, although highly weathered, Sherd 8 (CR-054) may originally have belonged to the same vessel, forming the rim of the vase (Meaghan Peuramaki-Brown pers. comm. 2010).

Only a small portion of the vessel's original iconography is preserved, but the vase's execution and the fine lines of the imagery bespeak of its high quality. Only the abdomen, including part of the right thigh and the talus of the left foot as well as the lower portion of an anthropomorphic figure are preserved on the sherd. This figure is shown seated cross-legged on a so-called "groundline" that defines the lower limit of a scene. Below the groundline is a series of circlets arranged in a triangular configuration over three rows. These circlets are part of the diagnostic elements (nicknamed "grapes") of the logogram **TUN** 'stone' and here serve to indicate that the individual is seated on a stone base or ground, or possibly an architectural element made of the same material. Faint stains of light brown wash have been applied to the figure's thigh as well as the besides the grapes of the stone sign. Unfortunately no accompanying glyphs have preserved and only this small portion of the iconography subsists, but it gives us a glimpse as to the type of scene that was originally represented.

Sherd 9 (Op. 354C/17, Small Find # CR-055)

Sherd 9 (Figure 6) represents a rim sherd of another shallow Tiger Run dish. Based on the extant fragment it appears to be attributable to the Uacho Black-on-orange: Var. Unspec. type (Gifford 1976: 208-209). As the type designation implies the dish was uniformly slipped orange and the painted decoration was rendered in black slip. Preservation of the sherd is good. The rim is accentuated with a solid band of black slip and the interior rim was embellished with a glyphic text that is framed by thin horizontal black guide lines, directly above and below the glyphic text. All that remains today is part of one grapheme, here representing the logogram **XIB** 'person, young man' (T1008). The spacing between the glyphs is substantial indicating that the text was likely written with individual graphemes split across glyph blocks, rather than compounding multiple signs into single glyph blocks. This feature is relatively commonplace for painted texts rendered on ceramics of the Late Classic I period. Whereas the single glyph that subsists can be read without difficulty without additional information it is difficult to provide more cohesive interpretations. Nevertheless, it seems probable that this glyph once formed part of the nomino-titular section of the text, considering the meaning of the logogram.

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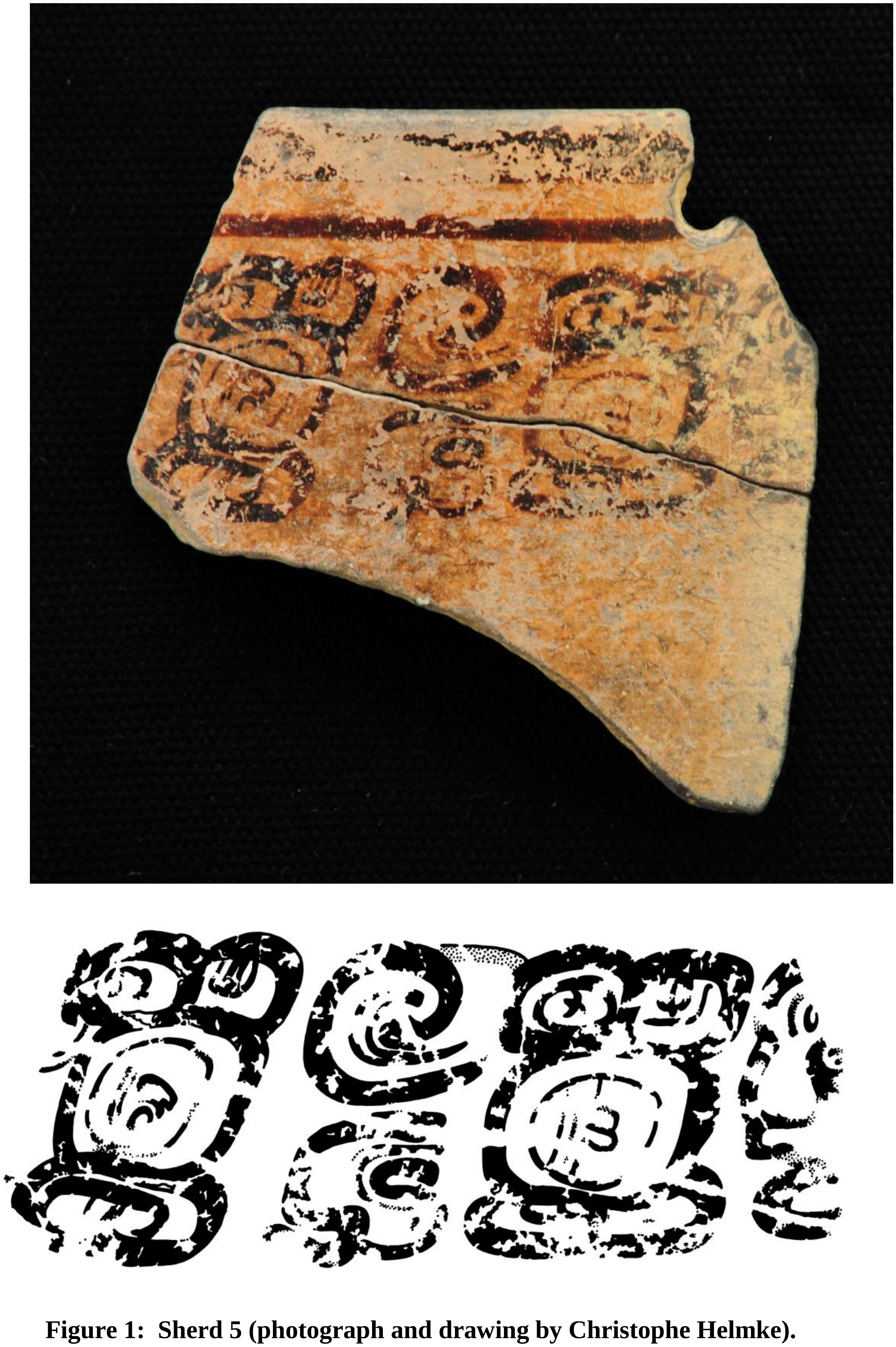


Figure 1: Sherd 5 (photograph and drawing by Christophe Helmke).

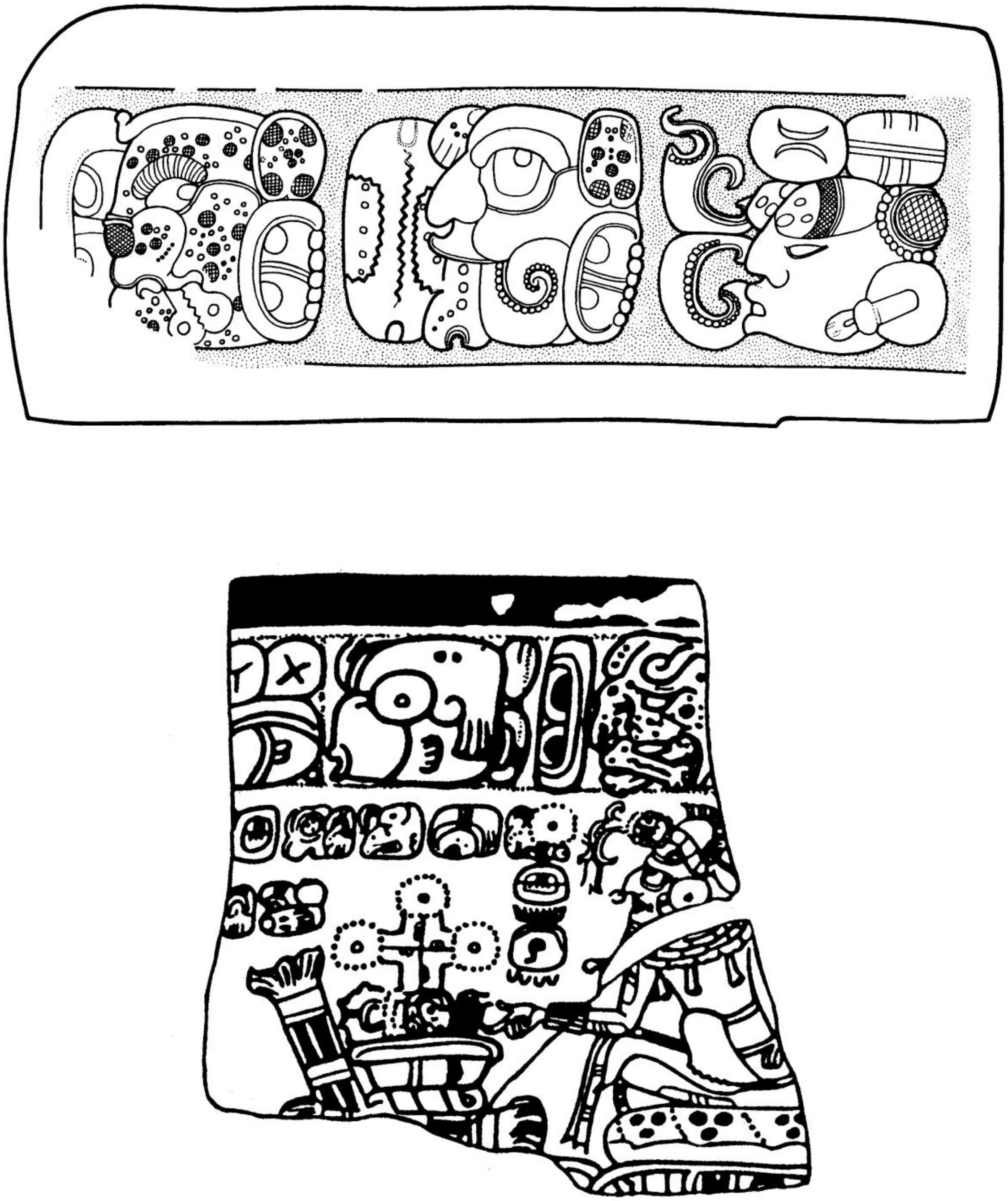


Figure 2: a) Unprovenanced panel (drawing by Nikolai Grube). b) Sherd 3 from Buenavista (drawing by Karl Taube).

Figure 3: Sherd 6 (photograph by Christophe Helmke).

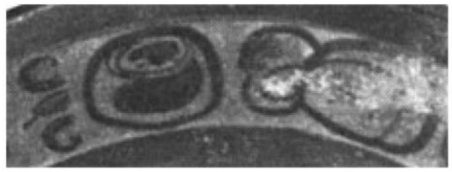


Plate 1: **ya-ja ji-b'i**

Plate 2: **ya-ja ji-b'i**

Plate 3: **ya-ja-la ji**[**b'i**]

Plate 4: **ja ji**[**b'i**]

Figure 4: The rare vessel type for shallow dishes (from Boot 2004: Fig. 5).

Figure 5: Sherd 7 (photograph and drawing by Christophe Helmke).

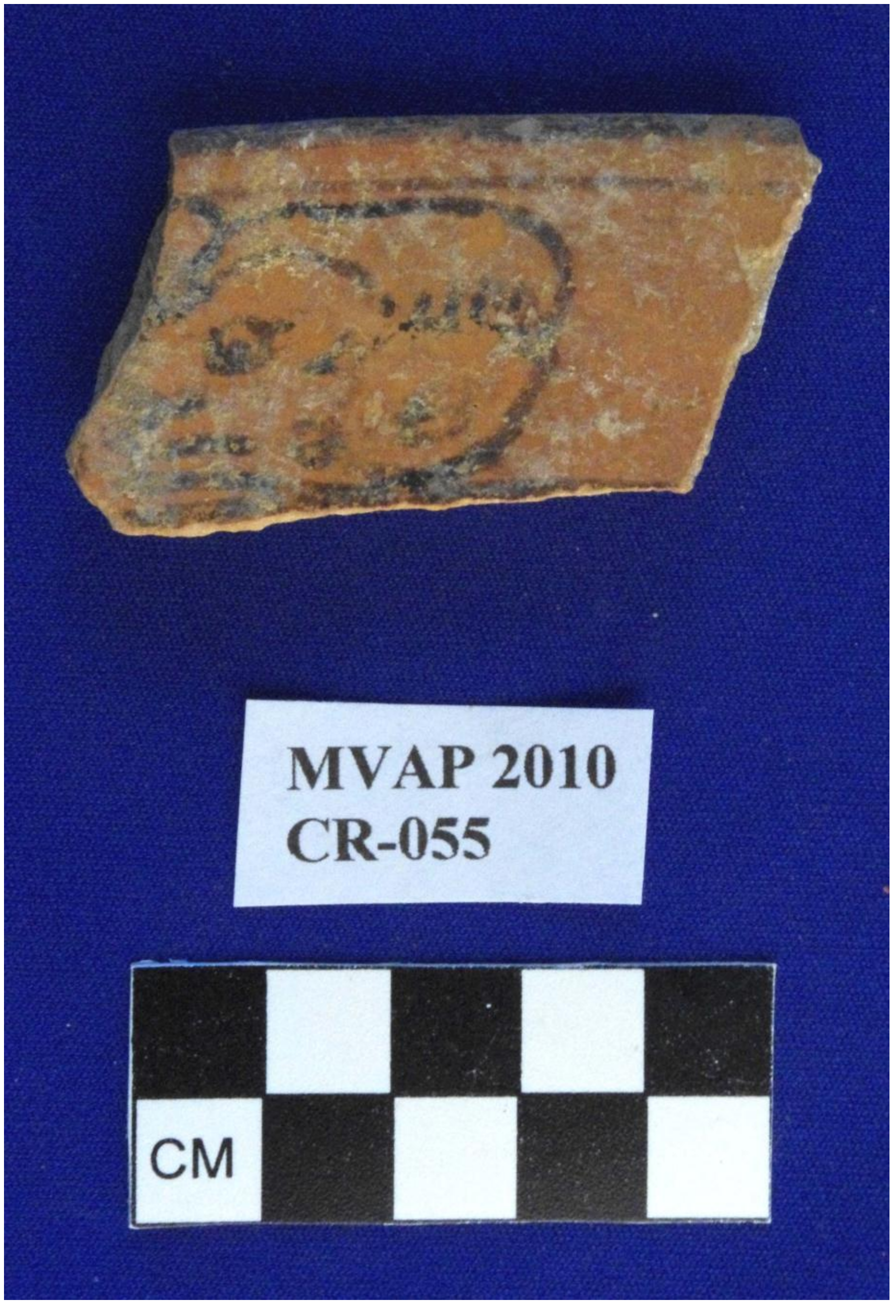


Figure 6: Sherd 9 (photograph by Meaghan Peuramaki-Brown).

APPENDIX III: CHIPPED STONE

As explained in Chapter 4, laboratory procedures for MVAP involved the division of artifacts and ecofacts into several categories for analytical and storage purposes. Most categories are based on the raw material of objects, such as Ceramics, Daub, Faunal (riverine shell and non-human bone), Marine Shell, Slate, Obsidian, and Human Remains. Other categories, particularly those associated with stone objects, were distinguished by technological attributes such as Lithics and Groundstone. Objects were categorized as Obsidian and Slate primarily on the basis of their raw material and as Lithics and Groundstone according to the technology used to produce the artifacts and incorporating raw materials other than obsidian or slate. This categorization also effectively separates local cherts, quartzites, etc., from more "exotic" materials in the Lower Mopan Valley, such as obsidian and slate. In this dissertation, I group Obsidian and Lithics together under the broader category of chipped stone artifacts in this appendix, a common practice in most Maya studies. As most slate objects are products of grinding, polishing, and pecking, I group them in the Groundstone category (Appendix IV) in the class of ground and pecked stone artifacts.

Non-Obsidian Chipped Stone Artifacts

Chipped stone tools and reduction debris (products of hard and soft hammer percussion, pressure flaking, indirect percussion, and bipolar splitting) formed the second largest category of artifact materials collected during BVS Cluster 1 investigations. The non-obsidian chipped stone sample totals 33,677 pieces, weighing 459.04 kg (Table AIII.1). Given limited time and resources, I chose to analyze only a small sample of this collection. I personally carried out all lithic debitage analysis from July-December 2009 and August-December 2010. I conducted my analysis of formal tools in October/November 2010 when Dr. James Stemp was in Belize, allowing me easy access to an experienced lithicist should any questions arise. I have training in lithic analysis and have taught the subject at the introductory level but do not consider myself a lithics expert.

I fully analyzed a 20% sample of the total non-obsidian chipped stone assemblage: 6652 pieces (including debitage and tools) weighing 118.03 kg. The lot groups chosen for full analysis of debitage included all identified refuse and use-related deposits from all excavated and/or tested settlement sites. Only a small sample was analyzed from the BVS-037 daub feature

(Appendix I). All formal tools identified from all lots were also fully analyzed. Chipped stone material from all other contexts and from Op 353 ground-truthing was counted and weighed only. I did consider doing a mass analysis of materials from all other non use-related contexts, a form of analysis that focuses on size, shape, and cortex characteristics of large batches of flake debris (Ahler 1989), but due to time constraints and the nature of my research question I decided against such an additional analysis.

