

Assessing the Form and Function of the *Sacbeob* and Associated Structures at Chan
Chich, Belize

by

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A Thesis

In

Anthropology

Submitted to the Graduate Faculty
of Texas Tech University in
Partial Fulfillment of
the Requirements for
the Degree of

Master of Arts

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August 2016

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Acknowledgments

I cannot overstate my appreciation to the various individuals whose contributions, support, and encouragement made the completion of my thesis possible. I would like to thank my advisor, Dr. Brett A. Houk, who lead me down the path of Maya archaeology and gave me the opportunity to be a part of the CCAP for so many years. His mentorship, support, and life coaching were invaluable and contributed immensely to the success of my thesis. Also, Dr. Anna Novotny deserves thanks for her assistance and guidance in the burial analysis and her advice throughout the editing process. I would also like to thank Dr. Tamra Walter and her continual advice, support, and critiques of my thesis.

I would like to thank the numerous individuals who contributed to the excavations. Without the help of Carolyn Nettelton, Alyssa Farmer, Paisley Palmer, and Valorie Aquino overseeing excavations, the success of excavations would not have been possible. Without their help, excavations would have been extremely stressful and much less would have been accomplished. Thank you to Lori Phillips and Sarah Van Oss for their hard work and dedication as lab directors and their outstanding job in processing the artifacts. I would also like to thank the staff at Chan Chich Lodge for their help in the field and hospitality. First, I would like to thank Letty Martinez, the manager of Chan Chich Lodge, for always making my stay enjoyable, and Migde Perdomo for his humor and encouragement to discover jade during excavations. I would also like to thank Raul Martinez, Chelis Monroy, Marvin Ramirez, Luis Romero, and Johny Ramirez for their hard work in the field. Also, thanks to the local high school boys, Jeffrey Magana, Felipe Moh, Jr., Victor Granados, Gary Romero, Roel Romero, Eric Galy, and Justin Gomez,

for their help in excavating the clearing units. I would also like to thank the 2014 and 2015 CCAP field school students for their hard work and dedication.

Finally, I would like to thank all of my friends and family who supported and encouraged me throughout the entire process. Special thanks goes to my parents who encouraged me to pursue Maya archaeology and always provided their support. I would also like to acknowledge my friends, especially Brooke Bonorden and Samantha Mitchell for their motivation and advice, and for making this journey worthwhile.

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Chapter 1

Introduction

Excavations of the Eastern and Western Causeways and associated structures at the ancient Maya site of Chan Chich were the culmination of two field seasons that began in 2014 and ended in 2015. The site of Chan Chich is located along the southern edge of the geographically defined study area known as the Three Rivers region in western Belize, approximately 4 km east of the Belize and Guatemala Border (Figure 1.1)(Houk and Zaro 2014).

This thesis details two years of research conducted at Chan Chich on the site's Eastern and Western Causeways and associated structures. Preliminary investigations of the site's causeways began in 2014 during the second summer session of the Chan Chich Archaeological Project (CCAP). Fieldwork continued in 2015 over the course of two 28-day field sessions from May to July. Project Director Brett Houk and Operation Director Ashley Booher opened and supervised a total of 51 suboperations over the course of two years. Students participating in the Texas Tech University Field School in Maya Archaeology, along with employees from Chan Chich Lodge and local high school students, conducted the excavations.

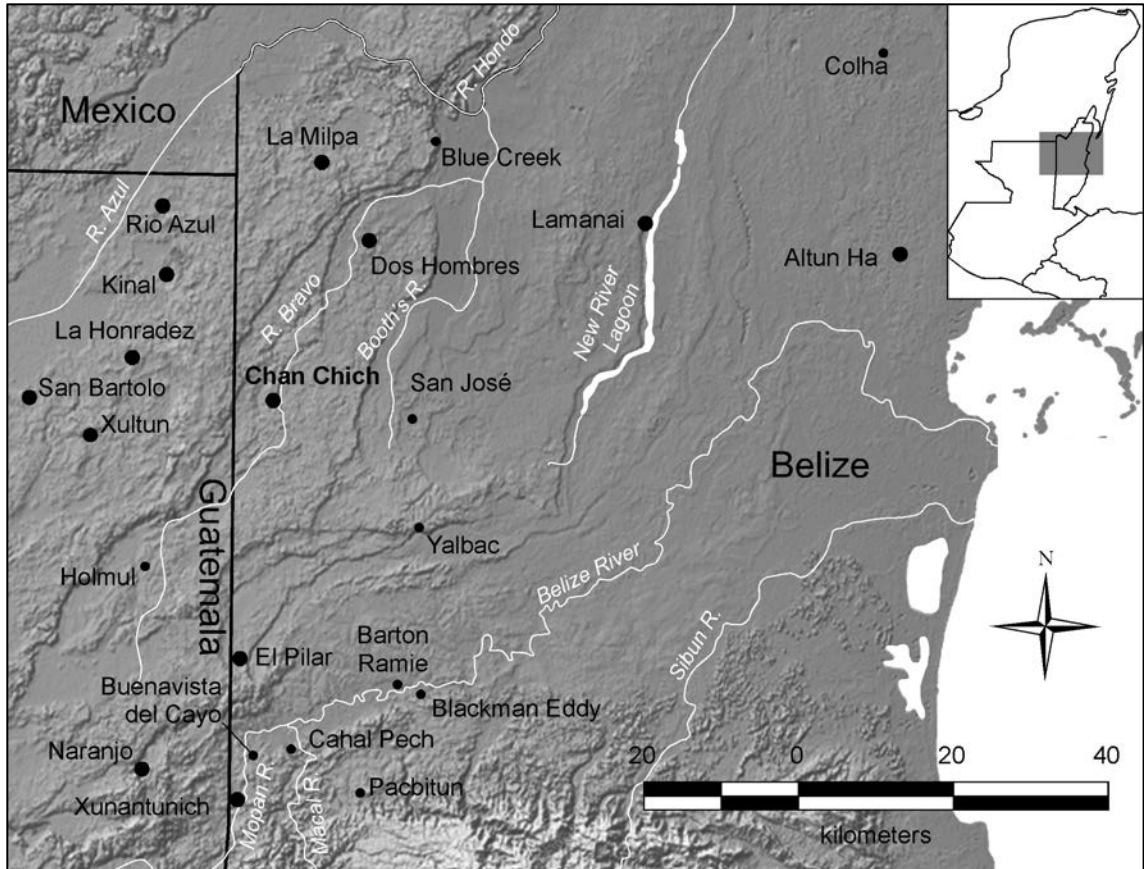


Figure 1.1 Geographical setting of Chan Chich in west-central Belize (after Houk and Zaro 2014:Figure 1.9).

Causeways are an integral part of many Maya cities. Maya causeways are diverse in terms of construction and function with most causeways having several different functions ranging from practical uses such as transportation to symbolic functions such as the integration of social and political ideologies and ritual use. Extensive research of sites' causeways, such as at Xunantunich (Keller 2006) and Caracol (Chase and Chase 2001), have provided reliable data on how a particular site utilized its causeways and the different functions that Maya causeways have at specific sites.

Other than mapping by Guderjan (1991) and Houk et al. (1996), Chan Chich's Eastern and Western Causeways had not been researched or excavated prior to this project. The present thesis research considers the role of ritual function in urban planning at the Maya site of Chan Chich. It takes as its premise that Maya cities were built with a dual purpose in mind: to facilitate everyday activities and to accommodate large masses of people to witness processions and public spectacles. At Chan Chich, we expected to find evidence that would aid in determining the functions of the Eastern and Western Causeways.

The processional architecture research project explored the intersection between site-planning and ritual use. This research worked under the premise that seemingly disparate elements of a city's design could all be components of its processional architecture and served as a stage for rituals and mass spectacles. At Chan Chich, both the Eastern and Western Causeways converge in the Main Plaza directly in front of Structure A-1, a large tandem range building associated with the Main and Upper Plazas (Figure 1.2). Both of these causeways are 40 m wide, much wider than they would have to be if the primary function was for everyday use as simple walking paths. Due to the large width of the causeways, it is possible that the causeways functioned to accommodate either the overflow of people witnessing a spectacle or were the locations for processions, including performers and spectators, that lead into the Main Plaza. Attached to the east side of Structure A-1 is the site's ball court. These architectural elements possibly formed a stage for processions along the causeways leading to public spectacles on or near Structure A-1. The Main Plaza would have been able to accommodate a large number of people to witness such spectacles (Houk 2013).

Furthermore, there are two small structures, Structure D-48 and Structure C-17, located at the termini of the Eastern and Western Causeways, respectively. Both structures face south and have a small platform extending to the south. This project tested the hypothesis that the two structures were functionally associated with the causeways.

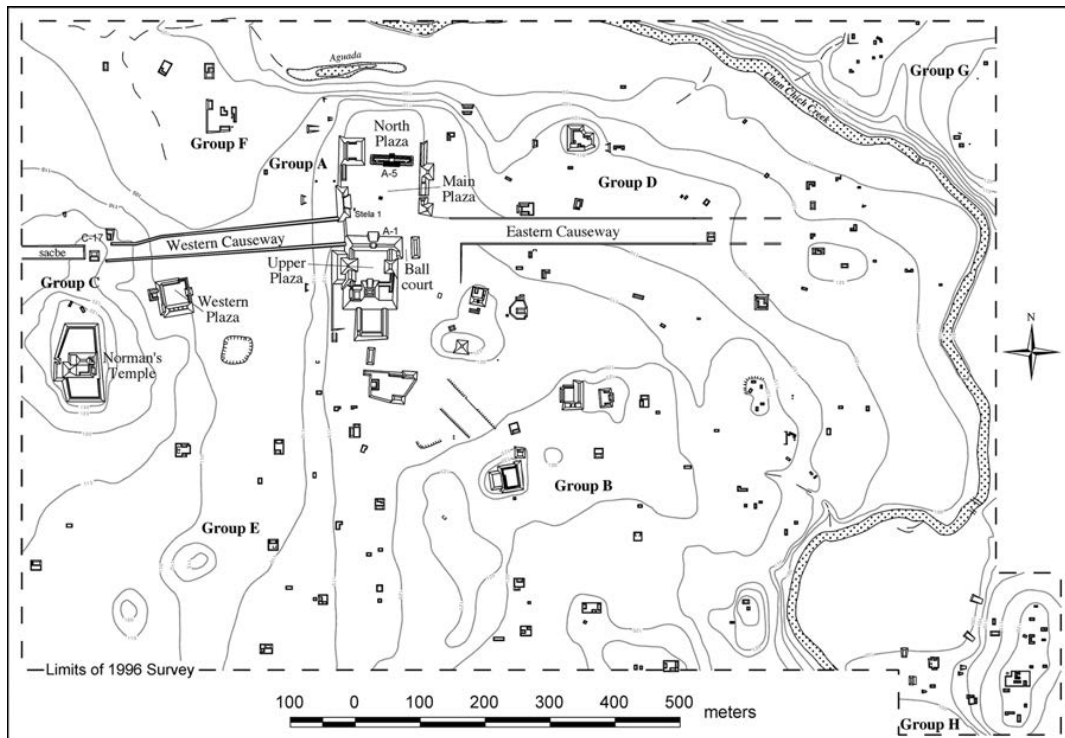


Figure 1.2 Site Map of Chan Chich, courtesy of the Chan Chich Archaeological Project.

The following chapter establishes the setting and previous archaeological research conducted at Chan Chich. Chapter 3 discusses performance theory and describes theatrical space and the role of mass spectacles in Maya society. Chapter 4 discusses the construction methods and functions of causeways. Chapters 5 and 6 discuss the methodologies for field work and analysis, and presents our findings from the 2014 and

2015 archaeological seasons. Chapter 7 discusses the various artifacts collected from excavations, and Chapter 8 presents the interpretations and conclusions of the research.

Chapter 2

Background

Research for this thesis took place at the site of Chan Chich, located in the Three Rivers region of northwestern Belize. The following chapter briefly discusses the geographical zones and setting of the ancient Maya and provides a brief summary of the cultural history of the Maya in the Three Rivers region. The natural setting, climate, and a brief history of the establishment of Chan Chich lodge and the Chan Chich Archaeological Project (CCAP) are discussed in more detail. This chapter also provides a description of the monumental architecture that occupies the site core as well as surrounding architecture located immediately outside the site core. The chapter concludes with a discussion of the previous archeological work that has been conducted under the CCAP from 1996 to present.

Geographical Setting of the Ancient Maya

The Maya area is divided into three geographical zones: the Pacific coastal plain in the south, the highlands in the center, and the lowlands in the north (Figure 2.1). The boundaries of each zone are not precise because they include subtle environmental changes that transition from zone to zone (Sharer and Traxler 2006). Environmental conditions vary tremendously from zone to zone, which further divides each zone into subzones.

