2014

Production, Discard, and Urban Life at the Early Horizon Center of Caylán, Coastal Peru

Jacob Pate Warner
Louisiana State University and Agricultural and Mechanical College, j.warn.121@gmail.com

PRODUCTION, DISCARD, AND URBAN LIFE AT THE EARLY HORIZON CENTER OF CAYLÁN, COASTAL PERU

A Thesis

Submitted to the Graduate Faculty of
The Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Geography and Anthropology

by
Jacob Pate Warner
B.A., Louisiana State University, 2010
August 2015

ACKNOWLEDGEMENTS

There are a large number of people without whom I would never have been able to complete this thesis. My friends, family, and colleagues have provided much support and for this help, I am eternally grateful. I would like to thank my advisor, Dr. David Chicoine, whose support, guidance, and knowledge helped shape this work, and whose enthusiasm for the field has inspired me down this path. I would also like to thank Lic. Hugo Ikehara, whose tutelage in the field and overall professionalism and enthusiasm are unmatched. I would like to thank both of these men, as well as all of the members of PIAC, and the participants of the 2009 and 2010 field seasons, for the opportunity to participate in fieldwork and access data and knowledge. I extend thanks to my committee members, Drs. Kristine DeLong and Heather McKillop, for their invaluable insights and writing tips.

The Solari family in Peru will forever have my gratitude for their gracious hospitality. I would also like to thank our Peruvian co-workers, especially German Llupton and Abraham Huaman, who helped educate me and whose friendship I greatly appreciate. Warm thanks are extended to Matthew Helmer and Lic. Camila Capriata, who taught me in the field. Their work has inspired me to do my best. I thank the members of the PAST lab, Robin Cobb, Gilman Ouellette, and Rebecca Hood, for their friendship and support. I would also like to thank Jenna Hurtubise, whose moral support has been invaluable, and without whom this task would have been even more difficult.

I would like to thank my family, especially my parents, Bob and Marce Warner, without whom I would not be the person I am today. Their encouragements to follow my dreams have driven me on in times when I greatly needed. Their self-sacrifice in raising three sons has not gone unnoticed. I also thank my brothers, Lawton and Hamilton, for their support and encouragement.

Finally, I would like to thank my parents, the Louisiana TOPS program, the LSU Board of Supervisors, William Everhardt, Jr., Samantha Peltier, and Great Lakes Borrower Service for their financial support in pursuing my Master's degree. I would also like to thank the LSU Board of Regents and the Office of Research Development in the Department of Geography and Anthropology for their financial support of Dr. Chicoine's work, and the Ministerio de Cultura del Perú for their permission to excavate at Caylán.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

In this thesis I examine material production, discard, and trash flow at the Early Horizon urban center of Caylán (800 – 1 cal. BC) on the Peruvian North-Central coast. Trash (or garbage, refuse, litter, or waste) is a central source of information for archaeologists examining prehistoric lifeways in Peru. Despite frequent use of trash as a source for radiocarbon samples, cultural material, and dietary evidence, few studies utilize the transportation and concentration of trash to examine human behavioral patterns. The Early Horizon, as a transitional period in Peruvian prehistory, presents an opportunity to test the utility of trash deposits in analyzing early urban lifeways.

Research was conducted at Caylán in the lower Nepeña Valley, in the coastal area of the Department of Ancash, Peru. Caylán is interpreted as a large urban center and the focus of an emerging polity during the Early Horizon (900 – 200 BC). Caylán's architectural core is comprised of a series of walled house compounds built from mortar and stone. Each architectural complex appears centered around a monumental communal plaza, as well as adjacent patios preliminarily interpreted as areas of production and residence. Excavations during the 2009 and 2010 field seasons included 6 excavation areas, 16 test pits, and the clearing of one looter's pit, which were placed to sample the diversity of architectural structures and associated material remains. Mapping operations provided spatial information to examine the layout of the urban core.

I examine the contents of the test units to explore the distribution of trash across different functional contexts at Caylán. I compare spatial contexts, including streets, corridors, plazas, patios, and open-air areas outside the walled compounds, and refuse densities within and between contexts. Results indicate a complex series of behavioral patterns that comprise the production, use, and discard of artifacts and food remains across the city. Manufacture of finished goods occurred in the house compounds, indicating a household economy with little centralized organization. However, refuse accumulation also centers around commonly accessible areas. The utilization of large amounts of trash as infill for episodic rebuilding indicates at least some level of cooperative organization among households. I argue that the material evidence points toward the existence of a household-based economy with competitive, non-specialized production, as well as a centralized leadership complex enough to regulate discard, but not production.

CHAPTER 1 – INTRODUCTION

According to data provided by the Environmental Protection Agency (EPA), in 2012 the average American produced 4.38 pounds of municipal solid waste per day. In sum, Americans produced over 250 million tons of municipal solid waste that year (EPA 2012). Despite this heavy trash production, most of us do not know where our trash goes once it is collected. This situation was not the case in earlier urban contexts, where the absence of mechanized, city-sponsored trash collection likely rendered trash management and disposal a central concern of households and their constituents.

In this thesis, I examine the production, use, and discard of materials as proxies for behavioral patterns at the Early Horizon urban center of Caylán (800 – 1 cal. BC). The evidence used comes from the Proyecto de Investigación Arqueológica Caylán (PIAC), whose members excavated more than 500 m^2 during the 2009 and 2010 field seasons. I utilize behavioral archaeology as an overall framework to examine the assemblage recovered from Caylán. I do so in order to understand how artifacts moved across the urban space. Of special concern is where different kinds of trash were produced and how people managed and interacted with rubbish.

Although archaeology as a whole has begun to move away from the spectacular and more towards the mundane, there is still little research into how early urbanites dealt with their waste. Trash, however, is useful in understanding several aspects of human behavior. How and where trash was produced and discarded in a city can tell us which areas were preferred for different activities, including food production, ceremonies, domestic life, and craft making. Distinct patterns appear in public and domestic production. Separate workshop areas produce unique material assemblages and trash flow. Patterns of trash type also inform us about systems of management, and reflect levels and forms of social organization associated with the regulation of urban affairs. Finally, discard patterns can also tell us about living conditions. The physical realities of urban life tie into how and where trash is located, as its sight, smell, and physical presence all greatly influence daily experiences and quality of life. The study of urban forms of community organization in Early Horizon Nepeña is particularly significant.

In Nepeña, the beginning of the Early Horizon around 800 BC marked the emergence of dense human settlements on the valley margins. This generalized human nucleation likely parallels profound socioeconomic and geographic transformations. Habitation sites and dwelling forms have yet to be documented for the local Huambocayán (1500-1100 BC) and Cerro Blanco (1100-800 BC) phases. Yet, the development of long lasting stone house compounds and enclosed lifestyles during the Nepeña Phase (800-450 BC) through the Samanco Phase (450-100 BC) appears unprecedented locally.

Excavations at Huambacho (600-200 BC) indicate that Early Horizon walled-compounds consist of benched plazas attached to colonnaded patio rooms of different sizes, as well as smaller roofed areas, and storerooms (Chicoine 2006). While Huambacho is relatively limited in size – the Main Compound extends for a little more than 8 hectares – and interpreted as a small elite center for the southern margin of the lower valley, Caylán stands out by its scale and complexity. Caylán compounds appear to follow the basic spatial and architectural patterns documented at Huambacho, but settlement-wise more than 40 large compounds are concentrated in an urban sector of approximately 50 hectares (Chicoine and Ikehara 2010, 2014). Overall, settlement pattern data and the primacy of Caylán suggest the existence of a multi-tiered polity with a capital at the inland center and satellite communities at the smaller settlements of Sute

Bajo (Cotrina et al. 2003), Huambacho (Chicoine 2006) and Samanco (Helmer and Chicoine in press).

Before the Early Horizon, elaborate mound complexes with evident ceremonial functions dominated human settlements in Nepeña. Temple structures at Cerro Blanco and Huaca Partida were eventually abandoned between and 800 and 500 BC (Shibata 2011), and replaced by much larger and completely different settlement systems characterized by dense stone walled enclosures.

Many questions remain regarding the sociohistorical contexts that led to nucleation in the lower Nepeña at the beginning of the Early Horizon. Elsewhere, Chicoine (2010) has suggested significant religious upheavals associated with the rejection and/or avoidance of earlier ritual monuments and their associated material culture. Here, I am particularly interested in the impact of urban nucleation of forms of material production, discard, and flow. Where did urban residents produce what? Where were the byproducts of certain activities transformed, channeled, and ultimately discarded? How can densities of different types of refuse across the cityscape be used as proxies of the intensity and degree of specialized production? What does that tell us about the overall socioeconomic organization of emerging urban societies in Early Horizon Nepeña? What do distributions of types of trash tell about the living conditions within the urban setting?

This thesis is organized into six chapters. In the following chapter, I discuss the origins and use of behavioral archaeology, especially in terms of human prehistory and artifact deposition. I cover its origins in the processual movement, its creation by Michael Schiffer and others, and its contributions to the broader archaeological project. I then discuss the utility of behavioral archaeology in creating testable archaeological models, and how its methods can be used to create a trash flow model for an incipient urban context such as Early Horizon Caylán.

In Chapter 3, I describe the geography of the study area, especially in relation to taphonomic processes, as well as its history, focusing on the Early Horizon and previous and current understandings of this period. I also describe patterns of Andean urbanism and related trash flows throughout Peruvian prehistory. I finish the chapter with a comparative consideration of ancient Andean urban centers to develop material expectations and a hypothesized model for trash flow at Caylán.

In Chapter 4, I discuss the history of research in the Nepeña Valley, as well as Caylán's physical layout and the results of previous research by members of PIAC. I describe the methods utilized by PIAC and by me, and frame my research within the broader goals of PIAC. I then describe the general results of PIAC's mapping and excavation efforts.

Chapter 5 presents the results of the test pit excavations, as well as my calculations regarding artifact densities. I use mapping results of those data to estimate refuse densities across all 16 test pits. I also provide an analysis of each test pit's assemblage and artifact density in relation to hypothesized area functions and the behavioral processes that may have contributed to its creation, as well as how it ties into the trash flow of the site.

In Chapter 6, I provide concluding remarks, emphasizing the spatial and physical aspects of each test pit's assemblage and artifact densities in comparison to the model based on other prehispanic urban environments. I also discuss the broader ramifications of this thesis, its potential application to other regions and timeframes, and comment on directions for future research into trash flow at Caylán.

CHAPTER 2 – THEORETICAL BACKGROUND

In this chapter, I develop the theoretical approach I will use to address research questions related to urban development, production, and waste deposition at Caylán. I outline the history and methods of behavioral archaeology, and define my expectations for the material remains at Caylán. I outline my analytical methodologies, and finally tie together my goals, background, and expectations for my research.

2.1. Origins and Developments of Behavioral Archaeology

In their 1958 paper on method and theory in archaeology, Willey and Phillips claimed that "archaeology is anthropology or it is nothing," a sentiment that was quickly taken up in the wider archaeological community and influenced theory for several decades (Binford 1962; Schiffer 1975, 1976a; Trigger 1968, 1984). This "New Archaeology", also known as processual archaeology, sought to bring the field back full circle to its anthropological roots (Binford 1962, 1965; Longacre 1964), and to apply a logical positivist viewpoint (Ascher 1959; Binford 1964; Gordon and Phillips 1955; Phillips and Gordon 1953, 1957). Researchers began utilizing sociological and ethnographic theory to expand their ability to analyze the past.

Lewis Binford followed the tenets of Willey and Phillips in applying wider anthropological theory to his work (Binford 1964, 1965). Binford became recognized as a neo-evolutionary social theorist. He created a method by which archaeologists could study cultural evolution through the material record without seeing artifacts as traits of a material culture, but rather as expressions of the cultural systems (i.e., technomic, sociotechnic, ideotechnic) in which they were created (Binford 1962, 1964, 1965, 1967). His work on the discard patterns present in Inupiat Inuit hunting camps laid the foundation for later studies in trash patterning. William

Longacre II and others also focused on ethnoarchaeological research, which greatly influenced a number of studies over the next few decades (Longacre 1964, 1966, 1975, 2000; Longacre and Cowgill 1974).

In the early 1970s, Michael Schiffer espoused a new model of thought within processual archaeology, which he came to call "behavioral" archaeology (Reid, et al. 1974; Reid, et al. 1975; Schiffer 1975, 1976a). Schiffer embraced a positivist view of archaeology and believed that artifacts could be used to infer human behavior (Reid, et al. 1974; Schiffer 1975, 1976a; Schiffer and Skibo 1987). Schiffer sought to provide a representation of how human (c-transform) and non-human (n-transform) processes created the archaeological record. He showed that by understanding these processes in both systemic (dynamic living) and archaeological (static) contexts, archaeologists would be able to understand how artifacts inform on behaviors (Reid, et al. 1974; Reid, et al. 1975; Schiffer 1975, 1976a).

The redefined view of behavioral archaeology is "the study of human behavior and material culture, regardless of time or place" (Schiffer 1976a:4). By removing these constraints, Schiffer established that archaeology was a complete, scientific field. He defined three basic properties of archaeological data: they (1) consist of materials in static spatial relationships, (2) have been output in one way or another from a cultural system, and (3) subjected to the operation of non-cultural processes (Schiffer 1976a:12). All three of these properties apply to human waste, making it an ideal source of information about the past.

As a new theoretical framework for applying the scientific method to archaeology, behavioral archaeology attracted interest in the 1970s and 80s. Schiffer's early work primarily centered on the American southwest with the Joint Site in Hay Hollow Valley, Arizona as the location of his dissertation research, which focused on room use and aspects of behavior in cultural formation processes (Schiffer 1975, 1976a). He later conducted studies into reuse patterns in Tucson, Arizona in the 1970s (Wilk and Schiffer 1979) and eventually expanded his research into other aspects of human behavior (Schiffer 1999). These works show the utility of trash patterns, especially in urban environments, in determining past human behaviors.

William Rathje became a major contributor to the development of behavioral archaeology (Reid, et al. 1974; Reid, et al. 1975) and adopted its tenets into his work, founding the subfield of "garbology" and the Garbage Project (Rathje 1992; Rathje, et al. 1992). Rathje sought to analyze the behavioral patterns of the modern residents of Tucson and other cities through their landfills and household garbage. Garbology has provided a dataset of modern human discard behaviors in industrialized society. The Garbage Project resulted in a multi-decade study of American large-scale waste disposal and its relevance to multiple socio-cultural research questions and environmental issues (Rathje 1992; Rathje, et al. 1992).

Jefferson Reid also contributed to the development of behavioral archaeology (Reid, et al. 1974; Reid, et al. 1975). Like Schiffer, most of his early work centered on prehistoric cultures in Arizona, although he also conducted research at historic period sites in that state and in the Maya region (Reid and Montgomery 1998; Reid, et al. 1989). Reid's use of behavioral archaeology mostly covers the ceramic technologies of the prehistoric Mogollon culture in relation to population movements and cultural change (Reid and Montgomery 1998). These studies underscore the importance of understanding material production and discard in prehistoric, sedentary societies.

Susan Kent, whose early work centered on the prehistoric American southwest, became one of the leading researchers in applying ethnoarchaeological methods (Kent 1983, 1992b, 1999). She focused on the creation and use of domestic space. As her interest expanded, she travelled to Africa to perform ethnographic research among hunter-gatherer groups undergoing transition to a sedentary lifestyle. Kent also wrote extensively on the African Middle Stone age (Kent 1989, 1992a, 1995). Her works show how trash and other materials move through domestic space, a complex issue given the wide variety of spatial patterns present in the archaeological record.

James Skibo, a student of both Schiffer and Longacre, became a leading researcher in the experimental study of ceramic technology especially in relation to how ceramic artifacts are transformed by use (Skibo 1992; Skibo, et al. 1989). His dissertation research focused on the Kalinga of the Philippines, and he incorporated ethnoarchaeology as well as experimental techniques into his work, creating a set of analogies for the material aspects of daily life (Schiffer and Skibo 1987, 1989; 1997; Skibo 1992; Skibo, et al. 1989).

2.2. Building Models

To comprehend the use-life and movement of artifacts through space and into the archaeological record requires a model of production, use, and discard. These models build on material evidence and not just conjecture. Michael Schiffer (1972:158-159) laid out a general model for artifact use-life that involves all steps from production to discard, and includes lateral movement into other contexts as well (modified into Figures 1 and 2). What these models show is that artifact deposition is a complex process that includes a large number of possible causes to produce the final location of discovery. In order to organize these possible causes, Schiffer laid out *site formation processes*. These processes are defined by the active context that produces them, either the systemic (ongoing behavioral system) or archaeological ("deposited" or not in the behavioral system) (Schiffer 1976b).

Considering that various taphonomic processes influence the archaeological record, and that the past is a dynamic landscape as much as the present, it is important to understand and model how objects transfer between systemic and archaeological contexts, and vice-versa. Schiffer divides formation processes into four main types: (1) systemic – archaeological (discard, loss, abandonment), (2) archaeological – archaeological (human land modification, natural earth processes, animal and plant action), (3) archaeological – systemic (looting, archaeological excavation, accidental discovery) and finally, (4) systemic – systemic (production, trade, curation, gifting, and maintenance). Schiffer sees the first as the dominant factor in shaping the archaeological record, the second as anything that disturbs an archaeological record *in situ*, the third as anything that involves removing archaeological materials, and the final as the area that is the goal of understanding for most archaeologists (Schiffer 1976b).

The final systemic-systemic transference is one of the most complex and difficult to reconstruct due to the highly diverse nature of human behavior (Binford 1965; Kent 1983; Schiffer 1976). In this regard, ethnoarchaeology becomes a useful tool for inferring past behaviors and provides a comparative foundation for understanding the processes involved in the creation and use of objects within cultural systems (Binford 1978; Kent 1992; Schiffer 1983).

Priscilla Murray (1980) compiled a comprehensive dataset of discard locations from various ethnic groups worldwide, creating a useful tool for comparing discard location with level of mobility and social structures. Murray gathered her information from records of the discard behaviors and patterns of 79 societies worldwide (Murray 1980:491-492). She suggests that sedentary, highly populous groups discard most of their trash in secondary contexts, usually outside of family living space. A few groups exhibited behavior that did not directly fit this model, but still disposed of their trash in ways that kept most living areas clean. She notes that Turkestani families allowed trash to accumulate in courtyards, and that Chippewa families either burned their trash or gave it to their dogs (i.e., food remains). Murray's conclusions help to create a model of residential trash disposal wherein "use location will not equal discard location…within family living spaces that are enclosed and permanent or occupied for at least one season…" (Murray 1980:497). Here, one would expect trash to be channeled towards either open, peripheral areas (e.g., middens, open-air trash dumps) or areas that are only temporarily used (e.g. abandoned buildings, empty lots).

More recently, Susan Kent (1999) combined an ethnographic study of the discard patterns of newly sedentary Kutse groups in the Kalahari Desert with excavations of various structures at a Pueblo II Anasazi group in the American southwest. Kent was able to delineate between discard and storage areas among various Anasazi structures. She notes that trash pits have a more homogeneous assemblage, while storage pits contain a more heterogeneous mix of items. Kent's conclusions are useful for identifying areas of formal or informal storage used for non-food items.

2.3. Production, Trash, and Discard in Complex Urban Societies

In ancient urban societies, such as those that developed in prehispanic coastal Peru, there are varieties of different activities that produce distinct markers in the archaeological record. From daily life, including cooking, eating, and other household activities, to special events, including large-scale feasts, game events, and religious ceremonies, the possibility of studying them all in one setting is beyond the scope or purpose of this thesis. Instead, I choose to focus on two broad activity sets: (1) the production and (2) discard of artifacts belonging to several categories.

2.3.1. Craft Production

2.3.1.1. Ceramic Production

Ceramic production has a long history in the Central Andes, the earliest examples coming from the Valdivia culture in Ecuador. Although not urbanized, Valdivia people were sedentary and likely undergoing a transition to more intensive agrarian and maritime economies. Ceramic production among the Valdivia would have been a part-time task, accomplished by skilled, yet part-time craftspeople. Facilities were simple, consisting of a simple firing area (pit or hearth, as no kiln has yet been found), and a drying shed, possibly a simple cane-and-mud structure (White 2004).

Large-scale ceramic production has been identified in the region in later periods, due to the use of molds to standardize vessel forms. Ceramic workshops leave behind sizable numbers of wasters, molds, and/or durable kilns, and were often placed in their own separate buildings (Shimada 1994:195-200). In that sense, these elements are useful for identifying large-scale specialized workshops, but such techniques did not come into use until at least the first millennium A.D., making them less useful for identifying earlier ceramic production areas.

Other artifacts are useful for identifying Early Horizon ceramic workshops. Paddles and anvils, usually made of wood, were used to mold wet clay. Stone polishers, used to burnish the outside of certain vessel types, appear in larger numbers in such spaces. Textiles would also have been used to create certain exterior patterns, as would incising tools made of bone, plant, shell, or stone. Misfired clay and broken pots would also be present as cast-offs. Fill derived from pottery production would also include stockpiles of larger pieces of broken ceramics (used as lids or in the firing process), ash, and charcoal. Kilns or ovens may have been temporary in nature, and may not have been placed in the area where prior or posterior steps of the operational sequence took place. Such workshops were usually placed close to residential buildings, often under roofs to keep wet clay from drying prematurely.

2.3.1.2. Lithic Production

Specialized lithic production is possible to identify in the archaeological record. Workshops dedicated to the production of body adornments, including earrings, nose plugs, and various other forms of jewelry out of stone, existed in the Andes (Shimada 1994:211). Lithic tool production is harder to identify than specialized ornament production in the archaeological record of complex urban societies. Due to their ubiquitous nature in pre-metal societies, as well as the overall portability of the tools used to produce them, lithic tools did not necessarily need a specialized workshop for their production. As long as a person had enough space to lay out their tools and raw materials, they could produce lithics (Shimada 1994:210-212).

If an area were frequently used for lithic production, there would still be traces of certain behavioral patterns that would enter the archaeological record. One of the most useful pieces of evidence is debitage, small flakes and other pieces of lithic material worn off a core during production. Debitage, smaller flakes, occur in areas where retouching or other modification of lithic items occurred. Other possible items would include unfinished or broken items, bone tools (used for pressure flaking), grinding platforms (for making points), and animal skins or large textiles (for workspace). Geographically, such work areas could occur anywhere, but most likely would have taken place in or near residential structures, where domestic activities typically occur.

2.3.1.3. Textile Production

Along the Peruvian coast, where arid conditions help preserve wood and fibers, textile production can be visible archaeologically, but depends on the type of weaving technology utilized. Looms, raw fibers, spindles, and spindle whorls would have all been necessary for yarning fibers, twine, and weave textiles. Looms, not being portable, would be primary indicators of such areas. Raw fibers are one of the best indicators of textile production areas, as they would not have been particularly useful for other activities, and could have been stored nearby for areas for spinning. Spindle whorls, while portable, are expected to cluster in areas where they were heavily used, and only discarded if too broken to be useful. Yet, it is significant to note that spindle-whorls were often re-used as body adornments and are commonly found in grave contexts.

Izumi Shimada (1994:206-210) found evidence of specialized weaving and cotton-processing workshops at the Late Moche site of Pampa Grande (AD 600-800). The weaving workshops are characterized by the presence of specialized ceramic artifacts (i.e., “drums” or large spools, storage vessels, spindle-whorls). A hardwood implement resembling the traditional batten used in all non-mechanized weaving, and postholes that may have been used as an anchor for backstrap looms, were also present. This workshop area was located in a small, adobe-enclosed room within a larger room-block that includes food and *chichi de maiz* (i.e., maize beer) production areas, and included a raised platform similar to those seen in Moche depictions of the weaving process.

The evidence for cotton processing at Pampa Grande is more conclusive, especially around what is known as the “Deer House”. One of the rooms in this multi-functional compound contained a layer of burnt, seedless cotton, as well as ceramic artifacts associated with the textile production process. The lack of weaving tools, as well as the presence of so much processed cotton, provides solid evidence for spinning activities (Shimada 1994:208).

2.3.2. Food Production

2.3.2.1. Daily Subsistence

As there are a wide variety of possible expressions of human food consumption at the daily level, useful study areas contain frequent consumption patterning (i.e., communal eating or preparation areas). To that end, kitchens and communal dining areas are the easiest to identify and most valid in relation to daily subsistence (Klarich 2010).

Kitchens are usually small areas within a house compound or other residential structure. Evidence of cooking, in the form of hearth remains, is the primary method for identifying such areas (Stahl and Zeidler 1990). Frequently kitchens also contain some form of storage, usually on a small scale and often consisting of no more than simple depressions in the floor (Topic 1982:152-153). Food remains, tend to be limited to the hearth, as it was the primary locus of discard for biological waste in the kitchen (Goldstein and Shimada 2010:170).

Communal dining areas were usually located in large, easier to access rooms within residential structures or near workshops (Goldstein and Shimada 2010). Their function is usually typified by the presence of serving and consumption vessels, food remains, and the presence of sitting spaces, often benches set into walls (Nash 2010:91-94). Communal dining is further separated from feasting in the archaeological record by frequent reuse, as the ritualized nature of feasting events makes them less occur less frequently, while exotic foods, special serving vessels, and special spaces also demark feasting from everyday food consumption (Dietler 2010:89; Nash 2010:94-100).

2.3.2.2. Feasting or Special Events

Feasting and other specialized, episodic events can be difficult to identify in the archaeological record. Nevertheless, feasting can provide evidence towards social organization as well as ritual life. Feasting events generally leave behind temporally homogenous deposits of food and consumption materials (i.e., serving vessels) (Klarich 2010:4).

Feasting can primarily be divided into two types: (1) inclusive events and (2) exclusive events. Inclusive events are used to recruit labor, support wider group bonds, or sometimes as ostentatious, competitive displays (Dietler 2010:76-85). Exclusive events are used primarily to promote status differences, impress other groups, or as part of religious ceremony (Dietler 2010:85-90; Potter 2000).

Spatially, feasting events can occur in open areas where higher numbers of attendees can participate, although this situation is not always the case (Joyce 2010:227). Some feasts take place in small, exclusionary settings where participation is limited to individuals of status (Nash 2010:98-100). The wide variety of feast types often leads to disagreement over interpretations of midden deposits and related assemblages of food related waste (see Table 1).

Table 1 - Area Functions and Their Material Expectations

Area Function:	Material Expectations:
Cooking/food preparation	Utilitarian pottery and gourd, temporary storage containers, plant remains, hearth, processing tools (lithic, portable/non), animal bones (cuy, etc.)
Food consumption (daily)	Pottery (utilitarian/plain wares), some animal and plant remains, gourd
Food consumption (episodic)	Fineware pottery (serving), midden (prestige foods), drinking vessels
Ceramic production	Broken pottery (especially large sherds), evidence of fire (kiln, ash), shaping and decorating tools (lithic, wood, bone), unfired vessels, animal skin
Lithic production	Debitage/flakes, lithic tools (grinding platforms), possible bone tools (antler), animal skin, unfinished items
Textile production	Spindle whorls, unused fibers, unprocessed cotton, loom weights, loom pieces (wood)
Storage	Large containers (ceramic or other), depressions in floor, food (if food storage)
Secondary (trash)	Mixed organic and inorganic, fairly homogenous assemblage, little to no differentiation between layers, scavenger remains
Butchering	Some animal bones/other remains (skin, hair), lost/temporarily discarded cutting tools (lithic)
Chicha production	Large utilitarian ceramic vessels, some plant remains (corn, some burnt), drinking vessels, stirring implements, lithic processing tools
Ceremonial	Burned elements, special/elite durable items (including shell, bone, lithic, ceramic), less durable elite items (textile, plant)
Animal pen	hair, skin, feces, some organic discard (plant), rope

2.3.3. Planning and Space

2.3.3.1. <u>Generalized Versus Specialized Production</u>

The degree to which material production and related discard are specialized is useful in determining political and social organizations. This comparison is especially true in urban contexts, where trash flow and content show how different areas were utilized and managed (Costin 1991; Costin and Hagstrum 1995). In the case of non-specialized production, the transformation of various raw materials into crafted goods would occur at the household level, usually rooms within or attached to residential structures (Hagstrum 2001). Household economies typically show evidence of autonomous decision-making and simple organization in relation to production goals. Material remains would indicate a mix of production activities occurring within the same space. Finished products reflect more individualistic patterns of creation and less standardization.

Specialized production is typified by segregation of workshop space into its own separate or unique context (Sinopoli 1988). Specialized workshops are often located nearer to elite structures or in their own separate sectors. Corporate groups, usually supported by elite patronage, rather than family groups, are the source of labor in such systems. Different crafts are separated into distinct workshops. As noted earlier, lithics, ceramics, textiles, and other materials would all be produced in their own separate workshops in a specialist economy (Haviland 1974; Hayashida 1999). Artifact types would also be more standardized, as finished products would need to meet the specifications imposed by patronage groups (Hagstrum 1985; Hayashida 1999; Murra 1956).

2.3.3.2. Axes of Transportation

In order to understand trash flow in systemic contexts it is important to understand how people and artifacts move through space. By studying axes of transportation, especially roads, avenues, streets, or similar pathways, we can develop an idea of what areas had priority for trash deposition. The termini of roads, especially on the outskirts of urban areas, are typically the preferred dumping places for varying types of garbage. Paths of least resistance, especially through abandoned or unused/empty urban lots, accumulate refuse as passers-by discard portable items (Wilk and Schiffer 1979). Streets themselves can also become dumping points, both for biological waste and inorganic material, as well as de facto refuse (Hugill 1931). Patterns of wind blow can also account for the accumulation of lightweight trash, as well as the preferential discard of smelly by-products away from living areas.

2.3.3.3. Plazas

Plazas are defined by Moore (1996:789) as "…unroofed, nondomestic areas that are recognizable elements in the built environment." However, this definition is somewhat simplistic, especially given the complex nature of urbanism in the Andes.

Plazas were the center of daily life and social interaction at Caylán. Architecturally, they were the center of residential compounds, and abutted by smaller colonnaded patios and side rooms used for storage and as living spaces. These large, open spaces were walled off from the outside and contained benches and cane roofs along the inner walls. Evidence from Plaza A, one of the most monumental benched plazas at Caylán, suggests that some plazas were decorated with clay geometric friezes. The murals were painted white – and perhaps yellow, red, and black – to produce a vibrant, bright atmosphere. Entrance and exit of these spaces was controlled by a series of baffled corridors, as well as simple locking mechanisms made of cane set into the doorways (Chicoine and Ikehara 2014; Helmer 2011; Helmer and Chicoine 2013; Helmer, et al. 2012).

As ritual spaces, Helmer (2011; Helmer and Chicoine 2013; Helmer, et al. 2012) interprets these plazas as the loci of competitive feasting events. During such times, the residents of each plaza's compounds would display their material wealth for members of other compounds. During daily life, they were more likely the location used for various production activities and communal meals, as evidenced by their material assemblages and related features (Helmer 2011).

2.3.4. A Trash Flow Model for Caylán

When all of these production and discard elements are combined, we create a complex model of trash production and management that we should expect at a sedentary, agricultural, urbanized settlement. By comparing the evidence recovered from Caylán with the model outlined in Table 1, I aim to infer different production activities carried out at Caylán, their associated organizations, locations, and degrees, if any, of specialization.

The first step is identifying the types of production present at Caylán. In order to do so, I utilize the material expectations established earlier in this chapter. Based on the Early Horizon occupation and the location on the coast, I expect the economy of Caylán to include lithic production, ceramic production, animal husbandry, farming, textile production, and maritime exploitation. After identifying the types of production that occurred in Caylán, I then aim to infer the modes of specialization and associated organizations that were in operation. I examine whether or not Caylán contained specialized, corporate workshops or a generalized, household-based economy. In order to identify these patterns of trash creation, movement, and accumulation, I turn to identification methods utilizing the type and density of trash in various areas.

2.4. Identification Methods

2.4.1. Artifacts and Activity Areas

I utilize the artifact assemblages of each test unit as a gauge for comparing the material expectations stated earlier in this thesis. As location of specific artifact types correlates to some degree with how a space was used (Flannery 1976:34; Schiffer 1996:280), I examine the assemblages of each test pit for differences. This method is most useful in identifying specialized manufacturing areas, as their assemblages contain specific sets of tools and related artifacts (Schiffer 1972, 1976b).

2.4.2. Refuse Densities and Trash Flow

This thesis focuses on the densities of various artifact types as proxies for human interaction with trash resulting from different behaviors, including cooking, feasting, and craft production. Refuse densities shed light on areas of trash creation, accumulation, and management as well as differential contents (Schiffer 1995:183). Archaeological materials from Caylán are broken down into the categories of lithics, ceramic vessels, other ceramics, textiles, plant remains, animal remains, and shells.

This research does not directly compare the artifact densities calculated for the block excavations against those from test pits. The block excavations contain more architectural features, skewing the resulting densities to make the test pits appear more heavily utilized. That would not be the case if the methodology were centered on bulk samples of floor contexts (i.e., in cubic meters). This method is particularly helpful for the recovery of seeds and other paleoethnobotanical remains. Bulk samples of soil were collected at Caylán and are currently under analysis. Yet, a different method was favored to explore the discard, presence, and density of artifact remains. For material culture, archaeologists typically consider the entirety of excavation contexts (instead of a sample). At Caylán, the test pits were put in place to examine the material content and function of several areas without examining the larger architectural structures. I focus on the test pits as they represent a wider range of sampled areas, were placed to avoid large architectural elements (i.e., walls), and are roughly similar in size (most are 2 by 1 m).

Total volume (V) of each excavation unit is calculated by finding the average final depth (D_{avg}) and multiplying it by the surface area (A) ($V = D_{avg} \times A$). I deem more complex volumetric calculations unnecessary because of the simple geometric shape of most of the excavations. Most of the test units at Caylán measure 2 m by 1 m, although some units included extensions, causing a variation between 2 m^2 and 9 m^2 for surface area. Volume varied from 1.03 m^3 to 16.7 m^3. After calculating total volume, artifact number and/or weight of each category (C) is divided by the volume of the unit (V) in which they were excavated ($\rho = C/V$). I then compare these final category densities across test units.

2.4.3. Descriptive Mapping

I also utilize a Geographic Information Systems (GIS) analysis of artifact distributions based on Inverse Distance Weighting (IDW) mapping of the different artifact types using ArcMap©. IDW is a form of spatial interpolation in which points in a raster data set have a calculated value based on their distance from the original point. As these calculated points get farther from the original point, the value of the weight variable is reduced (Bennett, et al. 1984:142-143; Shepard 1968). Intersecting point values create an image where color-coding allows the viewer to see which points are more heavily weighted by proximity to the original data points, inferring either similar conditions at that point or direct influence from the original point in a "smooth" visualization. I placed points in the center of each test pit in ArcMap© with values correlating to each artifact category's density, creating references for the program to run its IDW algorithm.

In archaeology, such models can be used to predict possible artifact-dense areas, locate artifact sources, or infer areas of similar artifact distribution (Barcelo and Pallares 1998:15-19). There are caveats to using such maps: although they present the data as a smooth, continuous surface, test units are performed in three dimensions, meaning that the maps neglect depth below surface. Inverse Distance Weighting also is most useful with regularly spaced data points (e.g., surface survey collections), an impossibility in this setting due to the goals enacted in the placement of each test pit. For the purposes of this study, and to avoid making any undue statistical errors, I use these maps for their descriptive rather than predictive value.

CHAPTER 3 – ANDEAN URBANISM, GEOGRAPHY, AND CULTURAL SETTING

In order to understand and frame the results of my research methods, it is important to locate Caylán geographically, theoretically, and temporally on the Peruvian coast. In this chapter, I discuss the environmental setting of the site, its location on the coast, and its place in the wider context of prehistoric urbanism in the Andes. I discuss previous and subsequent urban traditions in the region, in preparation for later comparison with the results from Caylán.

3.1. Environmental Setting: The Pacific Coast of the Central Andes

The environment of coastal Peru is created by the Andes to the east and the Pacific Ocean to the west. These two geographical features produce major climatological effects that combine to create some of the most arid coastal deserts in the world. Here I describe these features and effects, and how they combine to shape the physical setting of the north-central coast of Peru, as well as the taphonomic processes that influence the archaeological record.

The slopes of the Andes can be divided into a series of ecological zones by altitude. These zones were the foci of varying subsistence strategies and cultural trajectories in prehistory based on differential climates and growing seasons. These varying subsistence strategies produced a number of cultigens, including multiple types of maize and tubers (Parsons 1970; Pozorski 1979). Due to the limited number of large gregarious mammals, animal domestication was somewhat less prominent than in other regions of the world where pristine civilizations developed. Yet, ancient Andeans domesticated ducks, dogs, camelids, and guinea pigs (Gade 1967; Shimada and Shimada 1985). Trade between, or control over, various altitudinal zones provided a diversity of plant and animal life (Miller and Burger 1995).

The lowest zone is the *chala* or coastal zone, where Caylán is located. Comprised of the coastal deserts from approximately sea level to 500 m, the *chala* is one of the most important zones in the Andes. Rivers flow from the higher zones into coastal valleys, creating fertile floodplains that are used to cultivate a wide number of crops. Notable cultigens can be grown on the north-central coast of Peru include avocado, fruits, squash, beans, maize, cotton, tomatoes, and peanuts, though not all of these are native to the area. Close access to the Pacific Ocean makes the *chala* a useful region for acquiring marine resources. This combination of marine resources, arable land, and both industrial and food related cultigens made the *chala* an ideal zone for the development of complex societies and associated urban settlements (Haas and Creamer 2006; Pozorski 1979; Shady and Leyva 2003).

In the Pacific Ocean, the cold Peru Current, driven northward by prevailing wind patterns, carries upwelled nutrient-rich water from the deeper ocean along the coastline, supporting one of the richest marine biomasses in the world. Zooplankton and phytoplankton feed on these nutrients, providing a food base that supports fish, molluscs, crustaceans, sea mammals, and birds. However, this rich source of marine life is periodically disrupted (every 2 to 7 years) by El Niño-La Niña events (Graham and White 1988; Sandweiss, et al. 1996; Wang, et al. 1999).

During El Niño events the trade winds slacken as pressure gradients weaken, while the thermocline of the Peru Current depresses, bringing warmer tropical water up along the coast and cutting off upwelling. These two factors combined cause a decline in marine life and a period of heavy rainfall, usually followed by a prolonged drought. El Niño conditions last from a few months to over a year, and the droughts that follow can last for years themselves, heavily disrupting animal and plant life (Graham and White 1988; Shimada, et al. 1991; Wang, et al.

1999). Archaeological sites are often affected by ENSO events, as heavy rainfall can create flooding or mudslide events, which destroy both surface and subsurface evidence.

3.2. The North-Central Coast of Peru

The north central coast of Peru is a typical section of the Pacific coastal desert. The region comprises, from north to south, the Santa, Lacramarca, Nepeña, Casma, Culebras, and Huarmey valleys. The Santa River bisects the Andean mountains creating the Callejón de Huaylas, an intermontane valley that drains towards the coast. Smaller rivers, the Nepeña and Casma, spawn in nearby lagoons, and all continue toward the ocean. The Nepeña Valley is smaller than both the Santa and Casma, but has a shallower river channel than the two larger valleys, facilitating irrigation and access into the highlands (Figure 3). The Rio Nepeña is a class two river, with an annual discharge of 74.7 million m^3 of water, most of which occurs in the months of February and March. While this discharge volume is low compared to nearby river systems, the Nepeña Valley is still an efficient retainer of water, creating a large amount of arable land (ONERN 1972). These factors combine to make the Nepeña Valley an ideal location for agriculture and trade.