Tools used for flaking are extremely rare in the BVS assemblage. Only 12 hammerstones were recovered (they are counted among the groundstone materials), typically of chert or hard compact limestone, and these are considered multi-functional tools (flint knapping, pecking and grinding). Utilized cores and manos may also have been used in chipped stone tool production, based on the battering visible on many such pieces. As most formal hammerstones appear to be alluvial cobbles, it is likely many were not recovered in the field particularly from fill contexts where most fill material is alluvial cobbles. If not inspected individually for battering marks, these potential artifacts would be left uncollected. No antler or other potential soft billets were recovered.

Analysis

My method of analysis and coding, shown in Table AIII.3, is adapted from a system designed by Stemp (2000), originally developed for investigations at Marco Gonzales and San Pedro, and later modified for investigations at Pook's Hill, Belize. Stemp currently uses this system for analysis of assemblages from the Vaca Plateau and the Upper Belize River Valley, and I was in constant contact with him while using his system.

Terminology and associated definitions, unless otherwise indicated, are from Andrefsky (2005), Crabtree (1972), and Kooyman (2000). I relied heavily on Kooyman (2000) as this publication represents the methods on which I was formally trained at the University of Calgary. In addition to Stemp's system and general literature on lithic technology, additional literature on Maya lithic technology was regularly consulted including Hester (1976), Hester and Shafer (1982, 1991), Rovner (1974), etc. I also incorporated various analytical categories from XAP dissertation work by Braswell (1998), VandenBosch (1999), and Yaeger (2000a) to ease comparison between BVS/MVAP and XAP assemblages.

All analysis was conducted in Belize and was primarily macroscopic. On occasion I was assisted with the use of a magnifying loop and a 40x magnification field microscope. Photographs and preliminary illustrations were made of all small finds (formal tools).

Following washing, the initial sorting of all lot materials involved the separation of general reduction debris (Bulk Lithic) from formal tools (Small Finds coded LT-###). All debitage was washed, while formal tools from 2007-2009 were washed but those from 2010 excavations were left unwashed for possible future residue analysis. Following basic counting and weighing of all bulk material, debitage pieces were then further sorted, coded, and measured. Measuring of bulk material involved use of a series of graded squares ($1cm^2$, $2cm^{2,}$ $3cm^2$, etc.), matching up a piece's longest dimension with the appropriate square. I generally found few pieces smaller than $1cm^2$, however this does not reliably indicate that no very small chipped stone debris were present in a lot given that ¼" mesh screens were used to sieve matrix in the field. For this reason, I also collected 4L floatation samples in field from all refuse and use-related contexts from Phase 3 excavations (Appendix VIII).

Material from each size grade was then further sorted based on raw material type and morphology/form until it could no longer be further sorted. Limited data was recorded for shatter and other unknown blocky or thermally produced fragments and unknown flake fragments. Each pile exhibiting similar metric and non-metric attributes (size, material, morphology) was then counted and weighed to the nearest 0.1g. For formal tools I recorded, in addition to non-metric attributes, exact length, width, thickness, and weight for each individual piece.

Material

There are many natural materials that can be used for making chipped stone artifacts. Flint knappers (people who make chipped stone implements) choose materials that are ideally fine-grained and homogeneous enough that they can control the flaking process and obtain good predictable results. The most common material employed throughout much of the prehistoric world, including the Maya world, is chert: a silicate mineral of varying qualities that occurs as nodules or stream-worn cobbles (Kooyman 2000:170). This material ranges in grain size, colour, and translucency.

In an effort to address the sources of cherts, quartzites, etc. at BVS Cluster 1, I recorded several characteristics of the material of all chipped stone artifacts. Some of the finer grained and more translucent materials would probably be termed chalcedony by many analysts, but I did not attempt to fully distinguish chert from chalcedony due to the debate surrounding the differences between these two materials and in absence of any compositional analyses. As noted by Yaeger (2000a:1061) chert cobbles seem to be coarser near areas of cortex. Material colour was at times difficult to determine due to partial patination, although full patination was extremely rare.

The most common material in the BVS assemblage was chert. The most typical of chert materials ranges from coarse (almost of a limestone/quartzite granular texture) to fine-grained, from light grey/blue to dark grey in colour (GLEY1 7/N light grey to 3/N very dark grey), and from opaque to translucent. This grey material was also found to blend into translucent honey coloured tones (7.5YR 4/6 and 5/6 strong brown) of medium to fine-grain quality. Portions of this material may also be considered chalcedony, although I have only labeled the more transparent clear-blue coloured samples as chert/chalcedonies and are of a fine grain. Also very common is a medium grained, opaque to cloudy, light brown/cream/tan (10YR 8/3 very pale brown to 8/6 very pale brown to 5/8 yellowish brown to 8/8 yellow) chert and a white mottled or milky blue chert. It is assumed all of these cherts can be sourced to nearby outcroppings/quarries (discussed below).

The least common of chert materials recovered was a fine opaque yellow chert (2.5Y 7/6 yellow) and a very fine, dark brown coloured chert (7.5YR 2.5/2 very dark brown). The "very fine grain" designation is reserved for this material. Very little debitage was recovered of this material, but rather take the form of primarily finished products. It is possible this is an example of the fine cherts found in the *chert-bearing zone* (CBZ) of Northern Belize, although Hester and Shafer (1984:160) mention recovery of fine bifaces made of dark chocolate chert in the area of Colha that have not been sourced to any area in the CBZ. Aldenderfer (1991:123) also describes dark brown and "sepia" (red-brown) material found in excavations in the Central Peten Lakes region of Guatemala, and suggests the material may be from somewhere in Northern Belize.

Thermally treated/exposed chert materials in the BVS assemblage had a waxy appearance and crazing or circular crackling patterns on their surfaces. Often they exhibited pink to purple colours or a chalky grey appearance. Most contexts with high frequencies of burned flakes also contained evidence of other burned materials and may be an example of midden burning of structure burning. An exception may be activity at BVS-037 (see Chapter 4).

Most chert materials appear to be from alluvial cobbles based on the presence of smoothed (river rolled) cortex, however the chert/chalcedony materials are typically found encapsulated in a very rough white stone, the chert bearing limestone. This suggests this particular material is quarried, rather than collected as alluvial cobbles.

Various nearby chert quarry zones have been identified along and nearby the Lower Mopan. Of direct consequence to Buenavsita would be the Callar Creek quarry (Horowitz 2012), the San Lorenzo quarry (Yaeger 2000a), and the Succotz quarry (VandenBosch 1999), three quarries and associated manufacture locales at the site of El Pilar (Ford 1984), and a possible quarry area at the site of Chan (Hearth 2008), and a raw material procurement zone at Chaa Creek (Connell 2000). Research in Guatemala has identified a number of chert quarries and production areas in western Guatemala (Ciudad Ruiz et al. 2003; Laporte et al. 1996; Laporte et al. 1999; Mejia et al. 1999; Ramos et al 1993; etc.). Unfortunately, minimal archaeological work has been performed at these quarries, as they were identified in regional survey projects, and most chert-associated research has focused on production rather than procurement.

The closest identified CBZ is that of Callar Creek, discussed recently by Horowitz (2012). The quarry area, located on the opposite side of the Mopan from Buenavista nearby the small settlement of Callar Creek, is dominated by outcroppings of chert that appear to be eroding out of the limestone bedrock. Chert cobbles may have been obtained simply by their collection off the surface, or possibly by prying larger cobbles from the ground. The chert varies greatly in both quality and colour. The majority is white or a clear to milky blue, which is of high quality. Other nodules are brown, dark grey, or some combination of these colours. Large cobbles of chert combine both different colors and varying quality of raw material within the same nodule. This closely resembles the most common chert material (described above) recovered from Buenavista. Some bifaces and many multidirectional macro cores and tested cobbles have been recovered from the quarry zone. The initial analysis of the cores and debitage from the Callar Creek quarry suggest that initial reduction and testing of cobbles was occurring at the quarry, but also indicates some initial reduction was taking place in the area. Pottery collected from the quarry area has been dated to the late facet of the Late Classic (670-780 C.E.), suggesting use at the very least during the Late Classic.

Tool Form and Function

Tools included both formal and informal (expedient or *ad hoc*) tools, although typically only formal tools were given separate catalogue numbers. Informal tools consist of retouched reduction by-products, including flakes, blades, cores, and chunk tools that show some evidence of retouch that created a formal edge or significant damage resulting from use. The kind of retouch, the angle of the resulting edge, and the location of the retouch on the tool provided an idea of use/function.

In contrast to informal tools are worked types with standardized forms. I distinguish between two forms of bifaces: thin bifaces, typically fine projectiles, with a thickness of less than 1.5cm, and thick bifaces, including “General Utility Thick Bifaces” (very thick and characterized by a lack of detailed finishing with some utilized pieces even having cortex remaining on a surface, Hester and Shafer 1991), having a thickness of greater than 1.5cm. Thick and thin bifaces were further distinguished by form, at times function, and when possible by stage of finishing and use (Aldenderfer 1991; Hruby 2006).

Distal fragments of thick bifaces, often from a corner of the bit, were often encountered in the assemblage. These represent common breakage patterns on thick celt-shaped bifaces (see Willey et al 1965:428, fig. 273 for similar pattern). Medial “snaps” or end shocks of thick bifaces were also typical, resulting from stress near the hafting point or in the case of preforms/early stage bifaces it is a common location for manufacture breakage (James Stemp, personal communication, 2010; Whittaker 2009). Hafting of many thick bifaces is suggested based on the presence of "notching" or medial narrowing and a relatively high surface polish in the medial zone of some thick bifaces (Wilk 1978). Polish was also often encountered on the bit of celt or oval thick biface forms. This may be from soft activities such as digging or woodworking. If polish was not found on a bit, it does not mean the tool was not used for digging and woodworking as breakage may have removed most evidence along with retouch. Most thick bifaces are believed to represent multifunctional tools.

Microdrills or proper drills are elongated bits produced on blades or microblades. These blades are often crested and tend to be thick in cross section and shaped to a narrow point by steep, with bilateral opposing retouch. They are reported from a number of lowland sites including Tikal, the Peten Lakes region, Barton Ramie, Blackman Eddy, Marco Gonzales, and Xunantunich (Aldenderfer 1991; Braswell 1998; Stemp 2000:47; Willey et al 1965; VandenBosch 1999:317). The only example from BVS Cluster 1 is LT-330 from BVS-007-2 construction fill. Drill/gravers (VandenBosch 1999:317) are typically made on broader, thicker, flakes (primary and secondary) though they share the elongated pointed bit of proper drills shaped by steep unifacial retouch. They also possibly serve a scraping function in addition to drilling/graving, based on the angles of their edges.

Graver/incisors are tools with intentional retouch that results in a small triangular-shaped projection. Most graver/incisors are expedient or *ad hoc* tools secondarily produced on already existing tools or flakes. They also possibly serve a scraping function in addition to graving/incising, based on the angles of their edges. A perforator is a sharp implement designed to create holes or grooves in materials and exhibits intentional retouch that results in a converging point that is larger than a graver. The retouch forming a perforator may be either unifacial or bifacial but is most often unifacial. Perforators are typically long and narrow.

Burinated tools, similar to gravers, are either flakes or blades or fragments thereof that have been deliberately produced by the removal of an edge with a transverse blow. This transverse blow creates the right-angled longitudinal flake-scar that intersects with the other transverse tool edge or breakage plane to form the burin (Stemp 2000:49). In total, 5 burinated tools were recovered from BVS excavations: one from each of Op354, 355, 356, 358, and 359.

Tools classified as scrapers were identified by the presence of at least one edge that was retouched to a minimum 55-degree angle (Stemp 2000:50). Many *ad hoc* scraping/whittling tools were produced on flakes or blocky fragments with minimal retouch and possessed edge angles less than 55 degrees.

Chisels, and various fragments of them, are distinctive for their long narrow outline and thick diamond shape cross section. Use abrasion typically blurs or obliterates scars on their bit surfaces, leaving behind a high polish on one side of the distal bit. Such tools are known from Barton Ramie, Cerros, Xunantunich and surrounding areas (Mitchum 1991; Willey et al 1965; VandenBosch 1999:316). All chisels at BVS are made of chert and may have been used in limestone quarrying activity or wood working (Eaton 1991).

For all formal tools, detailed observations were made of attributes relating to finishing and retouch and to possible use wear and associated function. I noted both retouch location and extent. Although all of this data does not feature in this dissertation, it should ultimately allow for an additional detailed discussion on the ways tools were made and used in BVS Cluster 1.

I identified a number of chert objects in the BVS assemblage that had flake scars, but were highly polished and had dulled or rounded cutting edges. I agree with Yaeger (2000a:1061) that their polish and rounded character is due to having been abraded in the Mopan River. In most cases, it is clear the chipping is the result of human activity. It is possible these early artifacts ended up in the river and later, after the abrading action of rolling around in the river, were recollected for use in construction fill or for other purposes. In fact, some pieces were found to be re-chipped after having been weathered. Additional instances of "delayed curation" were identified in the assemblage: a patinated and reflaked tertiary flake (LT-254, BVS-060), and a patinated/burned then altered biface (LT-100, BVS-006).

Obsidian Chipped Stone Artifacts

I recovered a significant quantity of obsidian (volcanic glass) from the settlement sites of BVS Cluster 1, totalling 321 chipped artifacts (0.25kg), most of which were prismatic blade fragments (Table AIII.2). 301 pieces (0.24kg) were subject to visual inspection including metric and non-metric attributes such as colour, banding, and texture, and 83 of those pieces were subjected to chemical sourcing (described below). Based on these two forms of analyses and as expected based on most studies of Maya Lowland trade networks (e.g. Hammond 1975 and all subsequent articles), the vast majority of specimens came from the El Chayal source in the Guatemalan highlands.

Analysis

In 2007, Bernadette Cap began cataloguing and analyzing MVAP obsidian from the East Plaza. For comparative purposes, she also began examining the material from BVS Cluster 1. For this reason, I have adopted her methodology (Table AIII.4). The system represents a combination of coding systems from Blackmore (2008), Robin (1999), and Yaeger (2000a). BVS Cluster 1 materials collected from 2007 and 2008 Phase 2 testing were analyzed by B. Cap, while 2009 and 2010 obsidian recovered from Phase 3 excavations was analyzed by me. The obsidian was typically not washed, unless subject to chemical testing in which case it was cleaned using a sonic cleaner. To date, no residue testing has been conducted on any pieces, but no pieces appear to have a high probability of residue recovery. All analysis, other than chemical sourcing, was conducted in Belize and was primarily macroscopic. On occasion I was assisted with the use of a magnifying loop and a 40x magnification field microscope.

Because of the greatly reduced diversity of artifact types and material attributes in the obsidian collection, I did not need to use many of the coded attributes from the chipped stone analysis. The only exceptions were in two instances where artifacts were biface fragments (LT-241 and OB-783). In this case, the full chipped stone analysis was applied. All obsidian finds were of flaking manufacture. No ground obsidian was encountered in the assemblage.

Chemical Sourcing

In January 2011 I exported 83 pieces of the BVS Cluster 1 obsidian assemblage for subjecting to chemical sourcing analysis.[18] I chose a random stratified sample: one sample of each obsidian material type represented from each settlement site tested and/or excavated, and one of each morphological type represented at each site (e.g. blade, flake, chunk, core, biface, etc.). In March 2011 I travelled to Hamilton, Ontario to conduct this analysis at the McMaster University Archaeological X-Ray Fluoresence (XRF) Lab, or MAX Lab. The director of the lab and my analysis collaborator was Dr. Tristan Carter. These materials, along with other obsidian artifacts from the site of Minanha in the neighbouring Vaca Plateau, were analyzed whole and non-destructively using a Thermo Quant'X EDXRF spectrometer.

Energy dispersive x-ray fluorescence spectroscopy, or EDXRF, is a non-destructive technique (thus culturally sensitive) that is rapid, relatively inexpensive, and capable of determining elemental concentrations at the parts per million level with high-quality data reproducibility. Source attribution was achieved through matching the elemental signatures of artifacts with those of geological source samples run in the lab under the same conditions. In choosing which geological samples to compare with the BVS data, we considered not only the

[18] The remainder of the BVS assemblage was recently exported from Belize and will be subjected to EDXRF analysis in the fall of 2012 as part of a Master's project at McMaster.

major Guatemalan sources but also the important Mexican sources of Pachuca and Otumba (i.e. raw materials that have all been previously attested in Maya assemblages from the region).

Results of this analysis, and further analysis of the BVS sample, will be published in a series of upcoming co-authored articles.