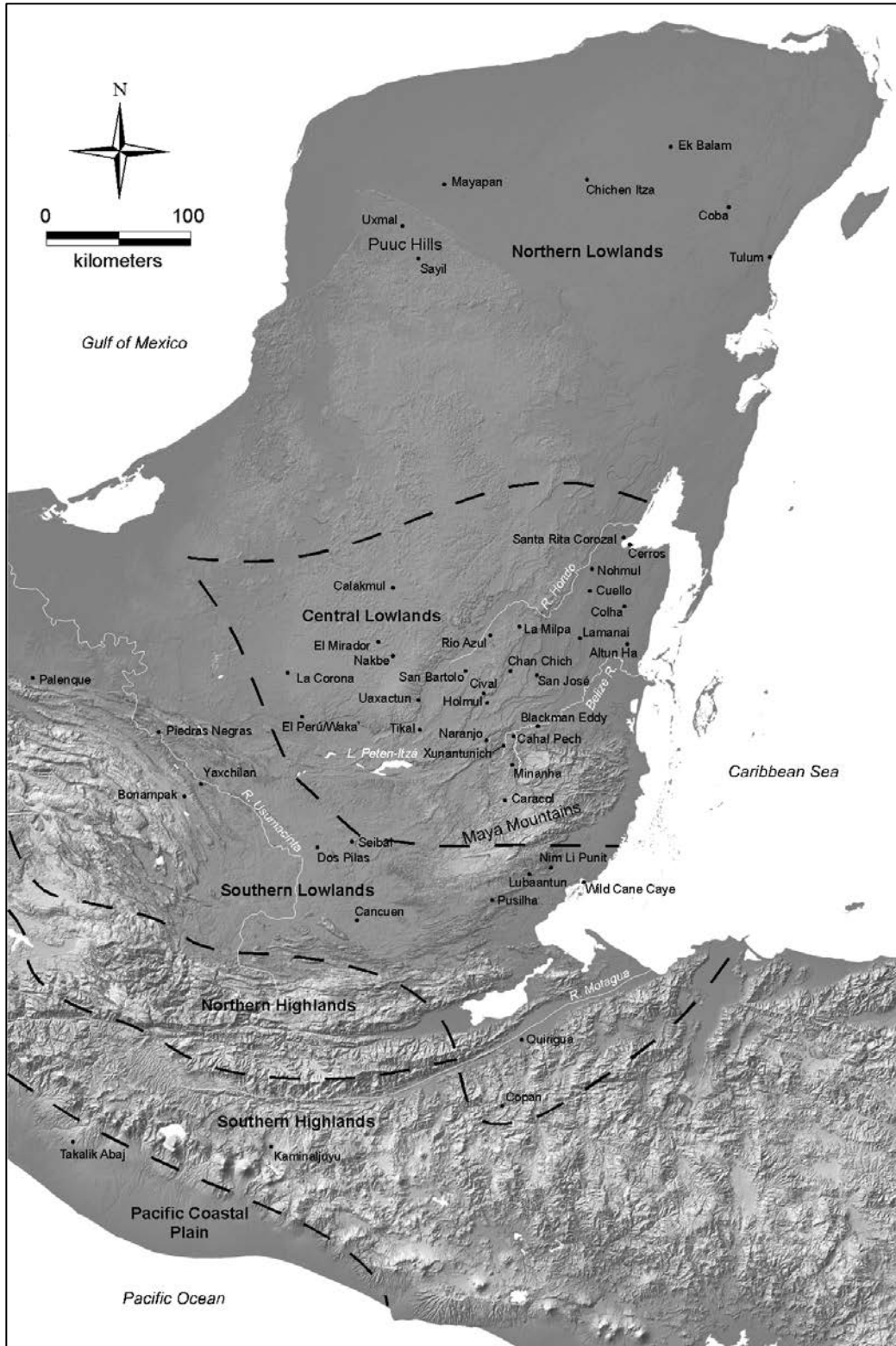


Figure 2.1 Map of the Maya area, showing principal archaeological sites, major rivers, and generalized environmental-cultural subdivisions (after Houk 2015a:Figure 1.1; Sharer and Traxler 2006:Figure 1.1)

The Pacific coastal plain stretches along the Pacific coast from Chiapas in Mexico through southern Guatemala and into El Salvador (Sharer and Traxler 2006). To the north of the Pacific coastal plain is the highlands, which is generally above 800 m in elevation and ecologically diverse. The highlands are further divided into two subzones. The southern highlands lie in an east-west band between the belt of volcanic cones along the Pacific coast and the great rift-valley to the north (Sharer and Traxler 2006). The southern highlands provided important natural resources to the ancient Maya such as obsidian and basaltic rocks used to make manos and metates, tools for grinding corn. The northern highlands lie north of the continental rift between the Motagua and Grijalva Valleys. Jadeite and serpentine deposits, minerals highly prized by the Maya, were heavily mined from this region (Sharer and Traxler 2006).

The lowlands constitute the largest portion of the Maya area, extending over northern Guatemala, Belize, and the Yucatan Peninsula of Mexico, and are characterized by lush, tropical rainforests (Sharer and Traxler 2006). The lowlands are divided into three subzones. The southern lowlands are characterized by elevations between 800 and 1,000 m, running from northern Chiapas through the central portion of Guatemala. The central lowlands are often referred to as the Petén region of Guatemala, along with adjacent areas of Belize. The northern lowlands begin north of the Mirador basin, roughly corresponding to the northern half of the Yucatan Peninsula (Sharer and Traxler 2006).

Setting of Chan Chich

The site of Chan Chich is located in the central Maya lowlands amid dense tropical forest in the Orange Walk District of northwestern Belize. Chan Chich has a long occupation history that began during the Middle Preclassic period (900-300 B.C.) and continues to present day. Chan Chich Lodge currently occupies the Main Plaza and has been home to the current CCAP crew and staff since 2012.



Figure 2.2 Chan Chich Lodge

Chan Chich and the surrounding area sit on a limestone shelf formed from the Yucatan Peninsula. The climate consists of a dry season spanning from February through May and a wet season beginning in May and ending in January (Brokaw and Mallory 1993). The climate of the region likely fluctuated throughout the millennia, although the extent of climate change and the impact it had on the area and Maya life is highly debated and still largely unknown (Dunning et al. 1999).

Chan Chich received its name from Chan Chich Creek, a small creek that flows by the ruins and modern lodge (Guderjan 1991). The ancient name of the site is still unknown. The site of Chan Chich is located on the western bank of Chan Chich Creek, which joins Little Chan Chich creek north of the site to become the Rio Bravo (Houk and Zaro 2014). The Rio Bravo is one of the three rivers from which the Three Rivers region received its name. Chan Chich is positioned within the Rio Bravo Terrace Lowland, a physiographic zone characterized by irregular *bajos* and hills (Houk and Zaro 2014). The forest around Chan Chich is a mixture of upland, cohune palm, and cohune riparian forest (Brokaw and Mallory 1993). The La Lucha Escarpment, which fronts the limestone shelf of the Petén Karst Plateau, is 3.75 km west, and the Yalbac Hills are 18 km to the south of Chan Chich (Garrison and Dunning 2009; Houk 2015a; Houk and Zaro 2014).

The ancient Maya site and Chan Chich Lodge reside on Gallon Jug Ranch, which is owned by Bowen and Bowen, Ltd. In the 1980s Sir Barry Bowen purchased a 130,000-acre property from the Belize Estate and Produce Company, which encompassed the ancient Maya site, and constructed the remote jungle lodge in the Main Plaza (Guderjan 1991). In 2012, Bowen and Bowen, Ltd sold most of the Gallon Jug property to

Forestland Group, retaining 28,000-acres that include the headquarters of Gallon Jug Ranch, Sylvester Village, and Chan Chich Lodge (Houk 2013).

Description of Chan Chich

Chan Chich's major architecture is situated on a north-south axis and is centered around the Main and Upper Plazas with structures surrounding the plazas on all sides (Figure 2.3). With the North Plaza positioned on the northern end of the site core, and the Back Plaza located on the southern edge, the contiguous series of plazas and buildings extends approximately 350 m from north to south (Houk and Zaro 2014). The site's causeways, or *sacbeob*, flank the site core. The Eastern Causeway (Harding Causeway) is a 40-m-wide elevated *sacbe* that extends 435 m to the east, ending at Structure D-48. The Western Causeway extends 380 m to the west, coming to an end at Structure C-17, but then picks back up again as an elevated surface on the west side of Structure C-17 and continues west toward the nearby site Kaxil Uinic (Harris 2012). Unlike the Eastern Causeway, the Western Causeway is composed of parapets defining a 40-m-wide space between them. The Western Causeway is elevated where it enters the Main Plaza, but surface inspections suggests that for most of its length it is a ground-level path flanked by parapets (Booher and Nettleton 2014; Houk 2015a). Both causeways converge in the Main Plaza in front of Structure A-1, a large tandem range building, and the ball court (Houk 1996). Chan Chich is the only site in northwestern Belize to have two causeways, and the "sunken" form of the Western Causeway is extremely rare (see Garrison 2007:317). The only other sunken causeways in the region are at La Honradez where there are three equally wide causeways that radiate from the site center to the east, west,

and north, and a Preclassic example at San Bartolo (Houk 2015a:194). The sites of El Pilar, Xunantunich, and Caracol are the only other sites besides Chan Chich that have parapet-lined causeways in Belize (Houk 2015a).

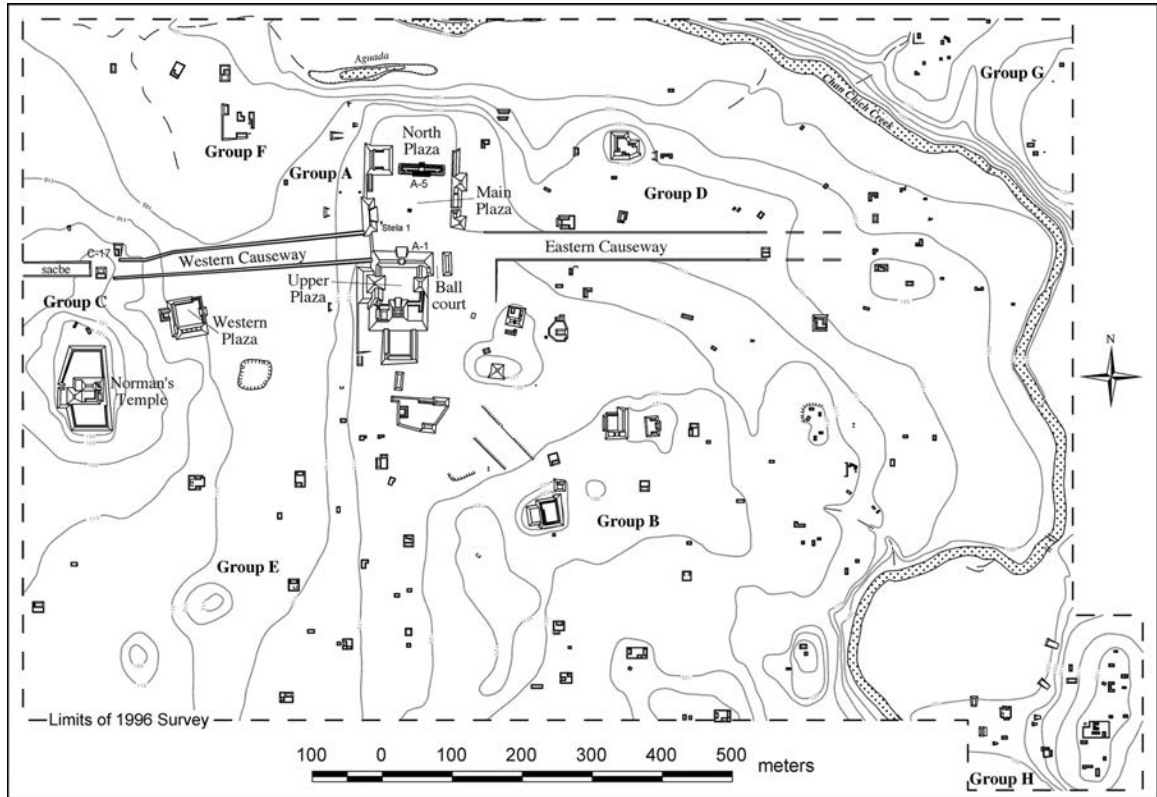


Figure 2.3 Site map of Chan Chich, courtesy of the Chan Chich Archaeological Project

The site core, or Group A, consists of four main plazas surrounded by large monumental architecture (Figure 2.4). The Main Plaza is bordered by structures on all sides with access points available by gaps in between the buildings (Houk and Zaro 2014). The only monument in the plaza is an eroded and burned stela positioned at the base of Structure A-2 on the western side of the plaza. The stela shows no evidence of carving (Houk 2015a). Structures A-7 and A-9, two small temple-pyramids that are linked by a low platform, form the eastern side of the plaza. Occupying the northwestern

corner of the plaza is Structure A-4, an 8-m-tall, square-based platform that supports three low mounds on its northern, southern, and western sides (Houk 2015a). Structure A-5, a 64-m long range building with stairs located on the north and south side, bounds the northern side of the Main Plaza and separates the Main Plaza from the North Plaza (Herndon et al. 2013; Houk 2015a). Structure A-1 is a 70 m long tandem range building, the largest building in terms of mass that divides the Main Plaza from the restricted Upper Plaza. A wide stairway leads up the northern face of the structure to a central landing, which provided the only access point into the Upper Plaza during the site's occupation (Houk 2015a:193). Attached to the eastern end of Structure A-1 is the site's ball court. Structure A-10a is the freestanding eastern portion of the ball court, whereas Structure A-10b, the western portion of the ball court, is physically attached to Structure A-1 (Ford 1998). The penultimate phase of both buildings had tiered playing surfaces facing the alley (Houk 2015a).