3.3. Andean Urban Developments

The development of urbanism in the Andean region is a complex and highly debated topic (Cowgill 2004; Engel 1978; Makowski 2008; S. Pozorski and T. Pozorski 1990; Rowe 1963; Shady 2003). Scholars mostly agree that the Inka achieved both state level society and urban form during the Late Horizon (see Canziani 2012:chapter 8; for counter arguments:Makowski 2008). However, examples of urban environments come from a number of earlier Peruvian prehistoric periods, leading scholars to recognize a multivariate and nonlinear nature to urban traditions. Most researchers tie the development of the city into the development of state-level society, complicating the study of early urbanism and political organizations (Bawden 1989; Cowgill 2004; Haas and Creamer 2006; Millaire 2010). Recent discoveries at a number of sites have shed light on the diversity and complexity of urban phenomenon in the Andes (Chicoine and Ikehara 2014; Millaire and Eastaugh 2011; Warner 2010).

Research into city type has differentiated a number of urban forms present in the Andes. These forms include pilgrimage centers, sacred cities, trade centers, and walled capitals (Isbell and Vranich 2004; Makowski 2008; Shady and Leyva 2003; Silverman 1994; Swenson 2003, 2011). These designations of city type are based on architectural patterning and material content, and usually reflect elite practices and lifeways over other modes of existence (i.e., commoner, lower-status). This diversity of urban function further obscures the origins of city development as most authors have trouble agreeing on what constitutes an actual “city”.

3.3.1. The Late Preceramic and the Initial Period

Some of the earliest known evidence of urban environments comes from the Norte Chico region (Haas and Creamer 2006; Haas et al. 2013; Shady 2003). During the Late (or Cotton) Preceramic (3500-1800 BC), a number of sites developed in the littoral and inland valleys directly of modern-day Lima on the central coast of Peru. These sites are characterized by large mounds with sunken plazas that evidence multiple building periods. Early research by Michael Moseley (1975b) posited that the site of Aspero [~3500 – 2500 BC, (Feldman 1980, 1985)] on the coast of the Supe Valley was the urban center of a chiefdom that relied primarily on marine resources for its subsistence economy. Evidence from Aspero and neighboring late Preceramic sites became the basis for Moseley’s Maritime Foundations of Andean Civilization theory, which has since been updated to include the role of agriculture in early Peruvian settlements (Moseley 1975b; Raymond 1981; Wilson 1981).

Research by Haas and Creamer (2006) as well as Ruth Shady (Shady and Leyva 2003; Shady, et al. 2001) points to the importance of several inland sites in the region during the Late Preceramic. Especially prominent is the site of Caral, located in the Supe Valley. This site covers 60ha, and consists of a number of mounds with sunken circular plazas. Radiocarbon dating places primary occupation between 2700 and 2000 BC (Shady, et al. 2001). Shady (2003; Shady and Leyva 2003) sees Caral as the central city in a large, multi-valley polity, though Haas and Creamer (2006) disagree with Shady on its level of importance. Shady and Haas and Creamer do however agree that the size and complexity of mound groups align well with a network of cities along both the coast and further inland that had some form of centralized leadership and communal labor, administrative or religious structures, and stratified social groups. Trash in these environments accumulated around residential structures associated with the larger mounds (Shady, et al. 2001:723), though Vega-Centeno (2005, 2010) points to the remains of episodic feasting events as central to the creation of monumental structures at Cerro Lampay.

In the Casma Valley, north of the Norte Chico region, Shelia and Thomas Pozorski (1986, 1987b; 1990; T. Pozorski and S. Pozorski 1990; Pozorski and Pozorski 2005) identify a possible trend towards urbanism beginning in the Late Preceramic Period that later coalesces into a theocratic state and defined urban centers in the Initial Period (1800-900 BC). They point to the Preceramic sites of Huaynuná (2200-1800 BC) and Las Haldas (3000-2150 BC) as examples of centralized leadership due to the presence of monumental platform mounds, non-residential structures that would have required large amounts of organized labor to construct (S. Pozorski and T. Pozorski 1990; T. Pozorski and S. Pozorski 1990). They see these factors as leading to the creation of urban settlements during the Initial Period which coalesced into polities centered around Pampa de las Llamas Moxeke (1850-1250 BC) and Sechín Alto (2150-1000 BC), respectively (Pozorski and Pozorski 2005). Much like in the Norte Chico, trash accumulated around residential areas and was sometimes used to construct larger monumental mounds (S. Pozorski and T. Pozorski 1990:481-486; T. Pozorski and S. Pozorski 1990:18-20).

3.3.2. The Early Horizon

Traditionally, the Early Horizon (900-200 BC) has been associated with the rise and influence of the Chavín cult across the Andes (Tello 1939, 1943). This religious movement, centered on the ceremonial center of Chavín de Huantar in the north-central highlands of Peru, was the focus of a complex sphere of interaction that influenced elites and thus the iconography and architecture of a large area (Burger 1981, 1984, 1992; Lumbreras 1974; Rick 2005). However, research into a number of Early Horizon sites on the north-central coastal has brought to light evidence that suggests the importance of regional traditions over Chavín influence (Chicoine 2006, 2011; Helmer and Chicoine 2013; Helmer, et al. 2012; Ikehara 2010; Pozorski and Pozorski 1987a; Shibata 2010). Recent research by Rick et al. (2011) provides evidence for a Late Initial Period peak in the importance of Chavín de Huantar, separating the Early Horizon from this religious phenomenon. According to the revised dating, most monumental constructions at Chavín appear abandoned by 500 BC (but see Burger and Salazar 2008 for a critique).

Sites in the Moche, Casma, and Jequetepeque valleys all follow distinct local traditions with related artistic and architectural patterns. Caylán, Huambacho, and Kushipampa in the Nepeña (Chicoine 2006, 2011; Helmer, et al. 2012; Ikehara 2010; Shibata 2010), Sechín Alto, San Diego, and Pampa Rosario in the Casma (Pozorski and Pozorski 1987b), and Jatanca in the Jequetepeque (Warner 2010) all follow patterns that utilize rectangular stone walls, orthogonal construction techniques, and compound-based layouts. New evidence links some of these sites together into what were originally known as the Salinar culture (Brennan 1980; Larco 1944; Mujica 1984) (Ikehara and Chicoine 2011).

The Salinar phenomenon began around 500 BC with the abandonment of Initial Period religious centers and continued through the Early Horizon into the beginnings of the Early Intermediate Period. Research by Brennan (1978, 1980, 1982) at Cerro Arena provides some of the original examples of the Salinar “style” of urban layout. Cerro Arena is a densely clustered city with evidence of centralized planning, administration, and economy, and a stratified population as well as religious facilities (Brennan 1978, 1980, 1982). Structures vary in form, consisting primarily of three separate types (further divided into subtypes) comprised of five primary room types.

Brennan (1980:5-14) notes that the level of trash accumulation within structures varies according to both social standing of the occupants and room type under consideration. High status residential structures center on a large plaza, which included fineware ceramic sherds, food debris, and hearths, making them multi-use areas. Low status residential structures contained more trash and living spaces are smaller. These findings emphasize that urbanism, in addition to religious proselytization, was a common cultural phenomenon during the Early Horizon.

3.3.3. The Early Intermediate Period

Later forms of urban development are associated with the Moche and Gallinazo during the Early Intermediate Period (200 BC-AD 600). Both of these cultural phenomena provide examples of urbanism and associated state-like developments. While the Moche do not represent a unified multi-valley state as previously theorized (Schaedel 1978), they do show evidence of a shared religious ideology and trade network (Bawden 1995, 1996; Chapdelaine 2011). Originally seen as preceding the Moche, the Gallinazo are now known to be their contemporaries, representing either a competing or subservient cultural group (Bawden 1996:186-205; Millaire and Morlion 2009).

The Moche had a well-developed urban tradition typified by the presence of two large *huacas* or platform temple structures at the Huacas de Moche city. These platforms, with some exceptions (Huacas de Moche), were separated from dense residential areas and served a primarily ceremonial function. However there were architectural elements that abutted the platforms, sometimes walled enclosures and terraces. The function of these structures is often interpreted as either ritual or ceremonial, with some evidence that workshops were placed next to platforms. Early Moche (AD 100-250) cities lacked extensive public architecture used for storage, administration, or military function (Bawden 1996; Chapdelaine 2011; van Gijseghem 2001).

At Moche settlements, trash tended to accumulate near the residential compounds, which included production areas as well as sleeping, eating, cooking, and storage areas (van Gijseghem 2001:260-263). Uceda (2010) notes the presence of four specialized production areas in the urban center between the Huacas de Moche. These centers were identified by their location within multifunctional residential areas, their high volume of production, the presence of production evidence on multiple occupational floors, and the presence of tools and products from multiple phases of production (Uceda 2010). Early Moche period urbanites thus accumulated trash in the general space around their homes, which also served as specialized workshops for different crafts.

During the late Moche period (AD 600-800), cities took on a different form. Along the southern periphery, platform construction all but ceased and authority shifted north to Pampa Grande, which typifies later Moche cities. At Pampa Grande larger platforms sit in the center of a complex of compounds used for a variety of purposes, including production, storage, and residential life (Shimada 1978, 1981, 1994). Across the Moche area, other cities followed this pattern, with *huacas* shifting from freestanding administrative and religious centers to urban nuclei, around which agglutinated urban settlements formed (Bawden 1996; Chapdelaine 2002; Shimada 1978, 1994). Galindo, in the Moche Valley, is another excellent example of this shift towards settlements nucleated around smaller *huacas*. Bawden (1977:202-207; 1982:176) and Lockard (2005:334) note the presence of metal and ceramic workshops and residential compounds next to *huacas* and smaller platform constructions.

At late Moche cities, craft production and the presence of daily subsistence activities closer to large public structures created different patterns of trash accumulation. Households deposited trash in temporary areas just outside of residential structures, and administrative buildings contained more floor accumulations than in previous periods (Bawden 1982; Lockard 2005, 2009). Denser residential patterns than early Moche cities combined with increased separation of households from production areas lead to trash circulating more outside of residential areas, as more frequent transportation of people and materials between different areas increased the potential for expedient deposition and specialized trash deposits near production sectors.

3.3.4. The Middle Horizon and Late Intermediate Period

Later cultural groups, including the Wari, and Chimú, developed other patterns of urbanism during the Middle Horizon (AD 600-1000) and Late Intermediate Period (AD 1000-1470). These groups created large, stonewalled enclosures that clustered into dense settlements. Wari, located in the Ayacucho Basin of Peru's central highlands, may have achieved state-level influence and centralized administration ca. AD 600 – 800 (Isbell and Schreiber 1978).

The capital city of Wari took on a structure that is unique in Andean prehistory. Large walled administrative units abut one another. Construction did not follow a centralized urban plan but instead the landscape, creating an organic, disorganized structure to the city (Isbell and Schreiber 1978; Isbell and Vranich 2004). Structures are defined by their variety in shape and size (usually trapezoidal or rectangular but sometimes square) as well as their high stone walls and complex entryways (Isbell and Vranich 2004). This pattern is interpreted as representing the militaristic lifestyle of the inhabitants of Wari, as well as an intense interest in privacy and controlling the movement of people within urban space (Isbell and Vranich 2004; Schaedel 1966). Interestingly, residential structures contain large amounts of refuse, indicating that either their occupants did not mind large amounts of trash accumulating in their nearby surroundings, or simply used trash as a way to seal abandoned homes (Isbell and Vranich 2004).

Outside of the capital, Wari cities took on a similar structure, but in miniature. These second or third order sites were composed of rectangular, walled enclosures, which contained smaller buildings and rooms within (Isbell and Schreiber 1978). These smaller sites were also far more rigidly designed than the capital city, containing less sprawl and more concentrated construction in set, defined forms (Isbell and Schreiber 1978; Isbell and Vranich 2004).

The Chimú, eventually conquered by the Inka at the end of the 15th century AD, were centered at the capital city of Chan Chan in the Moche Valley (Moseley 1975a). Ethnohistoric accounts from the Inka recorded by the Spanish suggest that the Chimú controlled large areas on the north coast of Peru, with a complex administrative and taxation system. Chimú cities were organized as citadels or tripartite adobe brick compounds called *ciudadelas* that housed the ruling elite (Klymyshyn 1982). These structures are especially evident at Chan Chan, where there are a dozen *ciudadelas* ranging in size from approximately seven to 21 ha. Each *ciudadela* was self-sufficient, containing administrative rooms, wells, food preparation areas, and residential areas. Chimú nobility lived in smaller compounds close to the *ciudadelas*, while commoners lived and worked in small irregularly agglutinated rooms (SIARs), especially to the south and west. SIARs comprised residential areas (organized into *barrios*) and in other sectors separate workshops (Topic 1982:154-155). Trash did circulate within the *ciudadelas*, but was primarily focused outside, in the lower-status areas of SIARs. Within the *barrios*, trash was either accumulated within the interior rooms of a house, or outside in the streets; animals were kept inside as well (Topic 1982:153-154).

CHAPTER 4 – PREVIOUS AND CURRENT RESEARCH IN NEPEÑA AND CAYLÁN

As discussed in the previous chapter, Caylán is part of a long (>4000 years) tradition of urbanism in the Andean region. Caylán's place in this timeline is the result of intensive research in the Nepeña valley as well as at the site itself. In this chapter, I discuss previous and ongoing research into both Caylán and the wider Nepeña valley in order to frame the results of this thesis into regional trends.

4.1. The Early Horizon in the Nepeña Valley

The Early Horizon (900 – 200 BC) follows the Initial Period (1500 – 800 BC) and precedes the Early Intermediate Period (200 BC – AD 600) (Rowe 1962, 1963). Corresponding to the Late and Final Formative designations of alternative Andean timelines (Kaulicke 2010; Lumbreras 1974), I utilize the Early Horizon designation in this thesis.

Excavations by Julio C. Tello (Museo de Arqueología y Antropología 2005; Tello 1943, 1960) identified Chavínoid stylistic elements (supernatural feline friezes) at Punkurí and Cerro Blanco in the Nepeña Valley, establishing their association with the Chavín cult and paving the way for future research into Early Horizon occupations in the area (Daggett 1987). Kosok's (1965) 1949 survey of various river valley systems included the Nepeña. Proulx (1968) and later Daggett (1984) conducted extensive valley surveys of both the upper and lower regions, identifying multiple phases of occupation.

Recent research at Cerro Blanco by Koichiro Shibata (Ikehara and Shibata 2008; Shibata 2010) has led to the creation of a chronological sequence for the Formative Period occupation of the valley. Shibata (2011) identifies four phases: Huambocayán (1500 – 1100 BC), Cerro Blanco

(1100 – 800 BC), Nepeña (800 – 450 BC) and Samanco (450 – 150 BC). The first two phases correspond to the Initial Period, while the second two span the Early Horizon.

Settlements occupied during the Early Horizon can be differentiated into two separate traditions located in the lower (0-30 km from the ocean) and upper (30-60 km) valley, respectively. In the upper valley, small but megalithic ridge top settlements (Daggett 1983), including Kiske, Paredones, and Kushipampa, nucleated primarily during the Samanco phase. These population centers are interpreted as competing political entities by Ikehara and Chicoine (2011) and are associated with "Megalithic Architecture" (Daggett 1984; Ikehara 2010). Each center had a residential area adjacent to a ceremonial and defensive center (Ikehara 2010). In the lower valley, several sites nucleated during the Nepeña and Samanco phases, including Samanco (Helmer and Chicoine In press), Caylán (Chicoine and Ikehara 2010, 2014), Sute Bajo (Cotrina, et al. 2003), and Huambacho (Chicoine 2006). Ikehara and Chicoine (2011) interpret these sites as part of a shared trade network or possible multi-tiered polity with Caylán at the center, due to similar architectural styles (mud and stone walled enclosure compounds) and material assemblages (Chicoine 2006, 2011; Chicoine and Ikehara 2010, 2014; Chicoine and Rojas 2012, 2013).

Culturally, the end of the Cerro Blanco phase corresponds to major change including the rejection, abandonment and/or avoidance of Initial Period stylistic elements related to the Chavín and Cupisnique phenomena, as well as the abandonment of the U-shaped megalithic ceremonial center at Cerro Blanco (Chicoine 2011; Shibata 2010). Resettlement occurs in the valley margins during the following Nepeña phase, along with the adoption of new, non-Chavín artistic and architectural styles. Ikehara and Chicoine (2011) suggest that the Samanco phase corresponds to the wider Salinar phenomenon of northern Peru (Brennan 1980, 1982; Larco 1944; Mujica 1984).

Architectural evidence points towards a rejection and/or avoidance of the earlier U-shaped layouts of both the coastal Initial Period traditions and Chavín phenomenon (Chicoine 2006; Chicoine and Ikehara 2010) The shift to a different settlement design included the formation of walled enclosure compounds. Along with shifts in settlement patterning came a number of socioeconomic and cultural changes, including intensified agriculture, restriction of access to space, incorporation of domestic and ritual spaces together (Helmer 2011; Helmer and Chicoine 2013; Helmer, et al. 2012). In this thesis, I focus on the intensified accumulation of waste resulting from the transition to more densely packed urban settlements.

4.2. Caylán (PV31-30)

The focus of this thesis is Caylán (9°11’30.38” 78°23’30.97” / UTM 17L 8 982 964N 786 506E), the largest Early Horizon center in the Nepeña Valley. Approximately 15 km from the Pacific Ocean, Caylán sits in a *pampa* between the twin peaks of Cerro Caylán, and rises between 105 and 150 masl. The protected archaeological zone totals approximately 200 ha (Figure 4), with the Early Horizon associated monumental core covering approximately 50 ha (Figure 5) (Chicoine and Ikehara 2009, 2011).

Earlier archaeological research at the site was limited to surface collection and survey. Bennett (1939:18) mentioned the site by the name Huaca Tambo and surmised that it may have been a village, identifying terraces, enclosures, and cemetery areas. Kosok’s 1949 survey included a visit to Caylán. His publication (Kosok 1965) mentions enclosures and several small stone “pyramids”. At the time, Kosok saw correspondences with Pueblo Mojeque in the Casma

Valley (Kosok 1965:208-209). Hans Horkheimer (1965) also mentions the site in his comprehensive bibliography.

Donald Proulx (1968) recorded Caylán in his 1967 survey, labelling it PV31-30. He concluded through analysis of the surface materials that the site was a habitation center with large, many-roomed stone structures that most likely pertained to a major occupation during the Middle Horizon based on pottery style (Proulx 1968:20, 71-72). Daggett's 1980 survey identified evidence of an Early Horizon occupation and associated it with a nearby site (PV31-31) and two in the Casma Valley (Pampa Rosario and San Diego) (Pozorski and Pozorski 1987b). Daggett (1984:213-218) divided it into two parts: "a valley floor complex of stone walled structures" and "a nearby ridge covered with platforms and fieldstone walls". He returned to Caylán in 1995 for an informal visit, and produced a sketch map of the site core based on aerial photographs and field observations (Daggett 1999). In 2009, Chicoine and Ikehara (2009) undertook the first scientific excavations to examine the occupation history, organization, and function of Caylán.

Surface survey and mapping have uncovered a multi-component occupation, with adobe structures located in the periphery associated with later pottery styles. A large number of intrusive burials imply a mortuary context in post Early Horizon cultural periods, with hundreds of disturbed burials visible at the surface. Based on masonry style, most of the standing stone structures, especially in the monumental core, appear to date to the Early Horizon. The structures are composed of quarried rock laid in mud mortar in an orthostatic fashion, unlike the use of adobes in nearby Initial Period sites or chinked stone in contemporaneous upper valley settlements (Chicoine and Ikehara 2010).

4.3. Field Methods

Project members excavated a total of 567 m^2 of soil during 16 weeks of fieldwork. All soils were screened through 3 mm wire mesh and 100% of artifacts discovered were collected. Artifacts were grouped, bagged, and labeled according to unit, stratigraphic level, and materials (e.g., ceramics, lithics, botanics, wood, textiles, animal bones). They were cleaned at a field house in the nearby town of Nepeña, with cleaning methods varying between artifact types. Shells, bone, and ceramics were initially brushed off using toothbrushes and similar implements, while lithic artifacts were washed in water. As excavations continued and increasing quantities of artifacts were collected, shells and ceramics were also washed in water. Ceramics with visible residues were not washed to allow for future analyses. I was not present for the 2009 excavations, but did participate in the 2010 fieldwork. Both seasons used the same methodology.

4.3.1. Architecture and Spatial Organization

Mapping focused on surface features and excavation features as they were being exposed. Mapping was done using a Topcon GTS-725 total station system and collected points were later drawn into shapes using AutoCAD. The total archaeological complex covers 200 ha (Figure 4) and includes both the *pampa* floor and ridges surrounding it. A series of walls encircles the Cerro Pan de Ázucar to the north, and other, smaller possibly defensive structures dot the surrounding ridges and Cerro Caylán.

The urban core, located in the *pampa*, is abutted to the north and east by what appear to be irregularly shaped stone structures, perhaps lower status residential groups. It is equally possible that these sectors were initially dotted with monumental compounds now destroyed by alluvial events and/or looting activities. The presence of ceramic scatters and more than 200 grindstones at the surface confirms the prevalence of domestic activities within and beyond the urban sector. The core itself is comprised of more than 40 house compounds (David Chicoine, personal communication 2014), divided into four main quarters by two crosscutting, intersecting avenues. A combination of surface artifacts and human remains observed during mapping indicate that later groups heavily reused the urban core as a mortuary complex, most evidence pointing to the Casma and Chimú people during the end of the first millennium and beginning of the second millennium AD. Stone structures are well preserved; usually standing several meters above the surface, and may have stood taller during the Early Horizon occupation, based on the amount of wall debris visible.

4.3.2. Excavations

During the 2009 and 2010 field seasons, crewmembers excavated 16 test pits (TP; Figure 5), six units of block excavation (UBE), and examined one looter's pit (LP1). All but one of these excavations occurred within the monumental core of the site or adjacent *pampa*, with one performed in the nearby zone of smaller structures with terraces. The primary goal of these excavations was to understand the occupational sequence, use, and abandonment of different areas, as well as to sample material culture and other discarded remains. UBE 1 through 3 and TP 1 through 5 were excavated in 2009, and the remainder (UBEs 4-6 and TPs 6-16) was excavated in 2010.

Excavations revealed a basic stratigraphic sequence common throughout the site. The first layer is windblown sand carried in from the surrounding *pampa*. The layer below is mostly comprised of structural debris in the form of rocks and mud. The third layer is soil, carried in either by aeolian, alluvial, or anthropic processes in association with the abandonment of floor contexts (e.g., dirt, ash, silt, sand). Below these deposits are floors plastered with clay, which represent the original Early Horizon occupation layers. Below floors there is either infill composed of trash and other cultural material (e.g., ash, plant matter, clay), or a culturally sterile mixture of sand and gravel as seen in the *pampa*.

The test pits were placed across of variety of contexts in order to inform on human activities and collect material samples (Table 2; Figure 5). One pit was placed in an open plaza or public space (TP12), while others sampled terraces (TP5), side rooms (TP1, 4, 8), and platforms (TP6, 7, 13, 14). The remainder were placed in streets (TP9, 10, 11), open-air trash dumps (TP2, 15, 16), and a defensive wall (TP3). Larger, block excavations were conducted to gain insights into the nature of various architectural features at the site, including a residential area/production (UBE6), a mound (UBE1, 4), and a nested, benched plaza (UBE2, 5). The non-random, targeted sampling strategy employed in this project limits the explanatory – and especially predictive - power of the data. However, the amount of data acquired and areas sampled is sufficient to begin the exploration of trash production and discard at Caylán.

Table 2 - Table of Test Pit Soil Volumes and Hypothesized Contexts

Test Pit #	Start (masl)	Surface Area (m^2)	Avg Final Depth (m)	Volume (m^3)	Spatial Context
TP3	135.3	4	1.129	4.516	Defensive Wall
TP12	129.43	2	0.912	1.824	Plaza Mayor
TP2	157.51	4	0.529	2.116	Open-Air Middens/Trash Dumps
TP15	145.82	2	0.513	1.026	Open-Air Middens/Trash Dumps
TP16	140.61	2	0.522	1.044	Open-Air Middens/Trash Dump
TP6	144.43	2	0.77	1.540	Platforms/Construction Fill
TP7	165.6	2	1.375	2.750	Platforms/Construction Fill

(Table 2 continued)

Test Pit #	Start (masl)	Surface Area (m^2)	Avg Final Depth (m)	Volume (m^3)	Spatial Context
TP13	145.5	2	0.8	1.600	Platforms/Construction Fill
TP14	144.88	2	0.74	1.480	Platforms/Construction Fill
TP1	130.01	3	0.662	1.986	Colonnaded Patios
TP4	133.99	4	1.53	6.120	Colonnaded Patios
TP8	132.2	6	1.39	8.340	Colonnaded Patios
TP9	138.4	2	1.603	3.206	Streets/Corridors
TP10	133.6	2	1.365	2.730	Streets/Corridors
TP11	134.42	2	1.403	2.806	Streets/Corridors
TP5	135.99	9	1.855	16.695	Streets/Corridors

4.3.3. Test Pit Contexts

4.3.3.1. Plaza Mayor (TP12)

Most of the plazas at Caylán are nested within the walled house compounds. They are preliminary interpreted, based on spatial data and limited excavations at Plaza-A as multi-functional gathering areas (Helmer et al. 2012). The Plaza Mayor (TP12; Figure 19), located in front of the Main Mound, is an exception to this pattern. It is an open plaza, with outside access unimpeded by the presence of walls. It is also the largest plaza on the site, covering approximately 5,800 m^2. TP12 is located at the center of the Plaza Mayor. Excavations revealed that the plaza ground was paved with a layer of gravel. This suggests that the plaza was designed for heavy foot traffic. The presence of stone wall in TP12 suggests that the plaza area was divided spatially. The limited area (2 sq m, 1.8 cu m) excavated at Plaza Mayor cautions the interpretation of the material results and their distributional analysis.

4.3.3.2. Platforms/Construction Fill (TP6, 7, 13, 14)

Many of the structures at Caylán are raised on platforms, usually standing several meters tall. These platforms are the result of rebuilding episodes. Excavations revealed limited remodeling events and most compounds follow a somewhat standardized orientation. Test pits (TP6, 7, 13, 14; Figures 12, 13, 19, and 20) were placed in several of these platforms to examine their contents. Platforms are typically organized as benches lining plaza or other open spaces. A total of 8 sq m (7.37 cu m) was sampled from construction fill contexts. The benches were built by filling the chambers created by wall structures. These "fill chambers" contained successive layers of dirt, ash, broken artifacts, and burnt food remains making them secondary trash deposition areas. The loose layers are typically alternated by layers of plant remains, often maize stalks, to consolidate the fill and minimize compaction (Figure 13) (see Chicoine 2006 for examples from Huambacho).

4.3.3.3. Defensive Wall (TP3)

A series of large walls enclose the urban core of Caylán (see Figures 4, 6). These walls appear to be a late Early Horizon addition, as they cut through several compounds, and appear to have a defensive purpose, based upon their impressive size and length, as well as parapets. Excavation (TP3; Figure 9) confirmed this hypothesis by uncovering earlier rooms underneath a section of the North-South wall. Radiocarbon dating of organic remains found underneath a parapet\places these walls later in the Early Horizon (405-380 BC, 2σ) (Chicoine and Ikehara 2014). The defensive walls lining the pampa and enclosing the urban sector were built with the recycled stone materials from surrounding compounds. The fill of the raised chambers and its associated trash were likely mined from adjacent Early Horizon deposits. Hence, the content of TP3 can be interpreted as a secondary context.

4.3.3.4. Streets/Corridors (TP5, 9, 10, 11)

As noted earlier, two main crosscutting streets bisect Caylán, dividing the urban core into four main sectors (Figure 6). These streets run Northwest-Southeast and Northeast-Southwest, with several others. Streets connected residential compounds with the periphery of the urban sector, as well as communal space. The street system appears to have been centered around the Plaza Mayor. Based on surface evidence it appears that each monumental house compound had an independent entrance via a distinct street or corridor (David Chicoine, personal communication 2014). Test pits (TP5, 9, 10, and 11; Figures 15, 16, and 17) were placed in two of the main streets and a corridor to examine their content, organization, and chronology. A total of 15 sq m and 25.44 cu m sampled street and corridors at the site. The streets at Caylán are lined with stone walls and range in width between 2 and 3 m. Contrary to the ground surface of the Plaza Mayor, the ground of the streets was not paved. Trampled dirt floors were found covered with the sand, dirt, and trash.

4.3.3.5. Colonnaded Patios (TP1, 4, 8)

Colonnaded patios are common at Caylán, abutting one another as well as the benched plazas in each walled compound. These patios are variable in size, but share a common spatial organization. Each patio was organized around a central area open to the sky and lateral shaded gallery spaces. The galleries are lined with colonnades of rectangular columns. In each residential compound, the patios mediate the semi-public plazas and the more private roofed living quarters. Their organization, location, and material assemblage suggest that colonnaded patios were the loci for the production activities of the urban residents at Caylán. Three test units samples colonnaded patios at Caylán (TP1, 4, 8; Figures 7, 10, and 14). A total of 13 sq m for 16.45 cu m were excavated from colonnaded patios at Caylán.

4.3.3.6. Open-Air Middens/Trash Dumps (TP2, 15, 16)

As noted by Dagget (1984: Figure 5.35, 216), large amounts of trash scatter the periphery of the urban sector at Caylán. These open-air middens appear related to the activities carried out within the various residential compounds. The middens are particularly visible on the northern periphery of the urban core, which is consistent with dominant wind patterns blowing from south to north. This is consistent with the discard of smelly remains away from living and production areas. It is hypothesized that the peripheries of the urban sector were dedicated to trash disposal. Test units were located in the northwest edge of the site (TP2, 15, and 16; Figures 8, 21, and 22). A total of 8 sq m for 4.19 cu m were excavated at Caylán.

CHAPTER 5 – RESULTS AND ANALYSIS

In this chapter, I introduce the results of my research into the test pits and their contexts. I first discuss the overall distribution of artifacts by category density and category within contexts. I then discuss my mapping of these densities and an overview of my overall results. I do not directly present the presence or absence of specific artifact types within each category in this chapter, as I have included artifact assemblages for each test pit in Appendix B. I will discuss my interpretation of these results based on the models I developed in Chapter 2, including the specific assemblages, in the next chapter. The overall results suggest a homogenous distribution of waste representing a variety of activities and behaviors across the site, but a heterogeneous expression of different waste types within contexts, representing some differential use of space within area categories.

5.1. Artifact Distributions

The following sections contain general artifact descriptions, amounts, and concentrations for each artifact category. I also break down artifact concentrations and distributions within contexts in order to illustrate how objects moved through space at Caylán. Finally, I include Inverse Distance Weighting maps as a tool to describe artifact distributions and movement patterns. For visual reference, look to Appendix A, Figures 23 – 27 for artifact concentrations and Figures 28 – 40 for artifact examples.

5.1.1. Lithics

Lithics were classified based on their morphology in comparison to known Early Horizon artifacts from the literature (Chicoine 2006; Pozorski and Pozorski 1987). Preliminary identification also included total weight of samples (156 artifacts weighing ~16 kg). Types recovered included scrapers, choppers, perforators, points, flakes, grinders, grinding bases (*batanes*), and "worked stone" (a generalized category for lithics of unknown use). These categories are indicative of different use behaviors. Grinding implements can be used to process plant foods, pigments, or help produce lithic tools. Cutting and scraping tools can also be indicative of plant processing, as well as butchering, hide preparation, or interpersonal violence. Perforators can be used for hide preparation, decoration of other objects (as can polishers), or opening shellfish. A few personal adornments and other non-too lithic items were also found, including an anthracite "mirror" fragment. Lithics were also sometimes used as a pavement (Plaza Mayor, TP12). In some cases, an estimation of rock type was also recorded.

Scrapers generally have one side flaked down to a sharper edge and one side left untouched as a handle. Choppers follow a similar morphology but are heftier and have a sharper cutting edge. Perforators take on a number of forms, but are generally smaller stones with one end ground down to a point. Flakes are found in a variety of different sizes, shapes, and materials, and may have been reused for scraping or cutting small objects, as some of them show evidence of retouching.

Grinding tools are ubiquitous throughout the site, as either smaller *manos* (one hand grinders) or larger *chungos* (two hand grinders). *Manos* are sub-spherical in shape. The larger *chungos* are somewhat oblong in shape. Grinding bases or *batanes*, are mostly larger (>10 kg) in size. Projectile points were created by grinding down small pieces of slate, and were possibly hafted to handles for use as daggers or spears. Only two of these points were found, and one was broken.

5.1.1.1. Streets/Corridors

The test pits placed in streets varied in density by weight and number, and weight to number ratio. By weight, TP11 contains the highest density, followed distantly by TP9,TP10, and finally TP5. By number, TP9 and TP11 contain almost the same density, and TP10 contains about half as many lithic items, while TP5 averaged only one item per cu m of soil.

5.1.1.2. Platforms/Construction Fill

The test pits placed in platform contexts follow a rough pattern regarding weight to number, though there are some differences. TP13 contains the highest density, followed by TP14, then TP7, and finally TP6 with none. The difference in density between TP13 and TP14 is much higher (~1.2 kg/m^3 vs. <.1 kg/m^3) by weight than by number (9 N/m^3 vs. 5 N/m^3).

5.1.1.3. Open-Air Middens/Trash Dumps

Density in the test pits placed in open-air middens varies when examined by weight or number. By weight, TP15 contains the highest density, followed by TP16, then TP2. By number, TP16 contains the highest density, followed by TP15, then TP2.

5.1.1.4. Colonnaded Patios

Test pits placed inside rooms follow a similar pattern regardless of measurement. TP1 contains the highest density, followed distantly by TP8, and finally TP4. By weight, there is an interesting difference: TP1 contains approximately five times as many lithics by number over both TP8 and 4, as opposed to only approximately three times as dense by weight over TP8.

5.1.1.5. Other Contexts

Test pits placed in other contexts followed the exact same pattern. TP12 contains the higher density by a wide margin, followed distantly by TP3, which contains a much lower density.

5.1.2. Ceramic Vessel Sherds

Pottery sherds comprise most numerous materials at Caylán. Excavations recovered more than 48,000 sherds (8,845 from test pits) weighing approximately 583 kg (88 kg from test pits). Individual sherd weights were not recorded. Both Early Horizon period and later sherds were included in the final artifact catalog. For the purposes of this thesis, I will omit the post-Early Horizon sherds in my density by count, as their number was recorded separately from the Early Horizon specimens.

Early Horizon sherds are subdivided into the categories of fineware body, plain body, decorated, or rim. Rim sherds were used to determine vessel shape. Neckless ollas are the most common form, but bowls, neck jars, single and stirrup-spout bottles, and cups were identified. Body sherds were identified by a lack of rim elements as well as their composition and coloration. Plain body sherds are mostly red in color (i.e., due to oxidizing atmosphere during firing) and tend to be composed of larger inclusions. Fineware sherds were identified by polishing on the exterior surface. Finewares can be red or black in coloration (i.e., due to reducing atmosphere during firing), although blackwares are most common. Decorative styles from the Early Horizon were used to identify sherds in the decorated category. These styles include Textile Impressed, Zoned Punctate, White-on-Red, Stamped Circle-and-Dot, Incised, and Pattern Burnished.

5.1.2.1. Streets/Corridors

The test pits placed in streets follow roughly the same distribution regardless of weight or number, making them fairly consistent in terms of artifact size (no one particular pit with distinct number/weight ratio change). TP11 contains the highest density, followed by TP9, then TP10, and finally TP5. When calculated by number, the densities between TP9 and 10 do get closer, but are still distinctly different.

5.1.2.2. Platforms/Construction Fill

The platform test pits also follow a roughly consistent pattern regarding weight to number ratio. TP7 contains the highest density, followed by TP13, then TP6, and finally TP14. Again, there is one distinct difference, in that when examining density by weight, there is a greater distance between TP7 and 13 when calculated by weight than by number.

5.1.2.3. Open-Air Middens/Trash Dumps

The test pits placed in open-air middens show differences when measure by weight and number. By weight, TP15 contains the highest density, followed by TP2, then TP16. By number, TP15 again contains the highest density, followed by TP16, then TP2. TP16 thus has an accumulation of lighter, more numerous sherds than TP2.

5.1.2.4. Colonnaded Patios

The test pits placed in colonnaded patios contain the same patterning regardless of weight or number measurement. TP1 contains the highest density, followed distantly by TP8, then finally TP4 with the lowest density.

5.1.2.5. Other Contexts

The test pits placed in the remaining contexts follow the same pattern regardless of whether they are measured by weight or number. TP12 contains by far the higher density, followed distantly by TP3.

5.1.3. Other Ceramics (Non-Pottery)

This category encompasses artifacts recovered during excavations that are fashioned out of ceramic materials, but are not vessel sherds. The majority of such artifacts are panpipes (which are often considered indicative of feasting and other special activity related to music), spindle whorls, as well as sherd discs (i.e., tokens), figurines, tiles, pendants, beads, and graters. Again, individual data (i.e., weight, morphology) was not recorded for these artifacts. Two hundred and forty-nine (n=249) other ceramics artifacts weighing approximately 1.76 kg were recovered from the test pits.

The prominence of panpipes at Caylán indicates the importance of music and ritual in daily life. Spindle whorls point toward the processing of cotton for the production of textiles. The purpose of the discs is currently unknown, though the hypothesis currently favored is that they represent some sort of game token. They could also have been used as lids for bottles and other neck vessels (Chicoine 2006). These discs were fashioned from broken vessel sherds, their edges ground down to create a rounded shape. Some discs include holes, and are classified as spindle-whorls, commonly known as *torteros*. In the Andes, *torteros* are typically used to spin camelid fibers. In contrast, smaller *piruros* are used to spin cotton fibers.

5.1.3.1. Streets/Corridors

The test pits placed in streets show distinct variability when calculated by weight and number. TP9 contains the most by weight, followed closely (<20 g/m^3 difference) by TP11, TP10 a distant (>90 g/m^3 difference) third, and TP5 an even more distant fourth (>110 g/m^3). By number TP11 contains the most, followed distantly (>10 N/m^3 difference) by TP9, TP10 (15 g/m^3), and TP5 again containing the lowest density at less than one per cu m of soil.

5.1.3.2. Platforms/Construction Fill

The platform test pits follow a very similar pattern regardless of whether they were measured by weight or number. TP7 contains the highest density, followed by TP6, then TP13, and then TP14 with the lowest. The biggest difference between weight and number density occurs in the distance between TP7 and the other test pits. When compared by number, TP7 contains almost 15 N/m^3 more than the next test pit.

5.1.3.3. Open-Air Middens/Trash Dumps

The test pits placed in open-air middens follow a similar pattern regardless of using weight or number of artifacts. TP15 contains the most, followed by TP16, and finally TP2. The biggest difference between the two measurements is a higher distance between TP16 and TP2 that occurs when using number (3 N/m^3).