Artifacts	Count	%	Weight (g)	%
Lithics (Op 353)	761	2.3%	4343.5	0.9%
Bulk lithics	32659	97.0%	428259.2	93.3%
Lithic Small finds	257	0.8%	26433.0	5.8%
TOTAL	**33677**	100.0%	**459035.7**	100.0%

Analysis	Count	%	Weight (g)	%
Basic count/weight	27025	80.2%	340810.4	74.2%
full analysis-debris	6395	19.0%	91792.3	20.0%
full analysis-tools	257	0.8%	26433.0	5.8%
TOTAL	**33677**	100.0%	**459035.7**	100.0%

Table AIII. 1: Total non-obsidian chipped stone materials collected and analyzed from Phase 2 and 3 investigations.

Artifacts	Count	%	Weight (g)	%
Obsidian (Op 353)	15	4.7%	8.9	3.6%
Obsidian	306	95.3%	239.2	96.4%
TOTAL	**321**	100.0%	**248.1**	100.0%

Analysis	Count	%	Weight (g)	%
Basic count/weight	20	6.2%	11.4	4.6%
Full analysis	301	93.8%	236.7	95.4%
TOTAL	**321**	100.0%	**248.1**	100.0%

Table AIII. 2: Total obsidian materials collected and analyzed from Phase 2 and 3 investigations.

Table AIII.3: Coding attribute system for chipped stone artifacts (based on Stemp 2000).

A. **Year**
B. **Operation**
C. **Suboperation**
D. **Lot**
E. **Catalogue #**
F. **Tool type** (can combine numbers and letters for most accurate description)

Cores (0--):
001 – blade
002 – bladelet
003 – conical/round/discoidal, flake
004 – elongate/cylindrical, flake
005 – tabular/rectangular, flake
006 – unknown/irregular, flake
007 – core fragment
008 – split/minimally worked cobble/nodule
009 – flake origin
010 – exhausted
011 - core tablet (rejuvenation)
012 – utilized core/cobble (also listed as 603)
[U: unidirectional, B: bidirectional, M: multidirectional, UD: undetermined]

Flakes (1--):
100 - undetermined
101 – primary (100% dorsal cortex)
102 – secondary (1 to 99% dorsal cortex)
103 – tertiary
104 – bifacial thinning/reduction flake
105 – resharpening/retouch
106 – citrus slice
107 – miscellaneous flake tool – retouched
108 - macroflake
109 – tranchet flake/biface fragment (see Stemp 2000)

Blades/Bladelets (2--):
201 – blade, prismatic
202 – blade, triangular
203 – stemmed macroblade
204 – retouched blade-tool
205 – macroblade
206 – stemmed blade
207 – bladelet
208 – retouched macroblade-tool

Thick Bifaces (3--): > 1.5cm in thickness

300 - undetermined
301 – celt
302 – oval
303 – parallel-sided
304 – tapered
305 – bipointed
306 – circular
307 – preform
308 – recycled tool
309 – chisel/adze/gouge

Thin bifaces, drills, other (4--): “thin” = < 1.5cm in thickness

401 – microdrill
402 – drill/graver
403 – graver/incisor
404 – scraper
405 – thin biface, miscellaneous
406 – thin biface, laurel leaf
407 – thin biface, stemmed
408 – thin biface, side notched
409 – thick uniface, miscellaneous
410 – thick uniface, circular
411 – thick biface, stemmed
412 – thin uniface, point
413 – thin uniface, miscellaneous
414 – thin biface, preform
415 – thin biface, corner notched
416 – perforator/awl
417 - burinated tool

Debitage (5--):

501 – flake (unretouched)
502 – burin spalls
503 – irregular blocky fragments/shatter

Other tool (6--):

601 – hammerstone
602 – chopper/pounder/cutter (core tool, see Crabtree pg.56)
603 – utilized core (also listed as 012)
604 – recycled/curated tool

Thermally produced (9--):

901 – unknown
902 – potlids/heatspalls

[w: whole tool/flake p: proximal fragment m: medial fragment d: distal fragment u: unknown fragment l: lateral fragment]

G. **Size Category** (longest dimension; no diagonal used; DEBITAGE ONLY)
   0- 0 to 1cm
   1- 1.01 to 2
   2- 2.01 to 3
   3- 3.01 to 4
   4- 4.01 to 5
   5- 5.01 to 6
   6- 6.01 to 7
   7- 7.01 to 8
   8- 8.01 to 9
   9- 9.01 to 10

H. **Frequency:** Count

I. **Length (mm)** – axis (small find only)

J. **Width (mm)** – widest part (small find only)

K. **Thickness (mm)** – thickest part (small find only)

L. **Weight (0.0g)**

M. **Butt/striking platform type**
   0- n/a
   1- cortical
   2- flat/faceted
   3- lipped
   [G- ground/backed, P- partial, C- crushed/damaged]

N. **Facet count**
   0- n/a or none (cortex)
   1- one facet (any whole plat.)
   2- two facets
   3- three facets
   4- more than 3
   5- undetermined (partial or crushed platform)

O. **Dorsal scar count**
   0- none,
   1- one scar
   2- two scars
   3- three scars
   4- more than 3
   5- undetermined (ventral not determined OR n/a)

P. **raw material type**
   1- chert
   2- chert/chalcedony (light colour and translucent)
   3- limestone/very coarse chert
   4- quartzite
   5- basalt
   6- granite

7- obsidian (not used)
8- slate
9- quartz
10- unknown sedimentary
11- unknown igneous

Q. raw material grain size

1- very fine
2- fine
3- medium
4- coarse

R. raw material colour

1- black
2- dark brown/sepia
3- honey/amber
4- light brown/tan/cream
5- dark grey
6- light grey
7- green
8- pink
9- red
10- yellow/gold
11- white
12- blue
13- orange
14- clear
15- purple

[b- banded, f- fossilifera, i- inclusions, m- mottled, v- voids]

S. geological condition

1- primary
2- rolled
3- partial patination
4- complete patination
5- rolled and patinated
6- unknown
7- rolled, patinated, and reworked
8- rolled and reworked
9- use (unknown category??)
10- patinated and reworked (curated)

T. Burnt

0- no
1- yes
2- undetermined

U. percentage of cortex (dorsal only)

0- no cortex
1- 1% to 25%
2- 26% to 50%

3- 51% to 75%
4- 76% to 99%
5- 100%

V. cortex type

0- n/a
1- alluvial
2- in situ/nodule
3- undetermined

W. retouch/macro-usewear position

0- n/a
1- bifacial
2- unifacial
3- dorsal
4- ventral

X. retouch/macro-usewear location

0- n/a
1- distal
2- medial
3- proximal

Y. retouch extent

0- n/a
1- >50% one edge
2- <50% one edge
3- >50% two edges
4- <50% two edges
5- >50% more than two edges

Z. hammer type

0- undetermined/NA
1- hard
2- soft

AA. termination

0- n/a
1- feather/straight
2- hinge
3- step
4- *outrepassé*

AB. end shock/breakage (small finds only; see Crabtree 1976:60-61)

0- n/a
1- medial
2- proximal
3- distal
4 - undetermined
5- transverse
6- lateral

AC. Use characteristics (macro)

0- unknown/NA

1- polish
2- crushing/battering
3- chipping/breakage

AD. Possible use type

0- undetermined/NA
1- digging
2- woodcutting/quarrying
3- chopping/pounding
4- scraping/graving (1 side retouch)
5- drilling/punching
6- cutting/sawing (2 side retouch)

AE. Lateral cross-section (ventral-dorsal)

0- undetermined/NA
1- plano-convex
2- bi-convex
3- convex-triangular
4- concave-convex
5- plano-triangular
6- bi-plano
7- bi-triangular
8- asymmetrical bi-convex
9- asymmetrical bi-triangular
10- plano-trapezoidal
11- convex-trapezoidal
12- irregular
13- convex-concave
14- square

AF. Longitudinal cross-section (see above designations)

AG. Comments

AH. Chronology information?

AI. Date analyzed

AJ. Analyst

AK. Photo?

Table AIII.4: Coding attribute system for obsidian artifacts (designed by B. Cap).

A. **Year**
B. **Operation**
C. **Suboperation**
D. **Lot**
E. **Cat #**
F. **Count**
G. **Length** (0.00mm)
H. **Width** (0.00mm)
I. **Thickness** (0.00mm)
J. **Weight** (0.00g)
K. **General Type**
  - Blade
  - Core
  - Flake
  - NDD (non-diagnostic debitage; tends to be shatter)

L. **Condition**
  - Broken
  - Whole
  - Unknown

M. **Portion Present**
  - Distal
  - Lateral
  - Medial
  - Medial/lateral
  - Proximal
  - Unknown

N. **Cortex**
  - 0
  - 100%
  - 1-25%
  - 26-50%
  - 51-75%
  - 76-99%

O. **Color**
  - Black
  - Clear
  - Gray
  - Gray/brown (tends to have a brown color in center of frag and clear edges)
  - Green
  - Green with gold

P. **Inclusion Type**
  - Black stripe
  - Black splotches
  - Black specks

Gray stripe
None

Q. Obsidian Type

A. gray, 25% transparent, no inclusions
B. gray, 25% transparency, grey/lack stripe inclusions that are also roughly 25-50% transparent
C. gray, 25% transparency, black dust
D. gray, 75% transparency, no inclusions
E. clear, 0% transparency, no inclusions
F. clear, 0% transparency, gray stripes that are 25% transparency
G. clear, 0% transparency, black stripes that are 25-50% transparency
H. clear, 0% transparency, black dust/splotches of no particular shape that are 50-75% transparency
I. gray/brown, 25% transparency, no inclusions
J. gray/brown, 25% transparency, grey/black stripes that are 25-50% transparent
K. gray, 75% transparency, black stripe inclusions also 75% transparency
L. green, 25% transparency, no inclusions
M. gray, 25% transparency, grey/black splotch inclusions that are roughly 50% transparent
N. black, 100% transparency (can't see through at all), no inclusions; may be form of ignimbrite
O. grey, 25% transparency, black stripes, 50-75% transparency
P. green, gold stripes/streaks

*Transparency key:

0	- can see right through it
25%	- it is cloudy but can still see through it pretty well
50%	- between 25- 50% in terms of light coming through the fragment
75%	- almost all opaque but can still see light through it
100%	- can't see through it at all

R. Blade Specific Type

Irregular (characteristics are described in comment section)
Prismatic
Triangular

S. Blade Series

Core preparation
Core rejuvenation
First series
Second series
Third series
Unknown

T. Flake Specific Type

Edge preparation
Isolation

Thinning
Unknown

U. Platform facet count (has at least one)

V. Platform preparation
Battered
Ground
None

W. Distal Termination Type
Feather
Irregular (characteristics described in comment section)
Overshot/outrepassé
single facet
Hinge
Step

X. Tool Specific Type
Biface
Projectile point

Y. Core Specific Type
Conical
Flattened
Unknown

Z. Usewear general (very general; type and amount of flakes that without significant magnification appear to be taken off the blade edge; can also be used to suggest whether used against a hard or soft surface)
Edge damage
Light
Medium
Heavy
Unknown

AA. Usewear amount
>50% one edge
<50% one edge
>50% two edges
<50% two edges

AB. Usewear Type
Continuous
Discontinuous

AC. Comments

AD. Date Analyzed

AE. Analyst

AF. Photo

APPENDIX IV: GROUND AND PECKED STONE ARTIFACTS

In this appendix I present the system used to analyze artifacts classified by MVAP as Groundstone and Bulk Slate (Table AIV.1), as these two classes were generally worked using a similar range of techniques of grinding, pecking, and polishing. Slate is considered somewhat of an "exotic" material in the Lower Mopan River Valley. Although it does originate in the Maya Mountains to the southeast, along with granite, large pieces of slate can be recovered from the lower reaches of the Macal River to the east. As previously mentioned the area, known today as Black Rock, along the Macal is only 8km from the Lower Mopan.

Analysis

Sylvia Batty assisted me in the analysis of all ground and pecked stone artifacts. Sylvia is a Belizean archaeologist and employee of the Institute of Archaeology who worked with me in the field during the 2010 season as an assistant supervisor and has had previous experience conducting groundstone analysis while working with the Chan project in 2009. Together we analyzed 385 artifacts (119.7kg). These included those intentionally shaped by grinding, pecking, incising, and/or polishing and those tools unintentionally shaped through use. The coding protocol and formal typology does not take into account this distinction between intentional and incidental shaping, particularly in the case of grinding implements. This class of artifacts includes stone items such as pendants, beads, spindle whorls, net weights, etc.; however the most common were grinding implements known as *manos* and *metates*. Other types of tools included within this category are alluvial cobbles and pebbles used as hammers or polishing and burning stones, etc. We also included within this category any raw pieces of material typical of this category, likely bits of debitage from manufacture. These typically include raw pieces of granite, basalt, and slate, as well as any unworked specimens of non-local rocks and minerals that must have been "manuports" such as speleothems, quartz crystal, etc.

The attribute coding system (Table AIV.2) applied to the groundstone analysis derives primarily from Robin (1999) and Yaeger (2000a), who made use of typologies and distinctions by Willey et al. (1965) and Schneider (1998) and Thompson (1939). I also made use of observations by Turuk (2006) who addressed the works of Anderson (1997), Hayden (1987), and Jaeger (1988). Full description of metric and non-metric attributes were made for all catalogued small finds (GS-###, SP-###, OT-###), while bulk raw slate was counted and weighed only along with a note on material colour (the most common of which was a dark grey and relatively soft slate). The goal of analysis was to determine the form, function, material and distribution of items to assess patterns of use and investigate access to materials.

Material

Identifying the material of ground and pecked stone artifacts was sometimes difficult. While I do have cursory training in geological identification, the classification of artifacts was based on visual properties alone. Having worked on-and-off and travelled extensively in the Belize Valley and neighbouring Vaca Plateau over the course of 14 years, I have had the opportunity to see many examples and collections of local raw materials that has greatly assisted with my identifications. I also consistently consulted local residents and archaeologists. Overall, I feel fairly confident than mine and Sylvia's material classifications are relatively precise and consistent.

In the case of jadeite, serpentine, malachite and other green stones, I have applied the term "greenstone" as the precise identification of any one of these minerals/rocks is typically dependent on chemical characterization. In general, such green stones tend to be exotic items. There was also a class of transparent crystals, not of quartz, that have been identified as calcite and confirmed by various spelunkers.

Form

In the case of *manos* and *metates*, grinding is presumed to be a primary manufacture method along with pecking for all items. However, we found it difficult to distinguish evidence of these methods from smoothing resulting from use.

Modified cortex refers to cortex that has been pecked, probably for the purpose of shaping, however no smoothing (from intentional or use related) has occurred. This is typically found on the underside of metates, but can also be an indicator of performs or other early stage artifacts.

A *mano bump* is a raised ridge on the metate, slightly above the basin and under the rim. This is thought to have developed through the use of different sized manos over the life of a metate. An extensive metate life may also be the cause of such a feature.

Artifacts	Count	%	Weight (g)	%
Bulk slate/other stone (Op 353)	4	1.0%	10.7	0.0%
Bulk slate	94	24.2%	1722.6	1.4%
Groundstone/other stone	291	74.8%	117969.2	98.6%
TOTAL	**389**	100.0%	**119702.5**	100.0%

Analysis	Count	%	Weight (g)	%
Basic count/weight	4	1.0%	10.7	0.0%
Full analysis	385	99.0%	119691.8	100.0%
TOTAL	**389**	100.0%	**119702.5**	100.0%

Table AIV. 1: Total ground and pecked stone materials collected and analyzed from Phase 2 and 3 investigations.

Table AIV.2: Ground and pecked stone attribute coding system (based on Robin 1999 and Yaeger 2000a).