The Upper Plaza is approximately 40 by 50 m and is surrounded by monumental architecture on all sides. The Upper Plaza is built on a natural rise, making it the most elevated area of the site core, measuring about 7 m higher than the Main Plaza (Herndon et al. 2014; Kelly et al. 2013). Adjacent to the south of the Upper Plaza is the Back Plaza, or Courtyard A-3, which is located directly south of Structure A-15. Courtyard A-3 is enclosed by three structures on the east, west, and south and lacks the formal accessibility and public space of the Upper and Main Plazas (Vazquez et al. 2014).

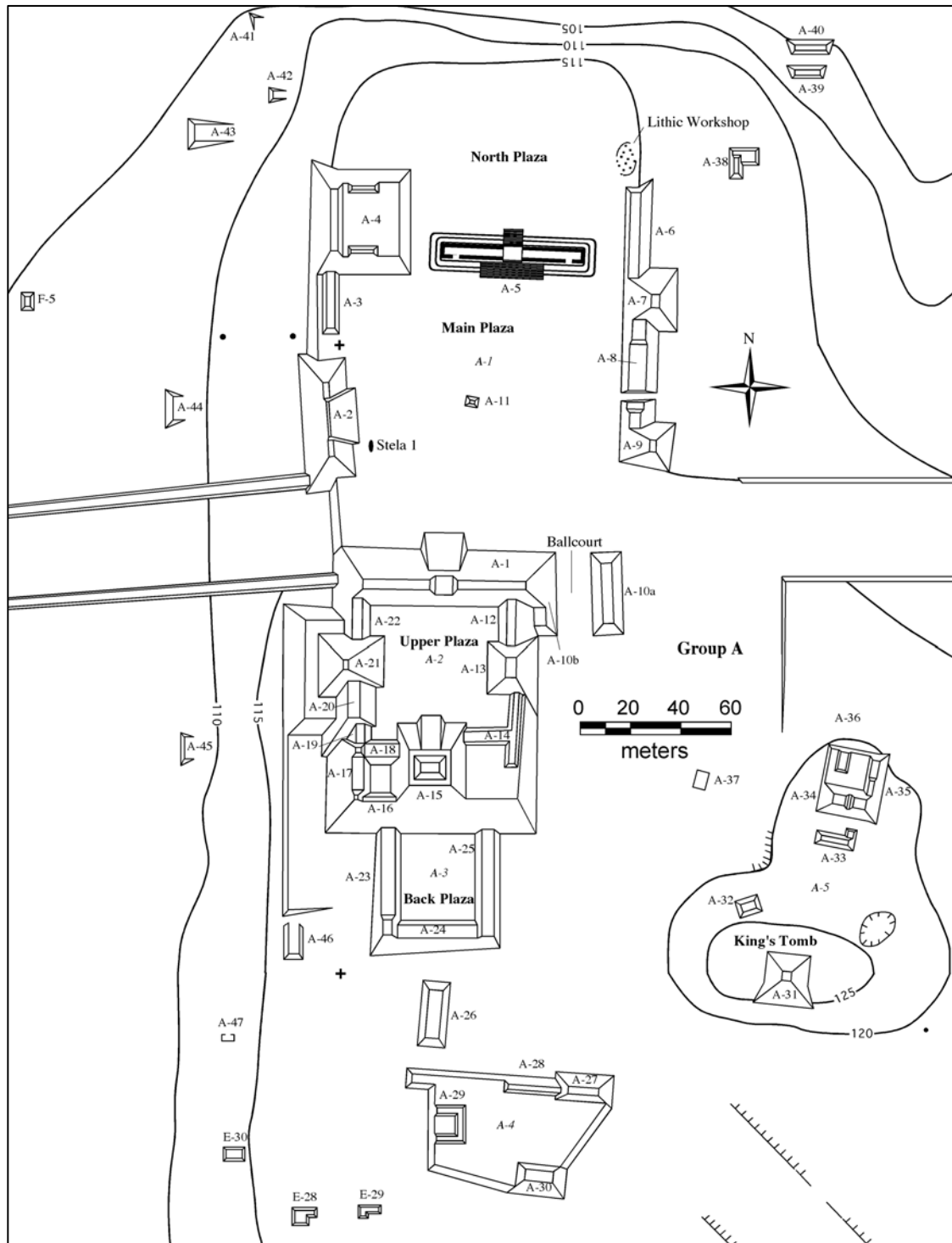


Figure 2.4 Chan Chich site core, courtesy of Chan Chich Archaeological Project.

Group C, located to the west of the Main Plaza, consists of 20 structures clustered around the Western Causeway. Norman's Temple, a courtyard surrounded by four structures, and the Western Plaza, surrounded by eight structures, dominate Group C. Located at the terminus of the Western Causeway is Structure C-17, a small south facing structure approximately 100 m north of Norman's Temple and 400 m west of the Main Plaza (Houk et al. 1996). Structure C-18, located 25 m east of Structure C-17, is associated with a small cave (Booher et al. 2015). Other structures and features, which were not previously mapped, were found associated with the cave and are elaborated on in Chapter 6.

Group D, located to the east of the Main Plaza, consists of 49 structures that are primarily small, informal residential courtyards and house mounds. The largest of these is Courtyard D-3, located approximately 250 m east of the Main Plaza. Courtyard D-3, built on a natural rise, is composed of four structures surrounding a common courtyard (Houk et al. 1996). Courtyard D-1, located 167 m east of the Main Plaza, is a small courtyard group composed of three structures organized around a central courtyard, which is open to the east. The largest building, Structure D-1, is orientated north to south while Structures D-2 and D-3 are orientated east to west (Booher and Nettleton 2014). Guderjan (1991:44), who originally mapped Courtyard D-1 as Structure D-37, proposed that the courtyard "clearly had a function related to the Eastern Causeway." Structure D-48, located 450 m from the Main Plaza, is a small, south facing structure located at the terminus of the Eastern Causeway. Likewise, Structure D-36 is a south facing structure

located approximately 575 m from the Main Plaza.

Summary of Cultural History of the Region

The chronology of the Maya area is divided into broad periods of cultural development—Preclassic, Classic, and Postclassic—with smaller subdivisions within each period (Figure 2.4). Settlement in the Three Rivers region and surrounding area began towards the end of the Early Preclassic period, ca. 1100-1000 BC (Houk and Zaro 2014:14). Occupation of the area continued through the Middle Preclassic period (900-300 BC), although evidence for this time period is limited; data suggest that small farming villages sparsely populated the area (Adams et al. 2004; Houk 1996). Middle Preclassic deposits have been discovered at sites such as La Milpa, Dos Hombres, and Blue Creek (Houk 1996). At Chan Chich, Robichaux (1998) discovered a midden deposit in the Upper Plaza, suggesting occupation at Chan Chich as early as the Middle Preclassic period. Kelley (2014; Kelley et al. 2012) excavated more of this midden in 2012.

Long Count	Time	Major Periods	Chan Chich	Altar de Sacrificios	Barton Ramie	Colha	Cuello	El Mirador	Seibal	Tikal	Uaxactun			
10.10.0.0.0	— 1200 —	<i>Late Postclassic</i>	(Vireo)	Jimba	New Town	Ranas				Caban				
	— 1100 —	<i>Middle Postclassic</i>				Canos								
	— 1000 —	<i>Early Postclassic</i>				Yalam								
	— 900 —		Pasion Chixoy	Tiger Run	Masson	Bayal				Imix	Tepeu 1 2 3			
10.0.0.0.0	— 800 —	<i>Terminal Classic</i>			Post Lac Na									
9.10.0.0.0	— 700 —	<i>Late Classic</i>	Motmot 1						Veremos	Hermitage		Bomba	Junco	Manik
	— 600 —		Motmot 2	Salinas	Cobweb	Acropolis	Paixbancito	Cimi			Chicanel			
	9.0.0.0.0	— 500 —	<i>Early Classic</i>									Jabiru		
8.10.0.0.0	— 400 —		Jacamar	Plancha	Mount Hope	Onecimo	Cocos-Chicanel	Cascabel						
	— 300 —								Oropendula	Kiskadee	Escoba		Mamom	
	8.0.0.0.0	— 200 —										<i>Terminal Preclassic</i>		San Felix Late Facet
7.10.0.0.0	— 100 —		Xe	Early Facet		Bolay	Bladen							
	AD/BC								Swasey					
	— 100 —	<i>Late Preclassic</i>												
	— 200 —													
	— 300 —													
7.10.0.0.0	— 400 —		Oropendula	San Felix Late Facet	Jenny Creek Late Facet	Chiwa	Lopez-Mamom	Monos	Escoba					
	— 500 —													
	— 600 —	<i>Middle Preclassic</i>												
	— 700 —													
	— 800 —													
	— 900 —													

Figure 2.5 Ceramic chronology chart (after Houk 2015b:Figure 1.6).

The Late Preclassic period (300 BC–AD 250) was characterized by an increase in population and settlements. Larger Maya cities such as El Mirador and Tikal began construction of monumental architecture and cemented their dominance in the area (Houk 1996; Sharer and Traxler 2006). At Chan Chich, the Late Preclassic period is marked by a time of considerable expansion and growth, with the Upper Plaza undergoing significant renovations. Additionally the earliest Maya Royal tomb in the eastern half of the Three Rivers region, dated to the Terminal Preclassic period, was found in the Upper Plaza at Chan Chich that (Houk et al. 2010).

During the Early Classic period (AD 250-550) political changes shaped the landscape, with Tikal rising to power and the decline of many Late Preclassic sites (Sullivan and Valdez 2006). This period experienced a large reduction in the rural population as most of the population was redistributed to large cities in the area (Houk and Lohse 2013). Tikal's power expanded into the Three Rivers region with the conquering and execution of the ruling elite of Rio Azul (Adams 1995). Adams (1995) speculates that Tikal's violent takeover of Rio Azul was to gain control and access to trade routes that ran from the central lowlands to the Caribbean. Despite Tikal's influence over the area, the population in the Three Rivers region continued to grow during the Early Classic (Houk 1996). The end of the Early Classic, referred to as the Middle Classic hiatus, shows a decline in population with the withdrawal of Tikal from the region and the abandonment of Rio Azul (Adams 1995; Houk 1996). Thus far, excavations at Chan Chich have failed to document any construction events dating to the Early Classic period. Houk and Zaro (2014) hypothesize that Early Classic period architectural phases are exposed in the looter's trenches of Structure's A-15 and A-21 in

the Upper Plaza, however excavations and testing have yet to confirm this possibility. Even though excavations have not found Early Classic deposits or architecture, Guderjan (1991) discovered Early Classic polychrome vessels at a looters' camp at Chan Chich, suggesting occupation of the site during this time.

The Late Classic period (AD 550–840) was characterized by rapid population growth throughout the Maya region with an increase in the number of sites and construction of monumental architecture, which likely stressed the already depleting natural resources and lead to an increase in competition between elites (Sullivan et al. 2007). Chan Chich expanded rapidly during the Late Classic period both in population and monumental architecture. Renovations and the construction of new buildings and features gave Chan Chich its final form (Houk and Zaro 2014:15).

The Terminal Classic period (AD 840–900) experienced a tremendous political and social reorganization that lead to a rapid decline of many Maya cities. The decline was likely triggered by rampant warfare, climate factors such as drought, and the depletion of natural resources (Webster 2002). Chan Chich went into decline during the Terminal Classic period, marked by inferior quality of construction, before being abandoned around AD 850 (Houk 2016; Houk and Zaro 2014). By the end of the Terminal Classic period and the onset of the Postclassic period (AD 900–1600), elite control dissipated and most of the sites in the Three Rivers region were subsequently abandoned (Sullivan et al. 2007). There is evidence that suggests that pilgrimages and small-scale reoccupation of sites continued through the Postclassic period in the region (Houk et al. 2008), but it was not until the 1800s that significant reoccupation took place as Caste War refugees settled at nearby Kaxil Uinic (Bonorden and Kilgore 2015).

Previous Archaeological Research At Chan Chich

In the 1930s, archaeologist Sir J. Eric Thompson originally intended to conduct fieldwork at the nearby site of Kaxil Uinic but relocated to the village of San Jose before any archaeological excavations could be conducted (Harris and Sisneros 2012). While Thompson was nearby, it is still unclear whether or not he visited the site of Chan Chich (Houk 2012). Chan Chich was heavily looted prior to any archaeological excavations, with looters' trenches found throughout the Main and Upper Plazas (Figures 2.6). Structures A-15 and A-21 were extensively looted, revealing earlier construction phases and exposing red stucco paint (Guderjan 1991; Figure 2.7).



Figure 2.6 Picture of a looters' trench in the Upper Plaza.



Figure 2.7 Red stucco paint in looters' trench on Structure A-21 in the Upper Plaza.
Photo courtesy of Edgar Vazquez.

In 1987, Thomas Guderjan visited Chan Chich and returned the following year with a team from the Rio Bravo Archaeological Project to map the site and profile the looters' trenches (Guderjan 1991). In 1995, at the request of Chan Chich Lodge, a team from the Program for Belize Archaeological Project mapped the nature trails at the site in relation to the ruins (Houk et al. 1996). In 1996, the CCAP was officially established. Brett Houk, Hubert Robichaux, and Jeffery Durst (1996) mapped the area around Chan Chich, recording 253 structures, 187 of which were previously undocumented. Among the newly documented structures and features were the Western Causeway and the ball court. In addition to the 253 structures recorded, the 1996 season also recorded numerous ancient landscape modification features such as chich mounds, quarries, reservoirs, and dams (Houk et al. 1996).