5.1.3.4. Colonnaded Patios

The test pits placed inside rooms contain large differences by weight, but all contain approximately one item per m^3. By weight TP1 contains the most by a wide margin (almost 12 g/m^3 difference), followed by TP4, and then TP8.

5.1.3.5. Other Contexts

When comparing the test pits from other contexts, they follow roughly the same pattern regardless of using weight or number: TP12 contains the higher density, followed by TP3. The distance between TP12 and TP3 is fairly large (6 N/m^3 difference).

5.1.4. Animal Remains

Animal bones comprise a small portion of the materials recovered at Caylán (~1.32 kg). Animal bones were assigned a preliminary identification in the field, and then analyzed by Víctor Vásquez and Teresa Rosales of the Centro de Investigaciones Arquebiológicas y Paleoecológicas Andinas (ARQUEOBIOS) in Trujillo, Peru. Animal bones may be representative of butchering sites, production areas, or trash pits while hair and hides could be indicative of textile production or similar activities. The smelliest remains would have been discarded away from residential areas to prevent unwanted odors. Weight of animal bones per unit was recorded. During the more in-depth analysis by ARQUEOBIOS, Number of Identified Specimens (NISP) per species per unit was recorded, allowing for calculation of numbers and weight. Unfortunately, NISP was not recorded for TP16 by ARQUEOBIOS. However, I estimate NISP = 3 for this test pit based upon the information provided in the field report (Table 18).

5.1.4.1. Streets/Corridors

The street test pits follow the same pattern by both number and weight density. TP11 contains the highest density, while TP9 is the median value, while TP10 and TP5 lag behind.

5.1.4.2. Platforms/Construction Fill

The four platform test pits follow different patterns by weight and number. In terms of weight, TP7 is the highest, followed by TP14, then TP15, and finally TP6. Contrastingly, by number TP6 is the highest, followed by TP7, then TP14, and TP13 at the lowest. In other words, all four test pits show inverse relationships between number and weight density.

5.1.4.3. Open-Air Middens/Trash Dumps

The only test pit that shows a corresponding value between number and weight density is TP2, which contains high values in both categories. TP15 and 16 contain relatively higher densities by weight than by number. Test Pit 15 falls in the middle of the three in both cases, but in terms of weight, both TP15 and 16 come within 50 g/m^3 of TP2, but fall more than 50 N/m^3 away by number.

5.1.4.4. Colonnaded Patios

In the side rooms, TP1 contains by far the highest density of material by both weight and number. TP4 and 8 come surprisingly close to each other in weight density, with TP4 as higher and TP8 as the lowest, but only by a slight difference (8.35 g/m^3 vs. 6.83 g/m^3 respectively). The inverse is true when considering number, as TP8 is the median while TP4 is the lowest, TP8 containing almost twice as many animal bones by density as TP4.

5.1.4.5. Other Contexts

The remaining test pits show a similar pattern between weight and number. By weight, TP3 is the densest, followed by TP12. When examined by number, TP12 and TP3 are virtually identical, at 4 N/m^3.

5.1.5. Plant Remains

Other researchers have begun to examine the plant remains at Caylán (Clement 2012; Cummings, et al. 2013; Stich and Chicoine 2013), so this section focuses on the weight of macrobotanical remains in each test pit. Plants were used for a wide variety of purposes, including as food, fuel, mats, animal feed/fodder, medicine, and as stabilizer in construction fill. Catalogued data include weight and preliminary field identification. The field identifications are not accurate; however, they do provide a general sense of the types of plant remains recovered (i.e., food vs. fuel vs. industrial), making them useful for rough estimations of area use. Approximately three kilograms of plant remains were recovered from test pits during the two field seasons.

Many test pits (TP4-6, 8, 10, 12, 14) contain densities close to zero, implying that almost half of the test pits had very little in plant remains. This result is not surprising given the generally poor preservation of the artifact type in question. Most plant materials would have degraded, been consumed by scavengers, or been displaced before interment into the archaeological record could occur.

5.1.5.1. Streets/Corridors

TP11 contains the highest density of plant remains, followed by TP9, TP10, and TP5. The difference between TP11 and TP9 is much greater (~21 g/m^3) than between TP9, 10, and 5, which all fall in to the range of 5-17 g/m^3.

5.1.5.2. Platforms/Construction Fill

TP13 contains the highest density of plant remains, followed by TP7. TP14 contains the third highest density of plant remains, but is much less dense (by over 400 g/m³) than the highest two. TP6 contains almost no plant material in comparison (2.27 g/m³).

5.1.5.3. Open-Air Middens/Trash Dumps

TP16 contains the most plant remains of the open-air middens, followed by TP15, and then TP2. Interestingly, the difference between the three is similar, at about 20-30 g/m³ between each.

5.1.5.4. Colonnaded Patios

In the side rooms, TP1 contained by far the greatest density, while TP8 was a very distant (>25 g/m³) second, and TP4 was the lowest.

5.1.5.5. Other Contexts

TP 3 contained the greater density of plants in the other contexts, while TP12 came in a distant (>40 g/m³) second.

5.1.6. Textiles

As in the previous section, my examination of textiles focuses on artifact weight rather than any stylistic or compositional analysis. Textiles counted for one of the lowest amounts of materials recovered from the site, as they do not generally preserve well, even in arid environments. A few scraps and fragments of various types of cloth were recovered at Caylán (~432 g), thanks to the site's arid environmental setting. These few fragments could represent a variety of behaviors, including expedient dumping of torn items, reuse of items for various purposes (cleaning, bandaging, decoration), disposal of smelly or unclean items, or use in manufacture (as a resting place, support, or to catch debris). Overall, their distribution is little indicative of activity areas, but may provide insights into spatial dumping preferences (i.e., where people are comfortable dumping this type of waste).

5.1.6.1. Streets/Corridors

TP11 contained the highest densities of textile remains, followed by TP9, TP5, and finally TP10, which contained no plant materials whatsoever. Interestingly, the difference between the three containing textile is almost equal, at about 9 g/m^3.

5.1.6.2. Platforms/Construction Fill

TP7 had the highest density of textiles, while TP13 had the second highest, TP14 was a distant (>25 g/m^3) third, and TP6 had none whatsoever.

5.1.6.3. Open-Air Middens/Trash Dumps

TP16 contained the highest density of textiles, while TP2 contained the second highest, and TP15 contained the lowest. The difference between TP16 and TP2 was double that between TP2 and 15 (>20 g/m^3 vs. ~10 g/m^3).

5.1.6.4. Colonnaded Patios

None of these rooms contained textiles.

5.1.6.5. Other Contexts

TP3 contained the higher density of textiles, while TP12 came in a distant (>5 g/m³) second.

5.1.7. Shell Remains

Chicoine and Rojas (2013) have performed research into the identification of the shells recovered at Caylán. I will use some of their results to examine distribution across contexts. Shellfish distribution is a useful proxy for feasting events, food preparation areas, and possible ceremonial events (i.e., in the form of cache offerings), and were used for body adornments, though this analysis focuses on undecorated shell. Shells were recorded in the field by weight in each unit as well as Minimum Number of Individuals (MNI) per species per context. This identification scheme allows for calculation of density by both weight and number per unit.

5.1.7.1. Streets/Corridors

The street test pits contained very different patterns by weight and number. TP11 contained the highest density of shells by both measurements, followed by TP9, TP10, and TP5. By weight, TP11 and 9 were very close, almost equal in density at almost .7 g/m³, while TP10 was over .3 kg/m³ less dense, and TP5 was over .5 kg/m³ than the highest two. By number, the difference between TP11 and 9 was much greater, at almost 100 N/m³, which also represents the approximate difference between TP9 and 10, and TP5 came in last at ~90 N/m³ less than TP10.

5.1.7.2. Platforms/Construction Fill

The platform test pits contain the same density patterning by both weight and number. TP13 contains the most shell, followed by TP7, then at a distance TP6 and close below it TP14.

5.1.7.3. Open-Air Middens/Trash Dumps

The open-air midden test pits contain similar density patterning by both weight and number. TP16 contains the most shell, followed by TP2, and then TP 15. The difference between TP15 and 2 is much closer by weight than by number.

5.1.7.4. Colonnaded Patios

The side rooms contained almost exactly the same patterning by weight and number. TP1 contains the most shell, followed by TP4, and then TP8. The difference between TP4 and 8 stays almost exactly the same regardless of measurement used, but is greater between TP1 and 4 by number than by weight.

5.1.7.5. Other Contexts

The remaining test pits contain the exact same patterning for shell regardless if measured by weight or number. TP12 contains the most shell, followed by TP3. There is a slightly greater difference between TP12 and TP3 when measured by weight rather than number.

5.2. Mapping

5.2.1. Lithics

Lithic Densities in both weight and number cluster around four units, TP12, 13, 15, and 16, all of which were located around the western and northern edges of the monumental core (Figures 41, 42). All of the other test pits show low concentrations of lithic material ($<.6$ kg/m^3, 6 N/m^3), implying that lithic waste may have flowed out of the more densely populated areas and into the nearby *pampa* or otherwise common areas for waste dumping. This hypothesis is supported by the fact that TP15, and 16 are from open-air middens, while TP13 is the infill of a platform, and TP12 is an open plaza (with a gravel paved floor, though this is not part of the assemblage), all contexts that would, or could, have contained waste material.

5.2.2. Ceramic Vessel Sherds

Ceramic vessel density in both maps is very similar, with most clustering around the southern edge of the monumental core. TP7, 11, 12, and 15 all show high densities (>3.5 kg/m^3, 329 N/m^3). TP2, an open-air midden, shows a medium density (2.5-3.5 kg/m^3, 248-328 N/m^3). TP7, 12, and 15 are southern periphery or southern sector test pits, from a platform, open plaza, and open-air middens, respectively. TP2 is to the west and TP11 is located in the extreme northern sector of the monumental core (Figures 43, 44). Most of the other test pits have a low density of material by both weight (<2.5 kg/m^3) and number (>329 N/m^3), and are located to the center of the monumental core. TP11 is a glaring exception, located in a street, making the area a possible locus of dumping from nearby households.

5.2.3. Other Ceramics (Non-Pottery)

Other ceramic artifact density in weight and number shows a different form of patterning. TP7, 9, 11, and 15 show the highest concentration of other ceramic artifacts (>60.4 g/m^3, 9 N/m^3) whereas TP12, from Plaza C, contains medium density (43-60.4 g/m^3, 7-9 N/m^3). Other ceramics tend to cluster more toward the center of the monumental core, especially in the street contexts of TP9 and 11, although there was still some dumping in the peripheries (Figures 45, 46).

5.2.4. Animal Remains

Animal bone density varies between weight and number (Figures 47, 48). In terms of NISP density, TP1, 2, 6, and 7 contain high values (>31 N/m^3), whereas in weight TP2, 15, and

16 are high (> 57.4 g/m^3) with TP1 and 7 containing medium densities (38.7-57.4 g/m^3). The large differences in TP1, 7, and 15 provide the main evidence for this discrepancy. The change in ratio between weight and number likely reflects a differential dumping of animal species by size in different contexts. The data point towards small, light remains (fish, birds) being discarded to the west and south, in the infill of platforms (TP6, 7) and a side room (TP1). Large, heavy remains (mammals) were discarded to the southwest and north, in open-air middens (TP2, 15, 16). The central areas of the monumental core remain low in either density measurement, indicating that animal remains may have been placed to the outside peripheries to avoid the smell wafting across the city.

5.2.5. Plant Remains

Plant remains, which were only measured by weight, clustered around TP7 and 13 (>214.6 g/m^3, Figure 49). Both test pits are in the southern sector of the site, next to or on the Cerro Cabeza de Leon, and were placed to study the infill of platforms. Most test pits contained a density that was in the lowest range (<114.7 g/m^3), whereas TP16 was just above. This result is somewhat unsurprising, as most plant waste would have been consumed by scavengers in trash pits, by guinea pigs, or burnt. The high densities in TP7 and 13can be attributed to the use of cane and similar plant materials as stabilizer for infill, which would have helped their preservation.

5.2.6. Textiles

Textiles, like plant remains, were calculated by weight, making their densities simple to interpret. TP7, 13, and 16 contained high densities of textiles (> 24.5 g/m^3), whereas TP2 contained a medium density (15.5-24.5 g/m^3, Figure 50). The presence of high levels of textiles in so few contexts is not surprising, as even in arid conditions textiles do not always preserve well. However, the higher densities in the three test pits mentioned above are interesting, as TP7 and TP13 were infill for a platform, and TP16 an open-air midden. Torn or otherwise damaged and non-reusable textiles were likely discarded as infill, and may have been thrown away primarily outside the residential areas to the north and south of the city.

5.2.7. Shell Remains

Weight and number densities of shell were similar, implying that shell material was deposited without any significant preference to species or size (Figures 51, 52). TP2, 7, 13, 15, and 16 all contain high densities of material by both measurements (>.94 kg/m^3, 452 N/m^3). TP7, 13, and 15, are to the south and southwest, TP2 is to the west, and TP16 is to the north. The deposition of shell in these areas may be a reflection, as noted earlier, of the prevailing wind patterns across the site. The only two that would have been upwind, TPs 7 and 13, were both subfloor deposits. The others, TPs 2, 15, and 16, were open-air middens downwind of the city. Mollusk remains are smelly, and this placement supports the hypothesis that such open-air trash pits were placed in a somewhat organized fashion. The other test pits, which were all placed in residential areas, contain shell density only in the lowest two levels by both measurements. Shellfish were most likely consumed in the plazas and colonnaded patios of the walled compounds, and then later deposited outside of the city to avoid accumulating smelly waste (Figure 6).

5.3. Summary

As mentioned in the beginning of this chapter, these results indicate a homogeneous distribution of waste across the site, in the sense that every excavated test pit contained waste material, though in different degrees both within and between spatial contexts. Trash was clearly an everyday, nearby part of life for the inhabitants of Caylán.

Most artifact densities shared similar distributions by both weight and number, implying regular movement of similar-sized objects between contexts. Two categories, other ceramics (non-pottery) and animal remains, had some inverse relationships when comparing weight and number density ratio, especially in the infill of platforms and open-air middens for animal remains, and streets and side rooms for other ceramics (non-pottery).

Descriptive mapping using Inverse Distance weighting helps illustrate the spatial aspects of the artifact categories and the contexts in which they interact. While they are too flawed to be a central aspect of this methodology, they do bring a different perspective to the interplay of artifact and context, allowing for increased awareness and understanding of how items may have moved through space. In the next chapter, I will elaborate on these results, including specific artifact types in the test pit assemblages.

CHAPTER 6 – DISCUSSION AND CONCLUSIONS

In this chapter, I summarize my interpretations of my findings, as well as the overall results and conclusions of this thesis. I discuss the distribution and concentration in context of specific artifact categories as well as types at the site, and discuss possible causes for final artifact placement, including craft production, subsistence/feasting activities, and other daily experiences in urban environments. I examine the results of the excavations and analyses against my proposed model for Caylán outlined in Table 1, and suggest future goals and avenues of research to better answer questions raised in this thesis. Finally, I place Caylán, and its trash, into both wider regional and larger global and historical contexts in order to establish its utility in examining questions relating to urban space, production, and the discard of human waste.

6.1. Assemblages, Production and Trash Flow at Caylán

6.1.1. Colonnaded Patios (TP1, 4, 8)

In the Colonnaded Patios, there is variability across artifact categories in terms of content. TP1 contains a greater variety of lithics, including flakes and a point, while TP4 only contains a small piece of hematite and TP8 contains a ground stone, piece of quartz, and polishing tool. TP1 contains more fineware ceramic sherds, though less sherds overall and no painted sherds, than the other two test pits. All three test pits contain fragments of musical instruments and ceramic discs in low amounts ($N<5$). All three also contain plant remains, though TP4 contain only small amounts of maize, while both TP4 and TP8 contain a variety of both food and industrial plant remains, including seeds and other remains of pumpkin, gourd, squash, and avocado.

Guinea pigs and/or rodents are found in all three test pits, and lots of bird bones were found in TP1 and 4, and fish bones in TP4 and 8. Other mammals of unidentified species were also found in TP4 and 8. Whole shell in all three contexts included the species *Donax obesulus* and *Perumytilus purpuratus*, and TP1 and 4 also included *Semimytilus algosus*. No textiles were recovered from any of these test pits.

The diversity of different materials within categories across this spatial type speaks to an unregulated, user-driven definition of use of space (see Tables 3, 6, 10). TP1 contains more evidence of lithic production, in the form of flakes and cobbles, but does not conclusively match the definition as laid out in Table 1. All three test pits contain food remains, ceramic sherds, and musical instruments. The assemblages point to multi-use areas, with functions that include possible lithic production, ceramic decoration, food preparation/consumption (daily and feasting), and ritual action.

6.1.2. Streets/Corridors (TP5, 9, 10, 11)

The Streets/Corridors test pits contain a diversity of artifacts (see Tables 7, 11, 12, and 13). All but one (TP10) contain artifacts from all seven research categories. The presence of artifacts in the streets indicates that, like streets in other parts of the ancient world (Hugill 1931), the streets and corridors of Caylán were not just avenues for transportation but also locations for temporary discard outside of homes and for expedient or accidental discard of items during travel.

TP5, which excavated both a corridor and part of a colonnaded patio, contains a set of lithic tools, including a polisher, grinding stone, and a grinding base with red pigment, indicating that the nearby compound was a location of at least some plant processing, as well as possibly lithic manufacture and ceramic decoration. The other test pits contained primarily small objects, especially polishers and flakes, indicating their transportation from other contexts, though TP11 did also contain one projectile point, also possibly lost or discarded by accident in the street. Ceramic vessel sherd counts varied from 393 (TP5) to 1604 (TP11), with the highest concentration of decorated sherds (9/393 or .023%, compared to .01% for total context), coming from TP5, though these concentrations are too low to tell very much about area use.

In terms of other tools, TP5 also contains a ceramic scorer or grater, which may have been used for processing plant material, as did TP11 (albeit in fragments). Other non-vessel ceramics include panpipe fragments, a pendant, and ceramic discs. This category contained one of the highest overall densities of non-vessel ceramics, and this density is reflected in the 43 panpipe fragments found in TP11, as well as the 16 found in TP10, and the 10 found in TP9, not to mention the 18 ceramic discs in TP9, and the 11 found in TP11. The presence of these artifacts could represent either games or ritual activities in the streets, or it could represent accidental or purposeful dumping of these small objects just outside of compounds.

Plant remains in this context included both food and industrial uses, primarily peanuts, maize, avocado, gourd, cane, and unidentified wood species. The food elements were likely due to consumption during travel (peanut shells) or loss during transportation. Animal remains varied, but all four test pits included fish and birds. TP5 did not include mammal species, but the other three test pits did, including dog and *Lama sp*. TP5 may have been farther from large animal butchering sites, or may have been part of a compound that did not receive meat from mammalian species. Shell amounts were fairly consistent between TP5, 9, and 11, all containing around 2 kg of primarily *Donax obesulus*, though TP10 contained less than one kg. TP5 and 11 also contain *Semimytilus algosus* and *Perumytilus purpuratus*, possibly indicating more diverse diet in the compounds near those sections of the streets. TP11 contained some rope, which along with the *Lama sp.* it contains, could be indicative of nearby camelid herding or husbandry, though this evidence coming from a street context makes it somewhat weak.

6.1.3. Plaza Mayor (TP12)

The Plaza Mayor contains a variety of lithic materials, over 1200 ceramic vessel sherds, fragments of panpipes, ceramic discs, a spindle-whorl, food and industrial plants, some animal remains, and 385 shells. This wide variety of artifacts (see Table 14) indicates no distinct specialized use for the space.

Lithic artifacts include flakes, core fragments, polishing tools, hand grinders, and other fragments, indicating a variety of possible production activities, including lithic production ceramic decoration, and food processing. Only 5 out of the 1264 ceramic vessel sherds are decorated, and only 4 fineware, indicating an inclusive rather than exclusive atmosphere to an y possible feasting events. The panpipe fragments indicate possible ritual activity, though their ubiquity throughout the site may be due to popular use rather than any special function. The small amount (42 g) of animal remains recovered are mostly from bonito, a large fish, with some *Lama sp.* and dog remains as well, all larger animals. The shells are mostly *Donax obesulus*.

The heterogeneous nature of the assemblage denotes the Plaza Mayor as a possible dumping area, but its cobblestone-paved floor, a low wall, and the presence of lithic tools suggests something more. The primarily utilitarian pottery points to a possible food consumption or preparation area, or maybe a multi-functional public space where production, consumption, and discard happened together. Though not discussed earlier in this thesis, Plaza Mayor could represent a public exchange or production area, and its location as the terminus of a main avenue suggests that it was important in overall public life.

6.1.4. Defensive Wall (TP3)

The unit excavated under a defensive wall contains artifacts from all seven categories, but the most striking are the ceramic vessel sherds and shell, as they are the most prolific (Table 7). There are 584 ceramic vessel sherds in TP3, of which 14 are fineware and 15 are decorated. The shell has an MNI of 761, primarily *Donax obesulus*. Other ceramics (non-vessel) include panpipe fragments and 5 ceramic discs. Lithics include a possible tool fragment, core, disc, and quartz. Plant remains represent a mix of industrial and food items, including branches, cane, maize, and gourd. Animal remains are mostly *Lama sp.*, with some bird and guinea pig. There are a few textile fragments as well, making this unit one of the few excavated to contain textiles.

The heavy amount of shell and ceramic vessel sherds compared to other artifact categories suggests that maybe the area was used for some form of feasting or daily eating. The presence of a stone tool fragment somewhat supports this assessment, though further analysis is needed. The overall heterogeneous nature of the assemblage is hard to interpret however, leading to the possibility that this was another multi-functional area.

6.1.5. Platforms/Construction Fill (TP6, 7, 13, 14)

The infill of the platforms represents a mixture of trash and soil from various contexts, making them excellent examples of secondary deposition. All contained ceramic vessel sherds, other ceramics (non-vessel), plant remains, animal remains, and shell (Table8, 9, 15, 16). However, TP6 did not contain lithics or textiles, an interesting contrast given the ubiquity of lithics throughout the other test pits, and the fact that some of the best preserved textiles come from another platform infill context (TP7). TP6 also contains one of the simplest assemblage of artifacts from the test pits, with only 136 ceramic vessel sherds (all utilitarian), some ceramic discs, a spindle whorl, panpipe, 160 g of animal bones (mostly smaller fish), and one of the lowest amounts of shell recovered from the site (MNI=222, weight=357 g).

The other test pits in this category contain more trash, including small amounts of specialized lithics (a "knife" and "anthracite mirror fragment", TP7), lithic tools or evidence of lithic production (flakes, polishers, cores, TP13 and 14), ceramic vessel sherds (fineware and decorated in TP7 and 13, though TP14 contains even less, all utilitarian, than TP6), ceramic discs and panpipe sherds (though no discs in TP14). Organic elements include food and industrial plants (including gourd, maize, avocado, lucuma, pacae, cotton, peanuts, squash, pumpkin, cane as stabilizer, "plum", and soapberry), fish bones, dogs, other mammals, birds, rodents, guinea pigs, and deer, shell (*Donax obesulus*, *Perumytilus purpuratus*, *Semimytilus algosus*), and textiles.

Variation in each infill context could represent variation in source location and context, possibly related to social level or just availability of large trash dumping areas nearby. The high plant content (1.156 kg) of TP7 is due to the use of cane as stabilizer for various levels of infill. The appearance of possibly elite items (the unusual lithics in TP7, deer bones, fineware and decorated vessels) could indicate sourcing from higher-status households. TP7, located on the Cerro Cabeza de Leon, is part of an elevated "fortress" context and certainly begs further investigation.

6.1.6. Open-Air Middens/Trash Dumps (TP2, 15, 16)

As secondary trash deposition areas, I expected this category to contain a mix of organic and inorganic refuse, which it did. All three test pits contained at least some material from each research category, making this one of the most artifact-diverse test pit categories at Caylán (Table 4, 17, 18). There was some variation in content between middens, possibly an indication of preferential dumping area for certain artifact types.

Lithic tools with a variety of functions appear in all three test pits, including cores, choppers, cobbles, hammerstones, and a polisher. All three test pits also contain flakes, which are expected considering they are a form of waste material, and TP15 contains quartz. In terms of ceramic vessel sherds, all three test pits contain large (> 2kg) amounts, though only TP2 contains a high level of fineware sherds (n=20), which may indicate that fineware vessels were discarded elsewhere. In terms of non-pottery ceramics, all three contain panpipe fragments and discs, though none in large amounts (all <10), and only TP16 contained an identifiably different object in the form of a spindle whorl.

Corn and Gourd showed up in all three test pits, as did leaves and other fuel or industrial plants. TP15 and 16 also contained peanuts, seeds, and wood, and TP16 contained fruit peels and cane. These varying plant assemblages could relate to differential access to or reliance on agricultural goods, or it could be a side effect of poor plant material preservation. Animal remains included fish bones in both TP2 and 16, *Lama sp.* and a cormorant in TP15, and mammal bones in TP16. As mentioned in the previous chapter, the differential deposition of animal remains by size could reflect various behaviors, but was likely a result of access differences between the different groups that had access to each dumping area.

TP2 appears to be from an area with more reliance on marine resources, as it also contains the greatest shell diversity of the three test pits, containing *Donax obesulus*, *Perumytilus purpuratus*, and *Semimytilus algosus*, while TP15 and 16 primarily contain *Donax obesulus*. All three test pits also include textile fragments, including some with color still visible in TP2 and 16, as well as rope or thread in those two, and cotton in TP16. From this evidence, there may be an area close to TP16 that was used as a weaving or cotton processing area, likely a colonnaded patio in a walled compound.

6.1.7. Trash Flow from Densities and Mapping

The agglutinated, restricted nature of most of the architecture at Caylán created a space where trash had to be carefully handled to avoid unnecessary and unhealthy accumulations of waste. As a result, trash was deposited in varying areas of the site with respect to artifact type. Based on their heavy distribution in test pits 15 and 16 (8 N/m^3, 1.48 kg/m^3 and 12 N/m^3, 1.05 kg/m^3 respectively, vs. 5 N/m^3, 0.49 kg/m^3 average), lithics were primarily discarded into open-air trash middens to the peripheries of the city (Figures 41, 42). This behavioral pattern makes sense, as broken lithics would represent a danger underfoot, necessitating specialized discard locations to avoid injury. Within spatial categories, there is a similar distribution, lithic waste accumulating more towards the outside of the monumental core rather than towards the center.

Ceramic vessel sherds, one of the most numerous forms of waste on the site, also tended to accumulate higher in the open-air trash pits (Figures 43, 44), again likely due to such artifacts representing a hazard. Internal variation within spatial categories was similar to lithics, indicating that the two artifact categories were probably treated similarly due to similar risk factors (underfoot).

Other ceramic (non-pottery) artifacts were spread more across a number of contexts, deviating from the overall core/*pampa* dichotomy seen in the majority of depositional patterns. While test pits 15 and 16, located in middens, contained high numbers of these items, they were also present in high densities in the infill of platforms and in specific parts of the streets in the northern sector of the city. Interesting trends occur when densities are broken down by spatial category. Colonnaded patios contain the same density by number, though TP1 clearly carried the heaviest objects. Such a distribution indicates similar efforts to regulate the amount of this artifact category within these rooms, likely because of their function. While these artifacts generally match the same distribution of lithics and ceramic vessel sherds, there is an anomalously high concentration at TP9 within the street contexts. This possibly is a form of expedient dumping for later use, or due to roads and streets being more likely to accumulate refuse, especially at their termini or in residential areas (Figures 45, 46). A similar high concentration at TP11, another street context, is less easily explained because it is not a terminal location, but may still represent a household dumping location considering its proximity to nearby house compounds.

Animal bones cluster around the outside of the city (average 22.26 N/m^3, 83.15 g/m^3 in open-air middens/trash dumps vs. average 15 N/m^3, 24.43 g/m^3 all other test pits, Figures 47, 48), an unsurprising result given that animal remains would be smelly and thus unlikely to be kept or discarded in the immediate vicinity of house compounds for long. When compared by weight and number, there is an apparent difference, with some test pits containing fewer, heavier bones while other contain more numerous, lighter bones. Further examination of the data within each spatial category indicates that this difference occurs within open-air trash middens and the infill of platforms. Specifically, TP15 and 16 (open-air middens) contain heavier, less numerous bones, while TP6 (platform infill) contains lighter, more numerous bones. This information suggests that TP15 and 16, periphery trash areas, were probably the loci of large mammal dumping, while TP6 likely contains more fish or small animal bones. The test pit assemblages, indicating preferential dumping areas for different animals, confirm this hypothesis (Table 8, 17, and 18).

Plant remains and textile remains both tended to cluster to the south, specifically in the infill of platforms as uncovered by TP7 and 13 (Figures 49, 50). This result is unsurprising, given that these contexts would best preserve such fragile remains. However, there is a difference in the distribution of textiles. TP16, the open-air midden to the north, contains a higher density of textiles, indicating that it may have been a preferential dumping area for such waste, or that the residents of the northern sector had greater access to textiles than those to the west. The use of plant stabilizers for platforms also somewhat skews the results for that artifact category. Examination of the data by spatial category further reveals that colonnaded patios contained no textiles whatsoever, an interesting find that indicates a possible focus on keeping these areas free of excess waste.

The final artifact category, shells, followed a similar pattern to most other categories, that being most deposition occurring in test pits and the infill of platforms (Figures 51, 52). As noted in the previous chapter, weight matched up well with number, indicating no real preference for deposition of larger or smaller shells at any point of the site. The colonnaded patio examined by TP1 did contain an abnormally high amount of shells for that spatial category, indicating possible higher consumption of shellfish within that house compound, or possibly even a shellfish cooking/preparation area. Within platform/construction fill contexts, TP7 and 13 contain much higher amounts of shellfish, possibly indicating that the fill of these two platforms came more from open-air middens than other sources.

An area of particular interest is TP12. While located in an open plaza, TP12 exhibited a similar assemblage to open-air middens/trash dumps. Furthermore, TP12 contained a higher density of objects across several artifacts than other test pits placed within the monumental core. These results lead to a number of possible conclusions. The most likely explanation is that members of the surrounding house compounds used the Plaza Mayor as an expedient dumping location, an explanation that is strengthened by its location toward the end of a main thoroughfare. Another possibility is that plaza was used as a production area associated with the main mound and nearby compounds, or as a meeting place for trade or market activities. Finally, the Plaza Mayor could have been a form of stopping over area for camelid caravans bringing in supplies from other settlements, a hypothesis largely based on its location, open nature, and the presence of a few non-local foods and objects in its assemblage (Table 14).

While the amount of material within the Plaza Mayor is remarkably high for the monumental core of the site, it does not approach the high densities seen in the open-air middens/trash dumps and certain platforms/construction fills in all categories. It does appear to be similar overall to the density found in street contexts, which are other possible areas of expedient dumping, is located next to a main avenue of the site, and included major concentrations of both lithics and utilitarian ceramic vessel sherds. It is however, conspicuously absent of a high concentration of animal remains, and contains elements of possible low structures in the form of a wall that bisected the unit (Figure 18). Based on these lines of evidence, it can be suggested that the Plaza Mayor most likely served as a gathering place, possibly some sort of market or regulated trading area, with expedient dumping also occurring due to its location between Mound A and a main avenue.

6.1.8. Implications for Economy and Social Organization

In contrast to expectations of a specialized, non-residential mode of production, the presence of a variety of tools and craft making materials in residential contexts implies that residents of compounds at Caylán participated in a generalized domestic economy. Colonnaded patios in the compounds were used as multi-functional areas where craft production and food preparation, were carried out. Specialized workshops for trade or redistribution are not evident in the data, although the colonnaded patios may have been the source of a high volume of materials for both consumption and trade between households. The presence of trash associated with production in expedient dumping locations (i.e., TP5, 9, 10, 11) contributes to this conclusion: that production waste was left near house compounds if not dangerous or if reusable, and was sometimes even deposited within the house. This pattern of household refuse is very similar to that seen in the SIARs of Chan Chan, which were organized into tight clusters called *barrios* (Topic 1982:151-154).

The presence of trash across the city is similar to evidence seen from earlier cities, as discussed in Chapter 3. However, the use of agglutinated, walled compounds for residential areas at Caylán concentrates trash near living space, a problem usually not seen in these earlier contexts. The lack of specialized production areas contrasts with many later cities, including Pampa Grande, Huacas de Moche, and Chan Chan (Moseley 1975a:223; Shimada 1994:191-216; Uceda and Rengifo 2006), though the architectural layout contains elements similar to these later urban environments. Caylán is thus a unique example of production and trash flow in the Andes, and is possibly an example of bridging trends from generalized to specialized production in urban contexts.

Farming tools appear almost invisible in the Caylán assemblage, although plant processing tools (*batanes*, graters, etc.) are common, especially on the surface of the peripheries, suggesting the regular consumption of plant foods. The frequent appearance of domesticated food crops, especially maize, in various assemblages also points to the presence of an agrarian economy at Caylán. The lack of agrarian work tools does not imply that the residents of the monumental core did not participate in farming activities, but the ubiquity of tools used to produce ceramics and process textiles in compound side rooms implies that craft production was a part of domestic life. The ubiquity of polishing stones, tools used to decorate ceramics, indicates the commonplace nature of this activity within the city, though no direct evidence of ceramic production itself has yet been uncovered.

6.1.9. Daily Life at Caylán

The daily experience of city residents would have included the production, management, and deposition of trash. The presence of trash in every context speaks to the ubiquitous nature of waste in this early urban environment. As the economy of Caylán centered on generalized, residential production, the byproducts of craft production would have been one of the most frequently handled waste streams for its residents. Production activities at Caylán include the creation of cloth, ceramic vessels, figurines, and tools; the creation, use, and maintenance of bone, shell, and stone tools and ornaments, daily food production, and feasting events, would have necessitated the controlled dumping of large amounts of biological waste, preferably away from house compounds. The movement of animal bones and shellfish shells to the outskirts of the city supports the idea that biological waste was at least somewhat regulated. The use of trash as infill would also have served to preserve the appearance of cleanliness within the dense confines of the city.

The positioning of open-air trash pits in the northern and western edges of the site, between the urban sectors and the slopes of Cerro Caylán was a purposeful choice to take advantage of the prevailing wind patterns in the area (see Figure 5). Wind comes primarily from the south-southeast along the coast of Peru, meaning that offensive odors would have been carried toward the northwest. High densities of animal remains, including shells, imply that odorous or otherwise biologically untenable waste was indeed dumped into these areas, though there are exceptions (see TP7). The lack of architectural elements downwind of open-air middens supports this conclusion, though this evidence is negative and thus only a weak support for the claim.

6.1.10. Broader Implications and Applications

The results of this thesis support the use of artifact density in identifying and analyzing trash flow in an incipient urban complex. As archaeology moves away from the spectacular and more towards the mundane, the need for a proper methodological and theoretical thread to study everyday life becomes more important. As others have pointed out, artifact density is a useful tool in determining area function (see Schiffer 1996:279-282). By examining differential distribution of waste at Caylán, as well as providing interpretation, I present interpretations useful for comparative studies (within both the Andean region and elsewhere).

The methodology I have developed takes advantage of advances in spatial studies and GIS tools, but is limited in that my samples come from targeted, subsurface samples rather than random, surface survey. It is also limited in that it only examines artifact categories and general characteristics (total weight and number), and does not utilize more precise individual metrics. This methodology is not region-specific, making application to other early urban contexts possible. By identifying patterns of trash accumulation as well as areas of low density, this method can be used to infer human activities. Although there are some issues in the use of this method, namely that excavations were geographically biased towards examining architectural features and determining specific area functions, this thesis is a test case that shows its efficacy in illustrating potential differences in artifact concentrations utilizing small-scale excavations (i.e., test pits). Unfortunately, its lack of more artifact-specific data limit the methodologies usefulness in examining questions of lateral cycling, recycling and curation.

In terms of regional developments, this study provides evidence that urban complexity is not always coupled with craft specialization. Unlike later cultures, the residents of Caylán appear to be household producers, deciding for themselves what sort of materials they want to use and crafts they produce. The urban layout of Caylán, however, is similar to later cultures, such as the Moche, who developed specialized production areas and techniques (e.g., ceramic molds). This information implies that urban architectural complexity most likely came before increased social stratification and full-time artisans. Future research (see below) may uncover evidence refuting this conclusion, but it does provide a direction for understanding the complexity of urban lifeways in the Andes. As mentioned earlier, urban development in the Andean region is a multi-faceted phenomenon, occurring in different times and locations in differing patterns. By introducing a new methodology in this thesis, I hope to contribute to the developing picture of prehistoric Andean urbanism as a whole.

In relation to wider modern issues, as well as prehistoric urban sites worldwide, my methodology helps define what material patterns reflect differential artifact production and discard in a generalized, household-based economy. Furthermore, as human populations increase and continue to migrate into larger and denser urban settlements, understanding the consequences associated with cramped urban lifestyles becomes increasingly important. High levels of urban discard lead to issues of waste management. The example of Caylán provides one interesting solution. Solid waste was reused in this dense urban environment to renovate, expand, and modify existing structures, a lesson in sustainability that is interesting given current attitudes toward the environment and eco-friendly lifeways.

6.1.11. Future Research

Further investigations are needed to properly understand the nature and extent of trash production and deposition at Caylán. A systematic surface survey targeted at ceramics would address issues of vessel shapes, styles, and densities as proxies for various functions, cultural affiliations, and activity intensity. Excavations, especially in the peripheries of the monumental core, could provide deeper temporal evidence for other behavioral patterns and social stratification in relation to trash. Only one unit (UBE3) was placed in an area that may contain lower-status structures. UBE3 partially uncovered a trash midden that contained large amounts of shells from a number of marine species (MNI = 13,513, NISP = 28, weight = 41.3 kg). Excavation was never completed on this unit, as there was simply too much material to catalog after the 2009 field season. However, the high amount of trash and its proximity to several possible residential structures point to an area of preferential dumping, most likely a communal trash pit used by the residents of the area.

Even in the urban core, excavations were limited to less than one percent of the total area. Although excavation units were spread over the urban core to examine different contexts, there are still a number of areas that require investigation, including the structures on and around the Cerro Cabeza de León and the walled compounds in the northwest. These areas could provide further insights into trash flow, as evidenced by TP7, placed on Cerro Cabeza de León, which shows evidence of dumping activity. The house compounds could provide more information on household economy and trash production at the domestic level, as well as potentially social stratification and urban planning at Caylán.

A systematic survey of the nearby fields and *pampa* utilizing small excavation units (2x1 m) would help identify other areas of high trash density, or simply other areas of human occupation, aiding in the planning of larger excavations. Surface collection and remote sensing would also provide ample data about areas that have not yet been excavated. A similar method in the urban core and surrounding peripheries would help confirm or reject the general trash model I have developed for Caylán by providing a more complete picture of the differential distribution of waste. Further excavation in the peripheries may also uncover specialized workshops placed away from the compounds to avoid the noise and waste streams of craft production.

More detailed analyses of individual artifact categories could also yield significant information about the use of space and human activity at Caylán. Information about individual artifacts, including size and weight, especially ceramic sherds, as well as accurate description and identification would improve our overall of the site by providing data for trample or breaking patterns. This is necessary to explore the transport of artifacts and their curation. Our understanding of lithic tool use is limited, as there is little to no data yet collected on edge-wear patterns or examination of possible retouching. All of this information is useful for identifying sites of primary, secondary, and de facto discard, something this thesis could not quite do.