A. **Year**
B. **Operation**
C. **Suboperation**
D. **Lot**
E. **Catalogue Number**
F. **Frequency:** Count
G. **Frequency:** Form
H. **Weight**
I. **Length**
J. **Width**
K. **Thickness**
L. **Material**

00 = Unknown
- 00 = really unknown
- 01 = unknown igneous
- 02 = unknown metamorphic
- 03 = unknown sedimentary

10 = Granitic Stones
- 10 = granite
- 11 = coarse granite
- 12 = fine granite
- 13 = gneiss
- 14 = eroding/poorly silicified granite/grano-diorite
- 15 = grano-diorite
- 16 = granitic river cobble [cobble (64-256mm), added by MPB, Aug 2010]

20 = Greenstone
- 20 = unspecified greenstone
- 21 = jadeite

30 = Limestone
- 30 = unspecified limestone
- 31 = hard limestone (Cretaceous?)
  - 32 = calcite (possibly Yaeger's "clear crystal, not quartz"; added by MPB, Aug 2010)
  - 33 = soft limestone (Tertiary?)
  - 34 = hard/compact limestone river cobble/pebble [cobble (64-256mm), pebble (4-64mm)]

40 = Chert/Quartz
- 40 = unspecified chert
- 41 = chert river pebble/cobble
- 42 = quartzite
- 43 = quartz massive
- 44 = quartzite river cobble
- 45 = quartz crystal
- 46 = carnelian (red chalcedony)

50 = Volcanic Stones (excluding obsidian)

50 = Basalt
51 = vesicular basalt
52 = pumice

60 = Metasediments
60 = slate
61 = siltstone
62 = sandstone (added by MPB, Aug 2010)
63 = schist (added by MPB, Aug 2010)

70 = Ferrous Metals
70 = unknown
71 = pyrite

80 = Other Minerals
80 = red pigment stone
81 = blue pigment stone

90 = unknown River Cobble/pebble

100 = Obsidian

M. Cortex? (primarily for unused material)

0. 0%
1. 1-25%
2. 26-50%
3. 51-75%
4. 76-100%

N. Primary Colour (for gneiss and schist, primary and secondary colour = striations)

00 = unknown
01 = none
10 = white
20 = light grey
30 = dark grey/grey
31 = black (added by MPB, Aug 2010)
32 = dark blue-grey
40 = cream/tan
50 = brown
51 = honey
60 = pink
70 = red/brown
80 = green
90 = clear
91 = yellow
92 = purple
93 = gold
94 = orange
95 = silver

O. Secondary Colour (codes same as primary)

P. Whole/Broken?

00 = Unknown (code raw material pieces as such)
10 = Whole

10 = complete
11 = mostly complete (portion missing not effect measurement)
12 = broken, but all pieces present

20 = Broken
- 20 = broken, unknown fragment
- 21 = medial (broken in half, mano)
- 22 = medial and one end (rim and basin)
- 23 = end (not lateral rim fragment)
- 24 = portion of lateral (metate rim fragment)
- 25 = portion of lateral and one end (corner piece)
  - 26 = split in half between upper and lower surfaces, both ends present
  - 27 = split in half between upper and lower surfaces, one end present (basin fragment)
  - 28 = full lateral
  - 29 = upper and lower surfaces but no edges (basin fragment)

Q. Form

00 = unknown/raw
- 00 = unknown or raw
  - 01 = unknown cobble: possible hammerstone but not enough sign of wear
  - 02 = unknown ground
  - 03 = unknown battered
  - 04 = unknown chipped
  - 05 = unknown smoothed
  - 06 = unknown sawn/sheared (added by MPB, Aug 2010)
  - 07 = unknown alluvial cobble/pebble

10 = Metates (# = cross section, letter = overall form, outline)
  - 10 = unknown
  - 11 = basin
  - 12 = flat
  - 12.1= slab (rock used as metate but not specifically made for purpose...altered, not made)
  - 13 = metate leg
  - 14 = possible metate fragment (differs from 10 because portion missing is surface of metate = distinguish from complete unknown piece “02”)
  - 15 = miniature (added by MPB, Aug 2010)
  - 16 = trough (added by MPB, Aug 2010)
  - 17 = small, slightly concave basin; (pigment grinder? Mortar?)
  - 18 = anvil (pitted surface from bashing) (added by MPB, Aug 2010)
  - 18.1 = metate preform (added by MPB, Aug 2010)
  - A = unknown (fragment)
  - B = turtle back
  - C = tripod

20 = Manos (code with number from 20-29 for form of cross-section and a letter from A to G for overall form of mano)
  - 20 = unknown
  - 21 = round/circular

22 = square
23 = rectangular-ovate (use on two sides only)
24 = plano-convex (flat side is use side)
25 = triangular
26 = diamond shape
27 = irregular/pentagonal/preform
28 = oval (use on all sides, more elongated than round; added by MPB, Aug 2010)
29 = overhang (added by MPB, Aug 2010)
30 = tear drop (added by MPB, Aug 2010)
A = unknown
B = circular
C = rectangular
D/E = oval (grouped “small” and “large”, MPB Aug 2010)
F = bipointed convex/tapered
G = irregular/preform
H = rectangular-oval
I = cowbell
J = cylindrical

30 = Misc. Raw or Ground Stones
30 = unknown function
31 = hammerstone (round; evidence of banging)
32 = pestle (rounded end; evidence of crushing)
33 = nutting stone (concavity for nut)
34 = smoothing/burnishing stone
35 = grooved stone, small (net weight)
36 = grooved stone, large (general weight/canoe anchor/net weight)
37 = smooth PEBBLE: polishing stone?
38 = thick bar: smoothing implement?
39 = round ball, unpolished: foot rattle? Blowgun pellet?

40 = Misc. Ground Stones
40 = unknown
41 = celt/adze
42 = smoothed plaque
43 = cloth/bark beater (unknown)
A = one side smooth, one side thick gauge
B = one side thin gauge, one side thick gauge
44 = smoothed pendant, notched
45 = smoothed pendant, biconically drilled
46 = smoothed pendant, uniconically drilled
47 = hexagonal bar
48 = inlay (for design/decoration, ornament, plaque, mosaic)
49 = wrench/mace (added by MPB, Aug 2010)

50 = Spindle Whorls
50 = unspecified spindle whorl
51 = round spindle whorl with single slightly uniconical perforation (plano-convex cross-section)

52 = decorated/incised round spindle whorl with single slightly uniconical perforation

60 = Large Manos or Multifunctional Crushing Stones (codes same as Mano)

70 = Beads

- 70 = unspecified
- 71 = globular bead
- 72 = disc bead
- 73 = tubular bead
- 74 = tubular, but with natural hole
- 75 = carved

80 = Other

- 80 = other, unspecified
- 81 = tooth inlay
- 82 = thin flat round adorno: mosaic piece?
- 83 = thin angular adorno: mosaic piece?
- 84 = sequin
- 85 = unknown worked slate (added by MPB, Aug 2010)
- 86 = disc
- 87 = unknown smoothed, incised ornament (added by MPB, Nov 2010)
- 88 = speleothem (any possible cave/wet environment formation)
- 89 = miscellaneous flake

R. Primary Production method

00 = unknown/NA/natural
10 = ground/smoothed
20 = pecking
30 = flaking
31 = bipolar split
40 = sawn

S. Secondary Production method

00 = unknown/NA/natural
10 = incising
20 = groove (pecking)
30 = sawn
40 = resharpening by pecking
50 = drilled/perforated

T. Primary Use Wear/working

00 = no evidence/unknown (fragment too small to identify use surface)
01 = burned
10 = battering

- 10 = unknown/single end if only one end present
- 11 = single end use
- 12 = double end use
- 13 = single face
- 14 = double face
- 15 = other (note in comment section)

20 = polish

20 = unifacial polish (mano)
21 = bifacial polish (mano)
22 = tri-facial polish (mano)
23 = round polish (all sides, circumference, mano)
24 = basin polish (metate)
25 = unknown extent of polish (mano)
26 = quadrifacial polish (all sides, but not edges, this code is also used for 3 sided manos for which all sides are polished)
27 = rim polish (polish extends to rim on the inside of the metate, rim fragments only)
30 = smoothing
40 = chipping/flaking/pecking (?) (slate and quartz)
50 = striations
60 = pitting/pecking (anvil)
70 = crushing
80 = incising
90 = groove-incising

U. Secondary Use Wear/Working (same codes as Primary)
V. Tertiary Use Wear/Working (same codes as Primary)
W. Comments
X. Date
Y. Analyst
Z. Photo?
AA. Drawn?

APPENDIX V: ARCHITECTURAL MATERIALS

As explained in Chapter 4, a major goal of the BVS Cluster 1 research design was to examine the nature of settlement site domestic and non-domestic architecture, including the layout of structures, the techniques used in their construction, and the materials from which they were created. This information would ultimately add to the discussion concerning the built environment and knowledge bases and urban integrative methods and eventual disintegration (Chapters 6, 7, 8). The Phase 3 clearing excavations exposed large portions of the final phases of architecture at each structure at five settlement sites and probed into the fill to examine earlier phases, providing information on layout and construction techniques. Because of the small area exposed at each structure in BVS Cluster 1, the information obtained from the Phase 2 testing excavation program was generally more limited. I did place test units so that one face of the tested structure would be exposed for evaluation, a strategy that provided data on the masonry techniques used in platform construction (Chapter 4).

I recorded four kinds of architectural materials: daub, plaster/stucco, fill, and masonry. I collected the daub and plaster/stucco fragments for later laboratory analysis. Sample collection was clearly not feasible with facings and fills, and instead I recorded these features with detailed descriptions, drawings, and photographs, discussed variously throughout this dissertation.

Daub

All superstructures in BVS Cluster 1 were made of perishable materials. Although most of the organic material that comprised the walls and roofs of these structures has long since disintegrated, I found abundant evidence of their walls in the form of fragments of clay daub that had once been placed over the wood stick walls (*bajareque*). Willey et al (1965) found a similar predominance of wattle-and-daub structures at nearby Barton Ramie, as did Yaeger (2000a) at San Lorenzo, while at Chan Robin (1999) found little evidence of daub use (just pole construction). Wattle-and-daub house styles were quite common in local Maya villages such as nearby Succotz until fairly recently.

Analysis

I examined most of the daub and plaster/stucco from BVS Cluster 1 testing and excavations, consisting of 7664 pieces weighing 67.7kg (Table AV.1). I did not examine the daub from Op 353 ground-truthing nor did I examine or include in my total count the daub collected at Site/BVS-037, the enigmatic firing feature that consists of over 16,000 pieces (see Independent Report #1 in Appendix I). The BVS-037 material was not subject to screening in the field, but rather was collected through floatation for future investigation. The metric and non-metric attributes analyzed are listed in Table AV.2, and are based on the system adopted by Yaeger (2000).

Plaster

I examined all pieces collected and identified as plaster or stucco. Four pieces were recovered from primary and secondary contexts. Some of these pieces displayed sections of thick red/orange paint while others displayed burning. These latter pieces were those specifically collected from the plaster surface at BVS-007-1 that displayed localized burning. Thickness of the pieces varies from 6.7mm to 16.5mm. In the few situations where plaster surfaces survived in BVS, these were in very rough shape and in most cases mostly disintegrated or severely disturbed. The overall lack of plaster surfaces is likely due to the limited access to limestone outcropping in the immediate area. It is most likely a good reflection of socio-economic status in BVS Cluster 1.

Masonry and Construction Fill

The structures excavated at BVS Cluster 1 presented a diversity of masonry techniques and materials. The different forms and trends were presented and discussed in Chapter 4.

Most of the structures tested and excavated at BVS Cluster 1 were small wattle-and-daub buildings/superstructures sitting on low platforms (substructures) faced with unmodified or modified stones, typically of limestone, and containing fills typically consisting of a soil or clay matrix with differing alluvial cobble/pebble inclusion content. These structures required relatively little labour to build, although they probably needed refurbishing relatively often.

Artifacts	Count	%	Weight (g)	%
Daub (Op. 353)	54	0.70%	269.0	0.40%
Daub	7653	99.16%	67547.5	99.41%
Other	11	0.14%	130.9	0.19%
TOTAL	**7718**	100.00%	**67947.4**	100.00%

Analysis	Count	%	Weight (g)	%
Basic count/weight	54	0.70%	269.0	0.40%
Full Analysis	7664	99.30%	67678.4	99.60%
TOTAL	**7718**	100.00%	**67947.4**	100.00%

* "Other" includes plaster/stucco fragments recovered

Table AV. 1: Total architectural remains collected and analyzed from Phase 2 and 3 investigations.

Table AV.2: Attribute codes for analysis of architectural materials.

A. **Year**
B. **Operation**
C. **Suboperation**
D. **Lot**
E. **Catalogue #/ Piece #/ Drawing #**
F. **Count**
G. **Weight**
H. **Size**
    0. 0-1cm
    1. 1-2
    2. 2-3
    3. 3-4
    4. 4-5
    5. 5-6
    6. 6-7
    7. 7-8
    8. 8-9
    9. 9-10
    10. >10

I. **Colour**
    0. unknown
    1. black to gray
    2. red to orange to tan
    3. yellow

J. **Material**
    0. unknown
    1. common: daub/fired clay with few coarse inclusions and impressions from organic temper (red to orange to tan typical)
    2. scorched marked daub (grey/black areas); same as #1 but burned
    3. daub, similar to #1 but may be different clay/mud source
    4. compact homogeneous clay; burned/natural sediment/eroded pottery
    5. daub but not typical of superstructure daub; lacking inclusions like most daub, denser and more homogenous
    6. daub or daub-like material with high sascab content
    7. limestone/CaCO3
    8. burned/fired clay (no inclusions; daub like)
    9. plaster/stucco
    10. burned plaster/stucco

K. **Primary special form, impressions and inclusions**
    0. unknown/no/none visible
    1. impression (<1.0cm diameter)
    2. impression (1 – 2.0cm diameter)
    3. impression (2 – 4.0cm diameter)
    4. impression (>4.0cm diameter)
    5. complex, multiple impressions (various sizes)

6. flattened side (exterior of building)/ smoothed piece
7. corner piece
8. organic inclusions (grass, etc.)
9. lithic inclusions
10. other inclusions (specify in comments)
11. stucco/plaster surface

L. **Secondary special form, impressions and inclusions** (*see above categories)
M. **Comments**
N. **Date**
O. **Analyst**
P. **Profile drawing?**
Q. **Photo?**

APPENDIX VI: HUMAN SKELETAL REMAINS

The human remains discussed in this appendix consist of two sets of osteological recoveries made in BVS Cluster 1 in 2008 and 2010 (Chapter 4: Tab. 4.13; Appendix VIII: Tab. AVIII.7, Sample # 354Z/20-F1). Excavations in no way were targeted to recover skeletal remains: rather the remains were unintentionally encountered during the testing and excavation of architectural structures. For this reason, the osteological evidence available does not constitute a large sample of the population. The small number of burials (one) encountered suggests that the majority of the population was not buried in residential or ceremonial structures, but perhaps in caves or outlying cemeteries or subject to cremation instead. A similar pattern was noted by Yaeger (2000a) at San Lorenzo. Due to these factors, I will avoid any demographic interpretations.

This appendix begins by detailing the various types of data that were collected from the skeletal and dental remains and the methods used in this process. This is followed by a description of each context from which remains were recovered. Because the bone was generally in poor condition, some of the descriptive information given below was observed by me in the field and not in laboratory. Finally, an independent report on results of isotopic analysis conducted on dental remains from Burial 350-B1 is presented at the end of the appendix.

Analysis

The laboratory analysis was conducted in July 2008 and February 2010 on the very few human remains recovered from BVS Cluster 1. This is the only osteological material recovered from MVAP 2007-2010 investigations. The analysis was conducted by myself and Lizzy Hare (undergraduate student, biological anthropology, University of Wisconsin-Madison) and employed the protocols outlined in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker, eds. 1994). I have had only preliminary instruction in osteological analysis, hence I was careful to consult with Dr. Carolyn Freiwald (MVAP faunalist and osteologist) and Dr. Anne Katzenberg (University of Calgary). The first set of remains, Burial 350-B1 at BVS-034, were identified in the field (Chapter 4), while the second set of remains were recovered from a microartifact sample from BVS-007-1 (lot group 007-1/25 on-floor deposit, Sample 354Z/20-F1, Chapter 4,6, Appendix VIII).

The goal of the skeletal analysis was to collect preliminary data in the field using non-destructive analyses. Data collection was designed to create an inventory of all bones and teeth, record age and sex indicators if possible, and any intentional body modifications (e.g. dental filing) if applicable. Analysis in the field laboratory was conducted using a hand lens and 40X magnification field microscope when necessary. In Calgary, analyses of the microartifact samples were assisted through the use of a 100x magnification microscope and HCl acid (to confirm bone). Later, a single tooth was subject to isotopic analysis by Dr. Freiwald (discussed below).

Preservation and Bone Condition

Generally, the preservation of the human remains was very poor in the BVS Cluster 1 area. The cranial bones of Burial 350-B1 (discussed in Chapter 4) were mostly powder with occasional tiny fragments. The occasional larger piece (less than 2mm) allowed distinction as flat bones from the cranium. Tooth preservation from the same context was generally good. The human remains recovered from BVS-007-1 on-floor material had been subject to burning and some degree of further calcification. These two differing states of preservation severely limited analysis and interpretation of Burial 350-B1 and BVS-007-1 remains. The fragmentary condition of the bones often precluded the collection of metric data. Taking these hindrances into consideration, it is still possible to make general statements regarding these ancient individuals.

Minimum Number of Individuals (MNI)

The Minimum Number of Individuals (MNI) is arguably the most popular method of quantification in any type of osteological analysis. In the case of Burial 350-B1, the MNI is presumed to be one individual based on the nature of the context and the near completeness of dental remains. For the finger remains of BVS-007-1, calculating an MNI is more difficult as the siding and positioning of phalanges of a child is very difficult. A total of 10 complete first phalanges, 5 partial phalanges, and 12 unknown or epiphyses were recovered. Based on the count of individual phalange bones and the context of the find, it would not be difficult to assume a single individual is represented.