The first archaeological excavations occurred at Chan Chich during the 1997 season with the goal of establishing the site's chronology (Houk 1996; Houk 1998a). Bruce Moses (1998) and John Arnn created a topographic map of the Upper Plaza, while Brett Houk (1998b) excavated the northern facing staircase of Structure A-1. The site's ball court and Group C were also tested during the 1997 season (Ford 1998; Meadows 1998).

During the 1997 field season, excavations in the Upper Plaza at the base of Structure A-1 revealed a midden deposit that contained ceramics, lithics, bone, shell, snails, and two marine shell bead fragments that, along with a radiocarbon sample, dated the midden to the Middle Preclassic period. Directly below the midden deposit was a post-hole cut into bedrock, which provided evidence of a Middle Preclassic occupation of

the northern portion of the Upper Plaza (Robichaux 1998). It is notable that while excavations encountered no Early Classic architecture or deposits, they did document Late Preclassic and Late Classic deposits in the Northern portion of the plaza.

Excavations at the southern portion of the Upper Plaza revealed a Terminal Preclassic royal tomb cut into bedrock, representing the earliest royal tomb in the eastern half of the Three Rivers region (Houk et al. 2010; Figure 2.8). The tomb, referred to as Tomb 2, contained a single male placed on a perishable litter surrounded by jade artifacts, ceramic vessels, a serpent-shaped wooden object, and a jade bib-helmet pendant (Robichaux 2000; Houk et al. 2010). The following two seasons focused on expanding and excavating Tomb 2.

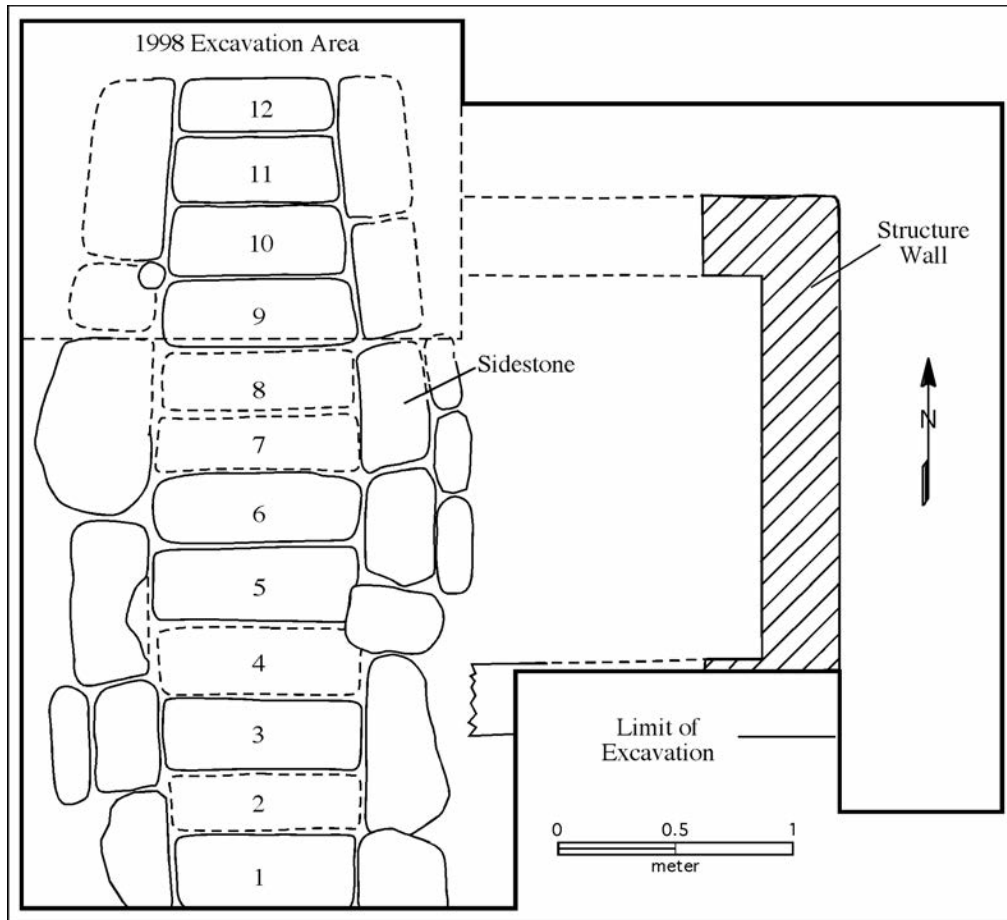


Figure 2.8 Final extent of excavations at Tomb 2 showing the top of the tomb as well as the excavated portions of the shrine platform capping the tomb (after Houk et al. 2010: Figure 4).

The 1998 and 1999 field season conducted work at Group H and the western groups including Normans Temple and the Western Plaza (Ford and Rush 2000; Meadows 2000). Additionally Structures A-1, A-13, and A-15 of the Upper Plaza were excavated to varying degrees over the course of the 1998 and 1999 seasons (Robichaux et al. 2000).

A hiatus of over 10 years ensued before excavations began again in 2012 at Chan

Chich (Houk 2012a). The 2012 excavations of the Upper Plaza focused on utilization of space and occupation history of the Plaza (Kelley et al. 2012). The 2013 season expanded on what was discovered the previous year. The 2012 and 2013 archaeological seasons uncovered a series of plaster floors with the earliest dated to the Middle Preclassic period, correlating with Robichaux's findings, with occupation continuing through the Late Classic period (Kelley et al. 2013). Excavations revealed that the plaza floor had been heavily modified throughout its use, with the finale construction event elevating the Plaza 1 m during the Late Classic period, making it the largest construction episode of the Upper Plaza (Kelley 2014). One of the most significant architectural finds during the 2013 season was a platform face in the northern portion of the plaza that accounted for a discrepancy between the elevations and sequence of plaza floors in the central area of the plaza (Kelley 2014; Kelley et al. 2012, 2013).

In 2014 the CCAP returned to the Upper Plaza with a specific long-term goal of understanding the early dynastic architecture (Herndon et al. 2014). Herndon and colleagues (2014) focused excavations on the plaza itself along with Structures A-1, A-18, A-20, and A-22. Excavations of the plaza surface continued to explore the enigmatic platform feature that was first documented by Kelley and colleagues at the end of the 2013 season. Herndon and colleagues (2014) further exposed the platform feature, which extends roughly 25 m across the plaza and terminates toward the westernmost area of the Upper Plaza. The platform face lacked any remains of plaster and was located among construction fill, suggesting that it may have served as a construction pen for stabilization to support the final large construction event of the plaza (Herndon et al. 2014).

Excavations of the monumental architecture surrounding the Upper Plaza

documented the final phase of the structures and uncovered two burials and a cache. Burial CC-B13 was found in association with Structure A-18 and contained a single individual placed within a crypt underneath a floor (Herndon et al. 2014; Novotny et al. 2015). Excavations on Structure A-1 exposed two rooms along with the central landing of the building. The most significant find on Structure A-1 was Burial CC-B11. The burial contained the remains of a single individual along with four complete ceramic vessels (Herndon et al. 2014; Novotny et al. 2015). An obsidian cache was discovered in association with the burial. Both the burial and cache were associated with the penultimate phase of Structure A-1 (Herndon et al. 2014).

Excavations of the Upper Plaza have provided an exhaustive account of the construction and occupation history of the plaza. Initial excavations of the Upper Plaza revealed a Middle Preclassic occupation of the plaza. The discovery of Tomb 2, which dated to the Terminal Preclassic period, established the beginnings of the royal dynasty at Chan Chich (Houk et al. 2010). Further excavations determined that the Upper Plaza underwent several renovations through the Late Classic period and exposed the final architecture of the surrounding structures. Radiocarbon dating along with ceramic analysis will provide a more complete understanding of the chronology of the Upper Plaza (Aquino and Houk 2015).

Aside from the excavations of the Upper Plaza, the 2013 season conducted excavations at Structure A-5, a range building located on the northern end of the Main Plaza. This research combined Structure from Motion (SfM) mapping and ground penetrating radar (GPR) to assess and document the structure (Houk 2013). Excavations revealed three construction phases with the final phase dating to the Late Classic period.

The final architectural form of Structure A-5 had a stairway on the south side and another on the north side with a long room on the summit of the platform with low masonry walls and a perishable superstructure (Herndon et al. 2013). The area to the north of Structure A-5 was long considered an unmodified area outside of the Main Plaza, however the north facing stairway suggests that this area, now called the North Plaza, was a part of the site core. The presence of the multiple construction phases of the building suggests that the structures surrounding the Main Plaza were not constructed during a single construction event (Houk 2013).

In 2014, Edgar Vazquez (2014) conducted research at the Back Plaza (Courtyard A-3), which had not been previously studied. Vazquez (2013:93) speculated that the Back Plaza may have functioned as a food preparation area for the Upper Plaza or served as a residential area for servants who were actively involved with the daily activities of the Upper Plaza. Structures A-23 and A-25 along with the courtyard were targeted for excavations. Shovel tests were conducted around the courtyard to look for middens. Excavations revealed that the plaza itself had a single construction phase dated to the Late Classic period with occupation through the Terminal Classic period, although the Back Plaza may have been inhabited during the Middle or Late Preclassic period before the construction of any significant architecture (Vazquez et al. 2014).

Two construction phases were uncovered for Structure A-23, both dating to the Late Classic period with occupation through the Terminal Classic period. Structure A-23 was constructed on a platform with several low walls around the perimeter of the building that would have supported a perishable structure (Vazquez et al. 2014). Structure A-25's architectural form is less evident, but was likely built on a platform and contained several

rooms with low walls that supported a perishable structure. A midden was located beneath a floor in Structure A-25 dating to the Late Preclassic period, suggesting that Structure A-25 was constructed on top of the midden in the Late Classic period (Vazquez et al. 2014). The material culture collected from Structure A-23 suggests that the building was a food preparation area, while Structure A-25 may have served as a residential area, although evidence for that is not conclusive (Vazquez 2014).

Structure D-36 was excavated over the course of two seasons in 2014 and 2015 (Booher and Nettleton 2014; Booher et al. 2015). Structure D-36 is located within Group D approximately 575 m east of the Main Plaza. It is a small, south facing structure with an adjacent platform on the south face of the structure. Excavations revealed the final architectural form and indicated that the structure likely had vaulted entranceways, with the remaining superstructure composed of a perishable structure (Figure 2.9). The interior of the structure was composed of two rooms, each containing a C-shaped bench. Excavations of the adjacent patio structure revealed one construction phase. Copious amounts of artifacts were collected above the final patio surface. Future analysis of ceramic and lithics collected from Structure D-36 will significantly aid in the overall understanding of the function of this building.



Figure 2.9 Overhead view of Structure D-36 showing exposed architecture (after Booher et al. 2015:Figure 2.33).

The excavations briefly described above reflect the majority of excavations that have been conducted at Chan Chich thus far, aside from the Eastern and Western Causeways and associated structures, which are extensively discussed in the following chapters. More detail on individual excavations is included in the project's technical report series.

Chapter 3

Processional Architecture and the Role of Mass Spectacles in Ancient Maya Society

The study of performance has become an important area of study for social scientists and the humanities. Performance is a broad term that encompasses highly ritualized acts of theatricality to small, everyday interactions. Performance theory has recently been applied to archaeological studies of premodern societies; specifically how premodern societies used public events to create a sense of community and generate political power. Michael Foucault (1977) suggested that antiquity was a civilization of spectacle whereas modernity is a society of discipline. Although a broad statement, it is likely that the development of large, centralized polities would have been impossible in any historical context without frequent public events (Inomata and Coben 2006). For premodern societies public events created social cohesion among a community, while simultaneously imposing asymmetrical power relationships between the elite and the general populace. This research specifically looks at the political and social importance of public events and mass spectacles in ancient Maya society and how such events were incorporated into the built environment of Maya cities.

Performance Theory

The study of performance has become an important theme within anthropology and recently has been applied to archaeological studies. The concept of performance used by various scholars comprises a wide range of meanings that include very broad, inclusive concepts of performance, to a narrower definition of performance. At one end

of the spectrum is the notion of performance as an enactment of what it refers to with an emphasis on what human beings do (Inomata and Coben 2006). Richard Schechner's (1988: xvii) concept of performance is an inclusive one. He believes that theater is only one node on a continuum that reaches from the ritualization of animals and humans through performance in everyday life including greetings, displays of emotion, family scenes, and professional roles through to play, sports, theater, dance, ceremonies, rites, and performance of great magnitude. Also found near this end of the continuum of a broad and inclusive concept of performance is informal daily activities as forms of human interactions and self-presentations. Erving Goffman (1959:22) has defined performance as "all the activity of an individual which occurs during a period marked by his continuous presence before a particular set of observers and which has some effect on the observers." In this manner, Goffman has associated social actions in everyday life with theatrical acts, both of which are communicative and expressive acts involving the presence of performers and observers (Inomata and Coben 2006).