6.2. Final Comments

The model I produced at the beginning of this thesis suggested that in an urban, agrarian economy that there are certain expectations in regards to craft production and spatial distribution of waste. In a complex, urban society, we expect to see specialized production of different materials and a detachment of these production activities from residential areas into specialized, corporate contexts. Waste from these activities would then be transported to designated dumping areas, which would contain evidence of their origin in primary production areas. However, the results generated from the excavations at Caylán challenge these assumptions about specialized production and urban complexity.

While the artifacts uncovered at Caylán suggest the beginning of production specialization (compare the differential assemblages in the colonnaded patios), the discovery of heterogeneous refuse assemblages across the site indicates that, at least spatially, production was not separated into specialized sectors. While there are open-air middens along the site peripheries, their heterogeneous content (refuse from all seven research categories) suggests that they come from residential activities, not specialized production (which would be more homogeneous, i.e., refuse from one or only a few of the research categories).

My results suggest that the residents of Caylán participated in a relatively generalized, domestic economy. Individual households produced crafts and goods not just for their own use, but potentially also for trade, or redistribution in ritual events. Trash from this production model, as well as the refuse of daily subsistence, was placed into both expedient dumps and reused as infill in construction projects. More dangerous and smelly goods, as well as some less harmful items, were placed into open-air middens in the peripheries of the urban core.

Caylán represents an important piece of Peruvian prehistory. Studying Caylán strengthens our growing understanding of the complexity of prehispanic urban lifeways. As archaeology expands and redefines itself, we find more and more that linear models and strictly quantitative methods have a narrow usefulness. This thesis shows how a quantitative methodology, combined with the application of some qualitative aspects, is useful in examining prehistoric urban environments.

BIBLIOGRAPHY

Ascher, R.

1959 A Prehistoric Population Estimate Using Midden Analysis and Two Population Models. *Southwestern Journal of Anthropology* 15(2):168-178.

Barcelo, J. A. and M. Pallares

1998 Beyond GIS: The Archaeology of Social Spaces. *Archeologia e Calcolatori* 9:47-80.

Bawden, G.

1977 Galindo and the Nature of the Middle Horizon in Northern Coastal Peru. Doctoral dissertation, Harvard University, Cambridge.

1982 Community Organization Reflected by the Household: A Study of Pre-Columbian Social Dynamics. *Journal of Field Archaeology* 9(2):165-181.

1989 The Andean State as a State of Mind. *Journal of Anthropological Research* 45(3):327-332.

1995 The Structural Paradox: Moche Culture as Political Ideology. *Latin American Antiquity* 6(3):255-273.

1996 *The Moche*. Blackwell Publishers, Cambridge.

Bennett, R. J., R. P. Haining and D. A. Griffith

1984 Review Article: The Problem of Missing Data on Spatial Surfaces. *Annals of the Association of American Geographers* 74(1):138-156.

Bennett, W. C.

1939 *Archaeology of the North Coast of Peru, an Account of Exploration and Excavation in Viru and Lambayeque Valleys*. Anthropological Papers of the American Museum of Natural History. The American Museum of Natural History, New York.

Binford, L. R.

1962 Archaeology as Anthropology. *American Antiquity* 28(2):217-225.

1964 A Consideration of Archaeological Research Design. *American Antiquity* 29(4):425-441.

1965 Archaeological Systematics and the Study of Culture Process. *American Antiquity* 31(2):203-210.

1967 Smudge Pits and Hide Smoking: The Use of Analogy in Archaeological Reasoning. *American Antiquity* 32(1):1-12.

Brennan, C. T.

1978 Investigations at Cerro Arena, Peru: Incipient Urbanism on the Peruvian North Coast. Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.

1980 Cerro Arena: Early Cultural Complexity and Nucleation in North Coastal Peru. *Journal of Field Archaeology* 7(1):1-22.

1982 Cerro Arena: Origins of the Urban Tradition on the Peruvian North Coast. *Current Anthropology* 23(3):247-254.

Burger, R. L.

1981 The Radiocarbon Evidence for the Temporal Priority of Chavín de Huantar. *American Antiquity* 46(3):592-602.

1984 Unity and Heterogeneity within the Chavín Horizon. In *Peruvian Prehistory: An Overview of Pre-Inca and Inca Society*, edited by R. W. Keatinge, pp. 99-144. Cambridge University Press, Cambridge.

1992 *Chavín and the Origins of Andean Civilizations*. Thames and Hudson, Ltd., London.

Canziani, J.

2012 *Ciudad y Territorio en los Andes: Contribuciones a la Historia del Urbanismo Prehispánico*. Fondo Editorial de la Pontificia Universidad Católica del Perú, Lima.

Chapdelaine, C.

2002 Out in the Streets of Moche: Urbanism and Sociopolitical Organization at a Moche IV Urban Center. In *Andean Archaeology 1: Variations in Sociopolitical Organization*, edited by W. H. Isbell and H. Silverman, pp. 53-88. Kulmer Academics/Plenum Publishers, New York.

2011 Recent Advances in Moche Archaeology. *Journal of Archaeological Research* 19(2):191-231.

Chicoine, D.

2006 Early Horizon Architecture at Huambacho, Nepeña Valley, Peru. *Journal of Field Archaeology* 31(1):1-22.

2011 Feasting Landscapes and Political Economy at the Early Horizon Center of Huambacho, Nepeña Valley, Peru. *Journal of Anthropological Archaelogy* 30:432-453.

Chicoine, D. and H. Ikehara

2009 *Informe Técnico Final del Trabajo de Campo del Proyecto de Investigación Arqueológica Caylán (Temporada 2009)*. Instituto Nacional de Cultura del Perú, Lima.

2010 Nuevas evidencias sobre el Formativo del valle de Nepeña: Resultados preliminares de la primera temporada de investigaciones en Caylán. *Boletín de Arquelogía PUCP* 12 (2008):349-370.

2011 *Informe Técnico Final del Trabajo de Campo del Proyecto de Investigación Arqueológica Caylán (Temporada 2010)*. Instituto Nacional de Cultura del Perú, Lima.

2014 Ancient Urban Life in the Nepeña Valley, North-Central Coast of Peru: Investigations at the Early Horizon Center of Caylán. *Journal of Field Archaeology* 39(4):336-352.

Chicoine, D. and C. Rojas

2012 Marine Exploitation and Paleoenvironment as Viewed through Molluscan Resources at the Early Horizon Center of Huambacho, Nepeña Valley, Coastal Ancash. *Andean Past* 10:284-290.

2013 Shellfish Resources and Maritime Economy at Caylán, Coastal Ancash, Peru. *The Journal of Island and Coastal Archaeology* 8(3):336-360.

Clement, B.

2012 Late Formative Plant use and Diet at Caylán (Peru) as Seen Through the Analysis of Macrobotanical Remains and Human Feces, Geography and Anthropology, Louisiana State University, Baton Rouge.

Costin, C. L.

1991 Craft Specialization: Issues in Defining, Documenting, and Explaining the Organization of Production. *Archaeological Method and Theory* 3:1-56.

Costin, C. L. and M. B. Hagstrum

1995 Standardization, Labor Investment, Skill, and the Organization of Ceramic Production in Late Prehispanic Highland Peru. *American Antiquity* 60(4):619-639.

Cotrina, J., V. Peña, A. Tandaypan and E. Pretell

2003 Evidencias Salinar: sitios VN-35 y VN-36, Sector Sute Bajo, valle de Nepeña. *Revista Arqueológica SIAN* 14:7-12.

Cowgill, G. L.

2004 Origins and Development of Urbanism: Archaeological Perspectives. *Annual Review of Anthropology* 33:525-549.

Cummings, L. S., P. Kovacik, K. Puseman, C. Yost and M. Logan

2013 What's for Dinner? A Record of Past Culinary Practices from the First Millennium B.C.E. Nepeña. In *SAA 78th Annual Meeting*, Honolulu, HI.

Daggett, R. E.

1983 Megalithic Sites in the Nepeña Valley, Peru. In *Investigations of the Andean Past,* edited by D. H. Sandweiss. Cornell University Latin American Program, Ithaca.

1984 The Early Horizon Occupation of the Nepena Valley, North Central Coast of Peru. Doctoral dissertation, Anthropology, University of Massachusets, Amherst.

1987 Reconstructing the Evidence for Cerro Blanco and Punkuri. *Andean Past* 1(1):111-132.

Dietler, M.

2010 Theorizing the Fest: Rituals of Consumption, Commensal Politics, and Power in African Contexts. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by B. Hayden and M. Dietler, pp. 65-114. The University of Alabama Press, Tuscaloosa.

Engel, F. A.

1978 Toward a Typology of Architecture and Urbanism in the Pre-Columbian Andes. In *Advances in Andean Archaeology*, edited by D. L. Browman, pp. 411-441. Mouton Publishers, The Hague.

EPA, U.

2012 Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012, edited by U. S. E. P. Agency.

Feldman, R. A.

1980 Aspero, Perú: Architecture, Subsistence, Economy and Other Artifacts of a Maritime Chiefdom. Ph.D. dissertation, Anthropology, Harvard University, Cambridge.

1985 Preceramic Corporate Architecture: Evidence for the Development of Non Egalitarian Social Systems in Perú In *Early Ceremonial Architecture in the Andes*, edited by C. B. Donnan, pp. 71-92. Dumbarton Oaks, Washington, D.C.

Flannery, K. V.

1976 *The Early Mesoamerican Village*. Studies in Archaeology. Academic Press, New York.

Gade, D. W.

1967 The Guinea Pig in Andean Folk Culture. *Geographical Review* 57(2):213-224.

Goldstein, D. J. and I. Shimada

2010 Feeding the Fire: Food and Craft Production in the Middle Sicán Period (AD 950-1050). In *Inside Ancient Kitchens: New Directions in the Study of Daily Meals and Feasts*, edited by E. A. Klarich, pp. 161-189. University Press of Colorado, Boulder.

Gordon, R. W. and P. Phillips

1955 Method and Theory in American Archeology II: Historical-Developmental Interpretation. *American Anthropologist* 57(4):723-819.

Graham, N. E. and W. B. White

1988 The El Niño Cycle: A Natural Oscillator of the Pacific Ocean-Atmosphere System. *Science* 240(4857):1293-1302.

Haas, J. and W. Creamer

2006 Crucible of Andean Civilization: The Peruvian Coast from 3000 to 1800 BC. *Current Anthropology* 47(5):745-775.

Hagstrum, M.

2001 Household Production in Chaco Canyon Society. *American Antiquity* 66(1):47-55.

Hagstrum, M. B.

1985 Measuring Prehistoric Ceramic Craft Specialization: A Test Case in the American Southwest. *Journal of Field Archaeology* 12(1):65-75.

Haviland, W. A.

1974 Occupational Specialization at Tikal, Guatemala: Stoneworking-Monument Carving. *American Antiquity* 39(3):494-496.

Hayashida, F. M.

1999 Style, Technology, and State Production: Inka Pottery Manufacture in the Leche Valley, Peru. *Latin American Antiquity* 10(4):337-352.

Helmer, M.

2011 Social Life and Ancient Andean Public Landscapes: Actions and Performances as Seen Through the Use of a First Millennium BCE Plaza at Caylán, Peru. M.A. thesis, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Helmer, M. and D. Chicoine

2013 Soundscapes and Community Organisation in Ancient Peru: Plaza Architecture at the Early Horizon Centre of Caylán. *Antiquity* 87(335):92-107.

In press Seaside Life in Early Horizon Peru: Preliminary Insights from Samaco, Nepeña Valley. *Journal of Field Archaeology*.

Helmer, M., D. Chicoine and H. Ikehara

2012 Plaza and Public Performance at the Early Horizon Center of Caylán, Coastal Ancash, Peru. *Ñawpa Pacha: Journal of Andean Archaeology* 32(1):85-114.

Horkheimer, H.

1965 *Identificación y bibliografía de importantes sitios prehispánicos del Perú*. Arqueológicas ; 8. Museo Nacional de Antropología y Arqueología, Pueblo Libre, Lima.

Hugill, W. M.

1931 The Condition of Streets in Ancient Athens and in Ancient Rome. *The Classical Weekly* 24(21):162-164.

Ikehara, H.

2010 Kushipampa: el final del Periodo Formativo en el valle de Nepeña. *Boletín de Arqueología PUCP* 12 (2008):371-404.

Ikehara, H. and D. Chicoine

2011 Hacia una reevaluación de Salinar desde la perspectiva del valle de Nepeña, costa de Ancash. In *Arqueología de la Costa de Ancash*, edited by M. Giersz and I. Ghezzi, pp. 153-184. vol. 8. Andes.

Ikehara, H. and K. Shibata

2008 Festines e integracíon social en el Periodo Formativo: nuevas evidencias de Cerro Blanco, valle bajo de Nepeña. *Boletín de Arquelogía PUCP* 9 (2005):123-159.

Isbell, W. H. and K. J. Schreiber

1978 Was Huari a State? *American Antiquity* 43(3):372-389.

Isbell, W. H. and A. Vranich

2004 Experiencing the Cities of Wari and Tiwanaku. In *Andean Archaeology*, edited by H. Silverman, pp. 167-182. Blackwell Publishers, Oxford.

Joyce, A. A.

2010 Expanding the Feast: Food Preparation, Feasting, and the Social Negotiation of Gender and Power. In *Inside Ancient Kitchens: New Directions in the Study of Daily Meals and Feasts*, edited by E. A. Klarich, pp. 221-239. University Press of Colorado, Boulder.

Kaulicke, P.

2010 *Los Cronologías del Formativo: 50 años de investigaciones japonesas en perspectiva*. Fondo Editorial de la Pontifica Universidad Católica del Perú, Lima.

Kent, S.

1983 The Differentiation of Navajo Culture, Behavior, and Material Culture: A Comparative Study in Culture Change. *Ethnology* 22(1):81-91.

1989 And Justice for All: The Development of Political Centralization among Newly Sedentary Foragers. *American Anthropologist* 91(3):703-712.

1992a The Current Forager Controversy: Real versus Ideal Views of Hunter-Gatherers. *Man* 27(1):45-70.

1992b Studying Variability in the Archaeological Record: An Ethnoarchaeological Model for Distinguishing Mobility Patterns. *American Antiquity* 57(4):635-660.

1995 Does Sedentarization Promote Gender Inequality? A Case Study from the Kalahari. *The Journal of the Royal Anthropological Institute* 1(3):513-536.

1999 The Archaeological Visibility of Storage: Delineating Storage from Trash Areas. *American Antiquity* 64(1):79-94.

Klarich, E. A.

2010 Behind the Scenes and Into the Kitchen: New Directions for the Study of Prehistoric Meals. In *Inside Ancient Kitchens: New Directions in the Study of Daily Meals and Feasts*, edited by E. A. Klarich, pp. 1-15. University Press of Colorado, Boulder.

Klymyshyn, A.

1982 The Elite Compounds in Chan Chan. In *Chan Chan: Andean Desert City*, edited by M. E. Moseley and K. C. Day, pp. 119-143. University of New Mexico Press, Albuquerque, NM.

Kosok, P.

1965 *Life, Land, and Water in Ancient Peru*. Long Island University Press, New York.

Larco, R.

1944 *Cultura Salinar: Síntesis Monográfica*. Sociedad Geográfica Americana, Buenos Aires.

Lockard, G. D.

2005 Political Power and Economy at the Archaeological Site of Galindo. Doctoral dissertation, Anthropology, University of New Mexico, Albuquerque.

2009 The Occupational History of Galindo, Moche Valley, Peru. *Latin American Antiquity* 20(2):279-302.

Longacre, W. A.

1964 Archeology as Anthropology: A Case Study. *Science* 144(3625):1454-1455.

1966 Changing Patterns of Social Integration: A Prehistoric Example from the American Southwest. *American Anthropologist* 68(1):94-102.

1975 Population Dynamics at the Grasshopper Pueblo, Arizona. *Memoirs of the Society for American Archaeology* (30):71-74.

2000 Exploring Prehistoric Social and Political Organization in the American Southwest. *Journal of Anthropological Research* 56(3):287-300.

Longacre, W. A. and G. L. Cowgill

1974 Models of Cultural Process; Testing Hypotheses: Suggestions from Southwestern Archaeology. *Bulletin of the American Schools of Oriental Research. Supplementary Studies* (20):29-40.

Lumbreras, L. G.

1974 *The Peoples and Cultures of Ancient Peru*. Smithisonian Insitution Press, Washington, D.C.

Makowski, K.

2008 Andean Urbanism. In *Handbook of South American Archaeology*, edited by H. Silverman and W. H. Isbell, pp. 633-657. Springer, New York.

Millaire, J.-F.

2010 Primary State Formation in the Virú Valley, North Coast of Peru. *Proceedings of the National Academy of Sciences of the United States of America* 107(14):6186-6191.

Millaire, J.-F. and E. Eastaugh

2011 Ancient Urban Morphology in the Virú Valley, Peru: Remote Sensing Work at the Gallinazo Group Site (100 B.C.-A.D. 700). *Journal of Field Archaeology* 36(4):289-297.

Millaire, J.-F. and M. Morlion (editors)

2009 *Gallinazo: An Early Cultural Tradition on the Peruvian North Coast*. UCLA Cotsen Institute of Archaeology Press, Los Angeles.

Miller, G. R. and R. L. Burger

1995 Our Father the Cayman, Our Dinner the Llama: Animal Utilization at Chavin de Huantar, Peru. *American Antiquity* 60(3):421-458.

Moore, J. D.

1996 The Archaeology of Plazas and the Proxemics of Ritual: Three Andean Traditions. *American Anthropologist* 98(4):789-802.

Moseley, M. E.

1975a Chan Chan: Andean Alternative of the Preindustrial City. *Science* 187(4173):219-225.

1975b *The Maritime Foundations of Andean Civilization*. Cummings Publishing Company, Menlo Park.

Mujica, E.

1984 Cerro Arena-Layzón: relaciones costa-sierra en el Norte del Perú. *Gaceta Arqueológica Andina* 10:12-15.

Murra, J.

1956 The Economic Organization of the Inca State. Dissertation, Anthropology Department, University of Chicago, Chicago.

Museo de Arqueología y Antropología, U. N. M. d. S. M.

2005 *Arqueología del Valle de Nepeña: Excavaciones en Cerro Blanco y Punkuri*. Museo de Arqueología Antropología, Universidad Nacional Mayor de San Marcos, Lima.

Nash, D. J.

2010 Fine Dining and Fabulous Atmosphere: Feasting Facilities and Political Interaction in the Wari Realm. In *Inside Ancient Kitchens: New Directions in the Study of Daily Meals and Feasts*, edited by E. A. Klarich, pp. 83-109. University Press of Colorado, Boulder.

ONERN

1972 *Inventario, evaluación y uso racional de los recursos naturales de la costa: cuencas de los ríos Santa, Lacramarca y Nepeña*. Oficina Nacional de Evaluación de Recursos Naturales, Lima.

Parsons, M. H.

1970 Preceramic Subsistence on the Peruvian Coast. *American Antiquity* 35(3):292-304.

Phillips, P. and R. W. Gordon

1953 Method and Theory in American Archeology: An Operational Basis for Culture-Historical Integration. *American Anthropologist* 55(5):615-633.

1957 Comment on "Method and Theory in American Archeology". *American Antiquity* 23(2):185.

Potter, J. M.

2000 Pots, Parties, and Politics: Communal Feasting in the American Southwest. *American Antiquity* 65(3):471-492.

Pozorski, S.

1979 Prehistoric Diet and Subsistence of the Moche Valley, Peru. *World Archaeology* 11(2):163-184.

Pozorski, S. and T. Pozorski

1986 Recent Excavations at Pampas de las Llamas-Moxeke, a Complex Initial Period Site in Peru. *Journal of Field Archaeology* 13(4):381-401.

1987a Chavin, the Early Horizon and the Initial Period. In *The Origins and Development of the Andean State*, edited by J. Haas, S. Pozorski and T. Pozorski, pp. 36-46. Cambridge University Press, Cambridge.

1987b *Early Settlement and Subsistence in the Casma Valley, Peru*. University of Iowa Press, Iowa City.

1990 Reexamining the Critical Preceramic/Ceramic Period Transition: New Data from Coastal Peru. *American Anthropologist* 92(2):481-491.

Pozorski, T. and S. Pozorski

1990 Huaynuná, a Late Cotton Preceramic Site on the North Coast of Peru. *Journal of Field Archaeology* 17(1):17-26.

2005 Architecture and Chronology at the Site of Sechín Alto, Casma Valley, Peru. *Journal of Field Archaeology* 30(2):143-161.

Proulx, D. A.

1968 *An Archaeological Survey of the Nepena Valley, Peru. Research Report 02*. University of Massachusetts, Amherst.

Rathje, W. L., W. W. Hughes, D. C. Wilson, M. K. Tani, G. H. Archer, R. G. Hunt and T. W. Jones

1992 The Archaeology of Contemporary Landfills. *American Antiquity* 57(3):437-447.

Rathje, W. L., C. Murphy

1992 *Rubbish! The Archaeology of Garbage: What our garbage tells us about ourselves*. HarperCollins, New York.

Raymond, J. S.

1981 The Maritime Foundations of Andean Civilization: A Reconsideration of the Evidence. *American Antiquity* 46(4):806-821.

Reid, J. J. and B. K. Montgomery

1998 The Brown and the Gray: Pots and Population Movement in East-Central Arizona. *Journal of Anthropological Research* 54(4):447-459.

Reid, J. J., W. L. Rathje and M. B. Schiffer

1974 Expanding Archaeology. *American Antiquity* 39(1):125-126.

Reid, J. J., M. B. Schiffer and W. L. Rathje

1975 Behavioral Archaeology: Four Strategies. *American Anthropologist* 77(4):864-869.

Reid, J. J., M. B. Schiffer, S. M. Whittlesey, M. J. Hinkes, A. P. Sullivan, III, C. E. Downum, W. A. Longacre and H. D. Tuggle

1989 Perception and Interpretation in Contemporary Southwestern Archaeology: Comments on Cordell, Upham, and Brock. *American Antiquity* 54(4):802-814.

Rick, J. W.

2005 The Evolution of Authority and Power at Chavín de Huántar, Peru. *Archaeological Papers of the American Anthropological Association* 14:71-89.

Rick, J. W., C. J. Mesía, D. A. Contreras, S. R. Kembel, R. M. Rick, M. P. Sayre and J. Wolf

2011 La cronología de Chavín de Huantár y sus implicancias para el Periodo Formativo. *Boletín de Arquelogía PUCP* 13 (2009):87-132.

Rowe, J. H.

1962 Stages and Periods in Archaeological Interpretation. *Southwestern Journal of Anthropology* 18(1):40-54.

1963 Urban Settlements in Ancient Peru. *Ñawpa Pacha: Journal of Andean Archaeology* 1:1-28.

Sandweiss, D. H., B. R. James, III, E. J. Reitz, H. B. Rollins and K. A. Maasch

1996 Geoarchaeological Evidence from Peru for a 5000 Years B.P. Onset of El Niño. *Science* 273(5281):1531-1533.

Schaedel, R. P.

1966 Incipient Urbanization and Secularization in Tiahuanacoid Peru. *American Antiquity* 31(3):338-344.

1978 The City and the Origin of the State in America. In *Urbanization in the Americas from Its Beginning to the Present*, edited by R. P. Schaedel, J. E. Hardoy and N. S. Kinzer, pp. 31-49. Mouton Publishers, Paris.

Schiffer, M. B.

1972 Archaeological Context and Systemic Context. *American Antiquity* 37(2):156-165.

1975 Archaeology as Behavioral Science. *American Anthropologist* 77(4):836-848.

1976 *Behavioral Archaeology*. Studies in Archaeology. Academic Press, New York.

1995 *Behavioral Archaeology: First Principles*. University of Utah Press, Salt Lake City.

1996 *Formation Processes of the Archaeological Record*. University of Utah Press, Salt Lake City.

Schiffer, M. B., A. R. Miller

1999 *The Material Life of Human Beings: Artifacts, behavior, and communication*. Routledge, London.

Schiffer, M. B. and J. M. Skibo

1987 Theory and Experiment in the Study of Technological Change. *Current Anthropology* 28(5):595-622.

1989 A Provisional Theory of Ceramic Abrasion. *American Anthropologist* 91(1):101-115.

1997 The Explanation of Artifact Variability. *American Antiquity* 62(1):27-50.

Shady, R.

2003 America's First City? The Case of Late Archaic Caral. In *Andean Archaeology III: North and South*, edited by W. H. Isbell and H. Silverman, pp. 28-66. Springer Science, New York.

Shady, R. and C. Leyva

2003 *La ciudad sagrada de Caral-Supe*. Insituto Nacional de Cultura and Proyecto Especial Arqueológico Caral-Supe, Lima.

Shady, R. S., J. Haas and W. Creamer

2001 Dating Caral, a Preceramic Site in the Supe Valley on the Central Coast of Peru. *Science* 292(5517):723-726.

Shepard, D.

1968 A two-dimensional interpolation function for irregularly-spaced data. *Proceedings of the 23rd ACM national Conference*:517-524.

Shibata, K.

2010 Cerro Blanco de Nepeña dentro de la dinámica interactiva del Periodo Formativo. *Boletín de Arquelogía PUCP* 12 (2008):287-315.

2011 Cronología, relaciones interregionales y organización social en el Formativo: esencia y perspectiva del valle bajo de Nepeña. In *Arqueologia de la Costa de Ancash*, edited by M. Giersz and I. Ghezzi, pp. 113-134. vol. vol. ANDES Boletin del Centro de Estudios Precolombinos de la Universidad de Varsovia 8. Centro de Estudios Precolombinos de la Universidad de Varsovia/Institut Français d'Études Andines, Warsaw/Lima.

Shimada, I.

1978 Economy of a Prehistoric Urban Context: Commodity and Labor Flow at Moche V Pampa Grande, Peru. *American Antiquity* 43(4):569-592.

1981 The Batán Grande-La Leche Archaeological Project: The First Two Seasons. *Journal of Field Archaeology* 8(4):405-446.

1994 *Pampa Grande and the Mochica Culture*. University of Texas Press, Austin.

Shimada, I., C. B. Schaaf, L. G. Thompson and E. Mosley-Thompson

1991 Cultural Impacts of Severe Droughts in the Prehistoric Andes: Application of a 1,500-Year Ice Core Precipitation Record. *World Archaeology* 22(3):247-270.

Shimada, M. and I. Shimada

1985 Prehistoric Llama Breeding and Herding on the North Coast of Peru. *American Antiquity* 50(1):3-26.

Silverman, H.

1994 The Archaeological Identification of an Ancient Peruvian Pilgrimage Center. *World Archaeology* 26(1):1-18.

Sinopoli, C. M.

1988 The Organization of Craft Production at Vijayanagara, South India. *American Anthropologist* 90(3):580-597.

Skibo, J. M.

1992 *Pottery Function: Interdisciplinary Contributions to Archaeology*. Springer Press.

Skibo, J. M., M. B. Schiffer and K. C. Reid

1989 Organic-Tempered Pottery: An Experimental Study. *American Antiquity* 54(1):122-146.

Stahl, P. W. and J. A. Zeidler

1990 Differential Bone-Refuse Accumulation in Food-Preparation and Traffic Areas on an Early Ecuadorian House Floor. *Latin American Antiquity* 1(2):150-169.

Stich, K. and D. Chicoine

2013 The Paleoethnobotany of Inicipient Urbanism at Caylán. In *SAA 78th Annual Meeting*, Honolulu, HI.

Swenson, E. R.

2003 Cities of Violence: Sacrifice, Power and Urbanization in the Andes. *Journal of Social Archaeology* 3(2):256-296.

2011 Stagecraft and Politics of Spectacle in Ancient Peru. *Cambridge Archaeological Journal* 21(2):283-313.

Tello, J. C.

1939 Sobre el descubrimiento de la cultura Chavín del Perú. *PRoceedings of the 27th International Congress of Americanists* 1:231-252.

1943 Discovery of the Chavín Culture in Peru. *American Antiquity* 9(1):135-160.

1960 *Chavín, cultura matriz de la civilización andina*. la Universidad de San Marcos, Lima.

Topic, J. R.

1982 Lower-Class Social and Economic Organization at Chan Chan. In *Chan Chan: Andean Desert City*, edited by K. C. Day and M. E. Moseley. University of New Mexico Press, Albequerque.

Trigger, B. G.

1968 Major Concepts of Archaeology in Historical Perspective. *Man* 3(4):527-541.

1984 Archaeology at the Crossroads: What's New? *Annual Review of Anthropology* 13:275-300.

Uceda, S.

2010 Los contextos urbanos de producción artesanal en el complejo arqueológico de las huacas del Sol y de la Luna. *Bulletin de l'Institut Français d'Études Andines* 39(2):243-297.

Uceda, S. and C. Rengifo

2006 La especialización del trabajo: teoría y arqueología. El caso de los orfebres Mochicas. *Bulletin de l'Institut Français d'Études Andines* 35(2):149-185.

van Gijseghem, H.

2001 Household and Family at Moche, Peru: An Analysis of Building and Residence Patterns in a Prehispanic Urban Center. *Latin American Antiquity* 12(3):257-273.

Wang, H.-J., R.-H. Zhang, J. Cole and F. Chavez

1999 El Nino and the Related Phenomenon Southern Oscillation (ENSO): The Largest Signal in Interannual Climate Variation. *Proceedings of the National Academy of Sciences of the United States of America* 96(20):11071-11072.

Warner, J. P.

2010 Interpreting the Architectonics of Power and Memory at the Late Formative Center of Jatanca, Jequetepeque Valley, Peru. Doctoral dissertation, Anthropology, University of Kentucky, Lexington.

White, J.-A.

2004 Early Valdivia Ceramics: Production and Consumption at Loma Alto and Real Alto. M.A. thesis, Department of Archaeology, University of Calgary, Calgary.

Wilk, R. and M. B. Schiffer

1979 The Archaeology of Vacant Lots in Tucson, Arizona. *American Antiquity* 44(3):530-536.

Wilson, D. J.

1981 Of Maize and Men: A Critique of the Maritime Hypothesis of State Origins on the Coast of Peru. *American Anthropologist* 83(1):93-120.

APPENDIX A: FIGURES

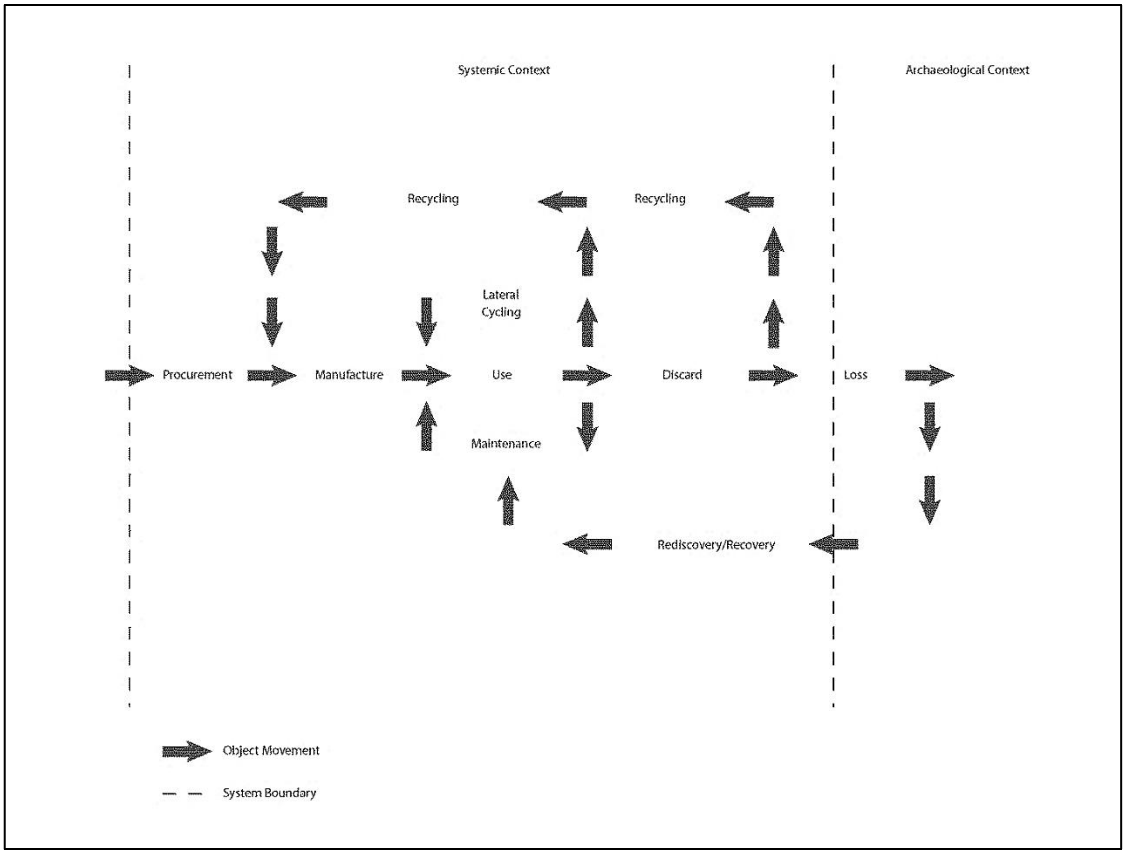


Figure 1 - Flow Model of Use-life for Durable Elements (modified from Schiffer 1972:158, Figure 1)

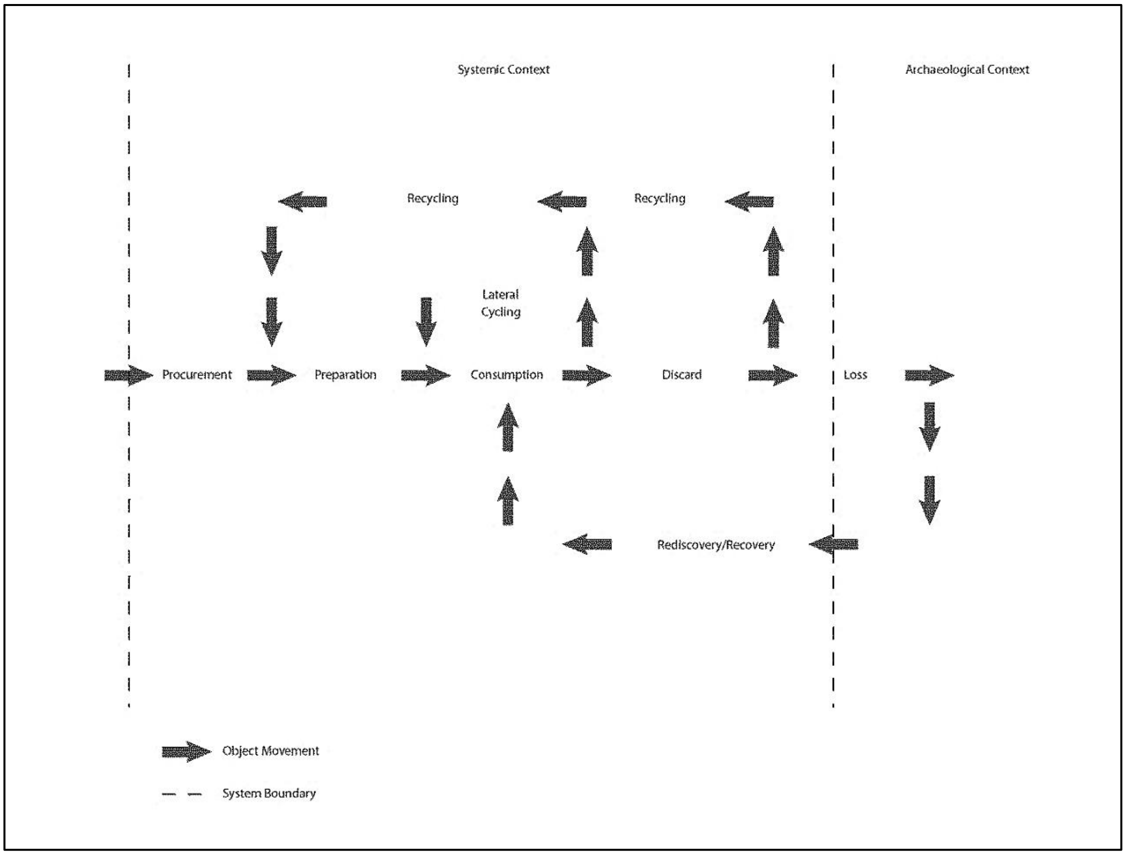


Figure 2 - Flow Model of Use-life for Consumable Elements (modified from Schiffer 1972:159, Figure 2)

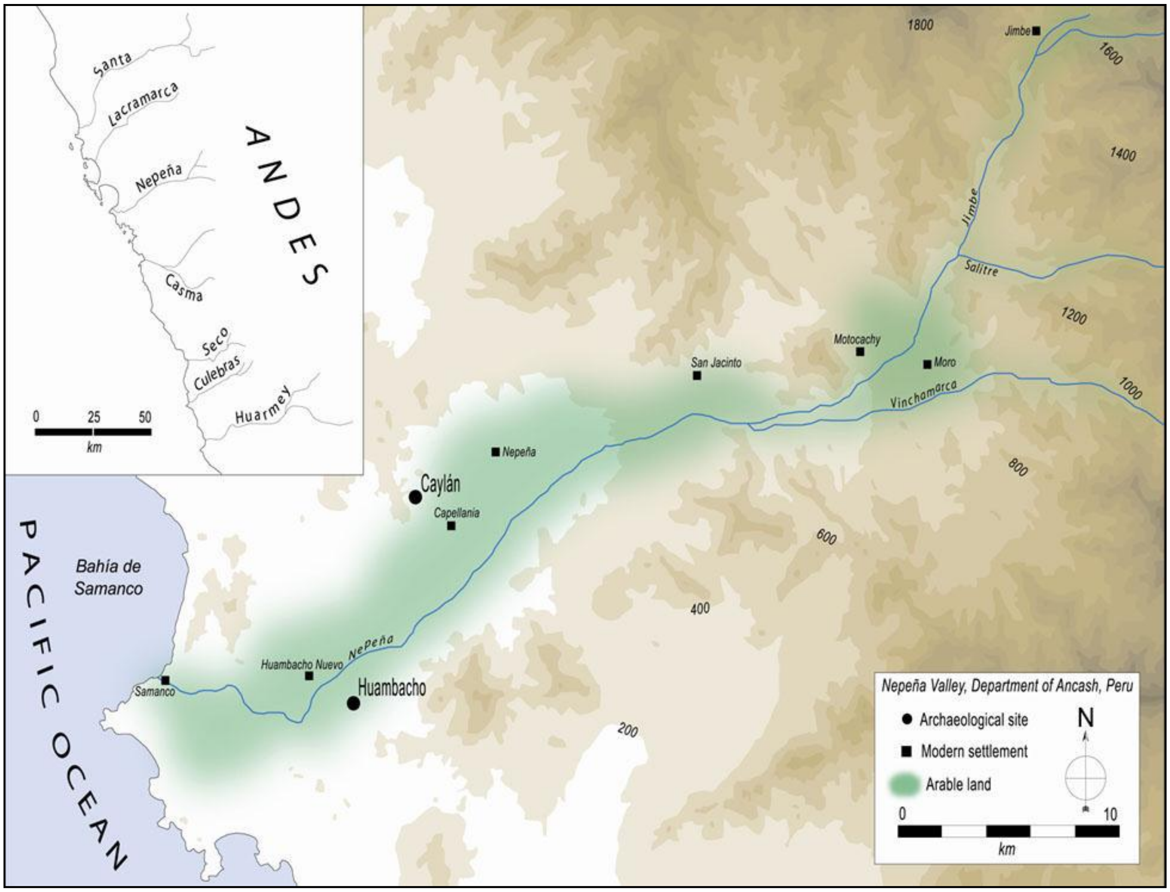


Figure 3 - The Nepeña Valley, Drawing by David Chicoine (Helmer 2011:35, Figure 3)