The presence of only two sets of remains within the BVS zone, both from children, is intriguing. In future, I would like to attempt DNA analysis on both sets to determine if they are from the same individual. If they are, this would be particularly interesting with regard to the civic integration discussion: one set being from the earlier Founder Household ritual locale (BVS-034) and the other being from the later community-urban ritual locale (BVS-007). I will approach Dr. Carney Matheson, Director of the Lakehead University PaleoDNA Lab, in the near future to discuss the potential for such a study that will also contribute to a future article focused on finds at BVS-034.

Age Estimation

It is often possible to assign more precise age ranges for young individuals than for older adults. This is because development changes like tooth formation and bone growth and fusion occur at more predictable rates than degenerative changes. The relative completeness of the dental remains of Burial 350-B1 allowed relatively precise age range assignment to the individual. The age range suggested was 4 years +/- 12 months (Buikstra 1994). This is not surprising given the commonality of child and infant remains in "Skull Caches" of the Late Preclassic and Early Classic (see below).

Age estimation could not be conducted for the phalanges of BVS-007-1 other than a general statement, based on size and possible recovery of epiphyseal plates, assigning remains to a "child" (Anne Katzenberg, personal communication, 2010).

Isotopic Analysis

In 2009, Carolyn Freiwald conducted strontium isotope analysis on a tooth from BVS-034 (Burial 350-B1), part of her larger dissertation research addressing population movement patterns in the Belize Valley during the Terminal Classic and Postclassic Periods (Freiwald 2011a, b). Her full independent report concerning the results of tooth analysis from Burial 350-B1 is presented here.

Independent Report #5

The origin of the child buried at BVS-034, Burial 350-B1: Strontium Isotope Values and migration at Buenavista

Carolyn Freiwald, University of Wisconsin-Madison.

Bone chemistry methods have been used to identify population movement in ancient societies around the world. Strontium isotope ratios reflect the source of an individual's food, and use of different water sources results in distinct oxygen isotope values. Both methods have been used to identify migration in Mesoamerica (e.g., Price et al 2008; White et al. 2004). In fact, non-local individuals have been identified in nearly every published study, including Buenavista del Cayo (see summary in Freiwald 2011).

Strontium isotope values become fixed in human tooth enamel and other tissues during infancy and early childhood, depending on timing of the tooth formation. Several assumptions inform interpretations of isotope values: first, most food was likely obtained locally. Average human isotope values at most sites in the Belize Valley fall within the range those of baseline samples collected nearby (Freiwald 2011). Second, children were likely nursing while teeth formed, so the mother's diet also contributed to strontium isotope values and also must reflect a largely local diet. Third, tooth enamel values do not exhibit significant diagenetic contamination. While deciduous teeth that are not fully mineralized are more likely to be altered in the burial environment, tooth enamel is relatively resistant to elemental exchange. Finally, although strontium isotope values in the Belize River Valley also are found elsewhere in the Maya lowlands, only individuals with values higher or lower than those identified in the Belize Valley are considered migrants. Relocation from a place with a similar strontium isotope value and multiple moves between childhood and death – the stages that the tooth enamel and burial represent – are not measured in this analysis.

The local range of Belize Valley strontium isotope values were determined using modern and archaeological fauna. Strontium isotope values along the Mopan, lower Macal, and Belize Rivers differ from those identified in the Vaca Plateau, the Maya Mountains and its foothills, and the Maya lowland region that borders the Belize Valley (Freiwald 2011). This is due to differences in the age and bedrock composition of the underlying geologic formations, allowing scholars to use strontium isotope values to identify population movement across the Maya region (Hodell et al 2004; Price et al. 2008).

Migrants are defined as individuals who relocated between communities at least one time during their lives (Freiwald 2011; Hoerder 2004). This does not include residential mobility in which an individual changes residence *within* a village or city. Isotope assays cannot capture mobility over such short distances, even in a region like the Belize Valley where average isotope values change over distances as short as 5-7 km. Twenty-three percent of the 148 individuals sampled at 15 sites in the Belize River Valley can be defined as migrants (Freiwald 2011). One individual buried at Buenavista de Cayo is included in this analysis and is discussed in the following section along with eight individuals sampled by Mitchell (2006).

Two of nine individuals, or 22%, sampled from the Buenavista burial population have non-local origins. Both individuals were interred in the architectural core. One was buried in the eastern structure of a residential group interpreted as the royal household, and the other was interred in a crypt in Structure 1. The strontium isotope values of these individuals evidence in-migration from at least two distinct locations during the Late and Terminal Classic. Both values lie outside the interquartile range (IQR), a robust statistical measure based on the median value rather than the mean, of the nine Buenavista samples (Freiwald 2011: 104). Both values also are more than two standards deviations from the mean of the fauna used to establish a strontium isotope baseline.

Human values may also be compared to the *range* of the baseline fauna. Modern fauna collected within 3.5 km of the site have values that range from 0.70829 – 0.70863 $^{86}Sr/^{87}Sr$. One of these samples is the lowest value identified in the valley. Values increase toward the coast, where the highest value is 0.70908 $^{86}Sr/^{87}Sr$, resulting in a range of values from 0.70829 - .70908. Most of the more than 150 human values fall within this range of values, 0.70829 – 0.70908 $^{86}Sr/^{87}Sr$, but a child buried in Buenavista structure BVS-034 during the Late Preclassic has a lower value, 0.70811 $^{86}Sr/^{87}Sr$. While this value may reflect a third non-local individual 0.70811 $^{86}Sr/^{87}Sr$, it most likely reflects a Belize Valley origin distinct from those buried elsewhere at the site.

The value of the four year-old child buried in Op. 350 Burial 1 in structure BVS-034 is one of a number of marginal values that are not statistical outliers, but are higher or lower than the values of the rest of the burial population and faunal baseline samples. Possible explanations include both a local and a non-local origin, but in either case, the child's main food source(s) differed from the other individuals in the Buenavista burial sample.

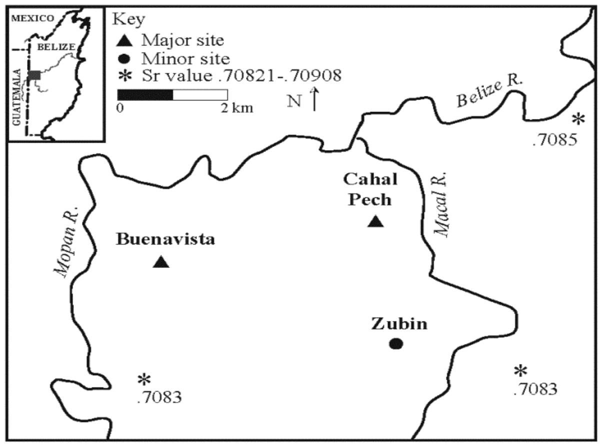
The most conservative explanation is that the value is a local one, and simply reflects isotopic variability within the Belize Valley that has not yet been identified. The burial dates to the Late Preclassic, hundreds of years earlier than the Late and Terminal Classic burials in the site core that were sampled by Mitchell (2006). While change over hundreds or thousands of years will not affect strontium values, a shift in food procurement practices might. It is not surprising that populations living hundreds of years apart, and living in distinct residential areas at Buenavista, acquired food from different sources.

A second possibility is that the child relocated from an area with lower strontium isotope values while the tooth was forming, and that the value represents an intermediate measure between the new and old residences. Other child migrants have been identified in the Belize Valley (Freiwald 2011). The child also might have relocated shortly before death from an area with a lower strontium isotope value. The deciduous second molar begins to form during infancy, so the child may have relocated with his or her mother.

Some aspects of burial treatment have a statistically significant relationship with origin. The southern orientation of burials that is common in the Belize Valley is present in the body positions of 89% of individuals with strontium isotope values that are interpreted as local (Freiwald 2011). However, burial patterns considered typical for the region – a prone, extended body position with the head oriented to the south – become common only by the Late Classic period (Schwake 2008; Willey et al. 1965; Yaeger 2003). Burial treatment of children during the Preclassic period in the Belize River Valley is not well-described. The position of the teeth in the bowl suggests a possible southern orientation for the cranium, but preservation was poor. Cranial elements other than teeth were not identified to element, and no post-cranial elements were recovered.

Population movement at Buenavista is a snapshot of movement elsewhere in the Belize Valley. Individuals buried at the site had diverse origins, and despite unique geology of the region, which allows identification of short- and medium-distance location, some data remain ambiguous. It is not possible to say with certainty whether the child in Op. 350 Burial 1 moved to Buenavista very early in life, or resided within the community. None of the possible migrants present clear cases of long-distance movement: each of the three strontium isotope values that differ from the rest can be found within 20 kilometers from the site. While high values are linked to the Maya Mountains and its foothills, low values are found across much of the central lowlands, resulting in multiple possibilities for the origin of the child.

Figure 1: Strontium values in the Lower Mopan, Lower Macal, and Belize Valleys (from Freiwald 2011:Fig. 5.19).



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APPENDIX VII: FAUNAL REMAINS

In my excavations in the BVS zone, I recovered many freshwater and marine shells, while simultaneously encountering few non-human osteological materials. The assemblage included 20 pieces of bone or teeth from vertebrate species, 322 pieces of freshwater riverine shells, and 33 pieces of marine shells (Table AVII.1). Dr. Carolyn Freiwald conducted the initial identification and analysis of all shell materials from the Phase 2 testing, while I analyzed all shell material from Phase 3 excavations with occasional identification assistance from Norbert Stanchly. I conducted preliminary analysis of all non-human bone and teeth.

Bone

The material included in this analysis consists of 20 pieces (14.9 g) of non-human bone and teeth recovered from BVS Cluster 1 investigations. All materials were recovered from upper level mixed contexts and are likely modern. In fact, one piece consisted of a bovine tooth. This is not surprising as much of this area was used as cattle pasture in modern times. All bone finds were fragmentary in nature and most were extremely bleached from exposure.

Analysis

The bone attribute coding system (Table AVII.2) adopted for analysis is based on Blackmore's (2008:311) dissertation study of commoner domestic remains at the nearby site of Chan. As the context of most finds suggests modern material, little time was spent on the remains.

Shell

We recovered a total of 663 (1215.6g) invertebrate remains (shells) - including riverine, marine, and land snails- and analyzed 639 (1180.0g) pieces from investigations at BVS Cluster 1. Full analysis was conducted on all materials except those recovered from Op 353 ground-truthing (although preliminary identification of species was made). Analyzed but not considered to any great extent in this study were the land snails recovered from testing and excavations. None of the land snail shells showed any indication that they were worked, used, or even collected by the ancient Maya. Furthermore, they are most common in the upper lots (humus) nearest the ground surface and well above any ancient cultural strata, and are likely later arrivals to the taphonomic record of the archaeological contexts investigated. Only in one case, Op 350O at BVS-035, were a pocket of small snails locally called “mazamorra” recovered in a habitation debris lot, considered in the discussion of excavations (Appendix I). Removing the land snails leaves a total of 354 (952.2g) specimens analyzed, all of which are mollusc remains.

Analysis

The shell analysis attribute coding system (Table AVII.3) I have adopted was taken in large part from Yaeger (2000a:1229-1231). I am not a mollusk expert, but consultation with Dr. Carolyn Freiwald and Norbert Stanchly greatly enhanced my identification abilities. I feel quite confident in assigning species names to the three kinds of *jute* shell and the riverine bivalve, as well as the more common of marine shells (conch, oliva, etc.). In some cases I was not confident in my ability to identify marine shell at a detailed level of specificity, due to the fragmentary and worked nature of most specimens and my lack of expertise. In such cases I frequently sent photos of pieces to N. Stanchly to assist in identification.

The most common of finds was the remains of *Pachychilus* snails. These freshwater gastropods served both dietary and ritual-use purposes for the ancient Maya, and commonly go by the name of *jute* or *tutu* snails (Healy et al 1990). Although these species have less protein than other molluscs, they have more fat and carbohydrate-derived calories: resulting in a caloric yield similar to rabbit, turtle, raw oyster and clam (Healy et al 1990). *Jute* is commonly found in fill materials of the Middle Preclassic to Terminal Classic (Healy et al 1990, referring to Pacbitun materials). This was also the case at BVS Cluster 1 where the fill of the single Preclassic masonry structure (BVS-034-1) contained much *jute*. They are, and were, also used as temper for pottery (Gifford 1976:199), and powdered for lime in maize processing (Healy et al 1990). Three types of *Pachychilus* snails are identified in the BVS Cluster 1 sample: *P. largillierti*, *P. glaphyrus*, and *P. indiorum*, differentiated by size and texture of shell.

The next most common mollusc was the *Nephronaias ortmanni*: a freshwater bivalve that is common in fast moving rivers. Hohmann (2002) discuss the ubiquity of such finds in Maya deposits, and associates *Nephronaias* pendants partially with children/age signifiers (based on Landa). Sylvia Batty (personal communication, 2010) also told me that her grandmother had related to her that these shells were typically ground up and used as a “spot remover” solution for skin in the recent past. These shells are the "freshwater pearly muscles" described by Willey et al.'s (1965).

The most common visually distinct species were large and small *Oliva* shells, commonly worked into tinkler forms. All marine shell specimens and worked pieces were given small find catalogue numbers (MVAP MS-###, MVAP SP-###) so they could be easily segregated for later, more detailed identification.

With regards to metric attributes, thickness was not measured for *jute*, while thickness measurements of bivalves were taken from the centre of a shell, not at its joint. The length of a bivalve is from the joint to the far edge. A "whole" bivalve is considered a single side, unless otherwise indicated. Finally the weights in general of *jute* are probably exaggerated due to matrix still trapped in the interior of shells.

With regard to modification of shells, holes in the sides of *jutes* often occurred immediately below the spire. These are likely puncture marks made to more easily access interior meat. Along with these holes, the spire of *jute* was found either broken or sawn. This is commonly believed to be a process followed in the preparation of the snails for cooking and removal of meat, still followed today when cooking these animals. However, Solis (2010) points out that much natural breakage of spires closely resembles intentional breakage (but not sawing) and this must be considered when assessing whether a specimen was human altered. In non-domestic contexts, *jute* is most often found with unbroken spires, suggesting a purely ritual use or a naturally occurring part of a collected matrix from a source such as a river.

Artifacts	Count	%	Weight (g)	%
non-human bone	20	2.9%	14.9	1.2%
riverine shell	322	47.1%	875.6	71.2%
marine shell	33	4.8%	95.4	7.8%
land shell	305	44.7%	242.7	19.7%
unknown	3	0.4%	1.9	0.2%
TOTAL	**683**	**100.0%**	**1230.5**	**100.0%**

Analysis	Count	%	Weight (g)	%
Basic count/weight	24	3.5%	35.6	2.9%
Full analysis	659	96.5%	1194.9	97.1%
TOTAL	**683**	100.0%	**1230.5**	100.0%

Table AVII. 1: Total faunal remains collected and analyzed from Phase 2 and 3 investigations.

Table AVII.2: Bone attribute coding system (based on Blackmore 2008).

A. **Year**
B. **Operation**
C. **Suboperation**
D. **Lot**
E. **Catalogue #**
F. **Count**
G. **Number of Individual Specimens (NISP)**
H. **Weight** (0.0g)
I. **Class/Order**
J. **Family**
K. **Species**
L. **Mammal Size**
    - 0 Unknown
    - 1 Small
    - 2 Medium
    - 3 Large
M. **Bone Element**
N. **Element Portion**
O. **Side**
P. **Modification**
    0. None
    1. Bead
    2. Burnt
    3. Biconically drilled
    4. Uniconically drilled
    5. Butchered
    6. Shaped object
    7. Unknown worked
Q. **Burned?**
    0. No
    1. yes
R. **Comments**
S. **Date**
T. **Analyst**
U. **Photo?**
V. **Drawing?**

Table AVII.3: Shell attribute coding system (based on Yaeger 2000).