Both Schechner and Goffman created a concept of performance that encompasses everyday mundane social activities to large-scale ceremonies, however other anthropologists prefer narrow definitions of performance. Hymes (1975:13) has argued that performance is not merely behavior but "something creative, realized, achieved, even transcendent of the ordinary course of events," which is interpretable, reportable, and repeatable in a domain of cultural intelligibility. In Hymes view, what makes performance are qualities that are consciously recognized by performers and observers, and he notes that performance is cultural behavior for which a person assumes responsibility to an audience (Hymes 1975). Schechner (1988:30) notes that certain ritual

activities can be viewed as performance even when they do not involve the physical presence of an audience, if gods, supernaturals, or performers take the real or symbolic role of an audience. Thus performance is a mode of communicative behavior (Bauman 1989).

The other end of the spectrum encompasses performance of highly circumscribed and prescribed acts in formalized theaters, in which the performers and audience are consciously concerned with the theatricality of the acts and settings (Inomata and Coben 2006). Richard Schechner has extensively written on the characteristics of theater and theatricality in comparison to other types of performances such as rituals, sports, and games. According to Schechner (1998), theater requires an audience-performer interaction—the physical presence of an audience who are observers and evaluators—whereas rituals often involve an audience as more active participants who sing, dance, pray, or present offerings (Schechner 1998). Beeman (1993:379) notes that a defining feature of theater is its focus on symbolic reality, in which performers represent themselves in roles detached from their lives outside the performance.

Early studies of ritual and other performance categories tended to emphasize what specific performance meant. Most types of performance have some form of conventional meaning shared by multiple individuals; performances are also multivocal and ambiguous at deeper levels (Schechner 1998). Recent developments in performance theory have led to examining performance in archaeological contexts, focusing more on how the theatrical events communicate, how they generate meaning, and how different meanings are negotiated among participants. Such examination of performance must include the formal properties of theatrical events (Inomata and Coben 2006). Inomata and Coben

(2006:21) argue that archaeologists need to analyze closely the physical acts of performance along with its material and social settings and consider how formal processes and characteristics of theatrical events shape, and are shaped by, meaning and emotion.

In contrast to the notion of institutionalized theater as described by Schechner, Inomata and Coben (2006) define theatricality as a more ambiguous, inclusive concept that suggests the degree to which some of the characteristics of theater are present in social action and practice. Hence theatricality is prevalent in human life outside the walls of a theater. Theatricality is a critical concept in examining the communicative potentials of performance, the construction of its meaning, and the emotional impacts on participants. The political implications of performance, in terms of the reproduction of power relations, the negotiation of ideologies, and the constitution of a community are closely related to its theatricality (Inomata and Coben 2006:16). When studying performance within an archaeological framework, performance encompasses public rituals, ceremonies, festivals, and courtly interactions, which fall between the two extremes of the conceptual continuum mentioned above. Inomata and Coben (2006:16) call these acts theatrical performances and suggest an arbitrary degree of theatricality and recognize that the social and political significance of any performance, whether it is daily practice or formal theater, is rooted in both performativity and theatricality and must be studied as such.

Inomata (2006b) notes an important dimension of performance include the concepts of spectacle and public events and the social and political implications for both the performers and the audience. The primary feature of the spectacle is a gathering

centered around theatrical performance of a certain scale in clear spatial and temporal frames, in which participants witness and sense the presence of others and share a certain experience (MacAloon 1984:243). The scale and grandeur of spectacles are not absolute measurements, but dependent upon the expectations of the participants and the cultural values of the themes presented in these events as shaped in specific social and historical contexts (Inomata and Coben 2006:16). In this sense, spectacles comprise any public displays of rituals, ceremonies, and festivals, which overlap significantly with public events, and such occasions inevitably involve certain elements of theatricality (Beeman 1993). The deliberate intention to use the terms “spectacle” and “public events” rather than ritual or ceremony consciously applies recent applications of performance theory to archaeological cases and examines the common qualities and political implications shared among certain rituals and other types of spectacles (Moore and Myerhoff 1977).

The study of performance now emphasizes more strongly its creative quality. Recent studies focus on the way ritual and other types of performance communicate, and important issues include the process of communication through performance and the process in which performance creates identities and social relations (Inomata and Coben 2006). Performance not only communicates concepts but also creates identities for the participants and constructs the world in which they live. Thus performance is not only a mode of communication but also a mode of social action (Inomata and Coben 2006). In this sense, performance not only mirrors social change but also creates change (Schechner 1994).

Theatrical performance and spectacles in premodern societies comprise a wide range of activities and occasions, such as polity-wide gatherings with the ruler as the

protagonist or sponsor, diplomatic ceremonies involving multiple political units, courtly activities with a restricted audience, religious rites detached from governmental institutions, festivals, and pilgrimages that draw numerous participants of diverse political and social affiliations. These events can have profound implications for the understanding of any society, particularly in terms of the integrations of communities and the establishment and maintenance of asymmetrical power relations (Inomata and Coben 2006).

Theatrical performances, spectacles, and public events created a sense of community among premodern societies and created a cohesive, collective identity among societies. Benedict Anderson (1991) suggests that all communities larger than small villages that have daily face-to-face contact are “imagined” in the sense that the members of the community never know most of their fellow members, yet they all bear the image of their community. No such thing as a “true” community exists. Anderson (1991) privileges the role of written media and the advent of religious communities are what bound people together. In the premodern world however, numerous imagined communities developed without the help of writing, thus theatrical performance and public events likely brought people together and created a sense of community and were important for the operation of any society. Inomata and Coben (2006:11) argue that the development of large, centralized polities would have been impossible in any historical context without frequent public events, in which agents of political power presented themselves in front of a large number of spectators, and the participants shared experiences through bodily presence. Community solidarity is produced by people acting together, not by people thinking together, thus rituals become effective in unifying a

community because they ground and display a sense of community without overriding the autonomy of individuals (Inomata and Coben 2006; Kertzer 1988).

The social effects of theatrical performances and spectacles are derived partly from the physical presence of participants as performers, audience, or both. Public events not only facilitate opportunities for the exchange of goods, communication, and ideas, but also create moments of “true” communities in which a large number of people can partake and experience the participation of other members (Turner 1987). Human sociality and identity are rooted in our sensory perceptions of the presence and actions of others, thus public events do not simply express the solidarity of a group, but they make a community (Rogers 1999). Rogers (1999:9-10) notes that communal identities associated with theatrical events are not the expressions of deeply held inner core of community members but practical accomplishments achieved by means of performance, witnessing, and participation.

The effects of spectacles in creating a community suggest its potential as tools for ideological and political unification. All forms of power relation necessitate constant affirmation and maintenance through the acts of performance and witnessing (Scott 1990). The process of the maintenance of power relations is particularly important for understanding premodern societies. Many premodern societies likely lacked any coercive force to control their entire population effectively. While warfare and coercive force were critical aspects of essentially all centralized societies, the subordinates in many cases still had the option of fleeing or allying themselves with others when subjected to excessive oppression (Inomata and Coben 2006). For premodern societies, the importance of performance in establishing, affirming, manipulating, and maintaining power relations

between elites and nonelites, as well as among elites themselves, emphasizes the power and effect of theatrical performance to define political reality and social relations. Thus performance itself is a critical part of politics (Inomata and Coben 2006).

The analysis of theatrical performance poses a challenge within an archaeological framework because such events cannot be directly observed. Inomata (2001) suggests that such studies should place a stronger emphasis on physical acts and the immediacy of material presence, which would be more directly accessible through archaeological research than abstract concepts of performance theory. Theatrical space, images, and objects used in a performance become particularly important when attempting to understand the social and political implications of performances in premodern societies (Inomata and Coben 2006).

Schehner (1994:618-620) has pointed out that the theater is a cultural place that obtains meanings through performance that takes place there and evokes the memory of past events and thus prior experience, ideological messages, and power relations. Even the natural landscape can be transformed into a theater by means of the enactment of theatrical themes and the attachment of the lore of performance by ancestors (Coben 2001). The construction of theatrical space, including plazas, certain types of temples, and palaces can become a critical part the preparations for theatrical events. In premodern societies, the builders of such architecture were not simply disinterested contract workers, but were often either participants or observers of a spectacle, thus providing a strong social implication for theatrical events. Moreover, the scale, location, and distribution of buildings in relation to other structures point to the political importance of theatrical events (Inomoata and Coben 2006:30).

The material culture of premodern societies provides archaeologists with another line of evidence of theatrical performances. Images of performance preserved through sculptures, figurines, murals, or ceramic painting provide information on certain aspects of theatrical events, including the identities of the performers, the appearance and posture of actors, and the spatial setting of the performance (Houston and Taube 2000). Material objects are important components of theatrical events, and like theatrical space and images, may serve as repositories of narratives or knowledge associated with the performance (Coben 2001). However, artifacts associated with performances are rarely left at the localities where the performance took place, which poses difficulties for archaeologists. Yet performance paraphernalia found in storage, domestic, or mortuary contexts can provide information on theatrical performances (Inomata and Coben 2006).

Theatrical Performance in Maya Society

Public performance, mass spectacles, and ritual or ceremonial processions played an important role in the social and political integration of large polity capitals in the Maya area. These grand performances served not only to unite the site center with the outlying population, but also strengthen social ties amongst the community. Mass spectacles served as a way for elite to demonstrate their power while simultaneously incorporating the general masses to create one, large cohesive identity (Inomata 2006b).

Colonial documents of Maya practices indicate that theatrical events were important for the colonial period Maya and provide a possible window into potential components of theatrical performance during the Classic period. Spectacles were important events for the Colonial Maya, involving various performers and numerous

spectators; they were viewed not only as religious duties but also as entertainments (Inomata 2006a). Bishop Landa recorded Colonial Maya practices in the northern lowlands during the early sixteenth century before there were any significant influences from the Spanish, and suggested that festivals and ceremonies were the primary concerns and obligations of all community members (Inomata 2006a). Several colonial documents (Tozzer 1941) mention that for the Maya public dances were extremely important and festive receptions with music and dances. Many colonial period theatrical events were religious ceremonies scheduled for various times of the year according to Maya calendars, but other ceremonies took place on special occasions, such as during visits from foreign dignitaries. Dances and music were the central elements in many of these public events with the performers elaborately dressed (Inomata 2006a; Tozzer 1941).

Mass Spectacles and Public Events

Mass spectacles and public events were an essential element of Maya culture. Spectacles can have a myriad of different meanings and connotations within the same culture as well as cross-culturally. Spectacles can be seen as a public display of a society's central elements within their culture and are important for members within the community to witness such events. A spectacle is a public display of a society's central, meaningful elements. The meaning of a spectacle is proportionate to the degree to which the elements displayed in the spectacle represent key elements to the society's cultural and emotional lives (Beeman 1993). Spectacles in this sense can comprise many different types of rituals, ceremonies, public presentations (such as an heir coming to the throne), festivals and feasts, and any public display of sacrifice. Spectacles give primacy to visual

sensory and symbolic codes; they are things to be seen and must be of a certain size or grandeur to elicit the appropriate response (Beeman 1993).

An important aspect of any Maya spectacle included dance and music (Inomata 2006b). Performers would be elaborately dressed, and sometimes events would involve dancers representing animals or different deities. Bishop de Landa described Colonial-period dances that represented mythical themes, such as the dance of Xibalba and the story of the Hero Twins (Inomata 2006b). Even though these events were witnessed during colonial times, it is still very likely that similar spectacles of this sort also occurred during the Classic period.

The murals of Bonampak depict a Classic Maya spectacle complete with dancing, musicians, and individuals wearing costumes. The murals in Room 1 depict two processions of musicians that converge on the south wall of the room. The musicians include rattle players, a drummer, trumpet players, and turtle shell players (Miller and Brittenham 2013). Within the same room as the musical procession is a group of individuals, including one dressed as a crocodile and another as a giant crustacean, while the others are dressed as individual deities (Miller and Brittenham 2013). The murals of Bonampak provide insight into what courtly performances and public displays likely consisted of during the Classic period.

The most essential component of spectacles or public events is that of the audience and the role they play. William Beeman (1993:384) states that “spectacles must have an audience... the audience is a crucial part to a spectacle.” Without an audience to witness the grandeur and significance, the spectacle becomes meaningless. Depending on the type of event, the audience’s role could differ. In a more ritual or ceremonial event,

the audience is a full participant in the event. The active contributions of the audience, whether it be vocal displays, dancing, eating, or the presentation of gifts to deities, priests, kings, or other participants, are essential to the success of the event (Beeman 1993). The audience as a witness is perhaps the most common role the audience portrays in a spectacle. Even though the audience is not participating in the event, in order for the event to be successful, there needs to be a present and actively watching audience (Beeman 1993).

Spectacles functioned as a way to bring together numerous individuals and for the elite to convey their ideology, beliefs, worldview, and power with the community. Spectacles were important events not only for the elite but also for the community that viewed these public events as not only religious duties, but also as entertainments (Inomata 2006b). These public events would physically bring together community members that otherwise did not have daily face-to-face contact with each other and would create a shared experience that generated a cohesive, unified identity for that certain polity.

Spectacles also served as a way for the Maya elite to create and spread their propaganda and common values to the general public. Spectacles thus have real and direct political effects (Inomata 2006b). The Maya elite would sponsor spectacles for not only entertainment purpose, but also as way to gain, maintain, and affirm their power to the community and the surrounding region. Inomata (2006b:803) argues that the development of large polities would have been impossible without a heavy reliance on public events and spectacles and points out that “no government can rule by force alone.” All forms of power relations necessitate constant affirmations and maintenance through

acts of public performances and witnessing (Inomata 2006b; Inomata and Coben 2006). For the Classic period Maya, both local power and interpolity connections were based heavily on ideological support and sanction (Demarest 1992:147). In other words the role of ritual, religion, and public display and monumental propaganda was central to Classic Maya society. According to Demarest (1992:147) ritual and religion was a principal source, perhaps the source, of power of Maya rulers. It is probable that many early Maya polities lacked any form of coercive force or a developed bureaucracy to control their entire population effectively. For the early Maya elite, spectacles and performances would have played a key role in establishing, affirming, and maintaining power relations (Inomata and Coben 2006).