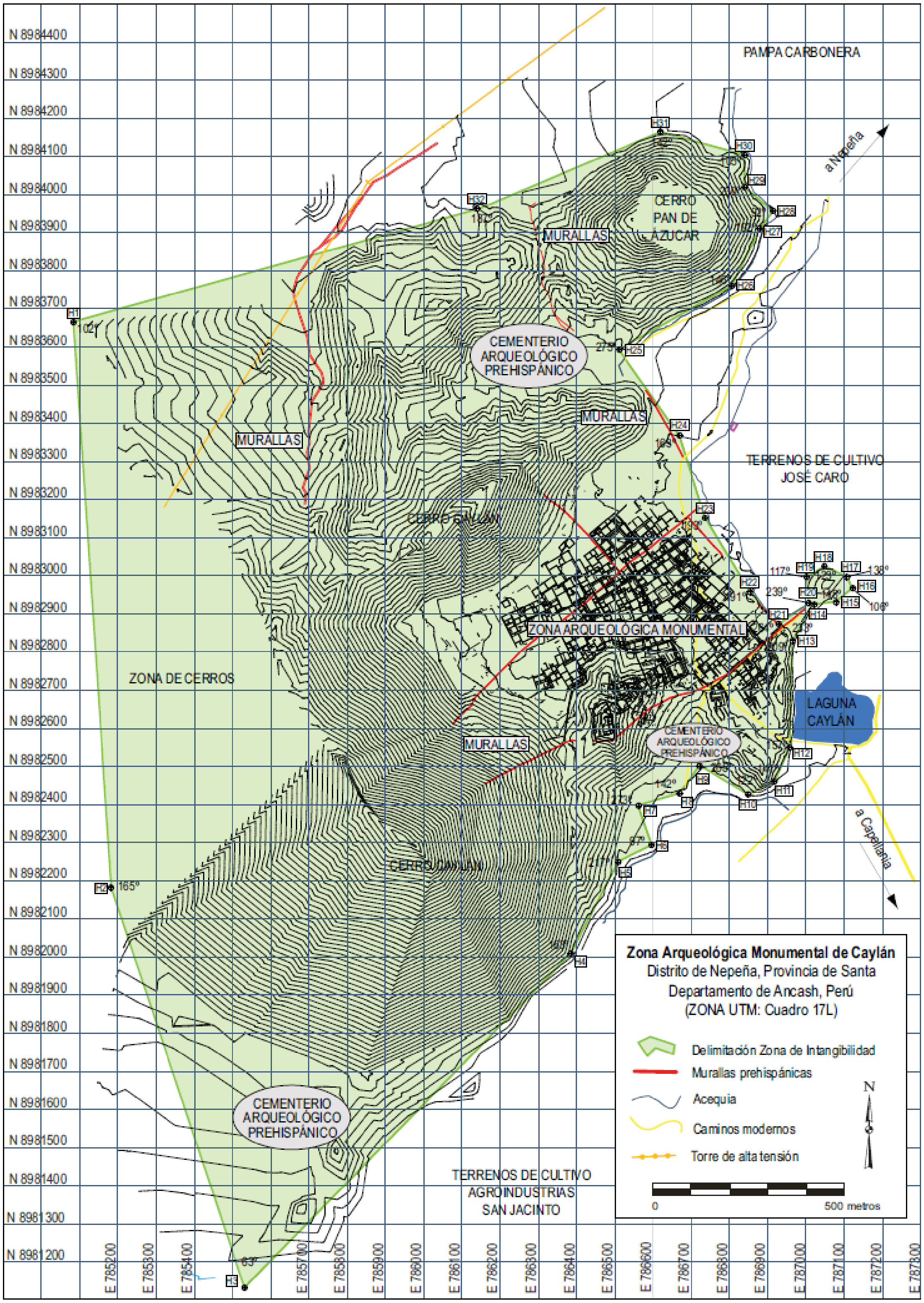


Figure 4 - Map of the Caylán Archaeological Zone, the defensive walls are highlighted in red (Chicoine and Ikehara 2011:177, Figure 138)

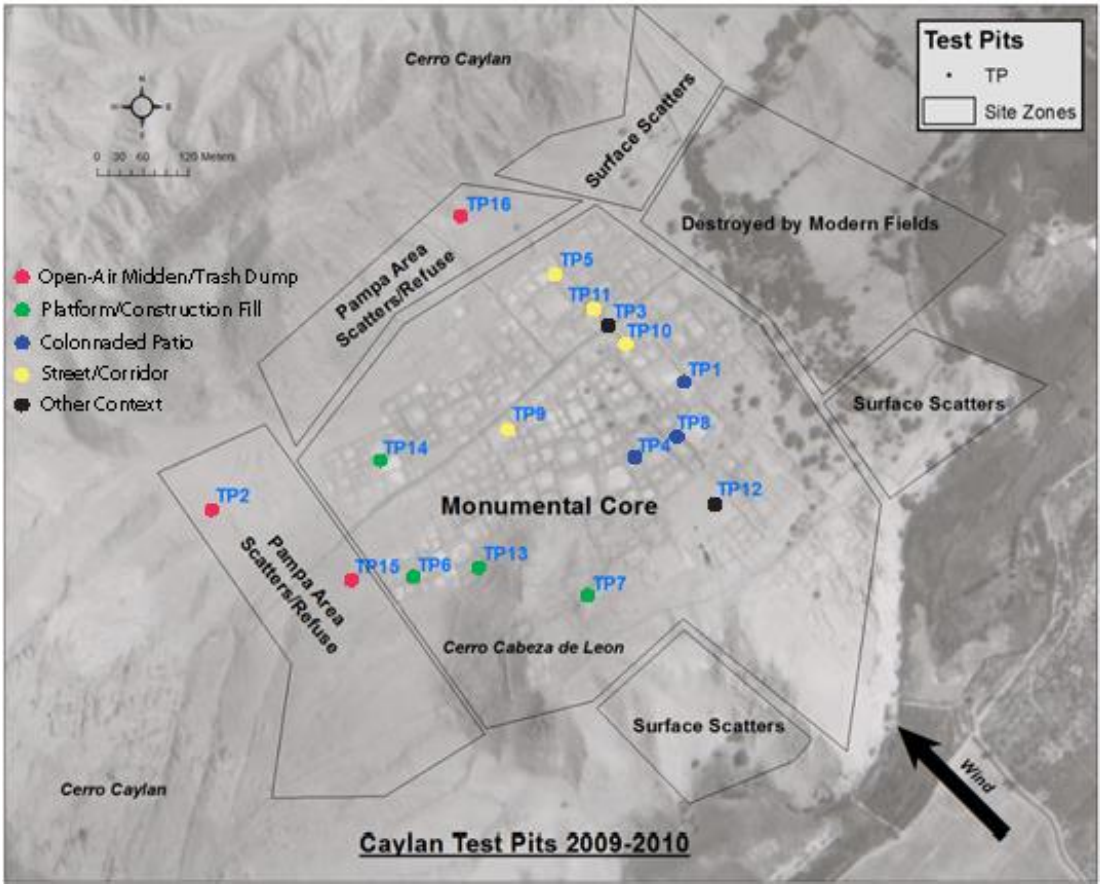


Figure 5 - TP Excavations and Associated Areas, 2009-2010, Mapping: Jacob Warner; Data and Polygons Courtesy of PIAC, David Chicoine; Aerial Photograph, Servicio Fotográfico Nacional 173:45

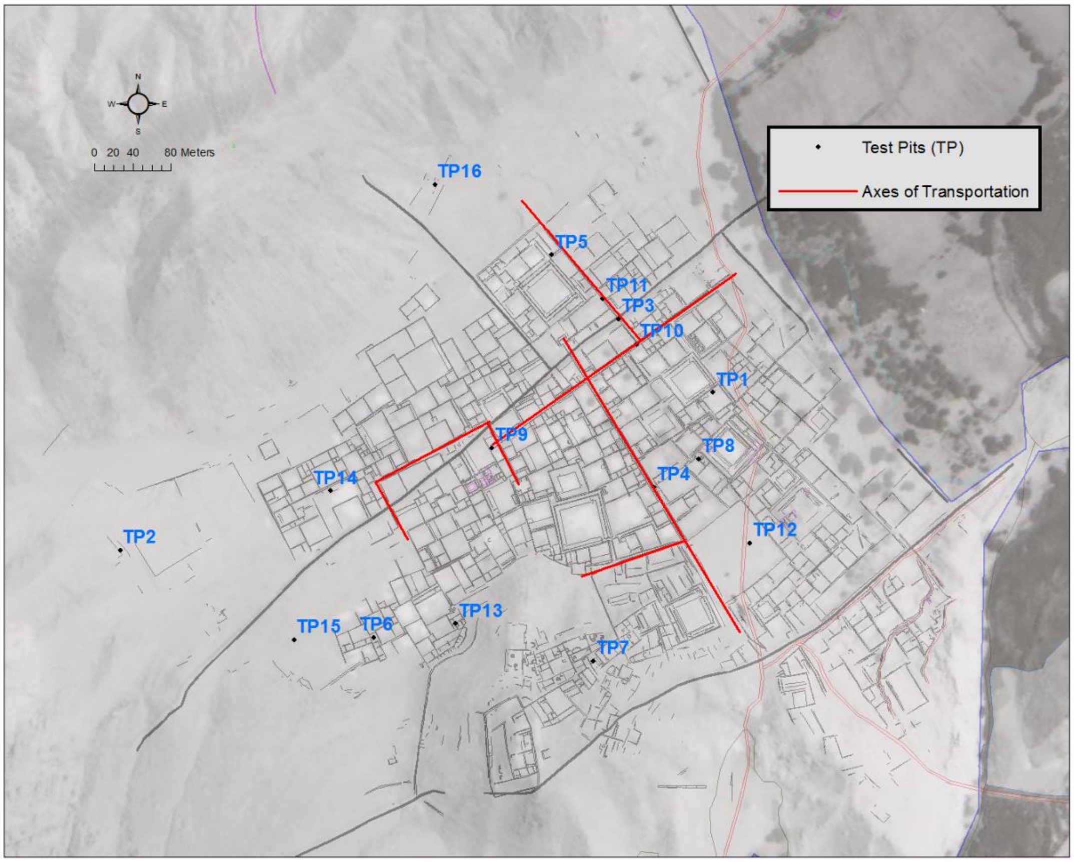


Figure 6 - Avenues and streets at Caylan, polygons courtesy of PIAC, mapping by Jacob Warner.

Figure 7 - TP1, photo credit: David Chicoine

Figure 8 – TP2, notice the shallowness of the unit, photo credit: David Chicoine

Figure 9 – TP3, note the layers of plant material, photo credit: David Chicoine

Figure 10 – TP4, which includes a large amount of shell in the northeast wall, photo credit: David Chicoine

Figure 11 – TP5, including a highly compacted sub-corridor area, photo credit: David Chicoine

Figure 12 - TP6, photo credit: David Chicoine

Figure 13 - TP7, note the layering with plant material used as stabilizer, photo credit: David Chicoine

Figure 14 - TP8, photo credit: David Chicoine

Figure 15 – TP9, photo credit: David Chicoine

Figure 16 - TP10, photo credit: David Chicoine

Figure 17 - TP11, photo credit: David Chicoine

Figure 18 - TP12, note the wall dividing the unit in the middle, Photo Courtesy David Chicoine

Figure 19 - TP13, Note the dense refuse infill, photo credit: David Chicoine

Figure 20 - TP14, photo credit: David Chicoine

Figure 21 - TP15, note the surrounding surface material, photo credit: David Chicoine

Figure 22 - TP16, note the refuse still present in the walls, photo credit: David Chicoine

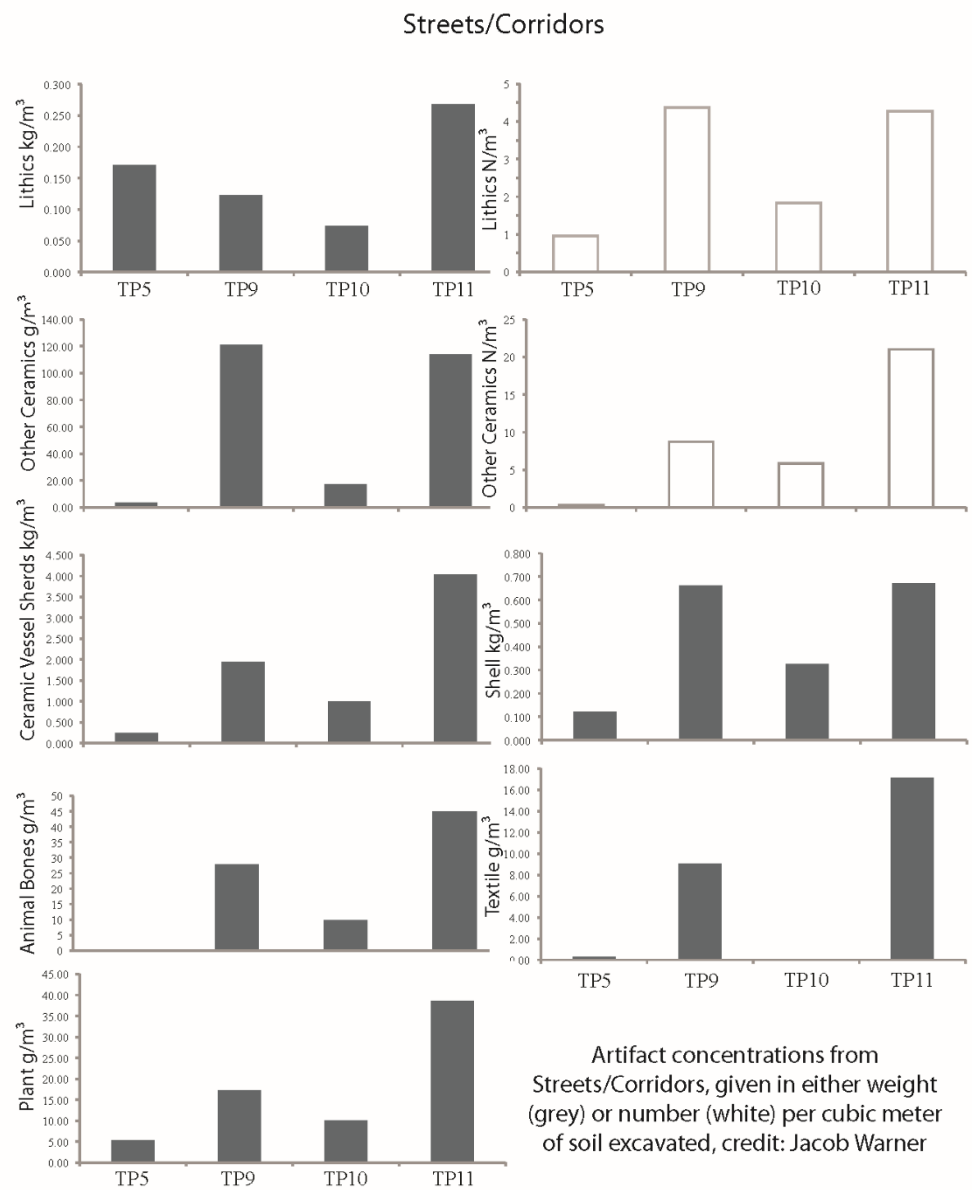


Figure 23 - Artifact concentrations from TP5, 9, 10, and 11, credit: Jacob Warner

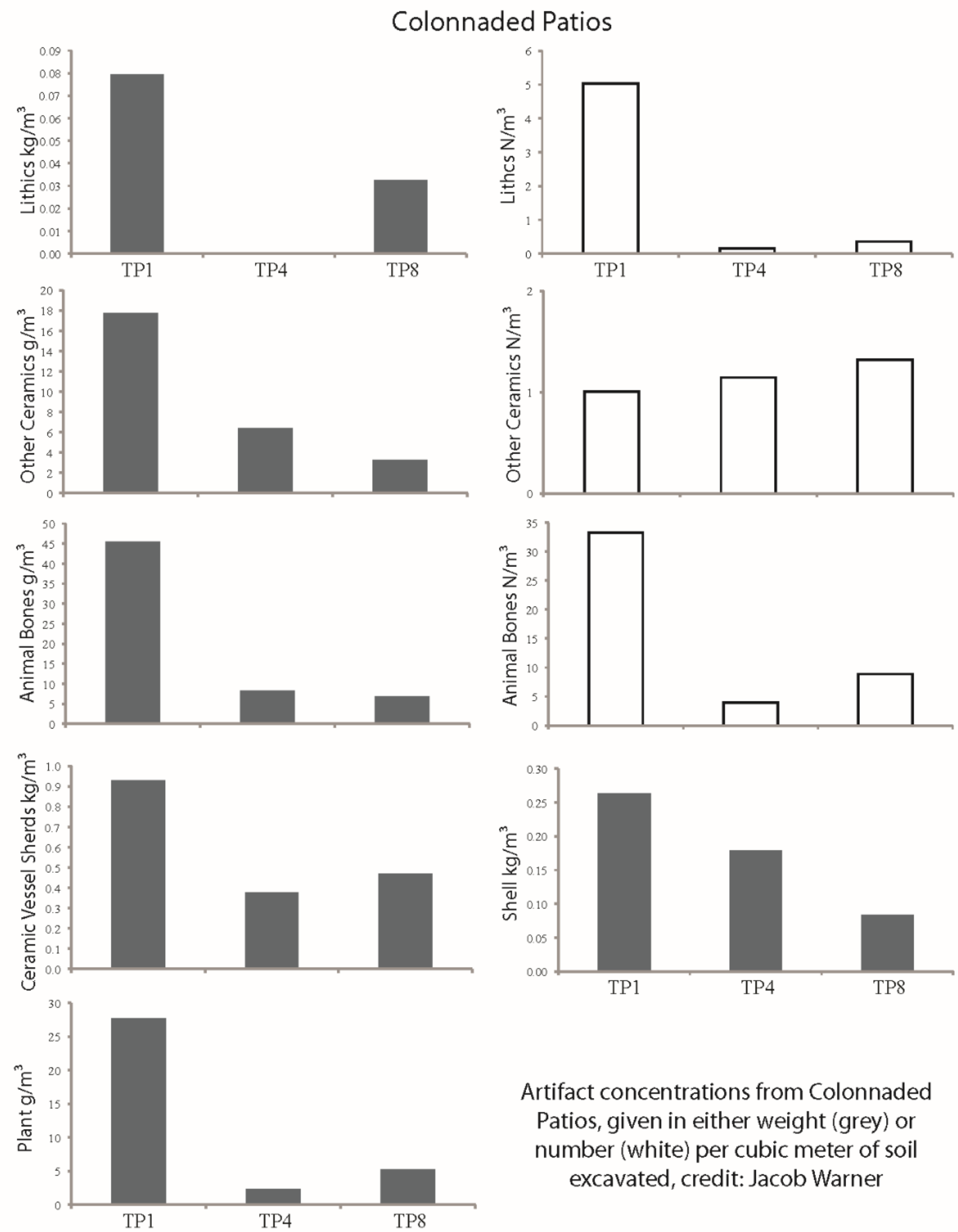
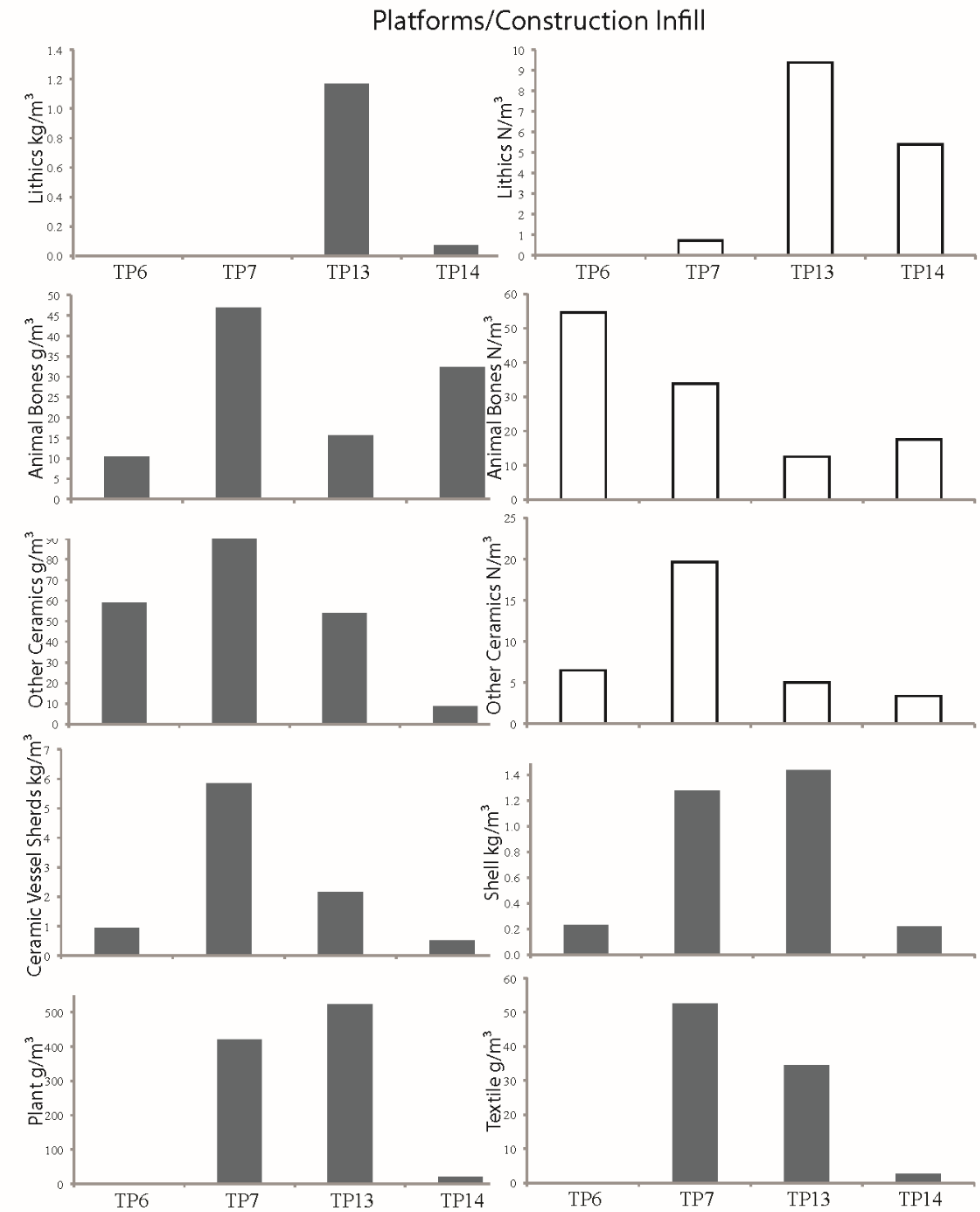
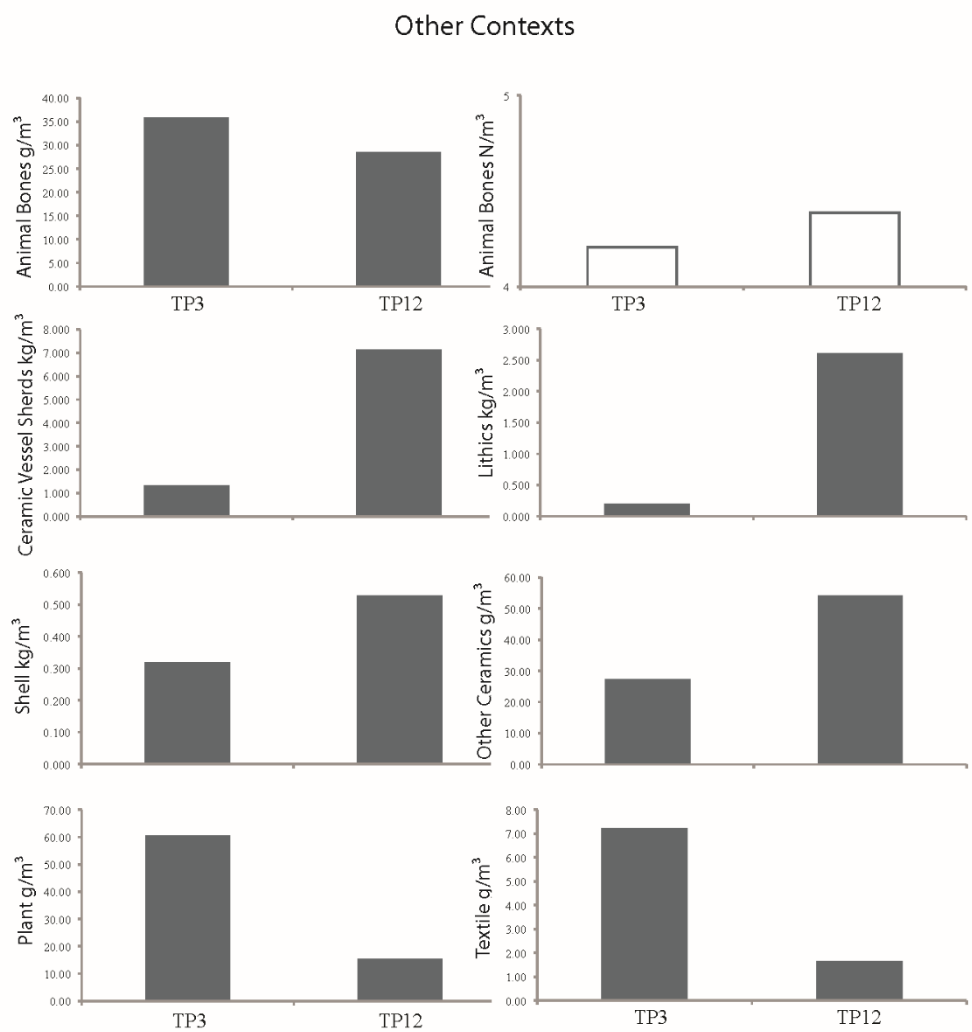


Figure 24 - Artifact concentrations from TP1, 4, and 8, credit: Jacob Warner



Artifact concentrations from Platform/ Construction Infills, given in either weight (grey) or number (white) per cubic meter of soil excavated, credit: Jacob Warner

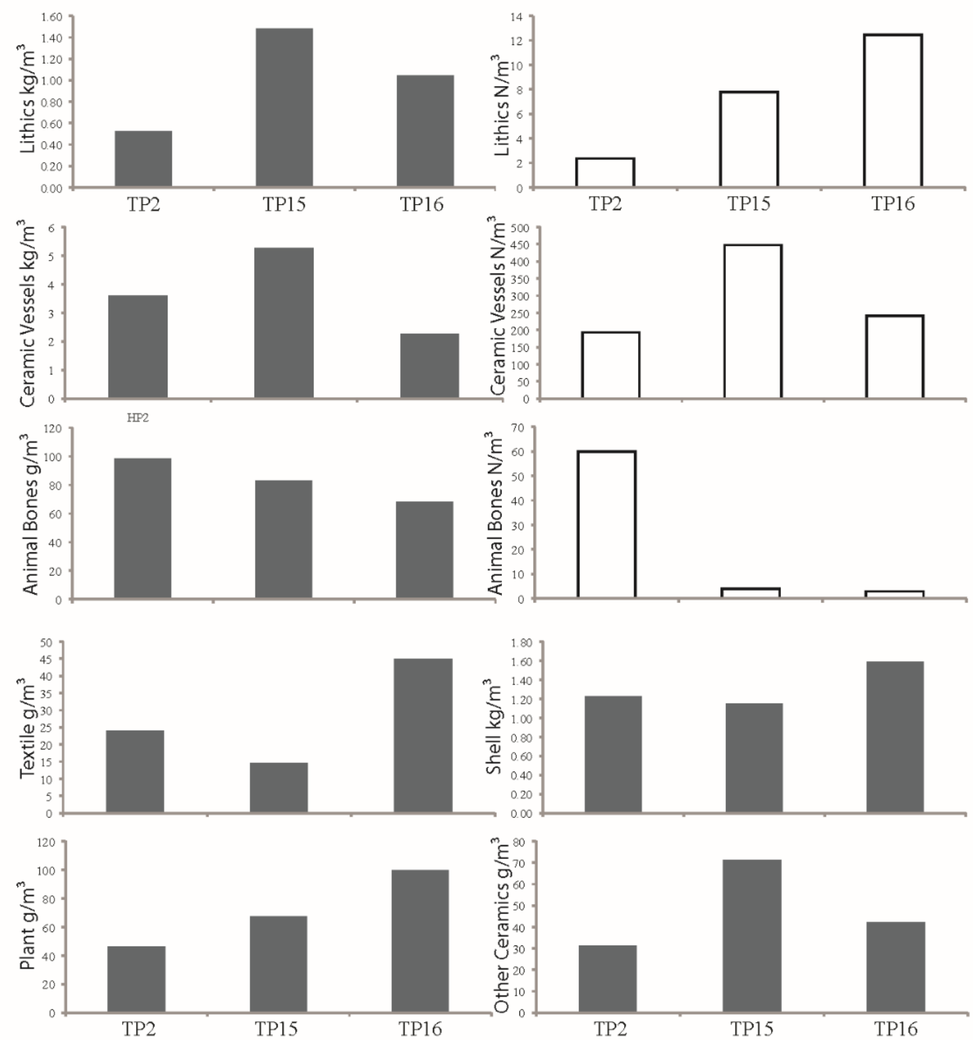
Figure 25 - Artifact concentrations from TP6, 7, 13, and 14, credit: Jacob Warner



Artifact concentrations from below a defensive wall (TP3) and an open plaza (Plaza Mayor - TP12). Concentrations are presented by weight (grey) or number (white), credit: Jacob Warner

Figure 26 - Artifact concentrations from TP3 and 12, credit: Jacob Warner

Open-Air Middens/Trash Dumps



Artifact concentrations from Open-Air Middens/Trash Dumps, given in either weight (grey) or number (white) per cubic meter of soil excavated, credit: Jacob Warner

Figure 27 - Artifact concentrations from TP2, 15, and 16, credit: Jacob Warner

Figure 28 - Chopper recovered from Unit of Block Excavation 5, photo credit: Matthew Helmer

Figure 29 - Flake recovered from Unit of Block Excavation 5, photo credit: Matthew Helmer

Figure 30 - Ground slate points recovered from Unit of Block Excavation 4, photo credit: David Chicoine

Figure 31 – Ceramic Graters, photo credit: David Chicoine

Figure 32 - Ceramic Sherd Discs or Tokens, photo credit: David Chicoine

Figure 33 - Ceramic Panpipes, photo credit: David Chicoine

Figure 34 - Ceramic Tiles, photo credit: David Chicoine

Figure 35 - Ceramic Spindle-whorl, photo credit: David Chicoine

Figure 36 - Various macrobotanical remains recovered in 2010, photo credit: David Chicoine

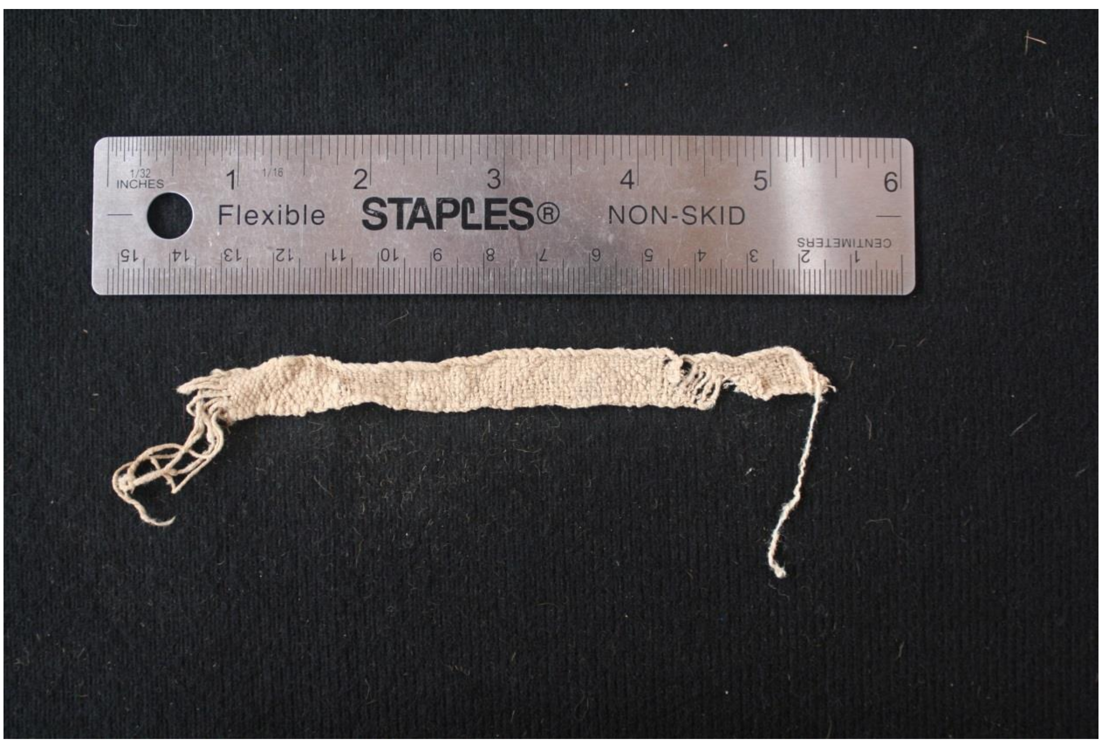


Figure 37 - Textile fragment recovered from TP7, photo credit: Flannery Surette

Figure 38 - Textile fragment recovered from TP13, photo credit: Flannery Surette

Figure 39 - Textile fragment recovered from TP11, photo credit: Flannery Surette

Figure 40 - Textile fragment recovered from TP16, photo credit: Flannery Surette

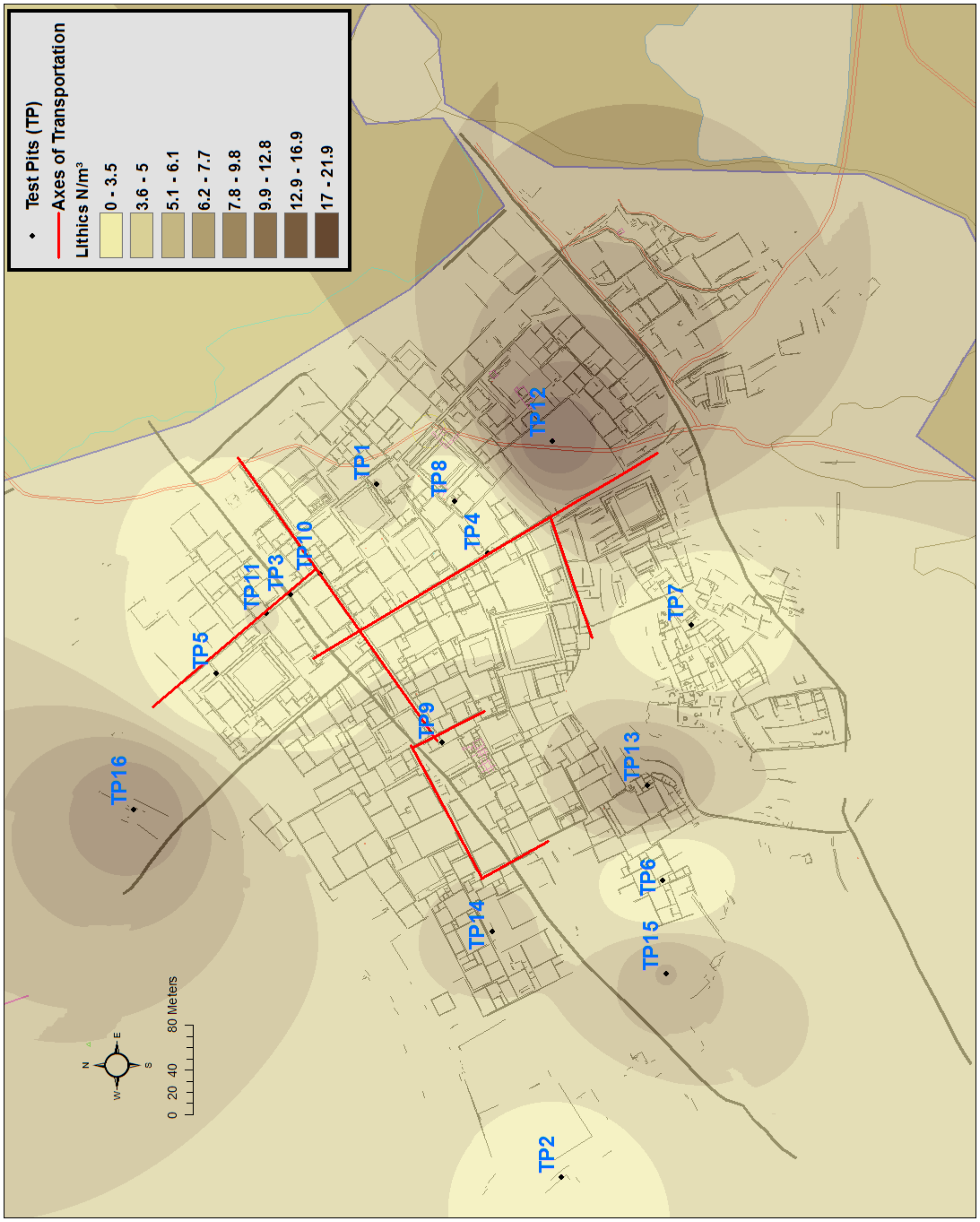


Figure 41 - IDW map of Lithic Densities by number per cubic meter of soil, credit: Jacob Warner