A. **Year**
B. **Operation**
C. **Suboperation**
D. **Lot**
E. **Catalogue #**
F. **Count**
G. **NISP**
H. **Weight** (g)
I. **Length** (mm)
J. **Width** (mm)
K. **Thickness** (mm)
L. **Type/Species**
  - 00 = Unknown
  - 10 = River Shell
    - 10 = Unknown/indefinite river shell
    - 11 = Jute, Ridged (*Pachychilus glaphyrus*)
    - 12 = Jute, Smooth (*Pachychilus indiorum*)
    - 13 = Jute, Between (*Pachychilus largillierti*)
    - 14 = Riverine Bi-Valve [*Nephronaias (ortmani?)*]
  - 20 = Marine Shell
    - 20 = Unknown/indefinite marine shell
    - 21 = Conch (*Strombus sp.*)
    - 22 = unknown Marine Bi-valve
    - 23 = *Oliva* Shell (small)
    - 24 = Tubular (*Dentalium sp.*)
    - 25 = *Spondylus sp.*
    - 26 = *Oliva* Shell (large) – ungulinidae
    - 27 = Large round univalve
    - 28 = unknown Marine Univalve (added December 2010)
  - 30 = Land Snail (typically not collected, unless special context)
    - 30 = Unknown/indefinite land snail
    - 31 = Neoclotus (*mazamorra N. dysoni*)
    - 32 = Orthalicus
    - 33 = Euglandina
  - 40 = Unknown Shell
    - 40 = unknown
    - 41 = unknown bi-valve
    - 42 = tabular, thick, dense fragment: probably marine
  - 50 = Other
    - 50 = crab shell

M. **Whole/Broken**
  - 00 = unknown
  - 10 = whole
  - 20 = broken

30 = whole, but modified

N. Shape Modification

00 = unknown
10 = not modified
20 = spire removed
  20 = undetermined method
  21 = natural
  22 = cutting
30 = modified
  30 = undetermined method
  31 = sawn/cut
  32 = various
  33 = perforated

O. Shaping

00 = unknown/NA
10 = natural
20 = disc
30 = rectangular
40 = tubular
50 = irregular
60 = elongated

P. Perforation

00 = unknown/natural
10 = unperforated
20 = uniconical perforation
  20 = single, uniconical perforation
  21 = double, uniconical perforation
  22 = triple, uniconical perforation
30 = biconical perforation
  30 = single, biconical perforation
  31 = double, biconical perforation
40 = side perforation/puncture (natural/unknown)
41 = side perforation/puncture/cut (man-made)

Q. Function

00 = unknown/NA
10 = food
20 = ritual
30 = ornament
  30 = unknown ornament
  31 = bead
  32 = pendent
  33 = adorno
  34 = tinkler
  35 = ear flare
40 = plaque
50 = small basin for grinding (e.g. scribe pigment holder)

60 = production waste
70 = pick/pin

R. Usewear

00 = unknown
10 = no usewear
20 = smoothed/polished
- 20 = smoothed/polished (general)
- 21 = smoothed/polished basin
- 22 = smoothed edges from use/rubbing not manufacture

30 = edge chipping

S. Burned

0 = no
1 = yes

T. Comments

U. Date analyzed

V. Analyst

W. Photo?

X. Drawing?

APPENDIX VIII: ECOFACTS AND MICROARTIFACTS

In consultation with colleagues at Washington State University, Lakehead University, University of California-Riverside, and University of Calgary, I began the analysis of ecofact samples collected from Phase 2 and 3 investigations at BVS Cluster 1 (Table AVIII.1). These include carbon and macrobotanical, phytolith, soil, and floatation (light and heavy fraction/ microartifact) samples. Due to limited funding, only two carbon samples have been subject to radiocarbon and AMS dating by Beta Analytic Inc. at this time.

Carbon and Macrobotanical Samples

These samples consisted of any pieces of charcoal or carbonized plant material that excavators found within Precolumbian lot contexts (Table AVIII.2). We immediately placed this type of material in aluminium foil envelopes. Large in-situ pieces were block lifted with surrounding matrix and placed in large plastic tubs covered with foil. Regular carbonized material was labeled with the operation, suboperation, and lot numbers, followed by a carbon sample number (C#). Large pieces of carbonized material were given a piece number (P#). The collection of macrobotanical remains was an opportunistic sampling procedure and only large pieces from BVS-007-1, and BVS-006-patio Features 1 and 3 were subject to further analysis and C14 dating.

Macrobotanical analysis

A limited number of macrobotanical remains underwent preliminary analysis. All samples came from BVS-007-1 (Op 354O/16-P1) and the BVS-006-patio Feature 3 (Op 355R/5-P1, 2, 3, 4, 5, 6). Preliminary identification was conducted by John Jones of Washington State University (personal communication, 2011), and identified all samples as dicot woods, and the BVS-006 material mostly consisting of compression wood, elbows, joints, etc. These samples will be further subjected to more complete analysis in the future, and integrated within an independent journal article focusing on the BVS-006-patio Features 1, 2, and 3.

Radiocarbon analysis

Two carbon samples were sent away for radiocarbon analysis at Beta Analytic Inc. (Figure AVIII.1). A sample of carbonized wood (Op 354O/16-P1), located off the north face of

BVS-007-1 above habitation debris deposits and sealed beneath the *sascab* melt layer, was subjected to the accelerator mass spectrometry method (Figure AVIII.2). This was due to the fact that although the overall piece was quite large, the weight of the piece was extremely light. A fragment of carbonized wood from the BVS-006-patio Feature 3 (Op 355R/5-P1), located directly atop the formal patio surface and sealed beneath the humus, was subjected to the regular radiometric dating method (Figure AVIII.3). The results are discussed in relation to their contexts in Chapters 4, 6, and 7, and further carbon analysis will be conducted on additional samples in the near future.

Phytolith Samples

The single phytolith sample (Table AVIII.3) was removed from the interior base of the single complete vessel uncovered at BVS-034 (Burial 350-B1, "skull cache") by scraping off sediment with a wooden pick from the interior of the vessel below the fragmentary cranial remains. This was collected in a formal plastic soil sample bag and is subject to analysis.

Analysis

Analysis of the single sample is currently underway at Lakehead University and is being conducted by Matt Boyd and Clarence Surette. Results will be integrated within an independent article focusing on finds at BVS-034 and Burial 350-B1.

Soil Samples

Soil samples were collected from all on-floor assemblage contexts and primary and *defacto* activity contexts encountered during Phase 3 excavations, as well as from any primary contexts encountered in Phase 2 (Table AVIII.4). A soil sample was also collected from all shovel test pits in Phase 2 Operation 353 ground-truthing. Soil collection typically consisted of 4oz samples stored in formal soil sample bags.

Soil chemistry analysis

Only soils collected from the BVS-006-patio at Feature 1 (firing feature) and Feature 3 (carbon feature) are currently being subjected to chemical analysis. This is being conducted at the University of California-Riverside by Lucia Guidel, and will be reported on in an upcoming co-authored article on the topic of the analysis of enigmatic firing features.

Floatation samples

Floatation samples were taken from all secondary habitation debris lot groups, as well as primary and *de facto* activity areas encountered in Phase 3 excavations (Table AVIII.5). The standard floatation sample consisted of 4L and were collected and stored in cloth bags to prevent condensation and moulding in the tropical environment. The MVAP lab staff processed samples relatively frequently, involving separation of samples into heavy and light fractions. Following processing, the heavy fraction was folded into sheets of fine mesh and the light fraction was placed on newspaper, and both were allowed to dry thoroughly. After drying, both light and heavy fractions were placed in paper bags with interior and exterior labels.

Microartifact analysis

A limited number of heavy fraction samples were subjected to microartifact analysis due to time constraints (Table AVIII.6). I analyzed a single, randomly selected, heavy fraction from each off-structure habitation debris context and primary use/*de facto* context. Bernadette Cap provided the analysis protocol followed by MVAP. To conduct analysis I made use of facilities and equipment graciously provided by Dr. Andrea Freeman and Dr. Derek Wilson of the University of Calgary. No light fraction was analyzed.

To begin, I separate the samples into size grades using a series of geological sieves. The sieve sizes included: 1mm (no18), 2mm (no10), 4mm (no5), 9.5 mm (no3/8 in) and a base pan. I labeled each size grade bag and stored all of the size grades for each sample together. I analyzed all of the size grades for all of the samples collected, except that from the 1mm screen and base pan. These were too small to analyze without a high-powered microscope and most do not provide useful information. For analysis I used both magnifying lenses and a microscope up to 100x magnification. At the 9.5-2mm size most material/artifact classes are still recognizable and additional information can be gained (e.g., a flake versus shatter, a blade versus a flake).

I separated the sample into the different categories listed on the sample recording sheet (additional categories added when required), and counted and weighed each category. After counting and weighing I put each category of artifact or natural material into its own separate bag and rebagged all into one bag when done. I found it difficult to distinguish between ceramic and daub pieces for items smaller than 2mm, so it is likely that these numbers are skewed at this size range. Results of the analysis are presented in Table VIII.7, some of which are discussed in various sections of Chapter 7.

Samples	Count	Weight/Vol.	Analyzed Count	Analysis	Analyst/Lab
Carbon	55	875.9g	2	radiometric/AMS	Beta Analytic
Macrobotanicals	10	in matrix	7	macrobotanical identification	John Jones (Washington State University)
Flotation	174	680 L	23	heavy fraction analysis	M. Peuramaki-Brown (University of Calgary)
Phytolith	1	1 oz	1	phytolith identification	M. Boyd/C. Surette (Lakehead University)
Soil	148	586.3 oz	9	soil chemistry	L. Guidel (University of California-Riverside)
	388		**42**		

Table AVIII. 1: Total ecofacts collected and analyzed from Phase 2 and 3 investigations.

Table AVIII. 2: List of carbon and macrobotanical samples collected and analyzed from Phase 2 and 3 investigations.

Op.	Subop.	Lot	CAT. #	Sample Type	Count	Weight (g)	Comments	Subject Further Analysis
350	M	3	MB1	MACROBOTANICAL	1	0.7	cohune nut?	
350	N	9	C10	CARBON	1	10.1	weight in foil	
350	O	9	C8	CARBON	1	2.0	weight in foil	
350	P	4	MB2	MACROBOTANICAL	2	0.4	cohune nut?	
350	T	4	C7	CARBON	1	1.5	weight in foil	
350	W	2	C9	CARBON	1	19.8	weight in foil	
350	W	4	C12	CARBON	1	1.7	weight in foil	
350	AH	12	C20	CARBON	1	3.4	weight in foil	
350	AM	6	C19	CARBON	1	2.4	weight in foil	
353	BU	1	C36	CARBON	1	5.0	weight in foil	
354	AG	3	C1	CARBON	1	4.0	weight in foil	
354	AG	8	C1	CARBON	1	200.6	weight in foil	
354	AG	11	C1	CARBON	1	12.8	weight in foil	
354	D	2	C30	CARBON	1	10.1	weight in foil	
354	D	19	C44	CARBON	1	3.1	weight in foil	
354	D	24	C43	CARBON	1	7.7	weight in foil	
354	D	11	C46	CARBON	1	12.5	soaked in flotation	
354	D	24	C48	CARBON	1	3.5	soaked in flotation	
354	E	2	C21	CARBON	1	11.8	weight in foil	
354	E	9	C26	CARBON	1	1.7	weight in foil	
354	E	11	C31	CARBON	1	3.6	weight in foil	
354	F	7	C1	CARBON	1	3.4	weight in foil	
354	O	13	C1	CARBON	1	29.1	weight in foil	
354	O	16	P1	MACROBOTANICAL	1	in matrix	large carbonized log piece in matrix	X
354	Q	7	C1	CARBON	1	2.1	weight in foil	
354	V	11	C1	CARBON	1	2.9	weight in foil	
354	V	16	C1	CARBON	1	32.4	weight in foil	
354	V	17	C1	CARBON	1	16.7	weight in foil	
354	V	18	C1	CARBON	1	47.4	weight in foil	
354	V	19	C1	CARBON	1	4L	in matrix	
354	W	4	C1	CARBON	1	4.1	weight in foil	
354	W	7	C1	CARBON	1	169.0	weight in foil	
354	X	5	C1	CARBON	1	10.3	weight in foil	
354	Z	20	C1	CARBON	1	2.3	weight in foil	
355	F	2	C22	CARBON	1	4.5	nw corner, interior of cobble circle - hearth feature	
355	F	2	C23	CARBON	1	5.5	ne corner - hearth feature	
355	F	3	C25	CARBON	1	9.9	ne corner, interior of feature - hearth feature	

355	F	4	C24	CARBON	1	13.9	hearth feature	X
355	G	3	C27	CARBON	1	4.0	ne corner of subop	
355	H	15	C47	CARBON	1	9.3	weight in foil	
355	J	9	C28	CARBON	1	3.3	ne corner of subop	
355	K	3	C32	CARBON	1	3.6	weight in foil	
355	O	1	C33	CARBON	1	13.0	NE corner, associated with daub	
355	O	2	C29	CARBON	1	11.7	NE corner, associated with daub	
355	O	3	C34	CARBON	1	7.1	NE corner, associated with daub	
355	O	4	C39	CARBON	1	5.2	associated with daub	
355	O	9	C42	CARBON	1	18.2	weight in foil	
355	P	2	C38	CARBON	1	3.1	weight in foil	
355	P	2	C41	CARBON	1	2.8	sw corner of subop	
355	Q	3	C37	CARBON	1	3.8	SE corner of subop	
355	Q	4	C40	CARBON	1	5.0	weight in foil	
355	R	1	C35	CARBON	1	28.5	SW corner, associated with daub	
355	R	1	C45	CARBON	1	79.9	SW corner with daub	
355	R	5	P1	MACROBOTANICAL	1	in matrix	large carbonized log piece in matrix	X
355	R	5	P2	MACROBOTANICAL	1	in matrix	large carbonized log piece in matrix	X
355	R	5	P3	MACROBOTANICAL	1	in matrix	large carbonized log piece in matrix + small fragments in foil	X
355	R	5	P4	MACROBOTANICAL	1	in matrix	large carbonized log piece in matrix + small fragments in foil	X
355	R	5	P5	MACROBOTANICAL	1	in matrix	large carbonized log piece in matrix + small fragments in foil	X
355	R	5	P6	MACROBOTANICAL	1	in matrix	large carbonized log piece in matrix + small fragments in foil	X
356	R	6	C1	CARBON	1	2.2	weight in foil	
359	B	2	C1	CARBON	1	3.3	weight in foil	
					62			

BETA ANALYTIC INC.

DR. M.A. TAMERS and MR. D.G. HOOD

4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Ms. Meaghan M. Peuramaki-Brown — Report Date: 8/31/2011

University of Calgary — Material Received: 8/19/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 304394	1220 +/- 30 BP	-27.3 o/oo	1180 +/- 30 BP

SAMPLE : MVAPOP354016
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal AD 770 to 900 (Cal BP 1180 to 1050) AND Cal AD 920 to 950 (Cal BP 1030 to 1000)

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 304395	160 +/- 30 BP	-26.4 o/oo	140 +/- 30 BP

SAMPLE : MVAPOP355R5
ANALYSIS : RadiometricPlus-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal AD 1670 to 1780 (Cal BP 280 to 160) AND Cal AD 1790 to 1960 (Cal BP 160 to 0)

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

Page 2 of 4

Figure AVIII. 1: Summarized report of radiocarbon dating analyses for Op 354O/16-P1 and Op 355R/5-P1 samples.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.3:lab. mult=1)

Laboratory number: **Beta-304394**

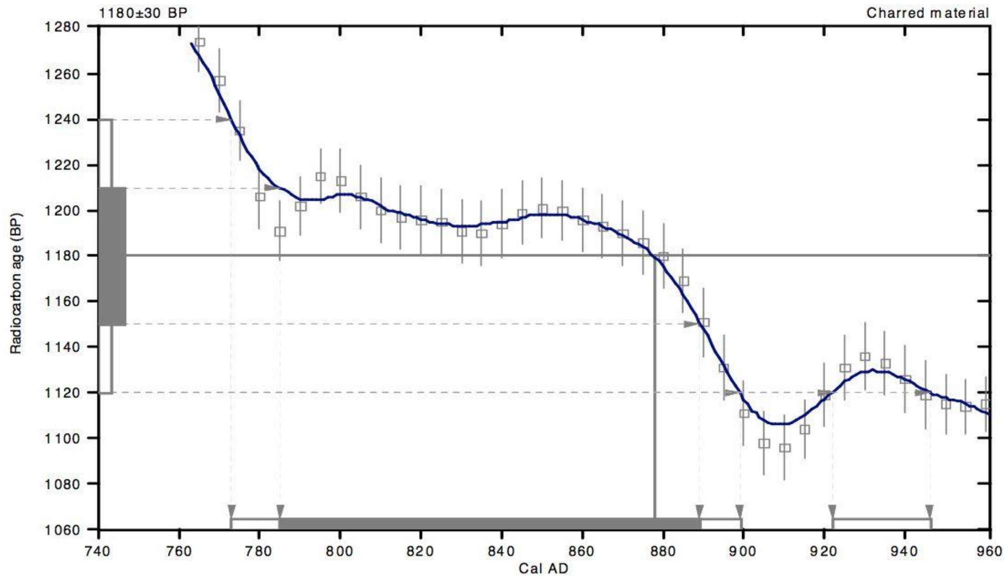
Conventional radiocarbon age: **1180±30 BP**

2 Sigma calibrated results: **Cal AD 770 to 900 (Cal BP 1180 to 1050) and**
(95% probability) **Cal AD 920 to 950 (Cal BP 1030 to 1000)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 880 (Cal BP 1070)

1 Sigma calibrated result: Cal AD 780 to 890 (Cal BP 1160 to 1060)
(68% probability)



References:
Database used
INTCAL04
Calibration Database
INTCAL04 Radiocarbon Age Calibration
IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com

Page 3 of 4

Figure AVIII. 2: Calibration of Op 354O/16-P1 radiocarbon age.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.4:lab. mult=1)