Aside from the participation of audience members, the role of the elites was crucial to the success of a spectacle. The elite were responsible for the preparation, organization, and execution of public events. The bulk of Maya labor, under the supervision of the elite, was spent in construction of the elaborate stages of their ceremonial centers- plazas, temples, facades, monuments, costumes, exotics, and paraphernalia- all for ritual events (Demarest 1992:147). The ideological role of Maya leaders was a very real, direct source of prestige and power, and the public displays carried out on the stage of ceremonial centers were a direct source generating power (Demarest 1992:148).

Ringle (1990) identified the title *holpop* in an inscription at Chichen Itza, which suggests that certain Maya elite were simultaneously responsible for festivals or public events and administrative duties. According to Cogollude (1971:243), the *holpop* was a principal singer who taught others, was entrusted with various musical instruments, and

was a venerated figure who had important roles in religious affairs, at feasts, and in assemblies. Roys (1943:63) noted that the *holpop* was not only in charge of ceremonial affairs but also important administrative officer. The Motul dictionary from the colonial period listed *holpop* as the head of the banquet and the master of the *popol nah*, or mat house, which was a council house where political matters were discussed and dances were prepared (Inomata 2006b). The functions of the *holpop* and the *popol nah* suggest that festivity and administrative duties merged inseparably in the Maya concept and practice (Inomata 2006b). The convergence of administrative and ceremonial functions can be seen archaeologically in evidence from Aguateca. Excavations of elite residences in close proximity to the site's causeway showed the building were burned and abandoned rapidly (Inomata 2001). Inomata (2001) has identified the residents to be courtiers who were likely responsible for political affairs associated with the polity. These elite residences contained numerous musical instruments, such as conch horns or trumpets, ceramic flutes, whistles, drums, and bone rasps, suggesting that these political elite engaged in musical performances on various occasions (Inomata 2006b).

As discussed more below, the elite would engage in ceremonies and events in a more private setting in palaces and elite residences, although it remains unclear how exclusive these performances were. At Aguateca, the probable throne room was placed along the axis of the causeway, and those who stood in the northern portion of the causeway would be able to see the ruler presumably sitting on the throne, or possibly performing a ceremony. Thus the audiences and meetings that the ruler held in front of his throne room may have been visible to those who were not allowed into the palace group (Inomata et al. 2001). At larger cities, access and visibility may have been more

restricted for elite-centered ceremonies. At Tikal, the Central Acropolis consisted of a complex arrangement of multiple patio groups that was shielded from outside view (Harrison 1999). Meetings and ceremonies held in the Central Acropolis were likely exclusive, involving only the elite. Thus, there appear to be varying degrees of exclusivity for events orchestrated by the elite and the accessibility and visibility given to the rest of the population.

In Maya society, spectacles and public events were a critical part of economic and political events and likely ranked among the most important administrative work carried out by Maya elites. Community rituals in Classic Maya society served to define and maintain asymmetrical power relations, and the sponsoring of public events created opportunities for elites to assert their images as leaders of the community and the embodiments of community integration (Inomata 2006b). Public events were a way for elites to take credit for the success and continuation of the polity. Rulers would impersonate deities and other supernaturals in public events to stress their divine status. This display and performance of a city's rulers and other elites in front of a large crowd, was the basis for their power (Foucault 1977; Demarest 1992). Additionally, the monumental architecture, stelae, and funerary temples that surrounded the theatrical space were constant reminders of the direct association of the ruling elite as well as the community to the dynastic regime (Inomata 2006b).

Processions

One constituent of spectacles is processions. Richard Schechner (1988:159) describes processions as a form of theatrical production, a kind of "natural" theater. "In a

procession—which is a kind of pilgrimage—the event moves along a prescribed path, spectators gather along the route, and at appointed places the processions halts and performance are played” (Schechner 1988:160). A procession moves toward a goal, and the event performed at the goal of the procession is well planned, rehearsed, and ritualized (Schechner 1988). Kirshenblatt-Gimblett and McNamara (1985:2-5) provide a dramaturgical perspective and define processions as a “performance in motion through space”; the movement becomes an essential aspect of the display’s ceremonial and symbolic importance. As with rituals, the performance is framed to distinguish it from everyday movement through space employing costumes, props, music, and choreography. Processional performance must compete with the surrounding distractions of life. The procession is designed to compete with the existing environment around it, becoming for a time the dominant element (Kirshenblatt-Gimblett and McNamara 1985:2).

Maya processions were diverse events that varied depending on the participants, destinations, and the activities within the procession. Processions could also have been the main focal point of the event or just the beginning event that lead into the main spectacle or ceremony. Processions are extremely communal, highly structured, and orchestrated events in which each person in the procession has a particular role to play and costume to wear (Keller 2006; Shaw 2008). Processions are always group events engineered by the elite to include the whole community as either participants or observers, but the taking part in a procession seems to have been primarily an elite activity. Angela Keller (2006:206) suggests that social status is firmly fixed in a procession and community cohesion is created within, rather than in opposition to,

hierarchical structure. The prime reasons for processions are that the people needed the rulers to act as divine intermediaries and the rulers needed their people to witness their divine acts of seating, stabilization, and creation (Keller 2006). All of these factors could be accomplished within a procession. The spaces through which processions passed were also meaningful, because those spaces and people, along with natural landscape features, and buildings were also incorporated into the procession. It is possible that the Maya even stopped at certain features, whether natural or built, along the procession's route to conduct a certain ritual or to feast (Keller 2006; Sanchez 2007).

Similar to spectacles, the roles of the audience and participants were important to the success of the procession. In processions, most people serve as audience members, although they may have participated in an active way by following the procession, dancing, and feasting at different stops along the route. One of the purposes for a procession is including the audience as part of the ceremony, whether they were to be witnesses to a political event or feel as if they were a part of the group. Processions are performed for the community to witness the event; without the audience, there would not be processions (Sanchez 2007).

In ancient Maya culture, processions share a close relationship with walking, which is reflected in the Mayan languages. Yucatec Mayan does not have a specific word for processions, much like many of the other Mayan dialects; instead it uses the term that describes the physical act of walking. In Yucatec, the word *mani*, meaning to walk, or more specifically "to walk in a single file line" or "to march past" is used to describe processions (Keller 2006). Walking in a straight, orderly line is a key element for Maya processions. A common characteristic of Maya processions is that they were almost

exclusively closed circuits that began in a civic-ceremonial center, proceeded out to the countryside, and then returned to the center. These closed circuits may be circular patterns that perambulate around the center, or straight-line processions that retrace the original processional route (Keller 2006). This can still be observed today within contemporary Maya groups. Palka (2014:38) documented several contemporary Maya groups and their practices, especially pilgrimages, and notes that a pilgrimage fundamentally involves people's movement from domestic settings to ritual landscapes and then back again to their settlements.

Julia Sanchez (2007) developed four descriptive categories of processions from Maya art based on the occasion for the procession: calendrical, military, supernatural, and political. A calendrical procession is an event that is related to the Maya's ceremonial cycle and their calendar. These processions would have taken place at regular intervals that coincide with specific calendrical dates.

Military processions were usually associated with warfare and music. These processions may consist of lines of people holding weapons and sometimes with captives from war. It is important to note that military processions differ from battle scenes depicted in Maya art. While battle scenes are often times chaotic, processions related to military are more organized and formal (Sanchez 2007). From lintels and painted vessels, it seems that military processions had a primarily elite audience and would commemorate important events and demonstrate the military power of the elite.

Political processions could have taken place for a variety of reasons: foreign dignitaries from other polity capitals performing a diplomatic visit, subjects or vassals of other cities that have come to pay tribute, or local political matters such as successions.

The murals from Bonampak depict a political procession scene celebrating the designation of the ruler's son as heir (Sanchez 2007).

The last category is supernatural processions. This type of procession is one in which some or all of the participants in the procession represent supernatural figures. Supernatural processions are known primarily from Maya art and iconographic representations. The participants depicted in the art are either supernatural beings or humans depicting supernatural beings; thus, these processions may take place in the supernatural world or the terrestrial world. A particular type of supernatural procession is a funeral procession. This procession involves an animal band composed of an armadillo with a drum, a gopher with a turtle shell drum, and a deer with rattles. This particular type of procession has been described as representing the soul's journey into the underworld (Sanchez 2007).

Archaeological evidence points to processions as being a significantly important component of ancient Maya society. Keller (2006) argues that our two best pieces of evidence of processions come from the artistic depictions of processions and specially constructed causeways. The murals at Bonampak and scenes on numerous polychrome vessels depict people wearing special costumes bedecked with ritual paraphernalia and walking in a single file line (Figure 3.1). Music and dance also appear to have been incorporated into Maya processions, with the most common instruments being trumpets, maraca-like instruments, and drums. The drums, however, are the only instruments that are typically found in archaeological contexts (Keller 2006). However, their presence along causeways alludes to and supports the theory that processions took place along causeways.



Figure 3.1 Mural from Bonampak depicting a procession, courtesy of FAMSI.

In addition to imagery of processions, there are also a number of causeways that have concrete remains of ancient processions having taken place. Ringle (1999) has discovered that many sites like Coba, Nohoch Mul and Ek Balam, along with numerous others, display a cruciform pattern. At these sites, the causeways do not actually appear to mark the boundaries of the city but instead mark the civil and ceremonial core. These causeways link important architectural groups within the site core together (Ringle 1999). The site of Tikal perhaps displays the best evidence of a large, circular pattern of causeways around a civic center. Aside from the impressive size and width, Tikal's causeways connect key architectural groups and pass through a number of important features, with the most important being the Twin Pyramid Groups erected during *k'atun* ending ceremonies. The close association between Tikal's causeways and Twin Pyramid

Groups suggest a connection between processions and calendrical ceremonies (Keller 2006).

Processions were a powerful form of ceremonial and ritual activity that imbued the landscape incorporated on a processional route with political, social, and ritual importance. Processions were a means to generate power for the elite while simultaneously reinforcing a sense of community and connection to the polity for the audience. As in public events, hierarchical structure and social status were firmly fixed within processions. Large portions of the participants of processions were observers who witnessed litter-borne kings, elaborately dressed musicians, and other elites parading along the causeway (Keller 2006). Processions were predominately an elite activity orchestrated by the elite to express their power and spread their ideology. Although the elite had the power to create and sponsor processions, it was the audience that was the central elements to the success of a procession. The presence, or lack there of, of an audience is what would affirm the strength and power of the ruling elite.

Theatrical Settings

Most historic documents do not describe theatrical settings, however Inomata (2006a:194) suggests that information concerning theatrical space can be gleaned from the documents. In the dances and ceremonies described by Landa, performers appear to have occupied the floor of the plaza, and, for one specific New Year's ceremony, Landa specifically noted that the priest occupied the center of the plaza (Inomata 2006b; Tozzer 1941). The location of the audience is in most cases unclear, but for certain ceremonies seats for the elite spectators were constructed in the plaza, and in some events high

temples facing the plaza probably served as theatrical stages. Landa described a ceremony where a lord sat on a throne surrounded by ceramic vessels, and other spectators appeared to have occupied a wooden platform built specifically for that event (Tozzer 1941).

Like their colonial period descendants, the Classic Maya engaged in diverse types of public performances in various spatial contexts, including large, open public spaces for mass spectacles and more restricted spaces for elite interactions (Inomata 2006b). Stelae and other stone monuments placed in open plazas of most Maya cities commonly depict dances and other theatrical performances of rulers and other elites, suggesting that these spaces were used for public performances. Stone monuments often depict rulers and other elites engaging in performances, indicating that the rulers were not only sponsors of theatrical events but also protagonists (Inomata 2006a). Many stelae show rulers in elaborate attire such as feathered headdresses, masks, jade pectorals, and shell belts, and some of the accompanying texts note that they are performing a ritual dance (Inomata 2006a).

Theatrical performances in Classic Maya society most likely took place in various spatial settings, including small residential complexes and sacred locations outside of centers such as caves. However, many mass spectacles involving a large audience were probably held in plazas- large open spaces surrounded by temples and other symbolically charged buildings that marked the core of every Maya city (Inomata 2006a). The numerous stelae found in Maya plazas were likely erected to commemorate public performances in the same spaces where the events took place. The Bonampak murals provide another line of evidence of public performances taking place in plazas and site

cores. The murals depict scenes of captive presentations and elaborate dances held on a wide stairway, which Miller (1986) identified as the one flanking the plaza of this center. Their spatial setting presents an effective theatrical space, heightening the visibility of the performers. Although the murals do not show the location of the audience, Inomata (2006a:811) suggests that the plaza was most likely filled with a large number of spectators. The use of palanquins to carry rulers and other elites, as depicted on lintels and graffiti at Tikal, some of which were decorated with enormous statues of deities of jaguars towering behind the ruler, only make sense in terms of their use in mass spectacles in open spaces (Inomata 2006a). Given these lines of evidence, it is highly likely that many public events and mass spectacles of the Classic Maya took place in open spaces such as plazas, with other architectural elements incorporated into either stages or places for the audience to congregate.