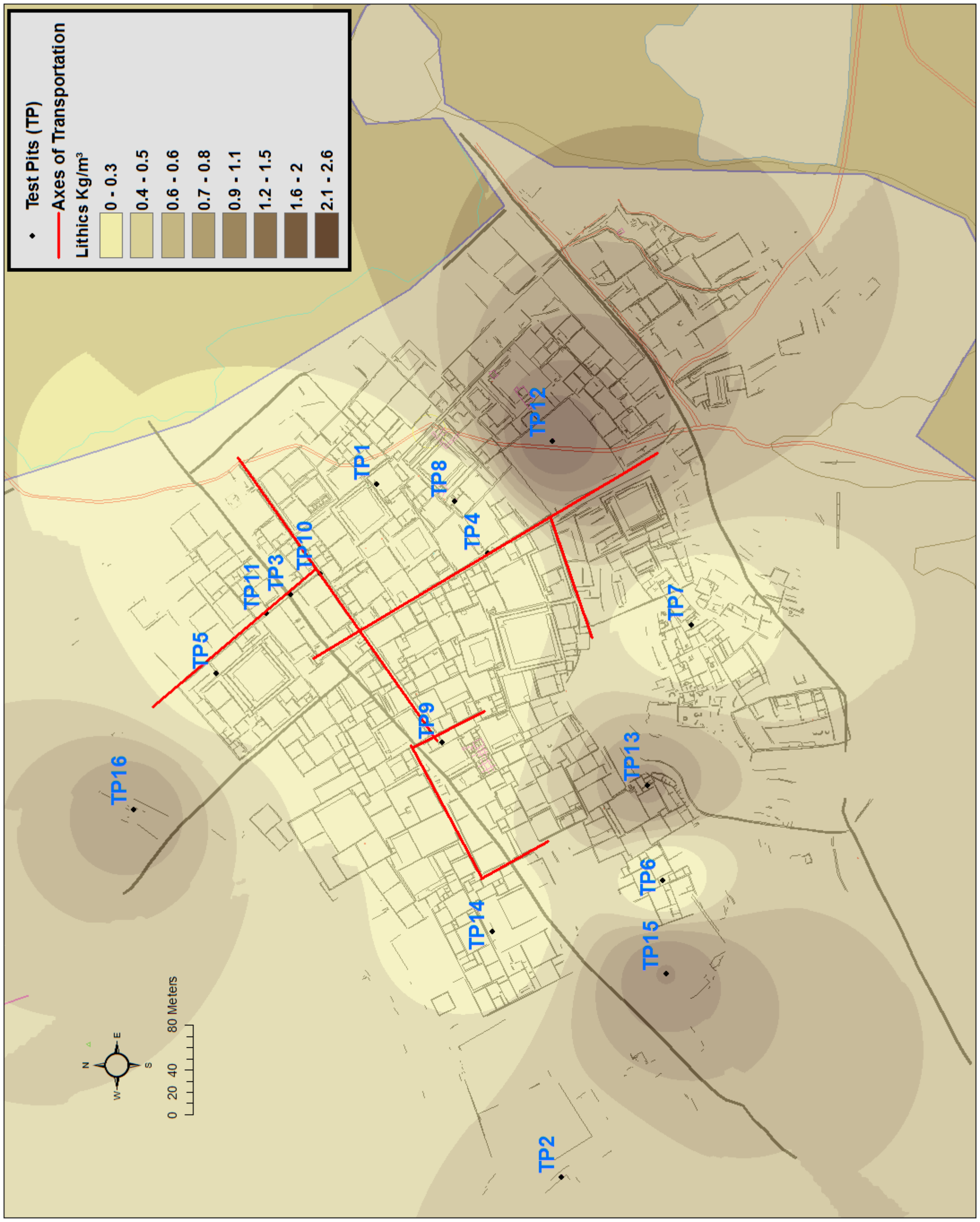


Figure 42 - IDW map of Lithic Densities by Kilogram per cubic meter of soil, credit: Jacob Warner

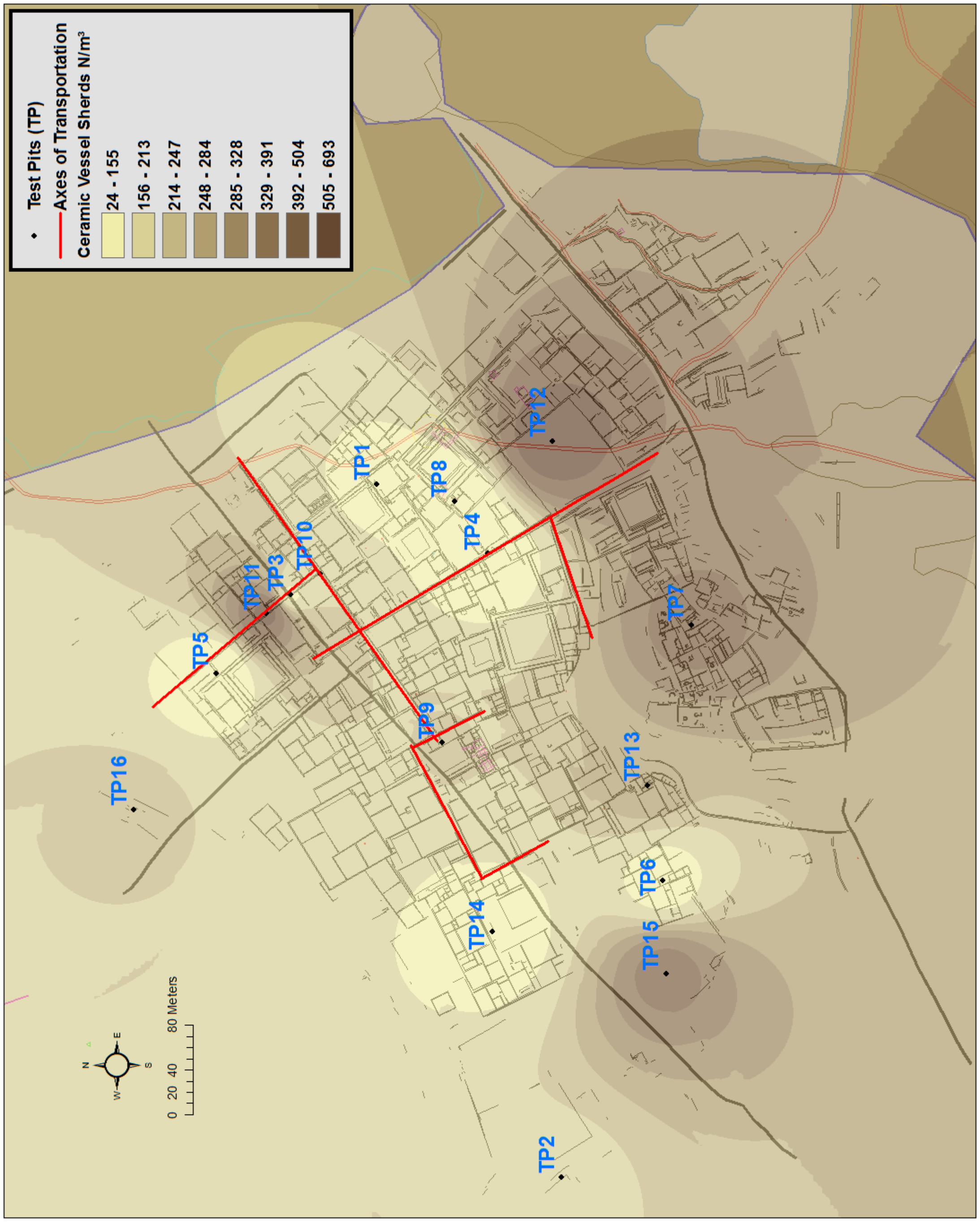


Figure 43 - IDW map of Ceramic Vessel Sherd Density by number per meter of soil, credit: Jacob Warner

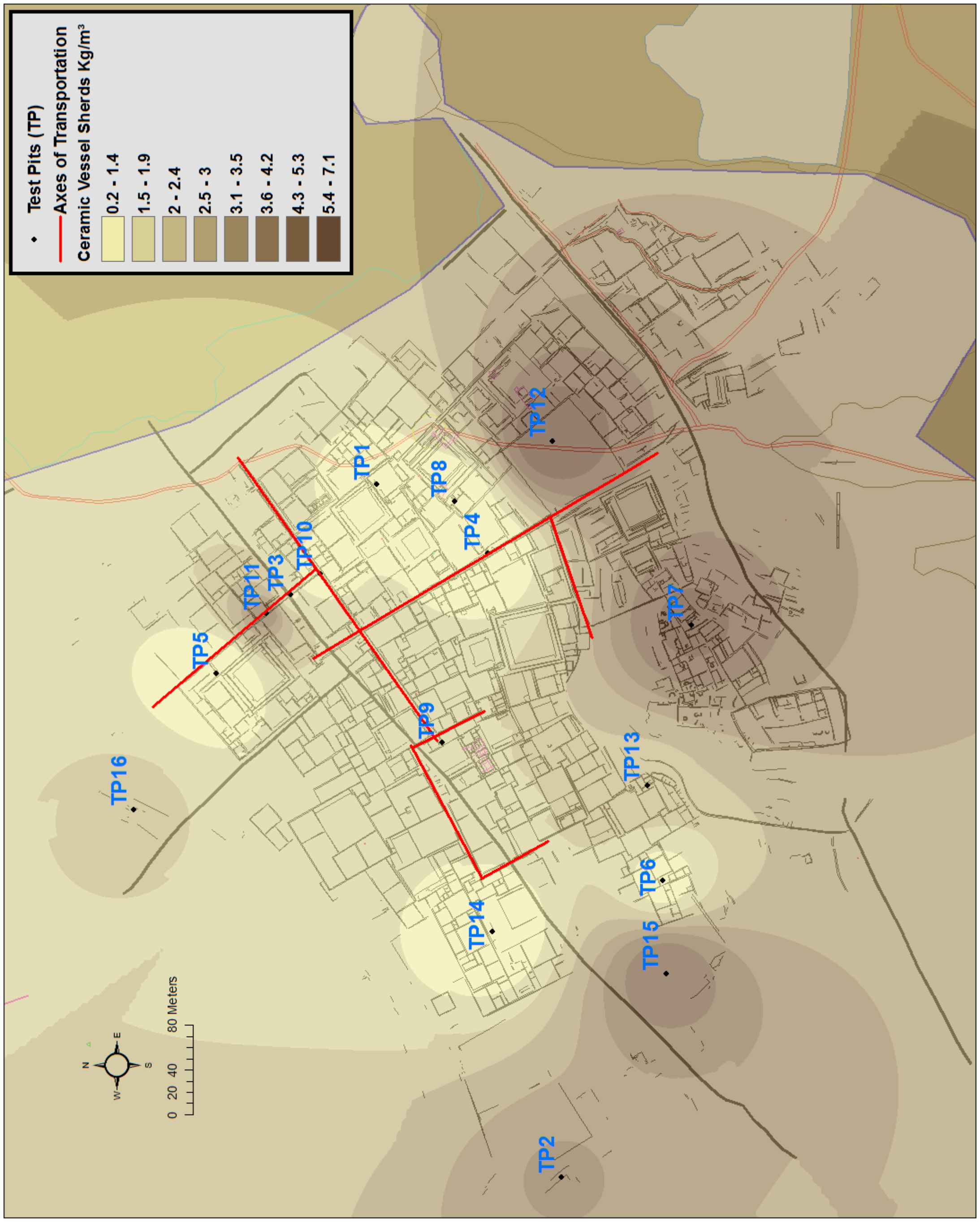


Figure 44 - IDW map of Ceramic Vessel Sherd Density by Kilogram per meter of soil, credit: Jacob Warner

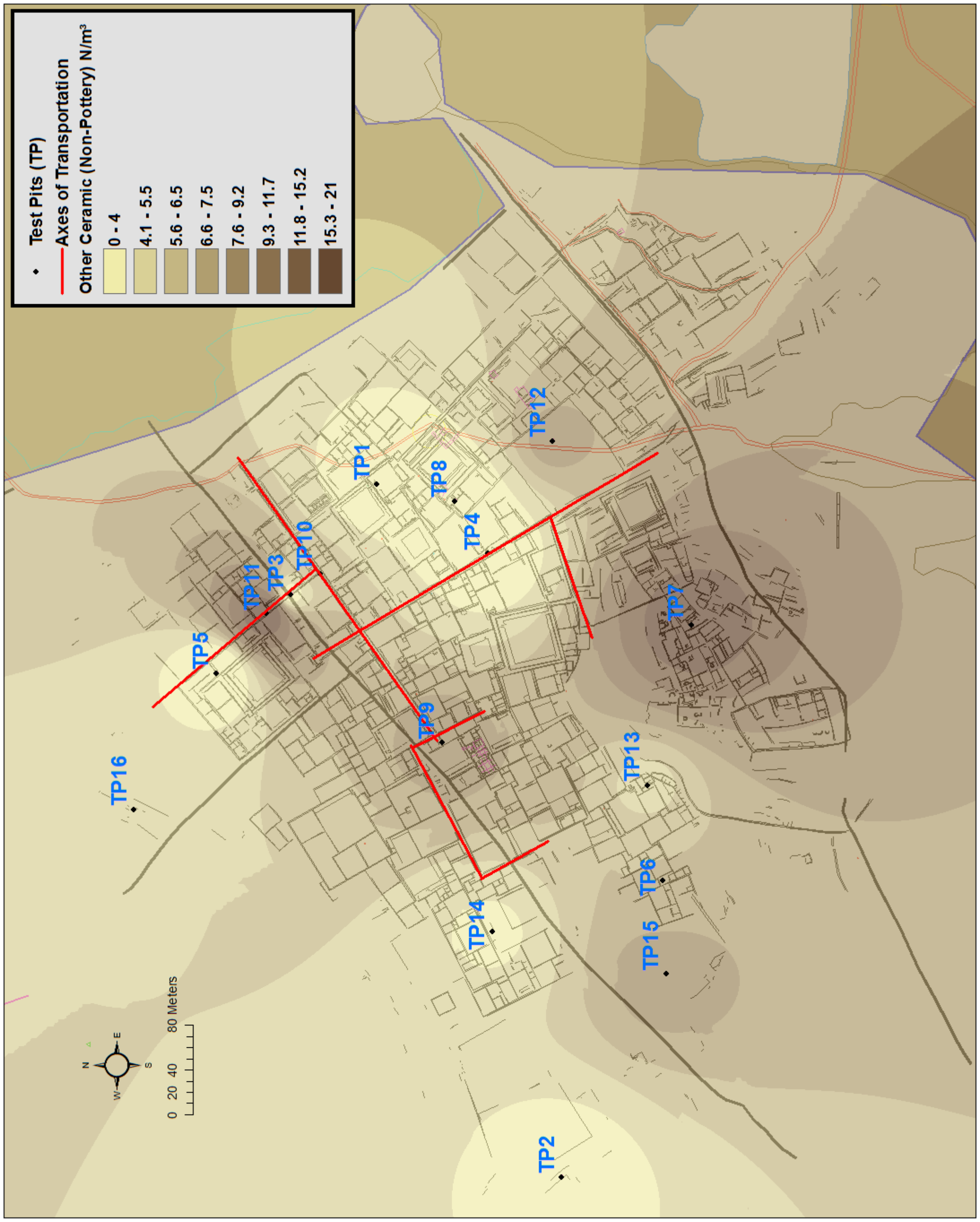


Figure 45 - IDW map of Other Ceramics (Non-Pottery) by number per cubic meter of soil, credit: Jacob Warner

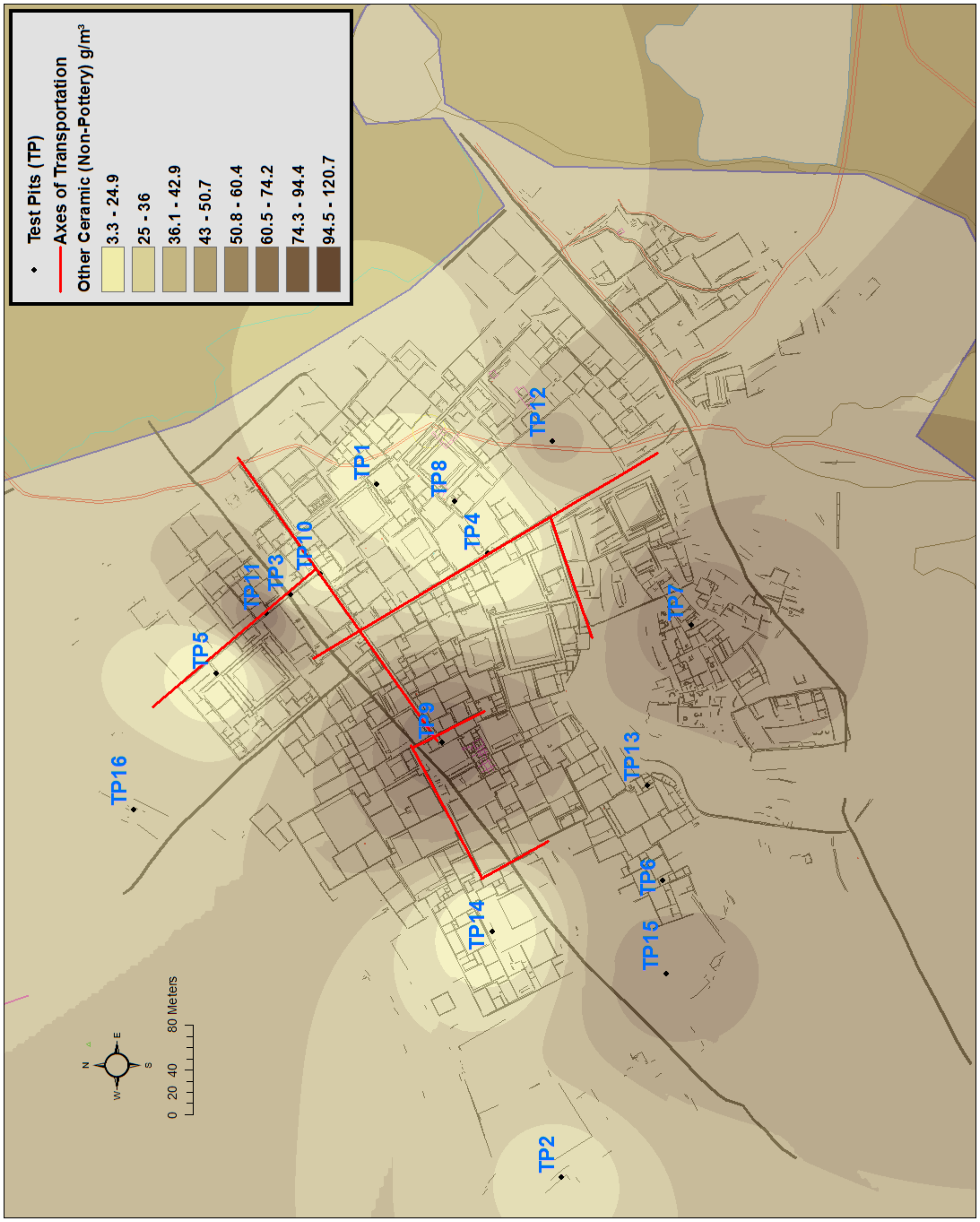


Figure 46 - IDW map of Other Ceramics (Non-Pottery) by grams per cubic meter of soil, credit: Jacob Warner

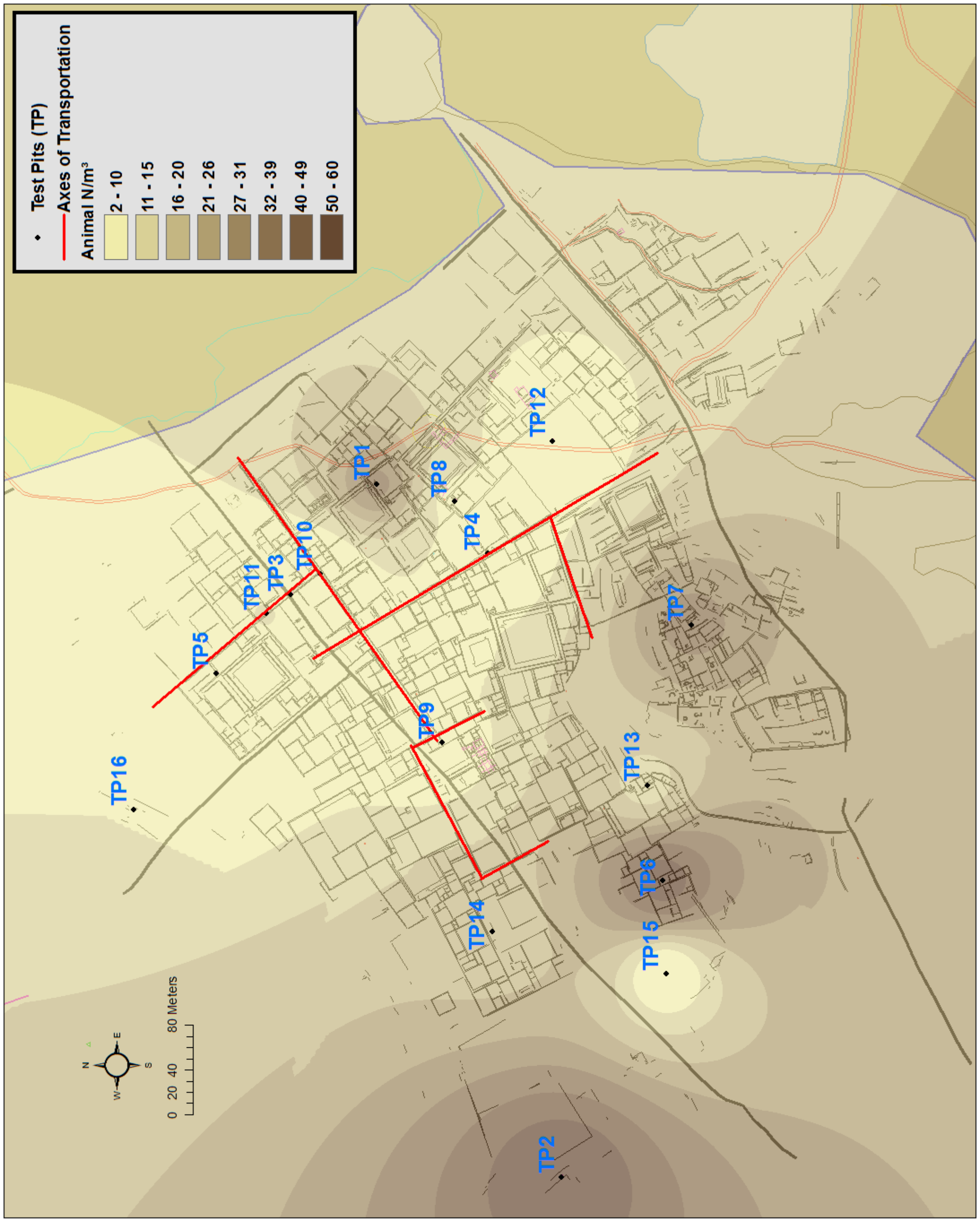


Figure 47 - IDW map of Animal Bones by NISP per cubic meter of soil, credit: Jacob Warner

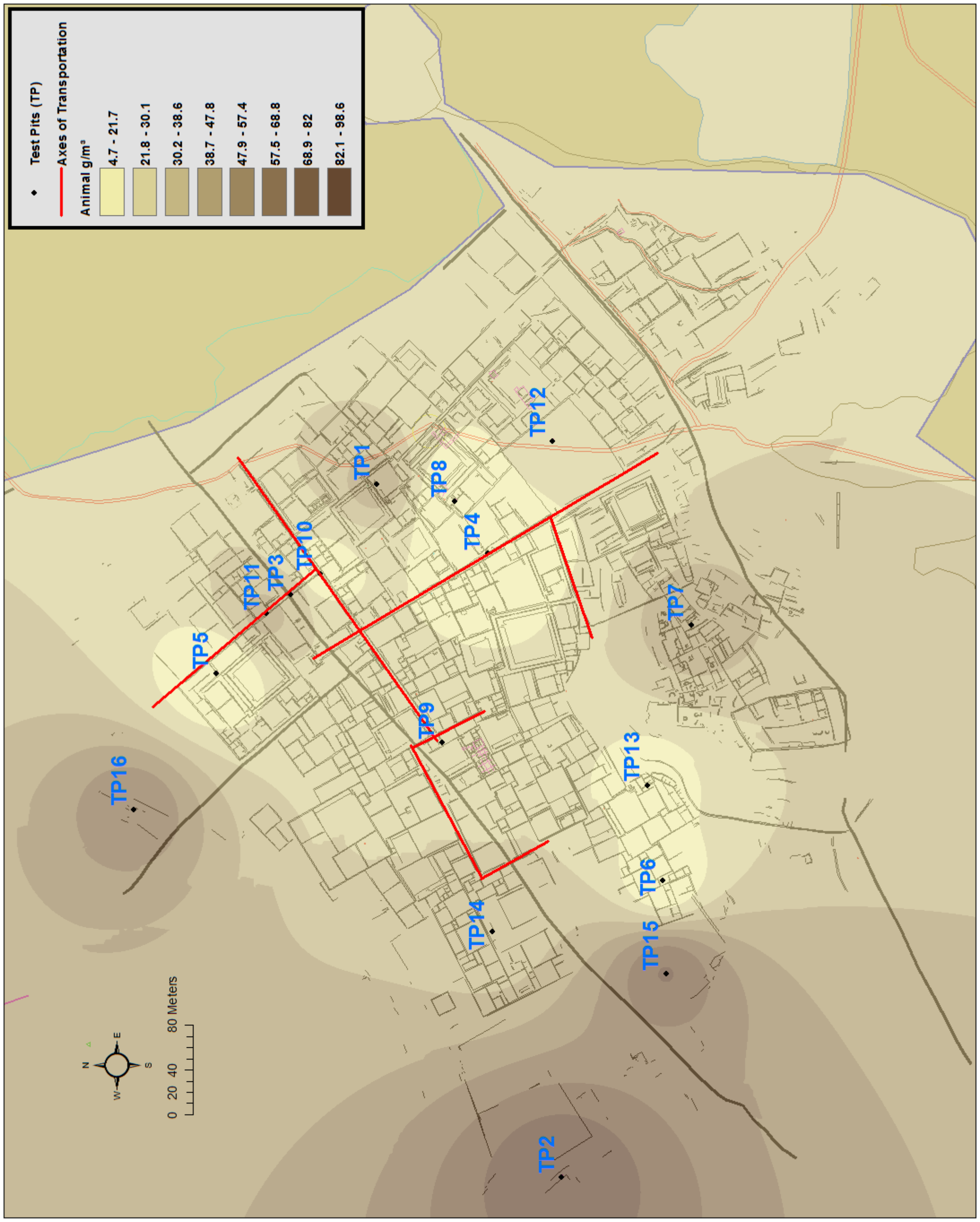


Figure 48 - IDW map of Animal Bones by gram per cubic meter of soil, credit: Jacob Warner

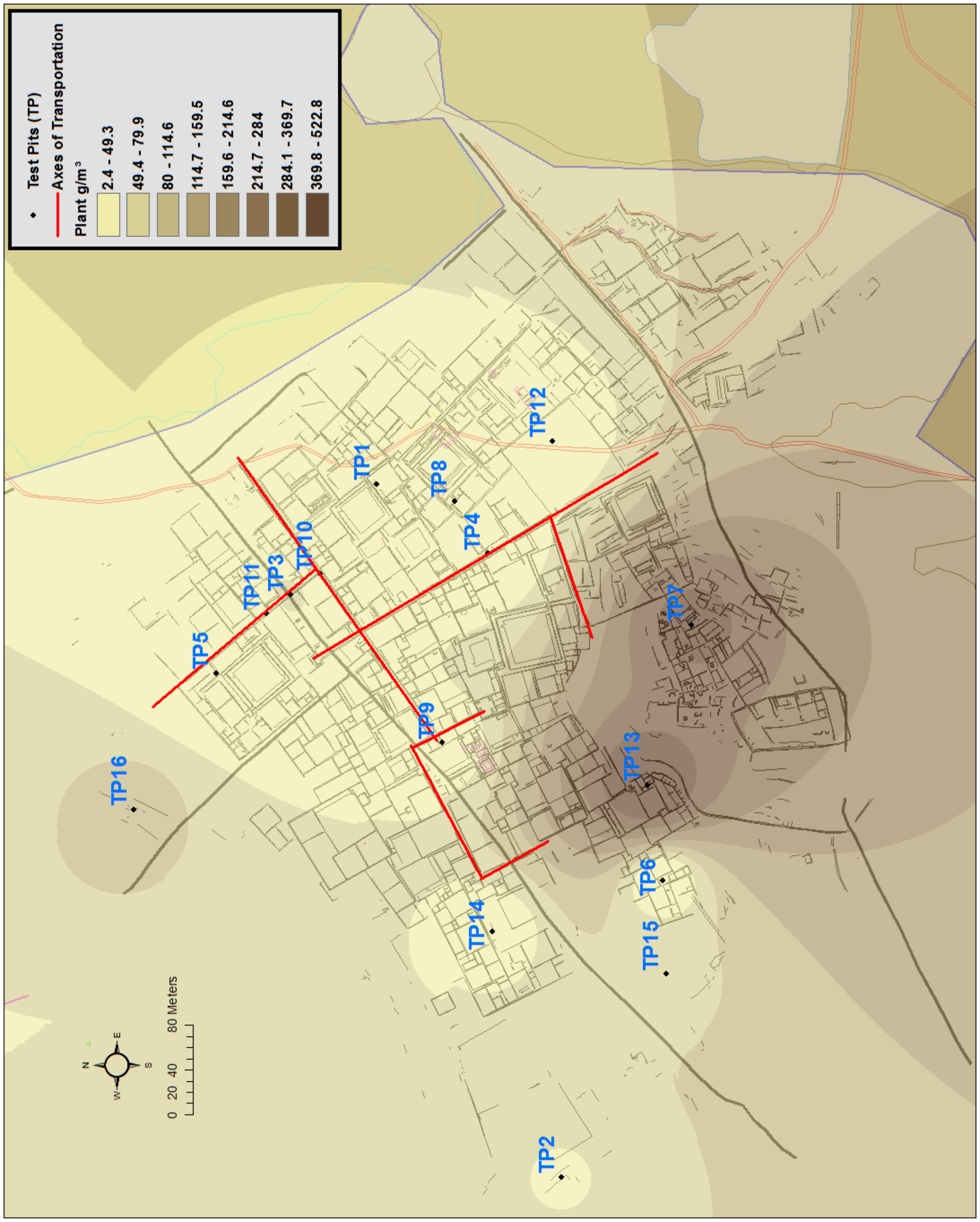


Figure 49 - IDW map of Plant Remains by gram per cubic meter of soil, credit: Jacob Warner

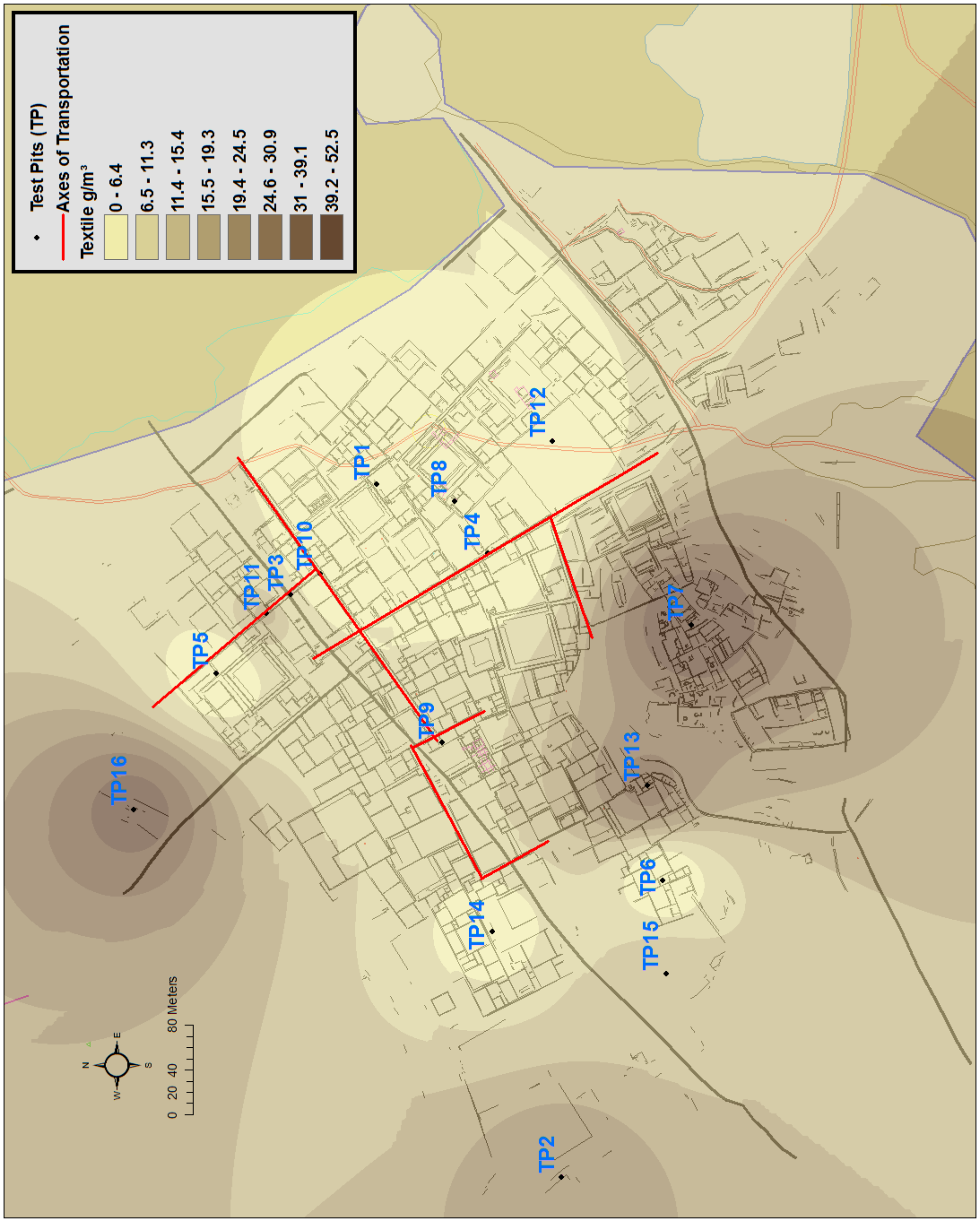


Figure 50 - IDW map of Textiles by gram per cubic meter of soil, credit: Jacob Warner

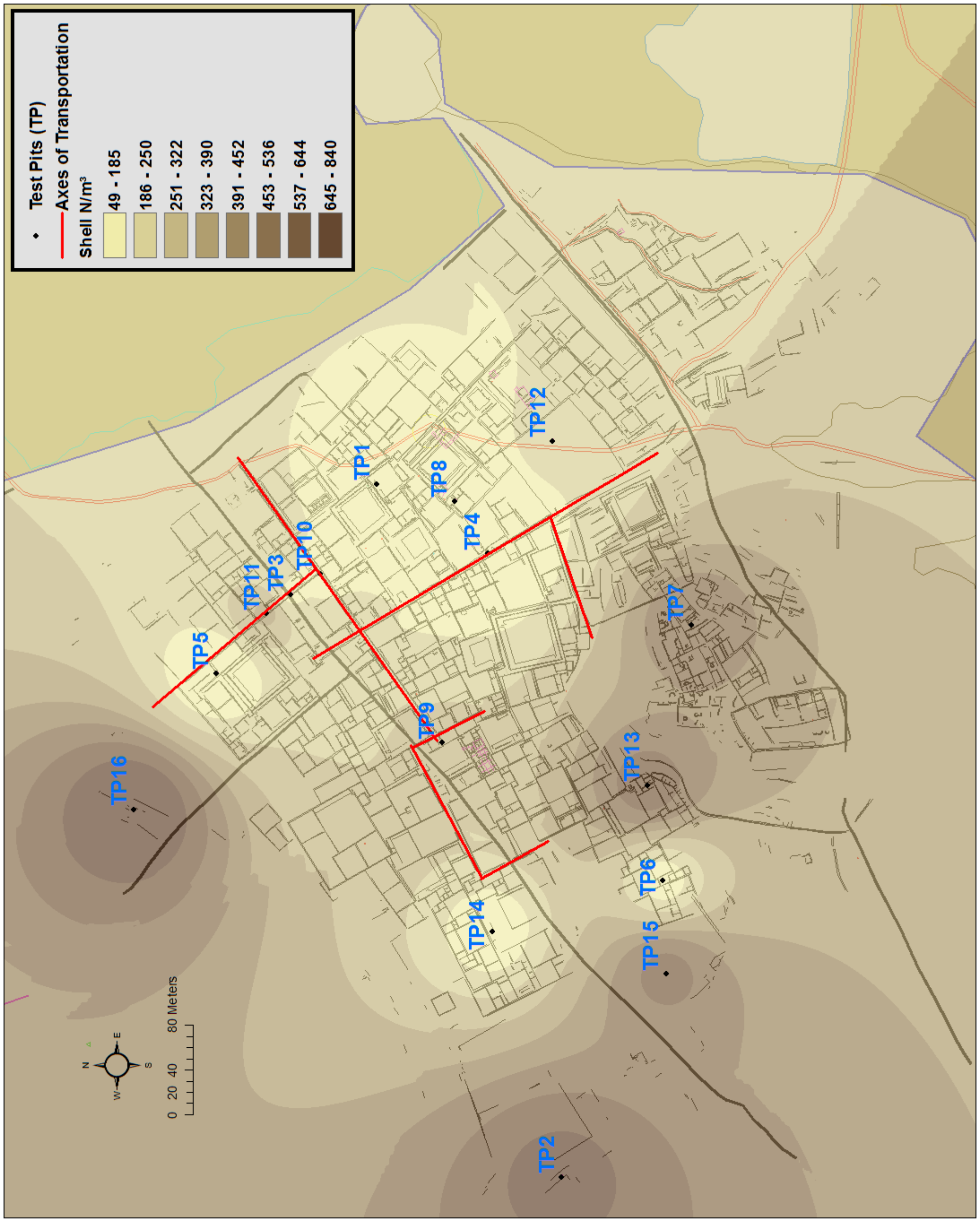


Figure 51 - IDW map of Shells by MNI per cubic meter of soil, credit: Jacob Warner

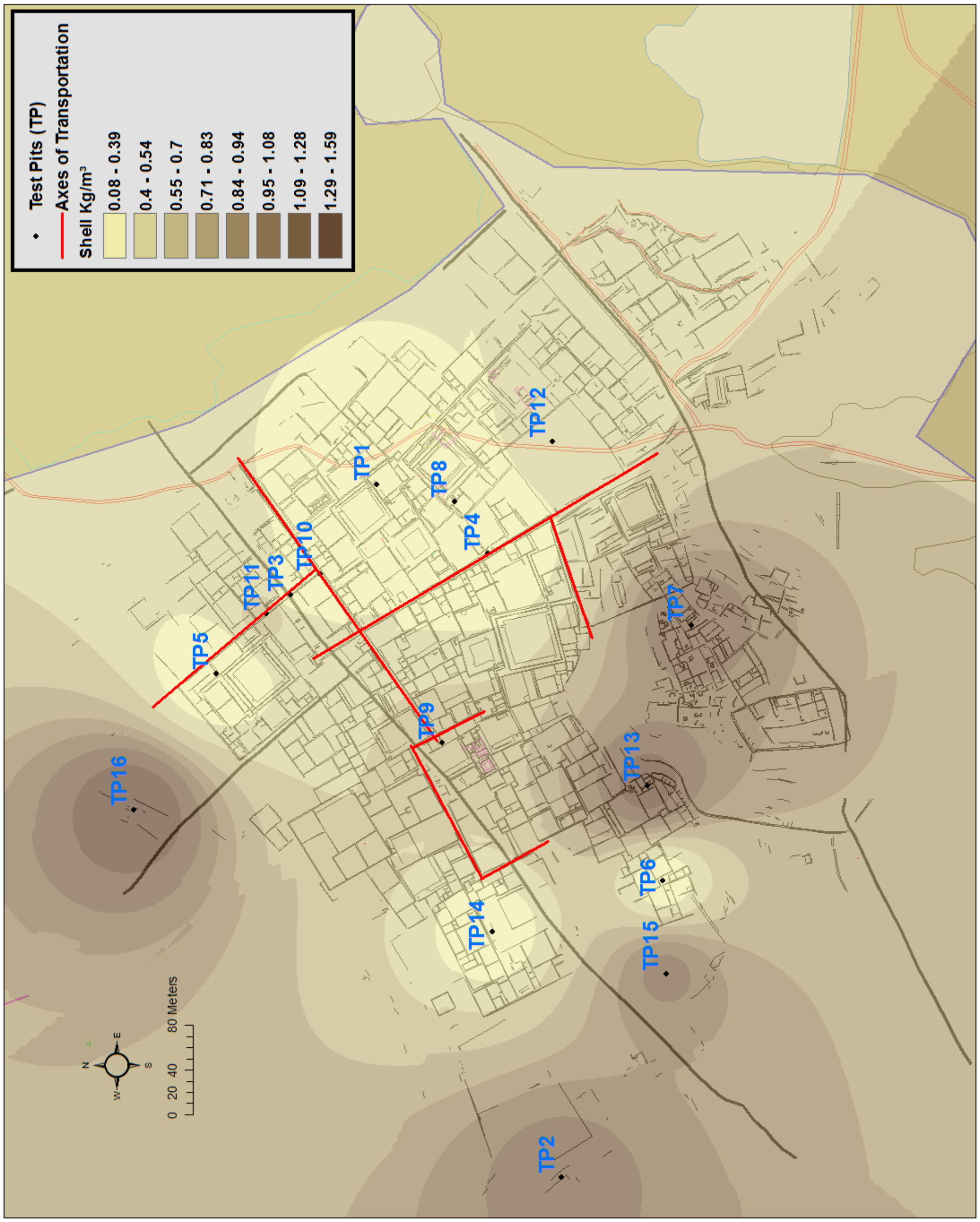


Figure 52 - IDW map of Shells by Kilogram per cubic meter of soil, credit: Jacob Warner

APPENDIX B: EXCAVATION DATA FOR TP1-16

TP1

Test Pit 1 was placed adjacent to Plaza B, one of the monumental plazas in the eastern portion of the site. The purpose of the unit was to examine the architecture and construction phases of the plaza. Final area totaled 3 m^2 and final average depth was 0.66 m, for a total volume of 1.99 m^3 of soil excavated. A total of five strata were uncovered, both natural and cultural, the first of which was the surface layer and the following four subsurface.