Laboratory number: **Beta-304395**

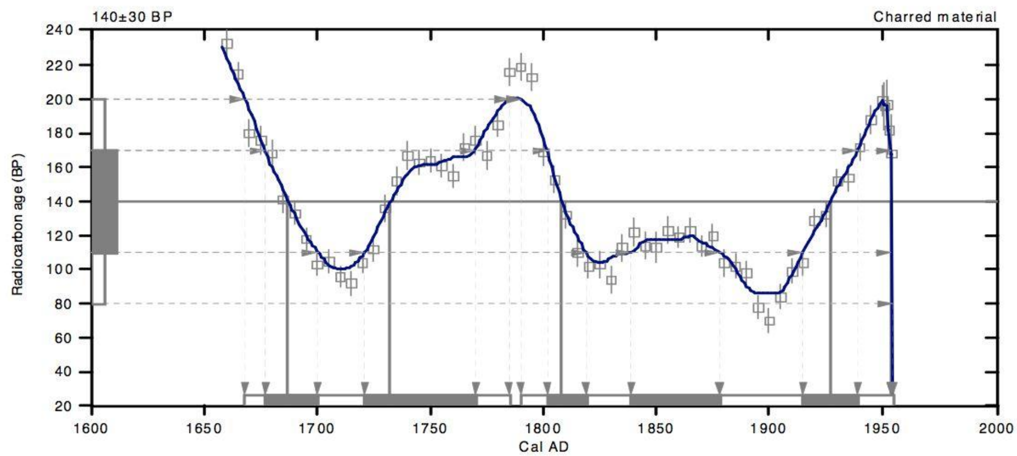
Conventional radiocarbon age: **140±30 BP**

2 Sigma calibrated results: **Cal AD 1670 to 1780 (Cal BP 280 to 160) and**
(95% probability) **Cal AD 1790 to 1960 (Cal BP 160 to 0)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1690 (Cal BP 260) and
Cal AD 1730 (Cal BP 220) and
Cal AD 1810 (Cal BP 140) and
Cal AD 1930 (Cal BP 20) and
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: Cal AD 1680 to 1700 (Cal BP 270 to 250) and
(68% probability) Cal AD 1720 to 1770 (Cal BP 230 to 180) and
Cal AD 1800 to 1820 (Cal BP 150 to 130) and
Cal AD 1840 to 1880 (Cal BP 110 to 70) and
Cal AD 1920 to 1940 (Cal BP 40 to 10) and
Cal AD 1950 to 1950 (Cal BP 0 to 0)



References:

Database used
INTCAL04
Calibration Database
INTCAL04 Radiocarbon Age Calibration
IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com

Page 4 of 4

Figure AVIII. 3: Calibration of Op 355R/5-P1 radiocarbon age.

Op.	Subop.	Lot	Cat. #	Sample Types	Count	Sample Size (oz)	Comments	Subject Further Analysis
350	AC	9	PH1	PHYTOLITH	1	1.0	From Burial 350-B1 and CR-012	X

Table AVIII. 3: List of phytolith samples collected and analyzed from Phase 2 and 3 investigations.

Table AVIII. 4: List of soil samples collected and analyzed from Phase 2 and 3 investigations.

Op.	Subop.	Lot	Cat. #	Sampl e Type	Coun t	Sample Size (oz)	Comments	Subject Further Analysi s
350	U	4	S1	SOIL	1	4.4	odd grey clay in fill	
350	AC	7	S1	SOIL	1	4.4	SW quarter - bone and limestone removed Burial 350-B1	
350	AC	7	S2	SOIL	1	2.5	SW quarter - bone and limestone removed Burial 350-B1	
350	AC	8	S1	SOIL	1	4.7	NE quarter - bone and limestone removed Burial 350-B1	
350	AC	8	S2	SOIL	1	4.6	NE quarter - bone and limestone removed Burial 350-B1	
350	AC	8	S3	SOIL	1	2.6	NE quarter - bone and limestone removed Burial 350-B1	
350	AC	8	S4	SOIL	1	4.0	NW quarter - bone and limestone removed Burial 350-B1	
350	AC	8	S5	SOIL	1	2.6	NW quarter - bone and limestone removed Burial 350-B1	
350	AK	9	S1	SOIL	1	2.5	from daub/cobble pile	
353	A	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	B	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	C	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	D	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	E	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	F	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	G	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	H	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	I	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	J	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	K	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	L	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	M	1	S1	SOIL	1	4.0	test pit - 10cm below surface	

353	N	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	O	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	P	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	Q	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	R	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	S	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	T	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	U	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	V	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	W	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	X	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	Y	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	Z	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AA	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AB	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AC	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AD	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AE	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AF	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AG	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AH	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AI	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AJ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AK	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AL	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AM	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AN	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AO	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AP	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AQ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AR	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AS	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AT	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AU	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AV	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AW	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AX	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AY	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	AZ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BA	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BB	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BC	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BD	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BE	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BF	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BG	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BH	1	S1	SOIL	1	4.0	test pit - 10cm below surface	

353	BI	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BJ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BK	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BL	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BM	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BN	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BO	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BP	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BQ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BR	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BS	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BT	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BU	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BV	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BW	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BX	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BY	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	BZ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CA	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CB	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CC	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CD	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CE	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CF	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CG	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CH	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CI	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CJ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CK	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CL	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CM	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CN	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CO	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CP	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CQ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CR	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CS	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CT	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CU	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CV	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CW	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CX	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CY	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	CZ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DA	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DB	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DC	1	S1	SOIL	1	4.0	test pit - 10cm below surface	

353	DD	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DE	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DF	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DG	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DH	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DI	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DJ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DK	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DL	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DM	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DN	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DO	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DP	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DQ	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DR	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DS	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DT	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DU	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DV	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DW	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
353	DX	1	S1	SOIL	1	4.0	test pit - 10cm below surface	
354	C	16	S1	SOIL	1	4.0	from plaster surface	
354	Z	22	S1	SOIL	1	4.0	from plaster surface	
355	F	2	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	F	3	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	F	4	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	F	5	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	F	6	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	F	7	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	F	8	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	F	9	S1	SOIL	1	4.0	hearth feature	X (2oz)
355	R	5	S1	SOIL	1	2.0	around carbon feature	X (2oz)
					148	**586.3**		

Table AVIII. 5: List of floatation samples collected and analyzed from Phase 2 investigations.

Op.	Subop.	Lot	Cat. #	Sample Type	Count	Sample Size (L)	Comments	Subject Further Analysis
354	C	7	F1	FLOATATION	1	4.0	heavy and light fraction	
354	C	16	F1	FLOATATION	1	4.0	heavy and light fraction	
354	D	2	F1	FLOATATION	1	4.0	heavy and light fraction	
354	D	11	F1	FLOATATION	1	4.0	heavy and light fraction	
354	D	19	F1	FLOATATION	1	4.0	heavy and light fraction	
354	D	24	F1	FLOATATION	1	4.0	heavy and light fraction	
354	D	24	F2	FLOATATION	1	4.0	heavy and light fraction	
354	E	9	F1	FLOATATION	1	4.0	heavy and light fraction	
354	E	11	F1	FLOATATION	1	4.0	heavy and light fraction	
354	E	12	F1	FLOATATION	1	4.0	heavy and light fraction	
354	J	2	F1	FLOATATION	1	4.0	heavy and light fraction	
354	J	3	F1	FLOATATION	1	4.0	heavy and light fraction	
354	J	4	F1	FLOATATION	1	4.0	heavy and light fraction	
354	J	5	F1	FLOATATION	1	4.0	heavy and light fraction	
354	J	6	F1	FLOATATION	1	4.0	heavy and light fraction	X
354	J	8	F1	FLOATATION	1	4.0	heavy and light fraction	
354	K	4	F1	FLOATATION	1	4.0	heavy and light fraction	
354	L	3	F1	FLOATATION	1	4.0	heavy and light fraction	
354	L	4	F1	FLOATATION	1	4.0	heavy and light fraction	
354	L	5	F1	FLOATATION	1	4.0	heavy and light fraction	X
354	O	15	F1	FLOATATION	1	4.0	heavy and light fraction	
354	O	15	F2	FLOATATION	1	4.0	heavy and light fraction	
354	O	15	F3	FLOATATION	1	4.0	heavy and light fraction	X
354	O	15	F4	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F1	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F2	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F3	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F4	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F5	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F6	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F7	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F8	FLOATATION	1	4.0	heavy and light fraction	X
354	O	16	F9	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F10	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F11	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F12	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F13	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F14	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F15	FLOATATION	1	4.0	heavy and light fraction	
354	O	16	F16	FLOATATION	1	4.0	heavy and light fraction	
354	W	7	F1	FLOATATION	1	4.0	heavy and light fraction	
354	W	8	F1	FLOATATION	1	4.0	heavy and light fraction	

354	W	10	F1	FLOATATION	1	4.0	heavy and light fraction	
354	W	11	F1	FLOATATION	1	4.0	heavy and light fraction	
354	X	5	F1	FLOATATION	1	4.0	heavy and light fraction	X
354	Z	19	F1	FLOATATION	1	4.0	heavy and light fraction	
354	Z	20	F1	FLOATATION	1	4.0	heavy and light fraction	X
354	Z	22	F1	FLOATATION	1	4.0	heavy and light fraction	X
354	AG	6	F1	FLOATATION	1	4.0	heavy and light fraction	
354	AG	6	F2	FLOATATION	1	4.0	heavy and light fraction	
354	AG	6	F3	FLOATATION	1	4.0	heavy and light fraction	
354	AG	6	F4	FLOATATION	1	4.0	heavy and light fraction	
354	AG	6	F5	FLOATATION	1	4.0	heavy and light fraction	
354	AG	6	F6	FLOATATION	1	4.0	heavy and light fraction	
355	C	3	F1	FLOATATION	1	4.0	heavy and light fraction	
355	D	2	F1	FLOATATION	1	4.0	heavy and light fraction	
355	D	2	F2	FLOATATION	1	4.0	no heavy or light fraction	
355	D	3	F1	FLOATATION	1	4.0	heavy and light fraction	
355	E	9	F1	FLOATATION	1	4.0	heavy and light fraction	
355	E	9	F2	FLOATATION	1	2.5	heavy and light fraction	X
355	F	2	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	3	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	4	F1	FLOATATION	1	4.0	heavy fraction only	
355	F	4	F2	FLOATATION	1	4.0	heavy and light fraction	
355	F	4	F3	FLOATATION	1	4.0	heavy and light fraction	
355	F	4	F4	FLOATATION	1	1.0	heavy and light fraction	
355	F	5	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	5	F2	FLOATATION	1	4.0	heavy and light fraction	
355	F	5	F3	FLOATATION	1	4.0	heavy and light fraction	
355	F	5	F4	FLOATATION	1	4.0	heavy and light fraction	
355	F	5	F5	FLOATATION	1	3.0	heavy and light fraction	
355	F	6	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	6	F2	FLOATATION	1	4.0	heavy and light fraction	X
355	F	6	F3	FLOATATION	1	4.0	heavy and light fraction	
355	F	6	F4	FLOATATION	1	4.0	heavy and light fraction	
355	F	7	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	7	F2	FLOATATION	1	4.0	heavy and light fraction	
355	F	7	F3	FLOATATION	1	4.0	heavy and light fraction	
355	F	7	F4	FLOATATION	1	1.0	heavy and light fraction	
355	F	8	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	8	F2	FLOATATION	1	4.0	heavy and light fraction	
355	F	9	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	9	F2	FLOATATION	1	4.0	heavy and light fraction	
355	F	9	F3	FLOATATION	1	1.5	heavy and light fraction	
355	F	10	F1	FLOATATION	1	4.0	heavy and light fraction	
355	F	10	F2	FLOATATION	1	4.0	heavy and light fraction	
355	F	10	F3	FLOATATION	1	4.0	heavy and light fraction	
355	G	2	F1	FLOATATION	1	4.0	heavy and light fraction	
355	G	3	F1	FLOATATION	1	4.0	heavy and light fraction	

355	G	3	F2	FLOATATION	1	4.0	heavy and light fraction	
355	G	4	F1	FLOATATION	1	4.0	heavy and light fraction	
355	H	4	F1	FLOATATION	1	4.0	heavy and light fraction	
355	H	5	F1	FLOATATION	1	4.0	heavy and light fraction	
355	H	6	F1	FLOATATION	1	4.0	heavy and light fraction	
355	H	7	F1	FLOATATION	1	4.0	heavy and light fraction	X
355	H	11	F1	FLOATATION	1	4.0	heavy and light fraction	X
355	I	4	F1	FLOATATION	1	4.0	heavy and light fraction	
355	I	6	F1	FLOATATION	1	4.0	heavy and light fraction	
355	I	7	F1	FLOATATION	1	4.0	heavy and light fraction	
355	J	4	F1	FLOATATION	1	4.0	no heavy or light fraction	
355	J	4	F2	FLOATATION	1	4.0	no heavy or light fraction	
355	J	5	F1	FLOATATION	1	4.0	heavy and light fraction	
355	J	6	F1	FLOATATION	1	4.0	heavy and light fraction	
355	J	6	F2	FLOATATION	1	4.0	heavy and light fraction	
355	J	7	F1	FLOATATION	1	4.0	heavy and light fraction	
355	J	7	F2	FLOATATION	1	4.0	heavy and light fraction	X
355	J	8	F1	FLOATATION	1	4.0	heavy and light fraction	
355	J	9	F1	FLOATATION	1	4.0	heavy and light fraction	
355	J	9	F2	FLOATATION	1	4.0	heavy and light fraction	
355	J	10	F1	FLOATATION	1	4.0	heavy and light fraction	
355	K	3	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	2	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	3	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	4	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	5	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	5	F2	FLOATATION	1	2.0	heavy and light fraction	
355	O	6	F1	FLOATATION	1	4.0	heavy fraction only	
355	O	6	F2	FLOATATION	1	4.0	heavy and light fraction	
355	O	6	F3	FLOATATION	1	4.0	heavy and light fraction	X
355	O	7	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	8	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	9	F1	FLOATATION	1	4.0	heavy and light fraction	
355	O	9	F2	FLOATATION	1	4.0	heavy and light fraction	
355	O	9	F3	FLOATATION	1	4.0	heavy and light fraction	
355	Q	6	F1	FLOATATION	1	4.0	heavy and light fraction	X
355	R	3	F1	FLOATATION	1	4.0	heavy and light fraction	X
355	R	4	F1	FLOATATION	1	4.0	heavy and light fraction	
355	R	4	F2	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F1	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F2	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F3	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F4	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F5	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F6	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F7	FLOATATION	1	4.0	heavy and light fraction	

355	R	5	F8	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F9	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F10	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F11	FLOATATION	1	4.0	heavy and light fraction	
355	R	5	F12	FLOATATION	1	4.0	heavy and light fraction	
355	R	6	F1	FLOATATION	1	4.0	heavy and light fraction	
355	S	5	F1	FLOATATION	1	4.0	heavy and light fraction	X
355	S	6	F1	FLOATATION	1	4.0	heavy and light fraction	
356	A	3	F1	FLOATATION	1	4.0	heavy and light fraction	
356	D	4	F1	FLOATATION	1	4.0	heavy and light fraction	
356	E	4	F1	FLOATATION	1	4.0	heavy and light fraction	
356	F	4	F1	FLOATATION	1	4.0	heavy and light fraction	X
356	G	3	F1	FLOATATION	1	4.0	heavy and light fraction	X
356	H	4	F1	FLOATATION	1	4.0	heavy and light fraction	
356	H	6	F1	FLOATATION	1	4.0	heavy and light fraction	
356	K	4	F1	FLOATATION	1	4.0	heavy and light fraction	X
356	M	10	F1	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F2	FLOATATION	1	4.0	heavy and light fraction	X
356	M	10	F3	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F4	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F5	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F6	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F7	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F8	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F9	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F10	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F11	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F12	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F13	FLOATATION	1	4.0	heavy and light fraction	
356	M	10	F14	FLOATATION	1	4.0	heavy and light fraction	
357	A	3	F1	FLOATATION	1	4.0	heavy and light fraction	
357	A	5	F1	FLOATATION	1	4.0	heavy and light fraction	X
358	F	7	F1	FLOATATION	1	4.0	heavy and light fraction	
358	F	9	F1	FLOATATION	1	4.0	heavy and light fraction	X
358	F	9	F2	FLOATATION	1	1.0	heavy and light fraction	
358	H	4	F1	FLOATATION	1	4.0	heavy and light fraction	X
358	H	4	F3	FLOATATION	1	4.0	heavy and light fraction	
358	H	4	F2	FLOATATION	1	4.0	NOT FLOATED	
358	H	5	F1	FLOATATION	1	4.0	heavy and light fraction	
					174	**680.0**		

Table AVIII. 6: Sample microartifact analysis form (designed by B. Cap).