The Maya also engaged in performances and ceremonies in more exclusive settings as well. These private, courtly ceremonies likely took place in rooms atop palace structures, range buildings, and sometimes temples, as well as in small courtyards and patios associated with these structures. Ceremonies in this type of setting were strictly for the elites of the city and possibly any visiting, foreign dignitaries.

At Copan, the East and West Courts located on the Acropolis were much smaller than the great plazas at the site. The courtyards also had restricted access, allowing only certain members of society entrance (Fash 1994). Fash (1994) has suggested that a low platform, Structure 10L-25, found next to the East Courtyard and Structure 10L-22A is probably a dance platform. This possible dance platform attests to the importance of theatrical performances in private courtly settings. In addition to theatrical dances,

various other courtly events, including diplomatic visits and royal or elite audiences expressed theatrical performances. Inomata (2006b) has pointed out that numerous paintings depict scenes of courtly gatherings, which he suggests took place in royal palaces and elite residences. Maya residential buildings typically faced a small, private patio that could house a small audience, typically the elite of the city, to witness the event (Inomata 2006b).

For the Maya elite to orchestrate ceremonies and performances for a large audience, the space would need to be equivalent in size to accommodate not only the audience but also the performers and elite at the center of the ceremony. Takeshi Inomata (2006a) argues that securing spaces for mass spectacles and performances was a key concern for the Maya when planning and building a city. Maya cities were constructed to function with a dual purpose in mind, to facilitate everyday activities and to accommodate a large amount of people for public spectacles and ritual ceremonies. Monumental architecture not only served as a way to radiate power, but also as stages for performances. Large, open plazas were utilized in different ways depending on size and the size of the audience. Plazas would either be a place for the audience to congregate to witness a spectacle or the place where the actual performance would take place. Temples and palaces were also utilized for spectacles. The stairs of temples and palaces could function as a place for spectators to gather. Since temples and palace structures were elevated, ceremonies could take place atop these structures with the audience down below in the plaza. Ball courts, which are already ritualistically charged architectural features, also served as a space for ceremonies to take place. Causeways, which are also categorized as monumental architecture, were incorporated into theatrical space.

Causeways not only channeled the masses into the city but also served as a place for ritual processions to take place, or a secondary location to accommodate the overflow of large crowds. Mass spectacles, public events, and processions were a crucial component within Maya society. In order for the Maya elite to carry out large public events, they needed space. Securing space to accommodate public events was an important design element for the Maya when constructing their cities, and plazas, temples, palaces, and causeways could function as spaces for public events.

Theatrical Space and Processional Architecture

For the Maya elite to facilitate mass spectacles they needed to procure theatrical space within their city to accommodate large crowds. For this reason, arrangement of certain urban design elements was of primary concern (Inomata 2006a). Seemingly disparate elements of a city's plan could all be components of its processional architecture or stages for rituals (Booher and Houk 2015; Houk 2015a). From a functional perspective Maya city planning likely took into consideration the need for city architecture to serve as stages for performances, and the need for processions, mass spectacles and elaborate public rituals may have been the primary concern in the arrangement of certain design elements (Houk 2015a:280). Plazas, causeways, and sometimes temples could be converted into spaces to conduct mass spectacles, while palaces, ball courts, and range buildings were places used for more private restricted ceremonies that only certain members of society would be allowed to witness. Monumental architecture provided stages for theatrical events such as mass spectacles,

while their physical presence created a defined, ordered space in which events could be held.

A key architectural element that every Maya site contains is a plaza. Plazas vary widely in terms of size and can have the capacity to hold thousands of people, or only hundreds. Large cities such as Tikal, Copan, and Palenque have several different plazas of varying sizes (Inomata 2006a). Stelae and other stone monuments that were placed in plazas usually depict dances and theatrical events, suggesting that plaza spaces were utilized as places to hold large public events. William Ringle and George Bey (2001:76) have argued that “rather than being the by-product of building placement, the plaza instead may be seen as a socially and ritually charged field about which buildings were built.” Therefore, when trying to understand the layout of a site and how it corresponds with public events, it is useful to consider that plazas were the primary elements around which all other construction was built.

Large plazas of the Classic Maya were likely designed to accommodate a large crowd to witness a spectacle. At the site of Tikal, which was one of the largest Maya polities, the site’s rulers made use of the East and West Plazas, along with the Great Plaza, as the primary foci of mass spectacles. The Great Plaza at Tikal was situated between the North Acropolis and the Central Acropolis and was likely a symbolically charged place, thus creating the perfect place for public events to take place (Inomata 2006a). At the center of Copán, the Great Plaza would have provided adequate space for mass spectacles (Fash 1994). Plazas were not only used to accommodate large crowds, but were the primary spaces where these public events would take place, which limited the amount of people that could witness the event. For these events, the steps of the

temples surrounding the plaza probably served as a place for the audience to gather. William Fash (1994) suggests that the steps of the Great Plaza at Copan would have provided seating for the audience to view the ritual or ceremonies taking place in the center of the plaza.

As mentioned above, temples were also a part of the theatrical architecture of a city. Temples not only provided seating, but the top landings of high temples were used to conduct ceremonies. In this case, the audience would occupy the plaza floor below. High temples that faced the plaza allowed rulers and other performers to become highly visible. The stairways of temples also provided stages for performances and ceremonies, on which the performers were visible to the large audience occupying the plaza below (Inomata 2006b). The larger the population of a city grew, the harder it became for the community to gather in one place. To remedy this, the Maya made use of their causeways. The causeways connecting plazas and other complexes provided additional space for theatrical performances such as processions or a place for the audience to congregate to witness an event (Inomata and Coben 2006). Processions would take place on wide causeways that allowed for the audience to line the edges of the causeway to witness the event.

The ball courts of the ancient Maya were a sacred space used not only to play the game but also as a stage for rituals. John Gerard Fox (1996) believes that the Maya dedicated ball courts and transformed them into meaningful stages for rituals. Audience members could witness the ballgame or ritual on the steps of high temples or by gathering around the ball court itself. The seating directly associated with the ball court was likely reserved for the royal court and high-ranking elites. Ball courts provided a

meaningful setting for “focused gatherings” and created a sense of community through participation in shared ritual (Fox 1996).

The consideration of architecture and theatrical space within a Maya city offers a unique opportunity to explore the various venues for performance. This process involves not only identification of sites for performances, but also how these architectural elements affected the movement of performers and audience members (Looper 2009:152). The functionality of architecture consists of two distinct meanings: the actual use of a structure and its ideal, intended function. Material remains of performance paraphernalia, symbolic devices used by the Maya such as dedicatory texts or architectural decoration, and architectural designs can aid in deciphering the functionality of a specific structure (Looper 2009).

Physical remains are sometimes used as evidence to identify the actual use of architecture in relation to performance, although the evidence is circumstantial. Musical instruments are found in a variety of locations such as tombs, palace rooms, temple platforms, causeways, and middens, suggesting no clear pattern of distribution across a site. The place where an instrument is found does not prove its use in that particular locale (Looper 2009). Thus, their deposition at Maya sites may not correlate precisely with public performances (Inomata 2006b; Looper 2009).

A more compelling argument for the presence of musical artifacts and inferring performance functionality of a structure has been made in the case of Structure M7-33 at Aguateca (Inomata et al.2001:203). Structure M7-33 is a large platform measuring over 7 m by 25 m and is located immediately west of Structure M7-22, a vaulted structure inside of which was found an extensive array of artifacts including ceramic drums, shell

ornaments, a possible pyrite mirror, and two ceramic masks (Inomata et al. 2001).

Inomata et al. (2001) suggests Structure M7-22 served as a storage chamber for dance paraphernalia and the nearby platform, Structure M7-33, served as a stage for performances using these costume elements and instruments.

While suggestive, artifact distribution is not always a viable tool for discerning performance functionality of a structure because the analysis of artifact distribution has little to say about the basic function of architecture, which is to organize space and movement of people (Looper 2009). Looper (2009) considers both architecture and performance both as spatial media and that it is useful to consider how architectural forms relate to the spatial dimension of performance and dance experience.

Schele and Freidel (1990) addressed movement patterns in Maya architecture in their analysis of Structure 5C-2nd at Cerros, Belize. Structure 5C-2nd is a Late Preclassic temple-pyramid that features a large masonry superstructure set atop a basal platform built in two levels. The superstructure has an asymmetrical plan, terminating in a small inner sanctum at its southeast corner, accessed via a labyrinthine corridor (Schele and Freidel 1990). Schele and Freidel suggests that the plan of Structure 5C-2nd was based on a conventional ritual movement involving rites of private ancestral rituals in the inner sanctum, followed by a procession via the corridor and concluding with a public presentation on the shallow platform in front of the doorway. From this platform, the performers would have proceeded down the front facing stairway, pausing on a larger platform midway down (Schele and Freidel 1990). The plan of Structure 5C-2nd emphasized how the builders designed it as a public stage that allowed the community to witness and affirm a successful performance (Schele and Freidel 1990).

The particular way in which Maya architecture actively assimilates the audience into the spatial matrix of performance underscores the fact that the Maya did not conceive of space as only representational or just as areas to conduct performance, but space was considered a co-participant in ritual (Looper 2009). Architectural elements can also be examined as part of a city design that functioned together as platforms for public rituals, spectacles, and processions. Houk (2015a) has suggested that Chan Chich along with the sites of Xunantunich, La Milpa, El Pilar, Dos Hombres, and Minanha make strong cases for having processional architecture.

At Chan Chich the Eastern and Western Causeways enter the Main Plaza in front of Structure A-1, a large tandem range building. A broad central stairway leads up the northern face of the structure to a central landing that divides the superstructure in half (Houk 2015a). Excavations of the structure determined that the large platform once supported eight-vaulted rooms on either side of the landing: on each side four rooms faced the Main Plaza, and four faced the Upper Plaza (Herndon et al. 2015; Houk 2015a). The site's ball court is attached to the eastern side of Structure A-1 and sits on the platform created by the Eastern Causeway. The Main Plaza is square in plan and measures 13,080 m², making it the third-largest plaza in the Three Rivers region (Houk 2015a). These four design elements likely constituted the stage for a variety of performances involving processions along the causeways, spectacles on the steps and central summit of Structure A-1, and ball games. The Main Plaza would have been able to accommodate a mass audience to witness these events (Houk 2015a).

Similar to Chan Chich, Xunantunich's *Sacbe I*, a 19-m wide *sacbe*, and *Sacbe II*, a 40-m wide *sacbe*, enter Plaza A-1 from the east and west and converge in front of the

Castillo. Angela Keller's (2006) dissertation research of the site's *sacbeob* and associated structures recovered artifacts that are presumably associated with processions such as a broken ceramic drums, censers, and jewelry that likely fell off of costumes. Houk (2015a:280) concluded that these artifacts support the architectural evidence for ritually focused groups of building and features that include the *sacbeob*, Castillo, Ballcourt 1, which is associated with *Sacbe* II, and the termini structures at the end of the *sacbeob*.

La Milpa has an apparent association among a *sacbe*, a large structure, and a ball court although the arrangements of the elements are different from Chan Chich and Xunantunich (Houk 2015a). The *sacbe* that connects Plaza B and the rest of the southern monumental architecture to the Great Plaza enters on the southeast corner of the Great Plaza. The largest temple-pyramid, Structure 3 does not face the Great Plaza but appears to face the eastern end of Structure 8. The orientation of Structure 3 suggests that the building is more functionally related to the *sacbe* than with the Great Plaza. The site's southern ball court is situated to the northwest of Structure 3 and in a direct line with the *sacbe* (Houk 2015a).

El Pilar has two small temples that are associated with entrances to the Plaza Copal. Structure EP8 faces west, toward the eastern end of Structure EP9. Structure EP8 is similar to Structure 3 at La Milpa in the sense that the real focus of the structure is likely the ramp or staircase that enters Plaza Copal's northern edge from Plaza Duende. Structure EP9 faces the area in Plaza Copal where the Bryan and Murphy Causeway enters (Houk 2015a). Houk (2015a:281) suggests Structures EP8 and EP9 likely functioned in the context of processions entering or exiting the Plaza Copal through those two routes.

At Dos Hombres, the site's main ball court sits at the southern end of a narrow *sacbe* that leads to the main plaza. However, at Dos Hombres there is no large building associated with the *sacbe*'s entrance like the previously mentioned sites, and it is not clear if the causeway functioned as a processional route (Houk 2015a). However, it is possible that the *sacbe*'s only function was ritual, as people moving down it would have to pass through the ball court alley to access the southern architecture at the site. Plaza B-1, located immediately south of the ball court, contains the only carved monuments at Dos Hombres and could have been part of a processional route (Houk 2015a).

At Minanha, most of the structures are orientated 15 degrees east of north, however a few of the buildings and the site's only *sacbe* are orientated 10 degrees west of north. The contrasting structure orientations in the site's epicenter could indicate a processional route (Houk 2015a). The *sacbe* exits the main plaza from the northwest corner and terminates at the shrine-like Structure 53 and Stela 7. Structure 7A, a temple-pyramid located to the north, Structure 3A, an E-Group, the ball court, the small platform that supports Stelae 1 and 2, and Structure 14C, located to the south, all share the same orientation as the *sacbe*, and Houk (2015a:281) suggest a relationship between these spatially disparate elements due to their shared orientation.