Stratum 1 consisted of materials from collapsed walls adjacent to the unit, rocks of varying size, loose soil, and diverse materials. Stratum 2 consisted of rectangular rocks and compact soil, most likely originating from a collapsed wall in the north profile of the unit. Stratum 3 was mostly a cap of gravel that seemed to have been placed intentionally, as well as a stone structure attached to a mud column with white plaster. Stratum 4 was a layer of dark, sandy colored soil found only in the southern half of the unit, and most likely due to heavy rains, with a clay bench to the north. This layer represents the base layer of construction for the plaza. Stratum 5 was very similar to 4, with less mud and more gravel. A small, U-shaped, clay and stone structure was uncovered in the northeastern section of the unit, and contained the whole remains of one guinea pig.

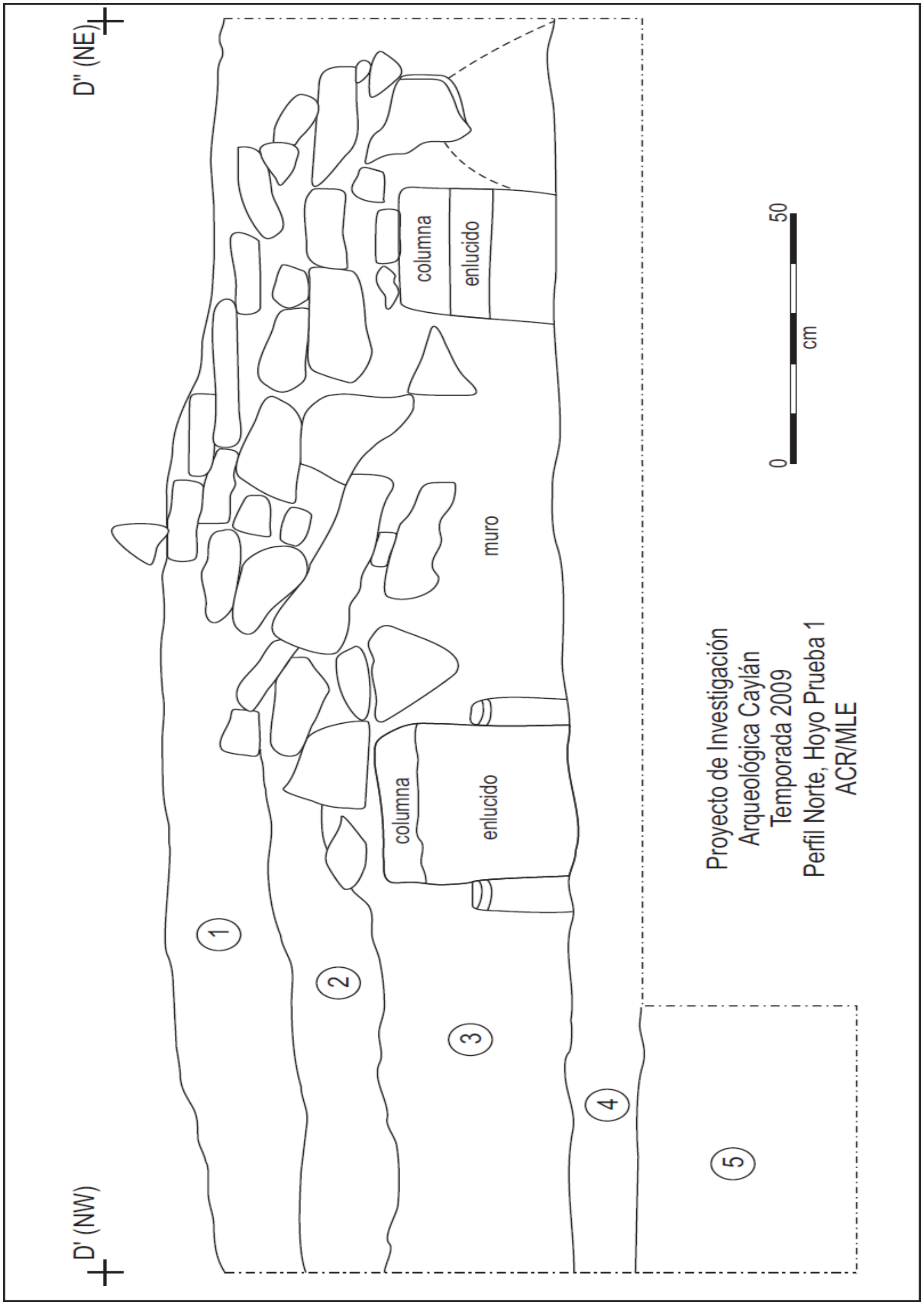


Figure 53 - TP1 Profile from the north (Chicoine and Ikehara 2009:78, Figure 35)

Table 3 - TP1 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	10	.158 kg	Several flakes, a slate point, cobbles
Ceramic Vessel Sherds	189	1.847 kg	18 later, 9 rim sherds, 9 fineware, 153 body
Other Ceramics (non-pottery)	2	35.3 g	One whistle, one ceramic disc
Plant Remains	--	55.1 g	Seeds, branches, avocado pit
Animal Remains	66	90.3 g	Including whole guinea pig, lots of bird bones (*Hirundo sp.)*
Shell	289	52.3 g	Mostly *Donax obesulus*, *Perumytilus purpuratus*, and *Semimytilus algosus*

TP2

The second test pit was placed in the extreme northwest of the site, in the base of a *quebrada*, specifically a terraced area in a section of walls made of large rocks. This location was selected for excavation because of a concentration of surface materials that PIAC members thought would be indicative of an open-air dump area outside of the urban core. Final area of excavation was 4 m^2, with an average final depth of 53 cm, producing a total of 2.12 m^3 excavated. Researchers identified only two strata.

Stratum 1 was the surface layer and slightly below, capped off with a layer of burnt organic material. Stratum 2 extended below the first stratum including loose soil and reached bedrock. Two separate features were uncovered in Stratum 2, designated Feature-4 and -5.

Feature-4, located 120 cm below the datum point for the unit, consisted of a cache of shells, which may have been originally held in a ceramic vessel. Feature-5, located another 10 cm below Feature-4, was an area of high concentration of trash, including shell, animal bones, textiles, and plant remains. Northeast of Feature-5 researchers also found an area of brown soil and corncobs.

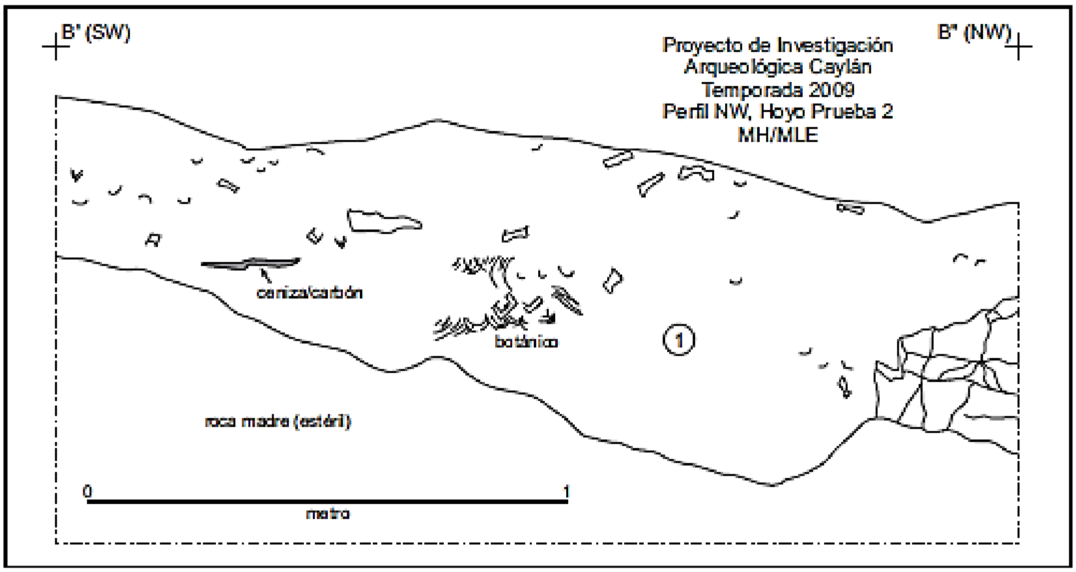


Figure 54 - TP2 Profile from the northwest (Chicoine and Ikehara 2009:80, Figure 38)

Table 4 – TP2 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	5	1.106 kg	One chopper, two flakes, one cobble, and one core
Ceramic Vessel Sherds	408	7.6 kg	2 later, 24 rim sherds, 3 decorated, 20 fineware, 360 body
Other Ceramics (non-pottery)	4	66.4 g	Panpipe fragments, disc, fragment with hole
Plant Remains	--	98 g	Leaves, branches, gourd, corn

(Table 4 continued)

Materials Recovered:	Number:	Weight:	Notes:
Animal Remains	127	208.6 g	Including hair, mostly fish bones (smaller species)
Shell	1489	2.592 kg	Mostly *Donax obesulus, Perumytilus purpuratus,* and *Semimytilus algosus*
Textile	--	50.7 g	Blue, beige, red, some fragments, thread

TP3

TP3 was placed to study one of the large walls that cross the site, specifically a large wall that runs east to west in the northeastern area of the monumental core. Furthermore, TP3 was placed to try to understand the relationship between visible cane remnants on the surface and architectural features, as well as establish a chronology for the construction of the wall and surrounding areas. The northern end of the unit was placed in the center of the wall (Wall A), and the southern end was place in a smaller wall (Wall B) bordering a plaza, allowing excavations to also examine the relationship between the two structures. Final area of excavation was 4 m^2, with an average final depth of 1.13 m, for a total of 4.52 m^3 of soil excavated. TP3 contained five strata.

Stratum 1 consisted of a layer of debris associated with the collapse of Wall A, as well as the poorly preserved remains of a floor under said debris and a cane roof extending 202 cm below the datum for the unit. Stratum 2 consisted of a layer of loose, dark sand over a second floor, labeled Floor-1, extending another 23 cm below the first stratum. Stratum 3 was identified as a layer of compact, dark sand and clay from Wall B extending another 10cn directly below Stratum 2. Stratum 4 contained compact, black sand and pieces of clay and rock from Wall B, and extended another 30cm below Stratum 3. Finally, Stratum 5 contained a layer of brown soil rich in organic material directly below the compact, black sand of Stratum 4 extending down 5 cm to sterile sand.

Table 5 - TP3 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	4	.897 kg	One core, a possible disc, quartz fragment, stone tool fragment
Ceramic Vessel Sherds	584	5.919 kg	21 rim sherds, 15 decorated, 14 fineware, 534 body
Other Ceramics (non-pottery)	11	123.5 g	6 panpipe fragments, 5 ceramic discs
Plant Remains	--	276.3 g	Corn, cane, gourd, branches
Animal Remains	19	161.5 g	Mostly *Lama sp.*, some bird, guinea pig
Shell	761	1.434 kg	Primarily *Donax obesulus*
Textile	--	32.6 g	Fragments

TP4

TP4 was placed east of the main street of Caylán, adjacent to Plaza A in the central portion of the site in order to study an entrance to various small rooms off Plaza A from the street. The unit was placed a meter within the possible entrance and a meter within the avenue.

Total area of excavation was 4 m^2, with an average final depth of 1.53 m, for a total of 6.12 m^3 of soil excavated. TP4 contained four strata.

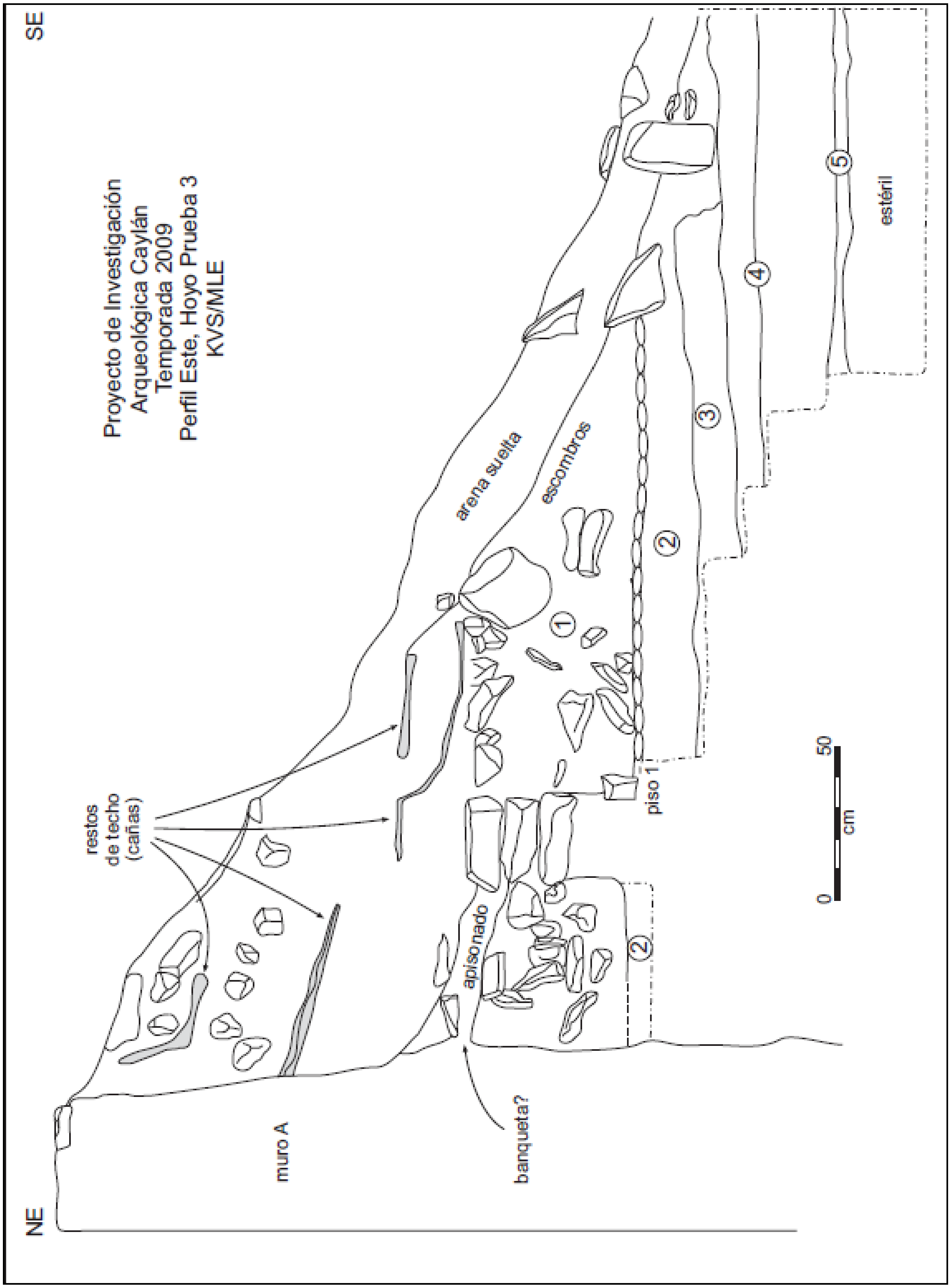


Figure 55 - TP3 Profile from the east (Chicoine and Ikehara 2009:83, Figure 42)

Stratum 1 corresponded with the surface level and slightly below. Stratum 2 consisted of a layer of compact sand and rocks from rubble just above a floor (Floor-1), indicating an intentional destruction during abandonment. Stratum 3 contained evidence that the possible entrance was actually a wall extending on a northwest to southeast axis to the center of the unit. This wall exhibited construction techniques different from deeper walls, with larger stones creating the outline of the wall and smaller stones used as filler. Stratum 4 consisted of a series of four floors in a rapid succession extending from 120-160 cm below the unit datum that were highly compacted, indicating an area of high traffic. Wall architecture at this level matched that more typically seen at the site, where rocks are held together by clay.

Table 6 - TP4 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	1	2 g	Possibly hematite
Ceramic Vessel Sherds	203	2.3 kg	1 later, 13 rim sherds, 3 decorated, 3 fine, 183 body sherds
Other Ceramics (non-pottery)	7	39.3 g	6 panpipe fragments, 1 ceramic disc
Plant Remains	--	14.3 g	Corn, branches
Animal Remains	24	51.1 g	Mostly guinea pig, some other mammal, bird, fish
Shell	486	1.095 kg	Mostly *Perumytilus purpuratus*, *Semimytilus algosus*, and *Donax obesulus*
Other	1	--	Shell pendant

TP5

TP5 was placed in the northern periphery of the monumental core to study an area of large terraces and possible associated domestic structures. The location was chosen based on the presence of these both the terraces and a number of large grinding stones on the surface. An extension was made after the excavation of the original unit in order to study the northern wall of the area uncovered.

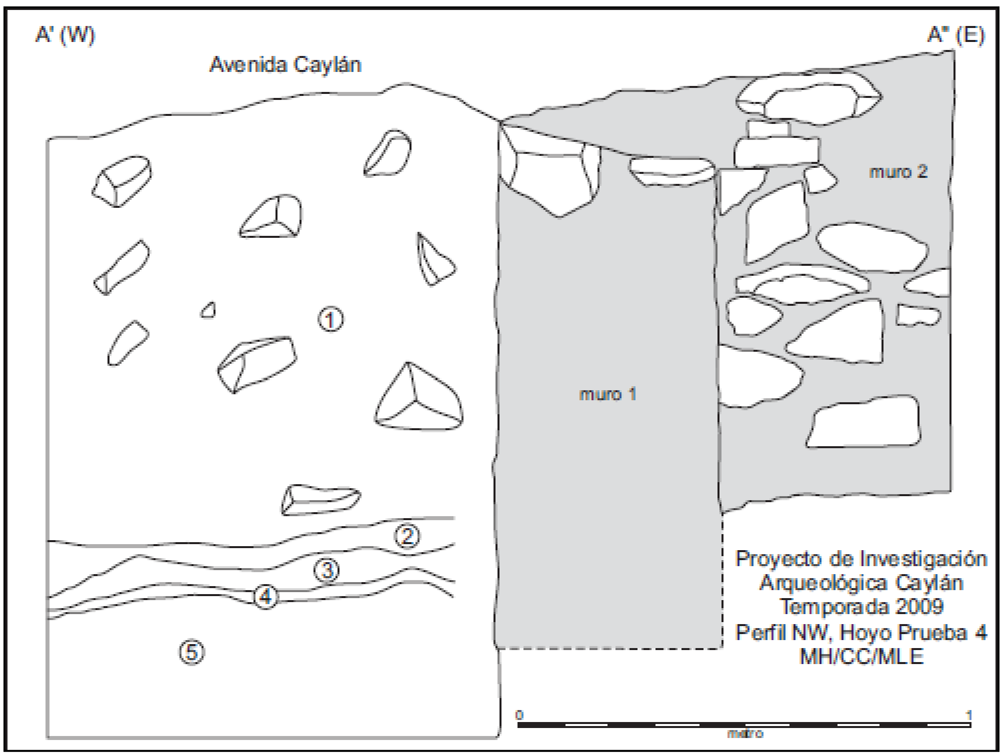


Figure 56 - TP4 Profile from the northwest (Chicoine and Ikehara 2009:85, Figure 45)

Final area of excavation was 9 m² when including the 1 m² extension. Average final depth of excavation was 1.86 m, for a total of 16.7 m³ of soil excavated. The original unit contained eight strata, while the extension only contained two.

For the original unit, Stratum 1 contained a layer of rubble 96 cm thick associated with the collapse of a wall in the southern section of the unit. Stratum 2 contained a clay floor (Floor-1) on both sides of a wall oriented along an east to west axis increasing the depth another 8 cm. Stratum 3 was located directly below Floor-1, and contained loose, gray colored soil. Stratum 4 only existed south of the wall mentioned above, which split the unit in two, and contained a second floor (Floor-2). Stratum 5 was loose fill consisting of black sand below Floor-2 and extended the depth another 15 cm. Stratum 6 contained another floor (Floor-3) located only on the south side of the wall, and extended the depth another 17 cm. Stratum 7 included yet another floor (Floor-4) consisting of brown clay, located in only the southern section of the unit, extending the total depth another 14 cm. Finally, Stratum 8 consisted of two separate layers, 8a and 8b. Stratum 8a consisted of a layer of loose, black sand that extended from the base of the wall that divided the unit to the south. Stratum 8b did the same, but consisted of a layer of sterile sand. Combined, Stratum 8 extended the unit down another 74 cm.

For the extension, Stratum 1 contained a layer of rubble 32 cm deep associated with the collapse of the walls around the unit. Stratum 2 was composed of loose black sand below the rubble extending down another 24 cm.

TP6

TP6 was placed in a low platform located in the center of the monumental core in order to study an area of incomplete construction that includes nearby structures. Final excavation area was 2 m^2, with an average final depth of 77 cm, for a total of 1.54 m^3 of soil excavated. TP6 contained only one stratum. This stratum consisted of sandy gravel and associated materials, with the amount of infill decreasing with depth. Toward the deeper end, the stratum consisted of larger rocks used to level the area underneath, with a sterile layer of sand and gravel below.

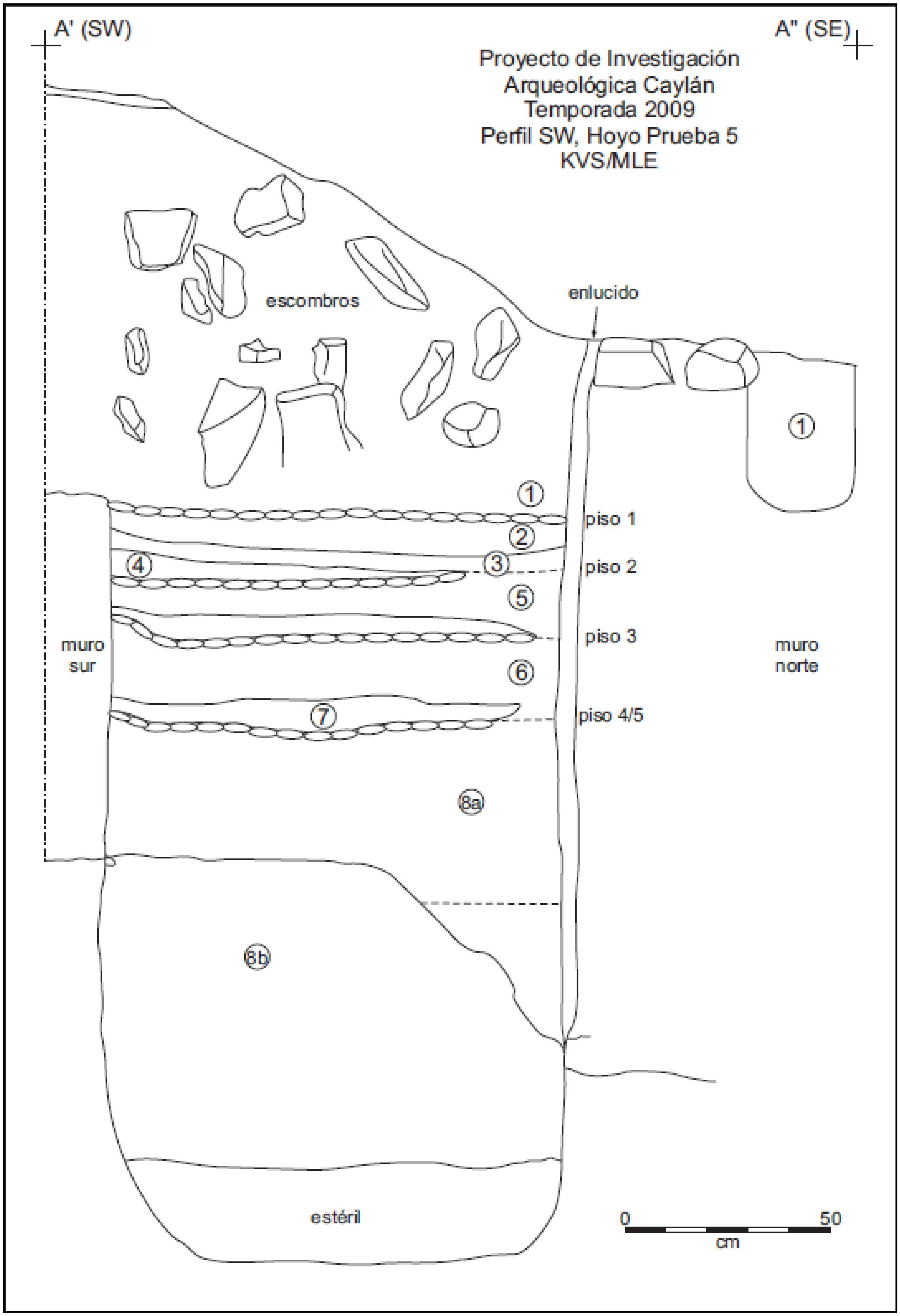


Figure 57 - TP5 Profile from the southwest (Chicoine and Ikehara 2009:88, Figure 49)

Table 7 - TP5 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	16	2.842 kg	Flakes, cobbles, a polisher, hand grinding stone, unknown lithic artifacts, a grinding base with red pigment
Ceramic Vessel Sherds	393	3.934 kg	56 later, 9 rim, 9 decorated, 3 fineware, 316 body
Other Ceramics (non-pottery)	5	62 g	3 panpipe fragments, pendant, grating/scoring implement
Plant Remains	--	90.2 g	Corn, gourd, avocado, peanut shells, branches, twigs
Animal Remains	29	78.8 g	Mostly fish (small and large), some birds (terrestrial and marine)
Shell	1204	2.004 kg	Mostly *Donax obesulus, Perumytilus purpuratus*, and *Semimytilus algosus*
Textile	--	4.2 g	
Other	1		Worked bone

TP7

TP7 was placed in a low platform on the side of Cerro Cabeza de León, a hill in the southern portion of the monumental core with manmade structures both on top of and surrounding. The unit was placed to study the construction techniques and materials used to build similar platforms. Final area of excavation was 2 m², with a final average depth of 1.375 m, for a total volume of 2.75 m³. TP7 only included two strata. Stratum 1 contained waste material mixed with dirt and rocks as well as layers of reed placed as a leveling medium, all below a stone structure. Stratum 2 contained sterile soil.

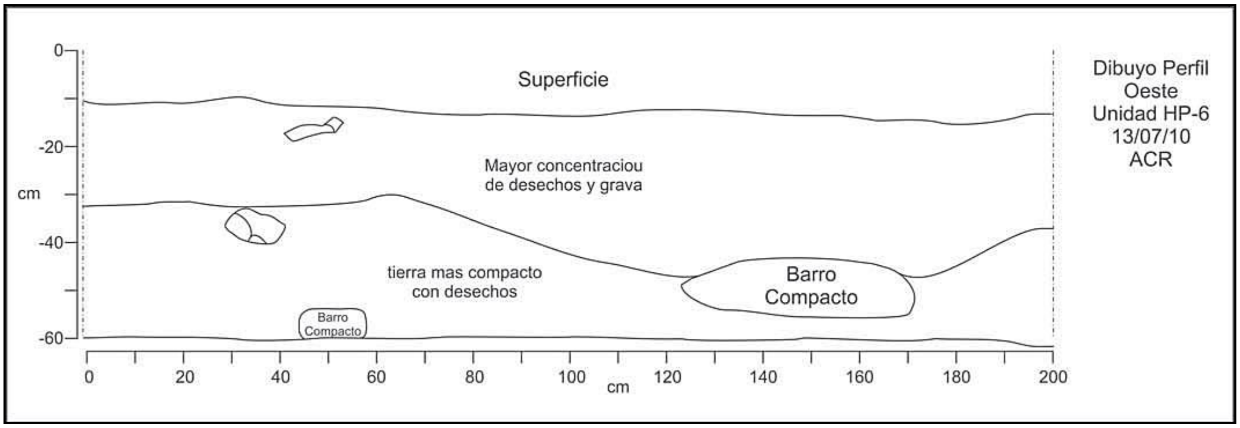


Figure 58 - TP6 Profile from the west (Chicoine and Ikehara 2011:150, Figure 89)

Table 8 - TP6 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Ceramic Vessel Sherds	136	1.45 kg	6 rim, 130 body
Other Ceramics (non-pottery)	10	91 g	8 ceramic discs, spindle whorl, panpipe
Plant Remains	--	3.5 g	Gourd
Animal Remains	84	160 g	Mostly fish (especially smaller species), some rodents, guinea pig, birds
Shell	222	357 g	Mostly *Donax obesulus, Perumytilus purpuratus*

TP8

TP8 was placed in a colonnaded patio to the west of Plaza A in the eastern sector of the monumental core. This area was chosen in order to study the spatial organization of these rooms and to collect materials representative of similar areas. The original unit and extension combined covered a total of 6 m^2, with an average depth of 1.39 m, for a total of 8.34 m^3 of soil excavated. TP8 contained three strata. Stratum 1 was a surface level, including rubble from a wall collapse and clay soil. Stratum 2 consisted of two floors (Floor-1 and Floor-2) superimposed with stone and clay fill between. Stratum 3 was sterile soil.

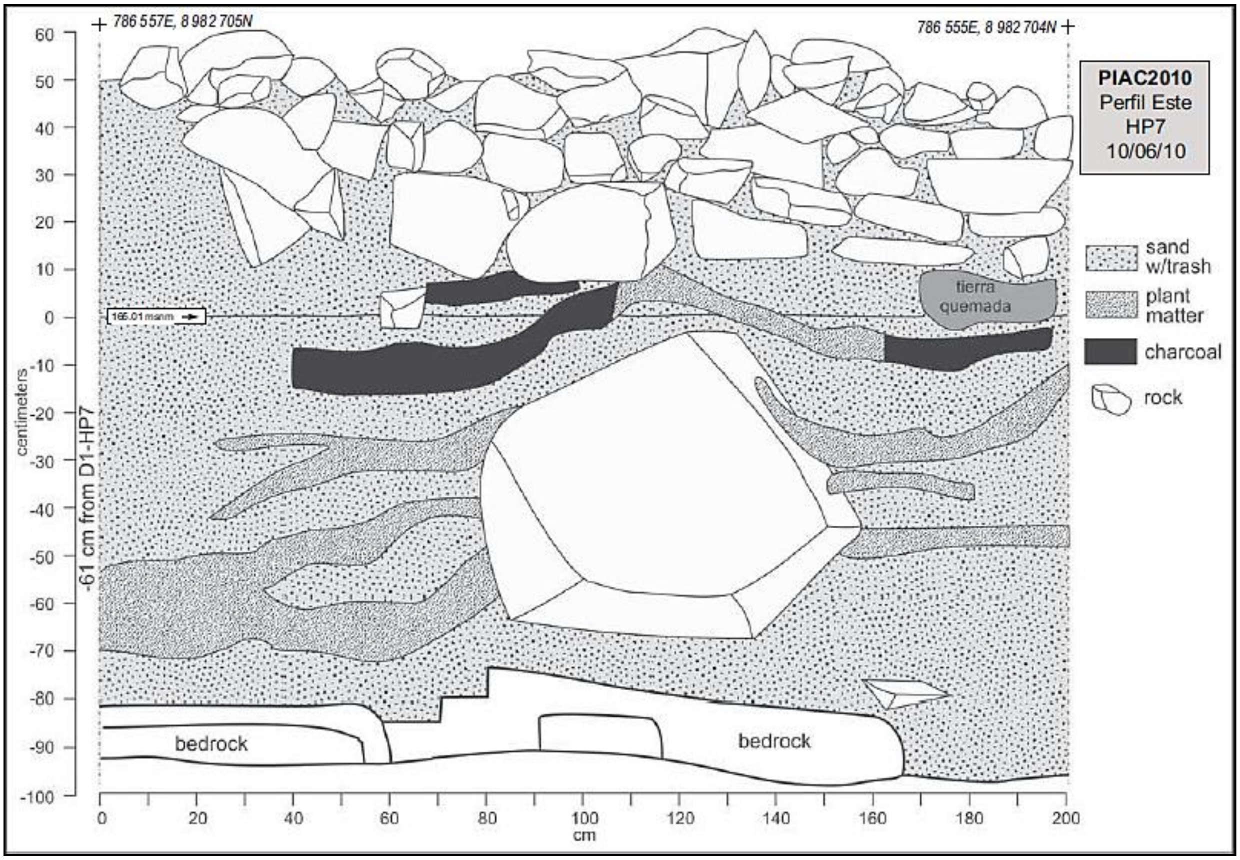


Figure 59 - TP7 Profile from the east (Chicoine and Ikehara 2011:153, Figure 94)

Table 9 - TP7 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	2	21 g	"Anthracite mirror fragment", "knife"
Ceramic Vessel Sherds	1241	16.08 kg	36 rim, 7 decorated, 5 fineware, 1203 body
Other Ceramics (non-pottery)	54	257 g	34 panpipe fragments, 20 ceramic discs

(Table 9 continued)

Materials Recovered:	Number:	Weight:	Notes:
Plant Remains	--	1.156 kg	Gourd, corn, avocado, pacae, lucuma, cotton, peanuts, squash, wood, pumpkin, cane, “plum”, soapberry
Animal Remains	93	129 g	Mostly fish, some birds, multiple dogs, other mammals and birds
Shell	1471	3.5 kg	Mostly *Donax obesulus, Perumytilus purpuratus, Semimytilus algosus*
Textile	--	144.3 g	“Clothing”, a bag, fragments of cloth

<u>TP9</u>

TP9 was placed in an area that had been identified as one of the roads running east to west through the site, specifically on the western end. The purpose of the unit was to study the end of the east to west road, as well as to examine the fill materials used to build the road, whether there was a flow of materials into this area to construct various structures, and to determine the spatial structure used in construction. TP9 contained three strata.

Stratum 1 was a surface layer composed of rocks of different sizes from the collapse of surrounding walls and compacted soil, most likely due to said collapse. Stratum 2 contained a layer of compacted soil and a floor in the southern portion of the unit, as well as construction fill in the northern section. A posthole was uncovered about 80 cm into the north end of the unit, approximately 17 cm in diameter. Below this layer was Stratum 3, which consisted of various construction materials including rock used to close the passage into the street from nearby rooms, and sterile sand and gravel below that.