Mopan Valley Archaeological Project - Microartifact Analysis Form
Microartifacts < 4 mm > 2 mm

Op/Subop/Lot										
Sample #										
Type	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**
chert flake										
chert chunk										
chert blade										
chert tool										
raw chert										
obsidian blade										
obsidian flake										
obsidian chunk										
obsidian tool										
obsidian NATD										
slate raw frag										
slate worked										
quartz										
CaCO3 nodule										
stone NATD										
shell frag										
shell worked										
ceramics										
ceramics worked										
ceramics NATD										
daub										
organics										
bone										
dirt										
NATD										

Table AVIII. 7: Results of BVS Cluster 1 microartifact sample analyses.

Sample # 356M/10-F2	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake			2	0.22	4	0.09	
chert chunk	2	4.23	8	1.21	16	0.45	
raw chert					6	0.16	rolled
quartz massive (raw)	1	2.77	1	0.15	8	0.22	
CaCO3 nodule/limestone		72.47		26.24		15.67	
stone NATD			1	0.1			high iron content/ rolled
shell frag						0.07	
ceramics	9	16.91	49	10.96	344	8.7	
daub	1	0.76	2	4.4			
organics		0.22		0.08		< 0.01	
NATD					18	0.39	vitrified ceramic? Burned chert?
calcite crystal				0.24			
grano-diorite (raw)					5	0.19	
TOTALS	**13**	**97.36**	**63**	**43.6**	**401**	**25.94**	

Sample # 356G/3-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake	1	0.75	10	2.82	17	0.27	
chert chunk			14	3.07	53	1.51	
raw chert	1	9.27	6	1.59	42	1.19	
obsidian chunk					1	< 0.01	
quartz massive (raw)					3	0.08	
CaCO3 nodule/ limestone		80.4		77.9		41.68	
shell frag		0.97		1.75		1.64	
ceramics	16	22.19	96	19.18	352	8.11	
daub	2	4.48	12	3.79	12	0.3	
organics		< 0.01		0.08		0.23	
dirt		0.11				0.24	
NATD					25	0.37	vitrified ceramic? Burned chert?
grano-diorite (raw)			4	0.84	15	0.36	
carbon				0.14		0.02	
TOTALS	**20**	**118.17**	**142**	**111.16**	**520**	**56**	

Sample # 356F/4-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake			6	1.95	15	0.46	
chert chunk	3	6.45	6	1.31	42	0.93	
raw chert			5	1.25	32	1	
obsidian chunk	1	1.39					
quartz massive (raw)			3	0.64	5	0.15	
CaCO3 nodule/ limestone		34.99		65.03		39.46	possible red pigment on some 9.5
shell frag		0.44		0.99		0.84	
ceramics	12	25.97	81	19.04	457	11.04	some vitrified likely within
daub	2	9	6	2.31	8	0.26	
organics				0.03		0.03	
grano-diorite (raw)					7	0.19	
carbon				0.1		0.1	4mm may be cohune
TOTALS	**18**	**78.24**	**107**	**92.65**	**566**	**54.46**	

Sample # 356K/4-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake			1	0.07			
chert chunk			3	0.54	26	0.68	
raw chert	3	5.81	4	0.98	12	0.23	
quartz massive (raw)					3	0.12	
CaCO3 nodule/ limestone		52.46		33.9		26.6	
shell frag				0.22		0.22	
ceramics	8	14.82	24	3.02	283	5.68	
daub	3	7.48	3	1.2	27	0.84	
organics		0.66		0.16		0.05	
grano-diorite (raw)			7	1.52	22	0.56	
carbon				0.74		0.58	
TOTALS	**14**	**81.23**	**42**	**42.35**	**373**	**35.56**	

Sample # 357A/5-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake			1	0.05			
chert chunk			2	0.36	4	0.11	
raw chert					9	0.2	
quartz massive (raw)					3	0.09	
CaCO3 nodule/ limestone		2.42		3.43		2.11	
shell frag				0.22		0.54	
ceramics			22	4.09	91	1.81	
organics				0.03		0.03	
grano-diorite (raw)			1	0.52			
carbon						0.05	
modern			1	0.01			string
TOTALS		**2.42**	**27**	**8.71**	**107**	**4.94**	

Sample # 358F/9-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake					3	0.03	
chert chunk	1	1.49			25	0.51	many spalls
raw chert	1	33.57	3	0.83	19	0.44	
quartz massive (raw)			1	0.3	7	0.15	4mm is flake or chunk
CaCO3 nodule/ limestone		74.95		38.86		49.12	
shell frag				0.09		0.07	
ceramics			22	4.96	224	4.37	many 2mm likely fired clay/daub
organics				0.16		0.07	
bone					1	< 0.01	unknown
dirt						0.11	
grano-diorite (raw)					1	0.03	
carbon						< 0.01	
resin					1	< 0.01	copal
TOTALS	**2**	**110.01**	**26**	**45.2**	**281**	**54.9**	

Sample # 358H/4-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake			1	0.05	1	0.03	
chert chunk	2	4.23	6	2.11	12	0.27	some spall/fire cracked
raw chert	4	56.12	9	1.61	11	0.32	
quartz massive (raw)			2	0.45			
CaCO3 nodule/ limestone		23.26		12		4.66	
shell frag		0.21		0.41		0.29	
ceramics	8	15.82	50	11.97	126	3.16	Chial ceramic within (LCI-II)
daub	1	0.74	8	2.11	9	0.18	
organics				< 0.01		0.02	
calcite crystal	1	1.6	3	0.93	15	0.47	
grano-diorite (raw)					2	0.17	
TOTALS	**16**	**101.98**	**79**	**31.64**	**176**	**9.57**	

Sample # 355F/6-F2	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert chunk			2	0.32	12	0.24	many spalls
raw chert					12	0.33	
quartz massive (raw)					1	< 0.01	
CaCO3 nodule/ limestone		66.48		18		8.07	9.5 red pigment on some
shell frag		1.13		0.34		0.27	
ceramics	3	7.46	23	4.55	51	1.25	
daub	9	9.59	116	16.87	709	11.96	
organics				0.03		0.01	
dirt				0.95		0.05	
carbon				1.95		0.35	
seed					1	< 0.01	think mineralized; odd shape
TOTALS	**12**	**84.66**	**141**	**43.01**	**786**	**22.53**	

Sample # 355E/9-F2	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert chunk					2	0.03	
raw chert			1	0.82	9	0.34	
CaCO3 nodule/ limestone		132.47		3.35		1.15	
shell frag						0.01	
ceramics	2	8.24	12	1.98	32	0.62	likely some daub mixed in 2mm
daub	1	1.46					
organics				0.02		< 0.01	
dirt						0.25	
carbon						< 0.01	
TOTALS	**3**	**142.17**	**13**	**6.17**	**43**	**2.4**	

Sample # 355O/6-F3	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert chunk			2	0.33	10	0.19	some heat breakage 4mm
raw chert					5	0.13	
quartz massive (raw)			2	0.35	2	0.03	
CaCO3 nodule/ limestone		1.33		6.66		4.47	
shell frag		0.56		0.16		0.33	
ceramics	1	0.9	6	0.92			
daub	40	88.71	346	52.23	1250	21.63	daub is burned (scorched)
organics		4.22		1.54		0.13	
dirt				0.75		0.38	
carbon				0.63		0.33	
TOTALS	**41**	**95.72**	**356**	**63.57**	**1267**	**27.62**	

Sample # 355H/11-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake					2	0.03	
chert chunk	1	6.36	2	0.15	10	0.14	
raw chert	1	28.58			10	0.2	
CaCO3 nodule/ limestone		100.74		28.11		13.4	
shell frag						0.48	
ceramics			31	9.06	148	3.54	likely some hardened clay within
daub	8	44.86	2	1.07	4	0.04	
organics		0.04		0.09		0.06	
dirt						0.15	
carbon						0.53	
modern	1	0.03					string
ceramic rim (calcite)	2	40.75					LCII Mt Mal bowl
ceramic rim (ash)	4(3)	63.26					
ceramic body (calcite)	18	107.48					
ceramic body (ash)	10	46.99					
TOTALS	**41**	**439.09**	**35**	**38.48**	**174**	**18.57**	

Sample # 355H/7-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake			1	0.22			
chert chunk					11	0.27	
raw chert					11	0.26	
quartz massive (raw)					3	0.05	
CaCO3 nodule/ limestone		60.01		30.79		24.94	
shell frag						0.01	
ceramics	6	19.02	35	5.78	217	3.92	
daub	1	0.65			15	0.18	
organics		< 0.01		0.03		0.09	
dirt						0.28	
carbon						0.02	
TOTALS	**7**	**79.68**	**36**	**36.82**	**257**	**30.02**	

Sample # 355J/7-F2	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake					1	< 0.01	
chert chunk	1	1.17	2	0.8	6	0.07	
raw chert					3	0.07	
CaCO3 nodule/ limestone		6.93		12.53		10.56	
shell frag						0.03	
ceramics	5	9.61	15	3.46	156	3.75	
daub			2	0.82	3	0.15	
organics				0.01		0.01	
dirt						0.35	
carbon						0.09	
TOTALS	**6**	**17.71**	**19**	**17.62**	**169**	**15.08**	

Sample # 355Q/6-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake			2	0.42	1	0.02	
chert chunk	1	1.51	4	1.25	14	0.31	
raw chert	2	50.73	1	0.27	16	0.32	
quartz massive (raw)					1	0.07	
CaCO3 nodule/ limestone		32.79		26.17		13.1	
shell frag		0.41		0.04		0.4	
ceramics	13	37.67	41	7.86	199	4.44	likely some daub in 2mm
daub	1	4.37	3	1			
organics				< 0.01		0.05	
dirt				0.38		0.05	
carbon						0.15	
TOTALS	**17**	**127.48**	**51**	**37.39**	**231**	**18.91**	

Sample # 355R/3-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake					2	0.03	
chert chunk			4	0.53	14	0.17	mostly spalls
raw chert	2	44.43			5	0.07	
slate raw frag					1	0.03	
CaCO3 nodule/ limestone		12.89		11.72		4.92	
shell frag		1.8		0.55		0.29	
ceramics	3	17.36	4	1.07			
daub	16	17.71	263	32.1	1424	22.3	much burned
organics		0.05		0.15		0.25	
dirt				2.39		2.29	
carbon		0.49		6.45		6.18	
TOTALS	**21**	**94.73**	**271**	**54.96**	**1446**	**36.53**	

Sample # 355S/5-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert chunk			4	1.56	7	0.22	
raw chert	1	2.72	1	0.1	22	0.7	
slate raw frag					1	< 0.01	
quartz massive (raw)			5	1.24	5	0.15	
CaCO3 nodule/ limestone		7.27		12.04		6.18	
shell frag						0.11	
ceramics	2	4.64	28	7.6	212	4.21	
daub	3	4.69	6	1.37	22	0.5	
organics		< 0.01		< 0.01		0.01	
carbon						0.08	
TOTALS	**6**	**19.32**	**44**	**23.91**	**269**	**12.16**	

Sample # 354J/6-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake			1	0.42			
chert chunk					3	0.04	
raw chert			2	0.47	10	0.23	
CaCO3 nodule/ limestone		8.26		28.71		15.37	
shell frag						0.06	
ceramics	3	3.62	32	5.04	251	5.4	
daub			7	1.73			
organics				0.48		0.11	
dirt						0.17	
TOTALS	**3**	**11.88**	**42**	**36.85**	**264**	**21.38**	

Sample # 354L/5-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake			1	0.11			
chert chunk			1	0.03	4	0.1	
raw chert					5	0.12	
CaCO3 nodule/ limestone		76.47		5.97		6.17	
shell frag		2.26		0.05		0.14	
ceramics	2	1.9	7	1.62	85	2.02	
organics				0.17		0.07	
dirt				0.46		0.14	
carbon						0.04	
TOTALS	**2**	**80.63**	**9**	**8.41**	**94**	**8.8**	

Sample # 354O/15-F3	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert flake					1	0.05	
chert chunk			4	1.07	12	0.27	
raw chert			1	0.12	12	0.53	
quartz massive (raw)			1	0.4			
CaCO3 nodule/ limestone		24.48		26.53		14.91	
shell frag				0.02		0.17	
ceramics	5	12	65	9.25	566	11.68	
daub	8	15.54	47	11.24	58	1.77	some burned; ceramic mix
organics		0.27		0.17		0.03	
carbon		0.95		1.27		1.15	
TOTALS	**13**	**53.24**	**118**	**50.07**	**649**	**30.56**	

Sample # 354O/16-F8	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert chunk	1	44.38	2	0.2	13	0.39	
raw chert					15	0.47	
quartz massive (raw)			2	0.76	1	0.02	
CaCO3 nodule/ limestone		180.2		33		27.7	
shell frag				0.2		0.16	
ceramics	7	37.79	27	4.13	112	2.82	one Vin. Tawny in 9.5
daub			4	0.94	11	0.47	
organics		0.17		0.01		0.04	
carbon				0.05			
TOTALS	**8**	**262.54**	**35**	**39.29**	**152**	**32.07**	

Sample # 354X/5-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake	1	1.2	3	0.79			
chert chunk			12	2.88	62	1.39	
raw chert			10	2.44	39	1.18	
slate raw frag			1	0.15			
quartz massive (raw)			1	0.11			
CaCO3 nodule/ limestone		112.38		139.83		80.24	
shell frag		0.6		0.95		0.64	
ceramics	15	33.11	104	16.14	497	11.12	some may be daub
daub	2	2.27	17	5.08			
organics		0.04		< 0.01		< 0.01	
grano-diorite (worked)	3	5.52			1	< 0.01	
carbon						0.11	
TOTALS	**21**	**155.12**	**148**	**168.37**	**599**	**94.68**	

Sample # 354Z/20-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	
chert flake			9	3.18			
chert chunk	1	1.02	18	2.57	60	1.28	
raw chert			6	0.81	18	0.48	
CaCO3 nodule/ limestone		128.75		136.93		84.11	
shell frag		0.2		0.08		0.32	
ceramics	20	37.03	105	16.05	422	9.31	
daub	3	4.87	23	3.64	10	0.37	
organics		0.1		0.1		0.18	
bone					27	0.59	1st phalanges (juvenile): 10 complete, 5 partial, 12 unknown
dirt				0.28			
NATD					11	0.21	burned; may be resin
grano-diorite (raw)			2	0.36	3	0.1	
carbon						0.03	
resin					20	0.2	burned to test = copal
quartz crystal			4	0.46	9	0.18	
TOTALS	**24**	**171.97**	**167**	**164.46**	**580**	**97.36**	

Sample # 354Z/22-F1	Size Categories						comment
	> 9.5mm		> 4mm		> 2mm		
Artifact Type	**Count**	**Weight (g)**	**Count**	**Weight (g)**	**Count**	**Weight (g)**	
chert chunk			3	1.18	8	0.28	
raw chert	1	32.84			1	0.03	
CaCO3 nodule/ limestone		317.16		491.54		311.27	
shell frag						0.04	
ceramics	7	20.88	6	1.83	63	1.87	
daub	2	4.23	8	1.65			
organics				0.06		0.06	
resin					9	0.13	copal
TOTALS	**10**	**375.11**	**17**	**496.26**	**81**	**313.68**	

APPENDIX IX: HISTORIC AND MODERN ARTIFACTS

We found relatively few artifacts that were clearly post-Conquest in date. Buenavista del Cayo has been a ranch and pasture land for decades, and there are several standing and occupied buildings and associated infrastructural features on and around the BVS Survey Zone. Given this modern occupation, I was not surprised to find the occasional piece of 20th century material culture (Table IX.1). I did not analyse these items beyond preliminary identification.

Op.	Subop.	Lot	Count	Weight (g)	Description
350	A	2	1	1.3	colourless glass
350	C	2	1	66.2	wood handle (trowel?)
350	G	1	6	8.1	green glass
350	G	2	2	8.7	green glass
350	H	2	1	4.8	U-shape metal fencing nail
350	Q	1	1	4.8	U-shape metal fencing nail
350	AD	1	1	13.6	ammunition casing
350	AD	2	4	68.6	olive green glass
354	AF	2	2	9.7	U-shape metal fencing nail
354	AF	3	1	5.2	U-shape metal fencing nail
354	AI	1	1	5.2	U-shape metal fencing nail
354	F	4	5	3.4	clear, patinated glass
354	G	1	9	9.5	clear glass - mason jar?
354	K	1	9	50.7	clear glass - mason jar?
354	W	5	1	0.9	green glass
354	Y	1	10	12.7	clear, patinated glass
358	H	2	2	6.6	barbed wire
358	I	12	2	73.9	clear patinated bottle; square base with basal ridging and M 170 mark on base
358	K	1	2	7.6	barbed wire
358	O	1	1	1.4	brown, patinated glass
358	X	1	7	50.8	olive green glass
			69	**413.7**	

Table AIX. 1: List of modern artifacts recovered from Phase 2 testing and Phase 3 excavations.