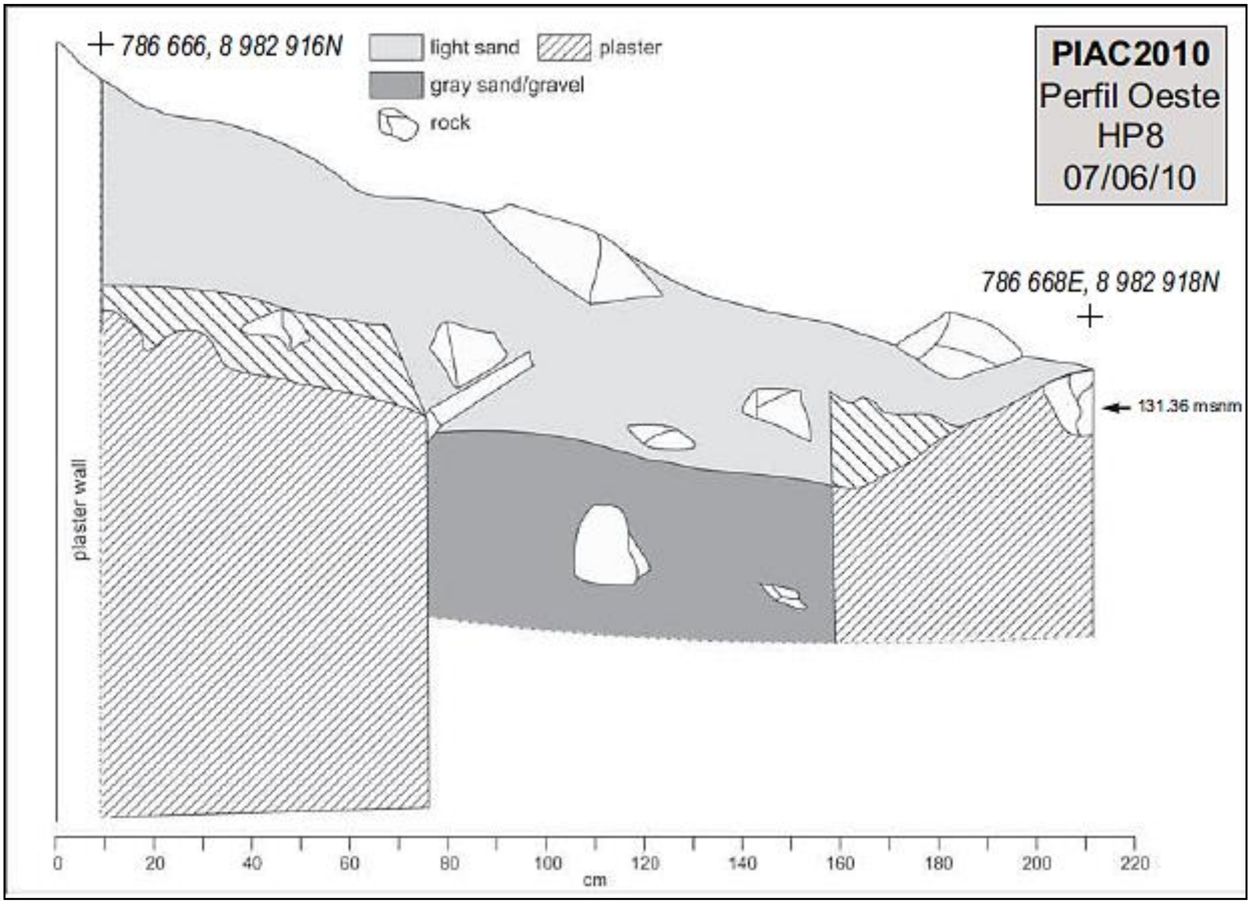


Figure 60 - TP8 Profile from the west (Chicoine and Ikehara 2011:157, Figure 100)

Table 10 - TP8 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	3	272 g	Quartz fragment, polisher, groundstone
Ceramic Vessel Sherds	313	3.908 kg	1 later, 15 rim, 4 decorated, 293 body

(Table 10 continued)

Materials Recovered:	Number:	Weight:	Notes:
Other Ceramics (non-pottery)	11	27 g	10 panpipe fragments, ceramic disc
Plant Remains	--	43.8 g	Corn, gourd, squash, wood, limbs, twigs
Animal Remains	74	57 g	Mostly rodents and guinea pigs, fish, a few other mammals
Shell	305	700 g	Mostly *Donax obesulus, Perumytilus purpuratus*

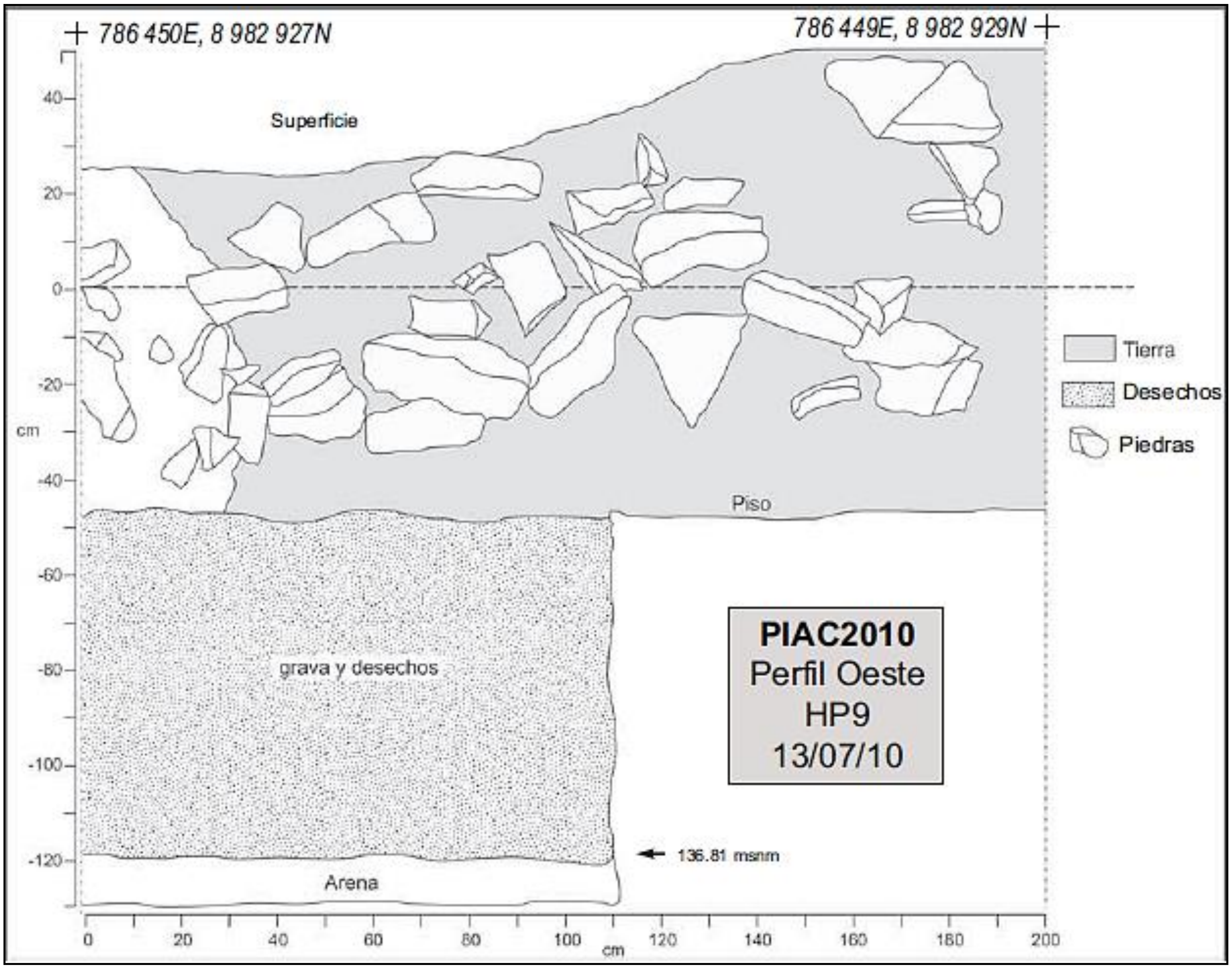


Figure 61 - TP9 Profile from the west (Chicoine and Ikehara 2011:159, Figure 104)

Table 11 - TP9 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	14	395 g	5 flakes, 7 rock fragments, quartz fragment, groundstone
Ceramic Vessel Sherds	713	6.225 kg	25 rim, 3 decorated, 4 fineware, 681 body

(Table 11 continued)

Materials Recovered:	Number:	Weight:	Notes:
Other Ceramics (non-pottery)	28	387 g	10 panpipe fragments, 18 ceramic discs
Plant Remains	--	55.4 g	Gourd, corn, peanut, cane, wood
Animal Remains	21	89 g	Dogs, birds, fish, some other mammals
Shell	864	2.12 kg	Mostly *Donax obesulus*
Textile	--	29 g	Fragments

TP10

TP10 was placed in the same road for similar research reasons, approximately 200 m northwest of TP9. TP10 was also 2 m^2 at completion, with an average final depth of 1.37 m, for a total volume of 2.73 m^3. TP10 contained six strata. Stratum 1 was composed of rubble from wall collapse seen at other similar areas of the site. Strata 2-4 followed a pattern wherein each contained evidence of a floor (Floor-1 to 4) with mixed fill below. Strata 2 contained two floors, Floor-1 in the north side of the unit and Floor-2 in the south. Strata 3 and 4 each contained one floor, Floor-3 and 4 respectively. Stratum 5 was a layer of sterile soil underneath the fill below Floor-4.

TP11

TP11, like the previous two units, was placed into one of the main avenues running through the site. Specifically, TP11 was placed NNW of TP10, and had the same objectives as the previous two units. Final area of excavation was 2 m^2, with a final average depth of 1.4 m, for a total volume of 2.73 m^3. TP11 contained similar strata to TP10 (a layer of rubble with superimposed floors underneath), excepting that it included a fifth floor, which was made of clay and more compact and level. In addition, the fourth floor (Floor-4) was more grayish in color than other floors encountered in the previous two units.

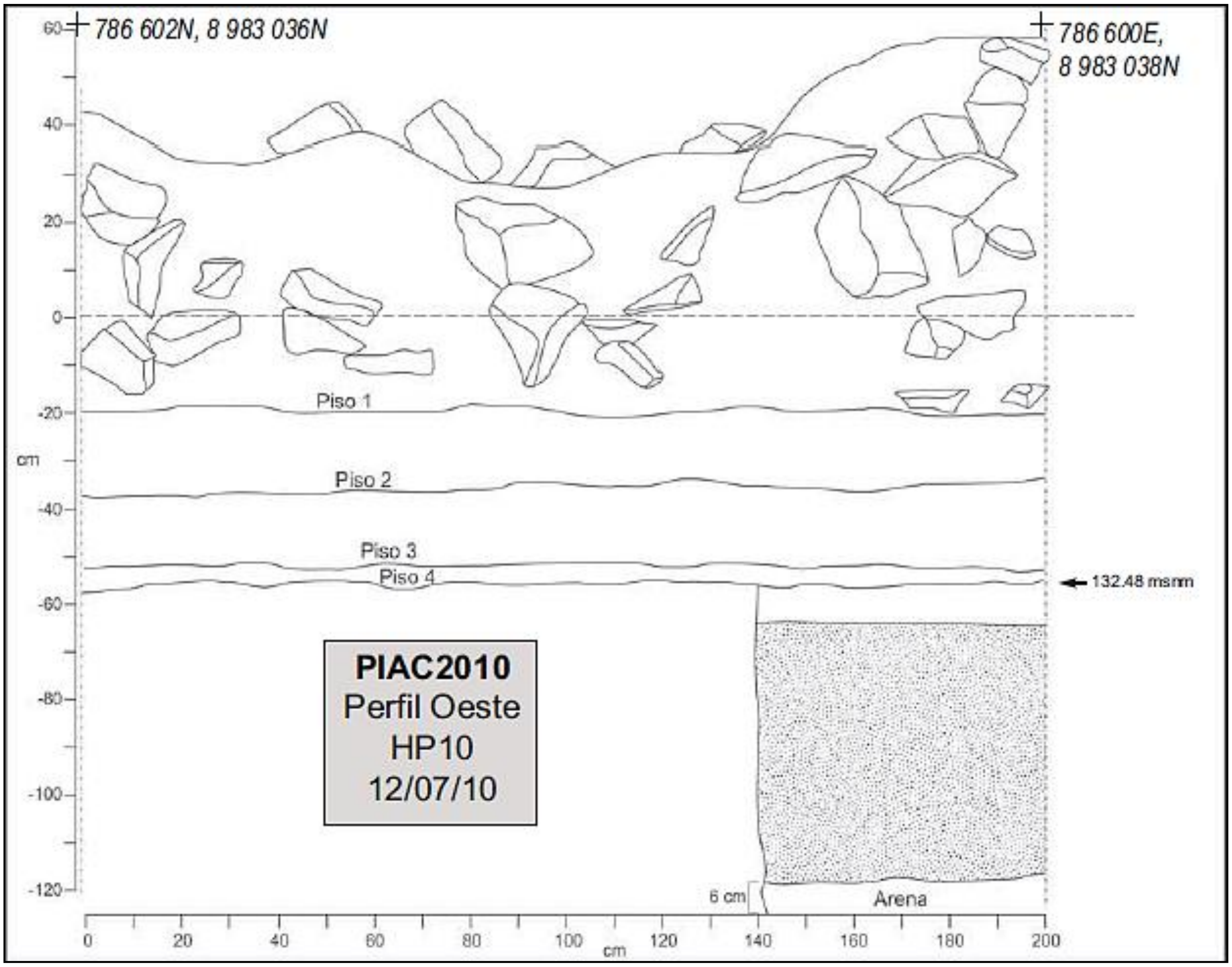


Figure 62 - TP10 Profile from the west (Chicoine and Ikehara 2011:163, Figure 111)

Table 12 - TP10 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	5	202 g	2 flakes (1 retouched?), 2 polishers, quartz fragment

(Table 12 continued)

Materials Recovered:	Number:	Weight:	Notes:
Ceramic Vessel Sherds	529	2.719 kg	11 rim, 8 decorated, 4 fineware, 506 body
Other Ceramics (non-pottery)	16	46.2 g	Panpipe fragments
Plant Remains	--	27.4 g	Gourd, corn, peanut, wood
Animal Remains	9	27 g	Mostly unidentifiable mammal, some fish
Shell	457	890 g	Mostly *Donax obesulus*
Other	1	---	Worked bone

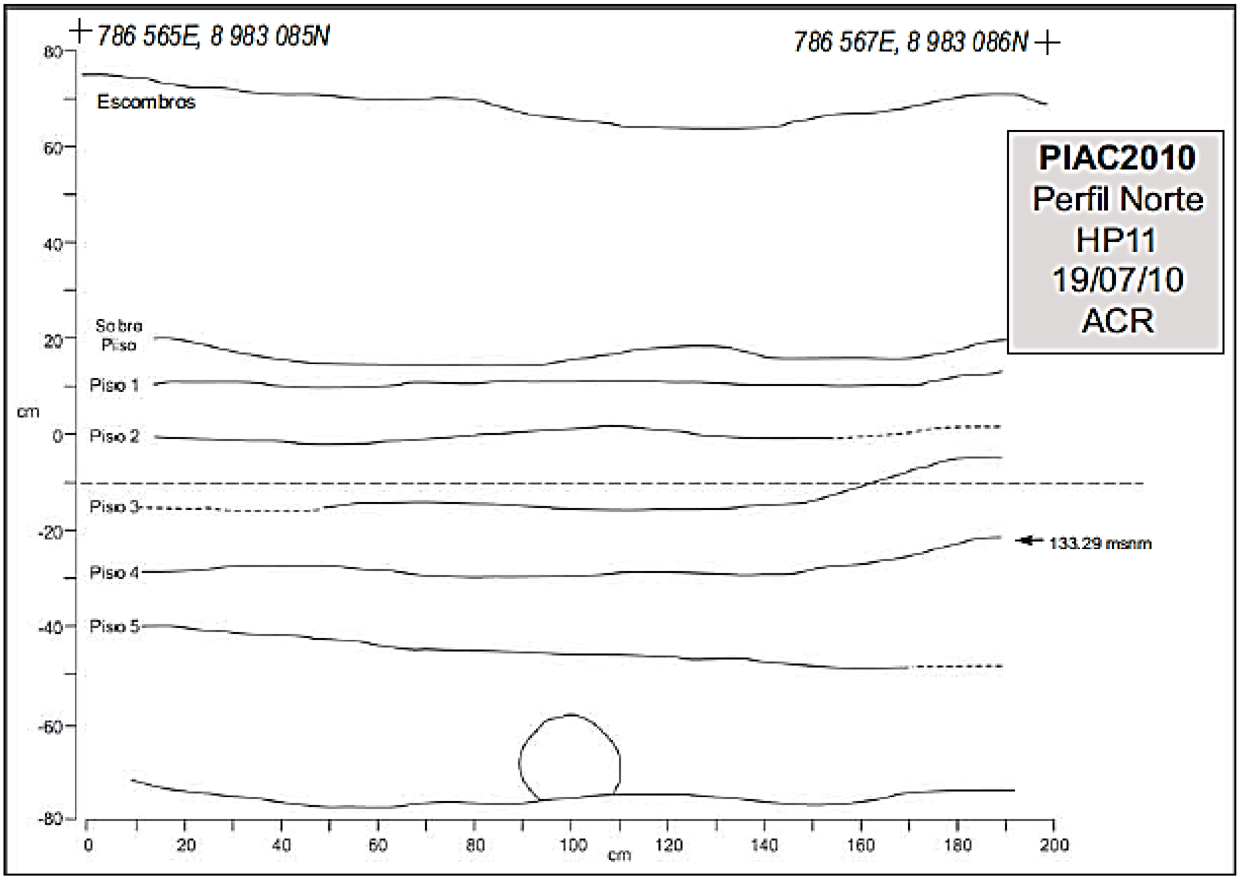


Figure 63 - TP11 Profile from the north (Chicoine and Ikehara 2011:166, Figure 117)

Table 13 - TP11 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	12	753 g	6 polishers, 3 flakes, core, scraper, projectile point
Ceramic Vessel Sherds	1604	11.298 kg	51 rim, 11 decorated, 8 fineware, 1530 body
Other Ceramics (non-pottery)	59	320 g	43 panpipe fragments, 11 discs, 5 grater fragments
Plant Remains	--	108.4 g	Corn, peanuts, gourd, avocado, cane, wood, roots

(Table 13 continued)

Materials Recovered:	Number:	Weight:	Notes:
Animal Remains	31	126 g	Mostly mammals, especially *Lama sp.*, some fish, birds
Shell	980	1.88 kg	Mostly *Donax obesulus, Semimytilus algosus*, and *Perumytilus purpuratus*
Textile	--	48 g	Textile fragments, rope

<u>TP12</u>

TP12 was placed in Plaza-C, on the western side of the Main Mound (Montículo Principal) in the southeastern portion of the monumental core. Plaza-C is the largest plaza in the site, and is located directly in front of the largest mound. TP12 was placed to study the construction techniques used to build this plaza. Final area of excavation was 2 m^2, with a final average depth of 91 cm, for a total volume of 1.82 m^3. A wall running north to south divided the unit into two portions, labeled Enclosure-1 to the northeast and Enclosure-2 to the west. Enclosure-1 contained two strata, while Enclosure-2 contained three. The first and second layers of both were identical, consisting of a layer of large rocks from a collapsed wall, followed by a floor with mixed fill underneath. In Enclosure-2, the third stratum was a sterile layer of gravel and sand, similar to other areas of the site.

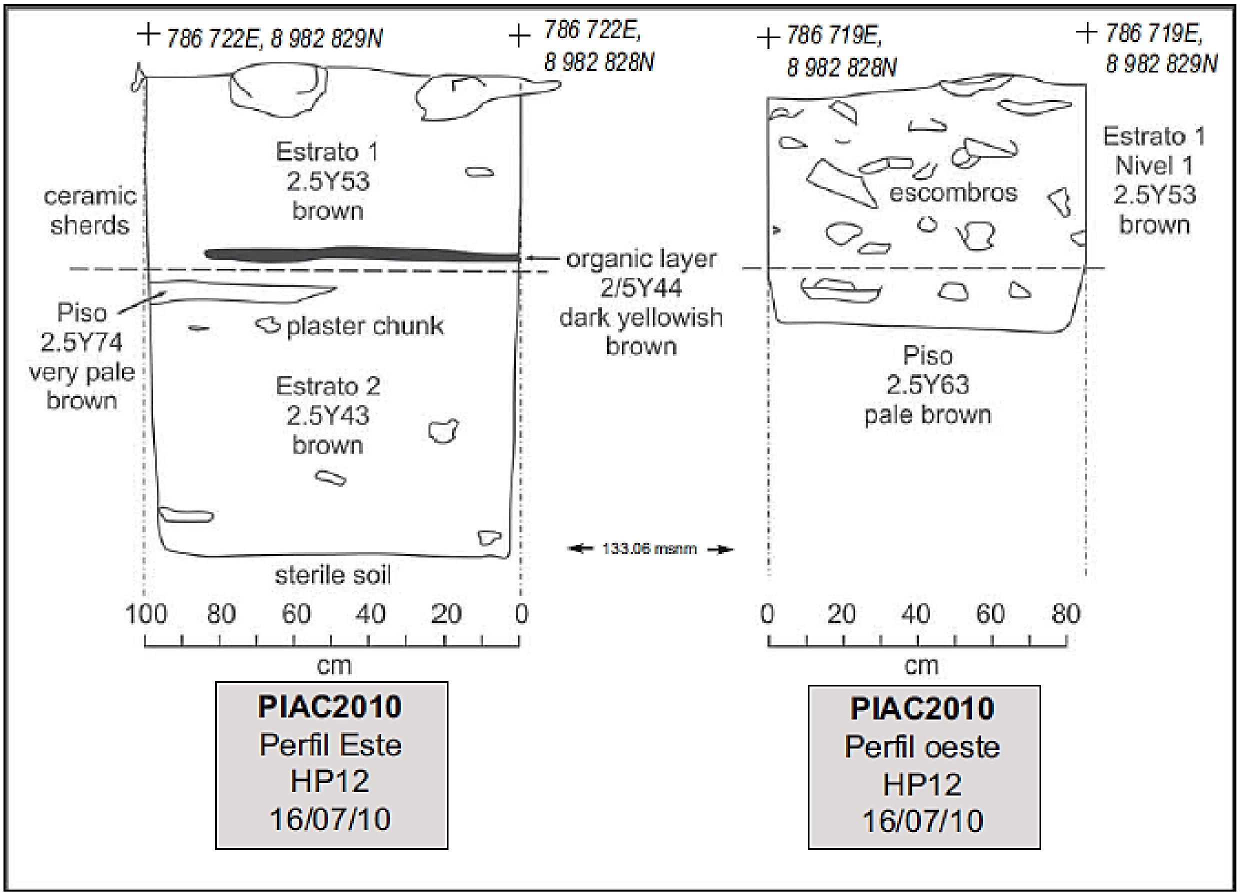


Figure 64 - TP12 Profile, left is from the east, right is from the west (Chicoine and Ikehara 2011:168, Figure 121)

Table 14 - TP12 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	40	4.755 kg	18 flakes, 11 core fragments, 6 polishers, 2 hand grinders, 2 quartz fragments, “ball” fragment
Ceramic Vessel Sherds	1264	13.006 kg	2 later, 50 rim, 5 decorated, 4 fineware, 1202 body
Other Ceramics (non-pottery)	15	99 g	9 panpipe fragments, 5 ceramic discs, spindle-whorl

(Table 14 continued)

Materials Recovered:	Number:	Weight:	Notes:
Plant Remains	--	28.3 g	Corn, peanuts, gourd, cane, seeds, wood
Animal Remains	8	42 g	Mostly *Sarda chilensis* (bonito, large fish), some *Lama sp.*, one dog
Shell	385	1.42 kg	Mostly *Donax obesulus*
Textile	--	3 g	Fragments

TP13

TP13 was placed in a low platform in the southern portion of the site. The purpose of the unit was to study the construction techniques and fill materials used in building similar platforms seen in the southern section of Caylán. Final area of excavation was 2 m², with an average final depth of 8 cm, for a total volume of 1.6 m³. TP13 contained 4 strata.

Stratum 1 consisted of a large mix of items of different types, indicating a trash dumping area. In addition, excavations uncovered a layer of intentionally placed cane in the southern portion of the unit, and another similar layer slightly lower in the northern section of the unit placed on top of a large rock. The excavation of this stratum also allowed for a new view of the wall of the platform, which was in the western part of the unit, and revealed a small space in between walls, which they could not excavate within the confines of TP13. Stratum 2 contained a little bit of sand with ash and waste, seemingly from a mixture with stratum 1. Stratum 3 was a sterile layer of sand and gravel.

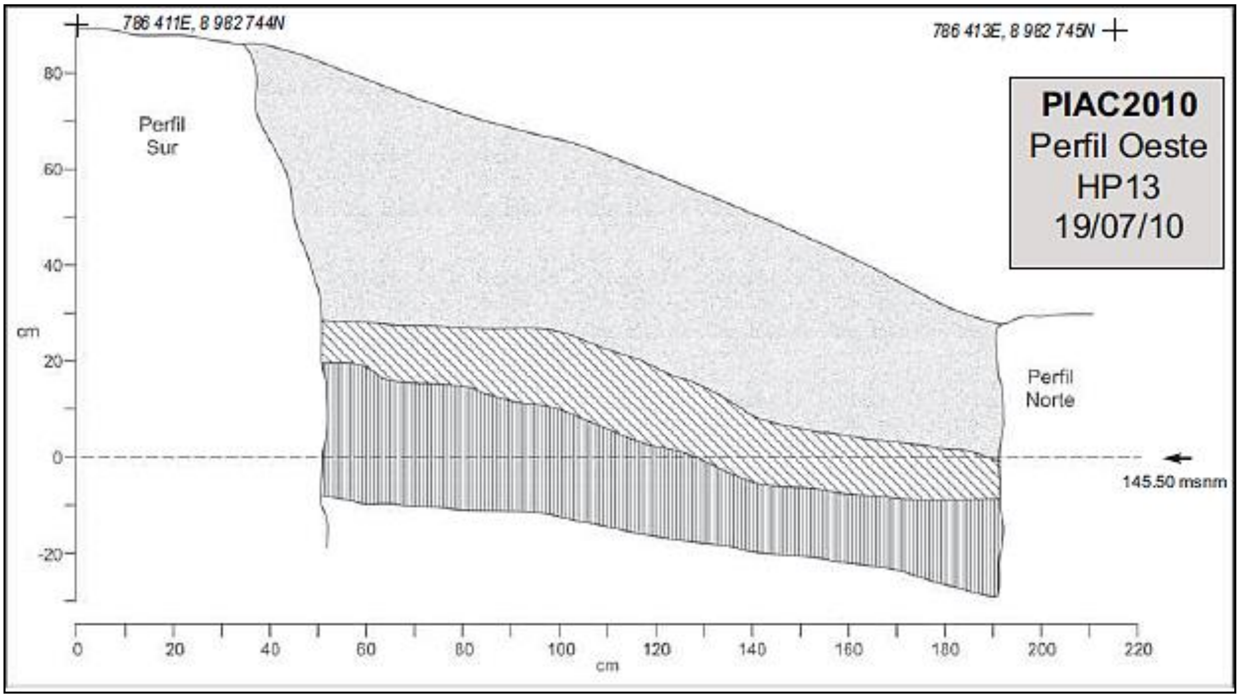


Figure 65 - TP13 Profile from the west (Chicoine and Ikehara 2011:170, Figure 125)

Table 15 - TP13 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	15	1.87 kg	7 flakes, 3 polishers, 2 cores, quartz, core fragment
Ceramic Vessel Sherds	455	3.448 kg	18 rim, 2 decorated, 5 fineware, 430 body
Other Ceramics (non-pottery)	8	86 g	6 panpipe fragments, 2 discs
Plant Remains	--	836.5 g	Corn, avocado, peanuts, gourd, cotton, cane, husks, pods, limbs, seeds
Animal Remains	20	25 g	Mostly fish, rodents, 5 guinea pigs, two deer
Shell	967	1.84 kg	Mostly *Donax obesulus*

(Table 15 continued)

Materials Recovered:	Number:	Weight:	Notes:
Textile	--	55 g	"clothing", textile fragment, cotton

TP14

TP14 was placed in an apparently unfinished platform in the western area of the site. The goal of the unit was to examine the construction techniques used to build such platforms. Final area of excavation was 2 m^2, with an average final depth of 74 cm, for a total volume of 1.48 m^3. TP14 only contained two strata: stratum 1 consisted of a layer of gravel and sand with little associated material, while stratum 2 was a sterile layer of sand and gravel.

Table 16 - TP14 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	8	105 g	4 flakes, 2 cores, 2 polishers
Ceramic Vessel Sherds	103	750 g	4 rim, 99 body
Other Ceramics (non-pottery)	5	13 g	5 panpipe fragments
Plant Remains	--	30 g	Corn, cane, wood
Animal Remains	26	48 g	Mostly rodents, lots of fish, some deer
Shell	187	320 g	Mostly *Donax obesulus, Perumytilus purpuratus, Semimytilus algosus*
Textile	--	4 g	Textile fragments

TP15

TP15 was placed in a trash area that may have been used to store material later used for infill in the construction of mounded areas of the site. The goal of the unit was to test this hypothesis. Final area of excavation was 2 m^2, with an average final depth of 51 cm, for a total volume of 1.03 m^3. TP15 contained three strata. Stratum 1 consisted of a layer of trash mixed with sand and rocks, possibly part of an industrial waste area. Stratum 2 consisted of much of the same material as the previous stratum, with a slight change in color. Stratum 3 was sterile, with a composition similar to that seen in other units' sterile layers.

Table 17 - TP15 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	8	1.517 kg	2 hammerstones, 2 flakes, 2 “other”, core, quartz
Ceramic Vessel Sherds	459	5.4 kg	22 rim, 1 decorated, 4 fineware, 432 body
Other Ceramics (non-pottery)	9	73 g	5 discs, 4 panpipe fragments
Plant Remains	--	69 g	Corn, peanuts, gourd, seeds, wood, “other”
Animal Remains	4	85 g	Three *Lama sp.*, one *Phalacrocorax bougainvillii* (cormorant)
Shell	590	1.78 kg	Mostly *Donax obesulus*
Textile	--	15 g	“clothing”, textile fragments

TP16

TP16 was placed in the northwestern portion of the site, just below the slopes of Cerro Caylán. The goal of the unit was to test if this was a storage and extraction area for waste materials, and if there were any structures associated with such processes. Final area of excavation was 2 m^2, with an average final depth of 52 cm, for a total volume of 1.04 m^3. TP16 contained only two strata. Stratum 1 was similar to its counterpart in TP15, consisting of a mixture of sand, rocks, and waste, with a wall apparently designed to contain such materials. Below this layer, which was thick, was a second layer of sterile sand and gravel.

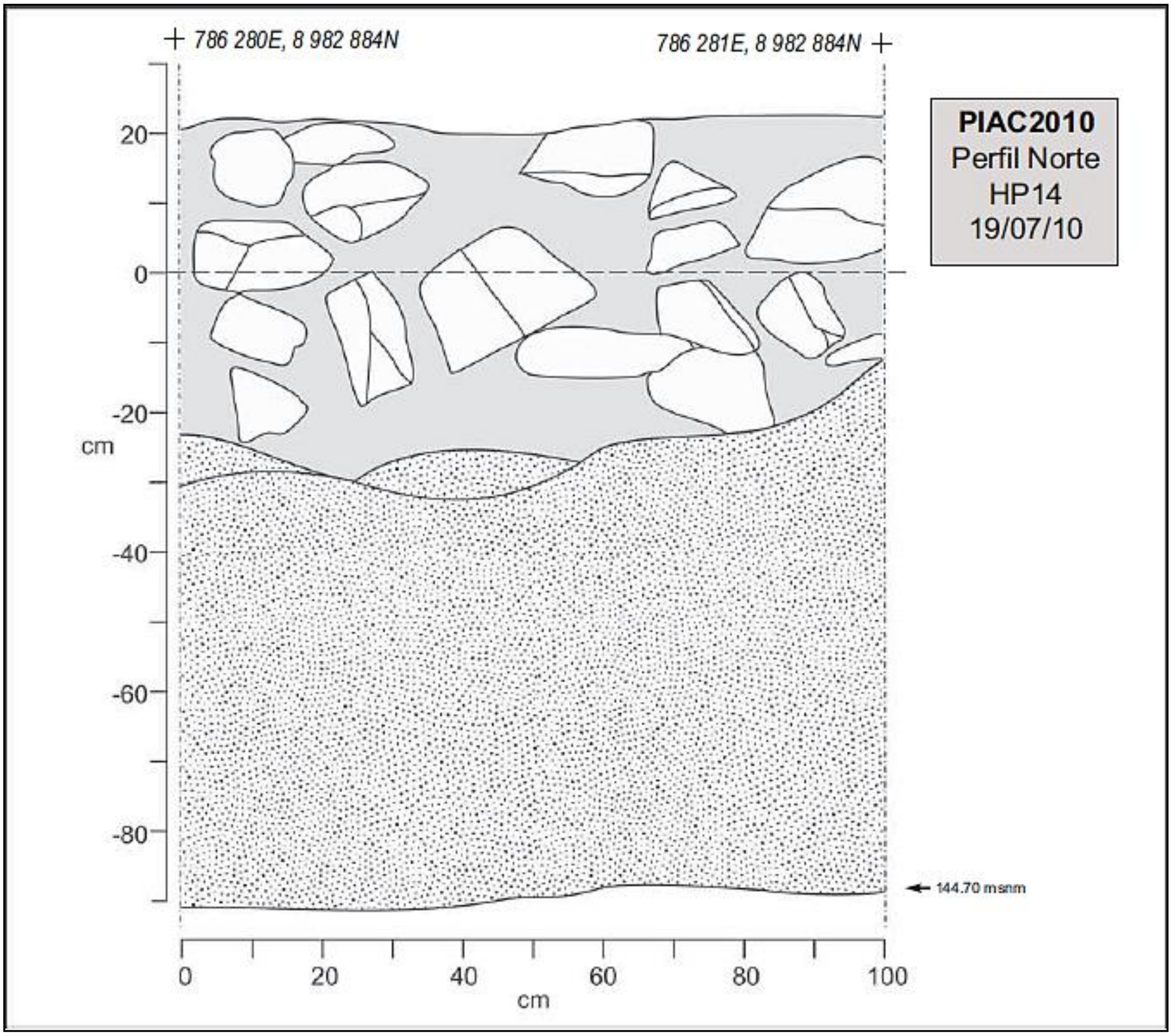


Figure 66 - TP14 Profile from the north (Chicoine and Ikehara 2011:172, Figure 129)

Table 18 – TP16 Assemblage

Materials Recovered:	Number:	Weight:	Notes:
Lithics	13	1.093 kg	6 flakes, 3 cores, 2 worked fragments, quartz, polisher
Ceramic Vessel Sherds	251	2.355 kg	9 rim, 242 body
Other Ceramics (non-pottery)	5	44 g	2 panpipe fragments, 2 discs, spindle whorl

(Table 18 continued)

Animal Remains	--	71 g	Mammals, Fish
Plant Remains	--	103.9 g	Corn, peanuts, fruit peel, gourd, seeds, leaf, cane, wood
Shell	877	1.66 kg	Mostly *Donax obesulus*
Textile	--	47 g	"clothing", textile fragments (some red and blue), cotton, rope

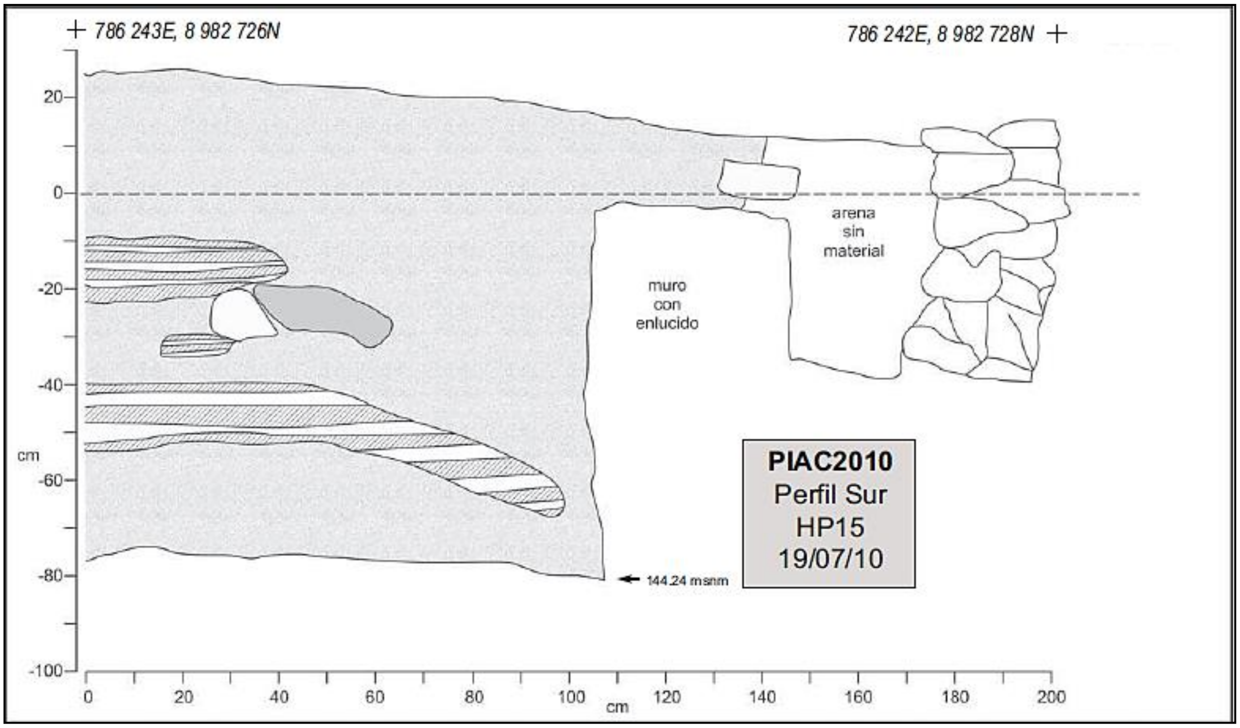


Figure 67 - TP15 Profile from the south, (Chicoine and Ikehara 2011:174, Figure 132)

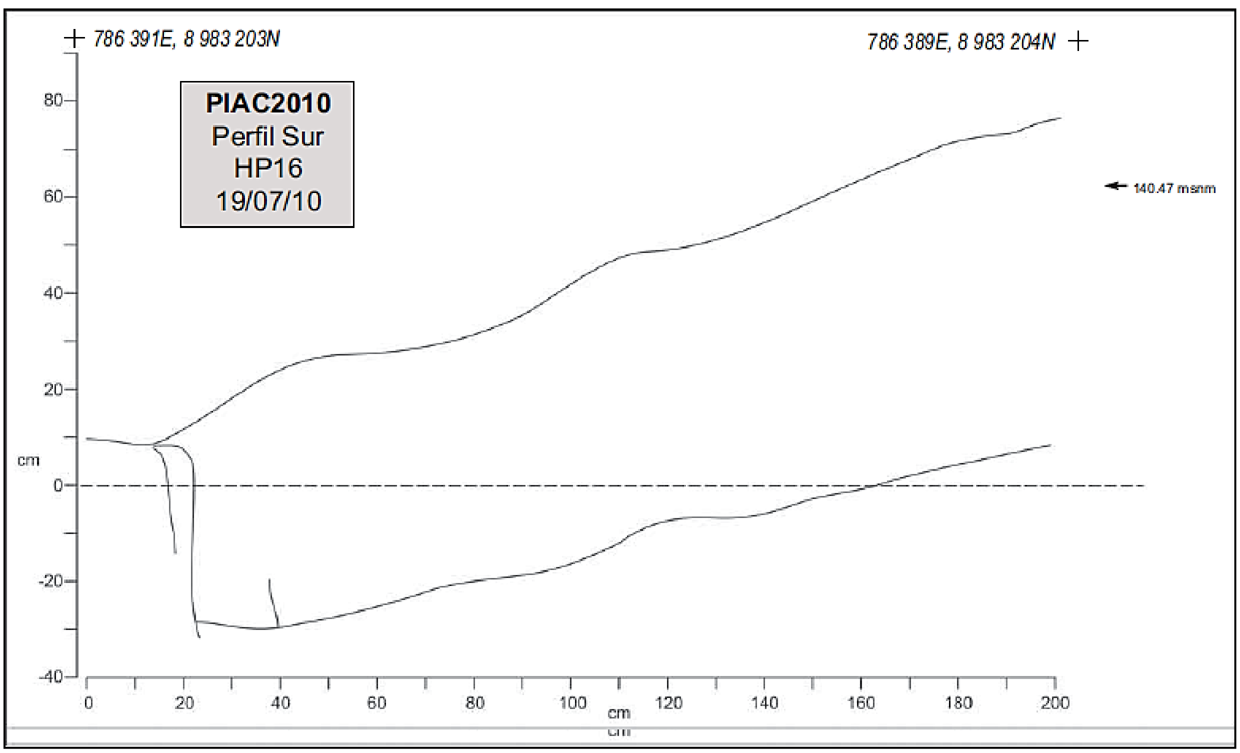


Figure 68 - TP16 Profile from the south (Chicoine and Ikehara 2011:176, Figure 137)

VITA

Jacob Pate Warner was born in Columbia, South Carolina, in 1989 to Robert Elmer Warner, Jr. and Margaret Peeples Warner. Jacob received a Bachelor of Arts in Anthropology from Louisiana State University in 2010, and has archaeological experience in Louisiana and Peru. His current research interests include behavioral archaeology, Andean urbanism, and the Early Horizon in Peru. Jacob intends to pursue a doctorate in Geography and Anthropology at LSU focusing on coastal adaptations and paleoclimate reconstructions in prehistoric Peru.