Conclusion

Performance theory has recently been applied to Maya archaeological studies to understand the importance of performance, space, and ritual to the ancient Maya. The term performance refers to communicative and expressive acts involving the presence of performers and observers and can range from highly formalized acts of performance to

informal everyday interactions between individuals (Inomata and Coben 2006).

Theatrical performance and public events in premodern societies included polity-wide gatherings, diplomatic ceremonies, courtly activities, festivals, and pilgrimages. Public events functioned as a way to create social cohesion of a community and establish and maintain asymmetrical power relations between the elite and the non-elite.

Theatrical performances and public events were important in the social and political integration for large Maya capitals. Large theatrical displays served as a way for the elite to demonstrate their power while simultaneously incorporating the general public to create a community identity (Inomata 2006b). Maya centers were considered the stage for large public ceremonies, and procuring theatrical space was likely an important component in the design of the city. For this reason, arrangement of certain urban design elements was of primary concern (Inomata 2006a). Seemingly disparate elements of a city's plan could all be components of its processional architecture or stages for rituals. Plaza, temple-pyramids, ballcourts, and causeways could all be considered components of a site's processional architecture. This thesis research specifically considered Maya causeways within processional architecture and the ritual functions they may serve. The following chapter discusses the construction methods of Maya causeways and how these methods may vary between sites and considers multiple functions a causeway may serve.

Chapter 4

The Form and Function of *Sacbeob*

The term *sacbe* refers to a linear feature composed of stone that may at one point been paved with a *sascab* (powdered limestone) or plaster surface. Commonly, *sacbeobs* were elevated features composed of large dry-laid boulders to form the base with smaller stones subsequently placed on top to eventually form a smooth surface. While causeways generally follow this similar form, causeways are still an inconsistent feature class in the sense that building material, height, length, width, and construction methods vary considerably throughout the Maya area. The functions of a *sacbe* are highly variable throughout Maya sites, and many *sacbeob* likely had several functions throughout its use. This chapter addresses what a *sacbe* is in terms of construction type and form, classification systems, and functions, with examples from numerous sites across the Maya region.

Origin of the Term *Sacbe*

The term *sacbe*, or the plural *sacbeob*, is a Yucatec Mayan word that can be broken down into two morphemes, *sac* and *be* (Bolles and Folan 2006; Shaw 2008). The word *be* or *beh* has many different meanings throughout the Mayan languages and was widely used in different settings and occasions. The Yucatec Mayan word *beh* translates to “road” or “path,” but can also carry the meaning of “life,” “destiny,” “matter,” “course,” and “affair” (Keller 2006). The term *sac* has a primary meaning of “white,” however the words “clean,” “neat,” “intensity,” and “artificial” are given as secondary

meanings (Bolles and Folan 2006). When the two morphemes are placed together, the entire word is generally translated as “white road.”

Evidence that the ancient Maya used this word can be found at different Maya sites as well as in the extant Maya codices and colonial texts. David Bolles and William Folan (2006) compared colonial Maya texts that used the morpheme *beh* to prehispanic Maya texts and found a correlation between the two texts in terms of roads. Bolles and Folan also found that the Maya term *sakbeh* was not mentioned in earlier historic texts, but was a term used by the ancient Maya to describe their stone roads. David Stuart (2006) translated a glyph found along the Coba-Yaxuna causeway to read *sakbih*, a Ch’olan form of the Yucatecan word for road. Stuart (2006) also points out examples in the Dresden Codex along with imagery from the Hieroglyphic Stairway at Copan that suggest a widespread use of the word throughout the Maya region.

Construction Methods

Causeways across the Maya area vary in terms of height, width, and the material used to construct them. However, all causeways share a relatively similar form. Before the construction of a causeway, the path would need to be cleared of any vegetation and the ground surface evened all to the same elevation (Keller 2006). If the intended course had dips, or high points, these were either filled in or quarried, which could require a significant amount of labor. The end result was a somewhat smooth and graded course. Following the layout of its course, the building of the causeway generally started with the placement of dry-laid retaining walls. These walls were designed to contain the various materials comprising the interior fill to the causeway. The retaining walls were either

composed of cut or uncut stones, with cut stones being more common in or near public spaces. The fill that the retaining wall contained included large, uncut boulders placed at the bottom to elevate the causeway. The actual walking surface of the causeway is comparable to ancient Maya plaza floors. The top layers of the fill are composed of small cobbles and gravel that were mined from nearby locations. Placed on top of the fill was *sascab* and lime plaster mixed with water that provided an impermeable surface (Folan 1991; Keller 2006; Shaw 2008).

Excavated and observed causeways generally follow the construction method described above, however there are exceptions, depending on availability of local material. At Calakmul, the causeway surface was constructed with packed earth, while at other sites in the Tabasco region tamped earth mixed with oyster shell was substituted for the limestone surface (Folan 1991). In the central and southern lowlands, causeway surfaces were finished with a polished, limestone plaster, while the northern lowlands utilized tamped *sascab* (Keller 2006; Shaw 2001).

Other regional differences in construction methods of causeways include the treatment of the road's walls or edges (Figure 4.1). Parapets, which are low retaining walls, are documented throughout the central and southern lowlands. Parapets are located along the edges of the causeway and are often filled, double wall constructions built from limestone or other available material. Parapets have been documented at sites such as Xunantunich (Keller 2006), Caracol (Chase and Chase 2001), and Chan Chich (Booher and Nettleton 2014). The northern lowland *sacbeob* rarely have parapets, and the causeway edges are instead constructed from unfaced stones seemingly stacked on top of one another to form a crude wall (Keller 2006). The causeways at Muyil, a Maya site in

northern Yucatán, were constructed from completely unworked stone to form retaining walls (Shaw 2008). The causeways in the northern lowlands had a convex surface that was higher in the center to allow water to run off the edges (Keller 2006). There are some sites, such as Caracol and Chan Chich, that exhibit both construction methods of parapets and unworked stonewalls along the edges of the causeways, while causeways at other sites, such as at Cozumel, lack any formal retaining walls and instead are constructed from layers of large slabs (see Booher and Nettleton 2014; Chase and Chase 2001; Shaw 2008).

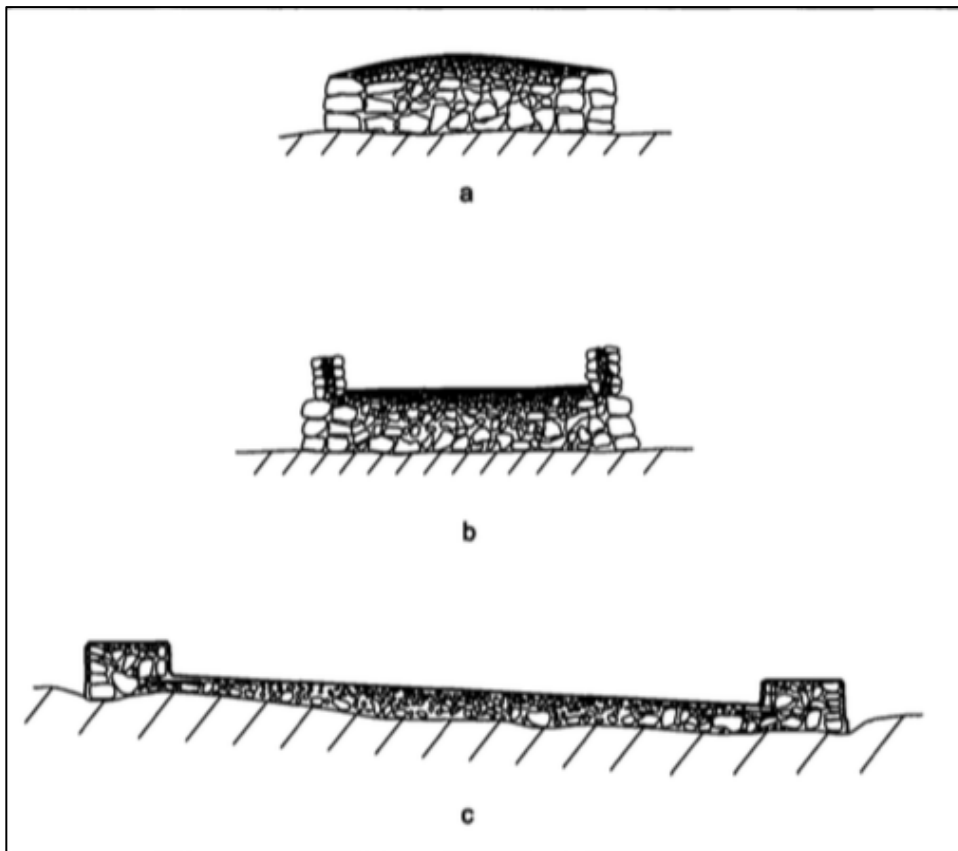


Figure 4.1 Typical cross-section profiles of Maya causeways: (a) the northern lowland form; (b) the central and southern lowland form; (c) *Sacbe I* at Xunantunich (after Keller 2006:Figure 2.1).

Also common in the northern lowlands but less frequent throughout the south are lines of cut stones protruding through the causeway surface that run the length of the road (Folan 1991). As this is not a common feature observed in most causeways, the function of these protruding stones is still unclear. A possible explanation is the stones may have functioned as stepping-stones to be used during a rainstorm when the rest of the road could potentially flood and become slick due to the clay-like *sascab* surface. Other *sacbeobs* have narrow culverts that facilitate the passage of water from one side to another (Folan 1991).

Regardless of construction material, causeways almost always connect two or more points together in the shortest distance with the least effort. Causeways are direct routes between architectural groups or sites with the causeway course dependent on the connections (Shaw 2008). Many Maya causeways tend to be relatively straight, although the straightness of causeways has been exaggerated by colonial texts, and not all causeways were constructed to be straight as seen at Tikal, Caracol, and Xunantunich (Keller 2006). Once the route had been established for the causeway, every effort was made to maintain the original route, even if that meant covering earlier architecture. Excavations from Ichmul *sacbeob* discovered earlier structures found buried below the causeways (Shaw 2008). If the obstruction could not be avoided, a slight angle change would be made to circumvent the obstruction. At Calakmul, a small angle change of the causeway was observed to bypass *bajos* or other low-lying areas, and at Mayapan an angle change was made to avoid a large sinkhole (Shaw 2008). Of course it is possible for slight angle changes to be the result of natural human error, or an angle change could have been intentional to connect architectural groups.

Longer Maya causeways that were intended to follow a comparatively straight path were composed of several relatively straight segments, between which slight adjustments could be made (Keller 2006). For the road builders to align these straight segments, they likely used height to their advantage, using hilltops and tall buildings to sight the course. In the case where hills or tall buildings were not readily available, temporary sighting platforms were likely constructed to provide a view of the desired route (Keller 2006).

Robert Redfield and Alfonso Villa Rojas (1990) offer a historical account of the construction of a road from Chan Kom to Chichen Itza. They described the leaders of Chan Kom constructing 50-foot high towers placed in intervals along a straight course to aid in sighting the direction of the road. The Maya took great care to construct a direct and somewhat straight course for the construction of a causeway, exhibiting their superior surveying techniques, with the end product being an almost straight and very well built road.

Aside from straight and angular causeways, Folan (1991:222) believes that some causeways were intentionally laid out to mimic astronomical bodies important to the Maya at the time. The *sacbeob* of El Mirador, especially the the Andrews, Bullard, and Gifford Causeways, represent an astronomical alignment of the Sun and Venus, much like the openings in the Caracol Observatory of Chichen Itza. Likewise, the Coba causeways were possibly set to align with certain stars (Folan 1991). In addition to astronomical alignments, Folan (1991) argues that some *sacbeob* might represent small-scale maps or models of larger features. At Coba, the terminus structures along with the causeways could represent the relative location of secondary and tertiary centers of the

city's realm. The path of a Maya roadway is heavily influenced by the need for the causeway, whether that be practical, such as connecting two points together, or more symbolic to align with astronomical points.

Features Associated with *Sacbeob*

Several features, whether cultural or natural, have been recorded in association with *sacbeob* to either augment the function of a *sacbe* or related to maintenance and road building. Other features located along the *sacbe* may have existed before the construction of the road, and thus were either incorporated into the function of the road or could have been the reason for the *sacbe*'s existence or desired course.

To ensure a steady supply of rock for the construction of the causeways, stone quarries and *sascaberas* located close to the construction were utilized to increase efficiency and reduce the amount of effort exerted (Shaw 2003). At Chichen Itza, Ichmul, and Yo'okop, stone quarries and *sascaberas* have been documented along the causeways as well as at other locations around the sites (Shaw 2001). The quarries and *sascaberas* found in relation to *sacbeob* often show evidence of tool marks from the implements used to mine the *sascab* (Folan 1978). Located along the Coba-Yaxuna *sacbe* was a stoneroller, possibly used for construction and maintenance of the *sacbe* surface. The stoneroller weighs approximately five tons and was discovered resting atop the *sacbe*'s surface. It would have been used to compact the *sascab* to make a smooth walking surface during construction with continued use to perform maintenance on the surface, such as during replastering events (Folan 1978; Shaw 2008).

The Maya would routinely incorporate other features associated with *sacbeob* to augment the function. Stone stelae and small platforms were located at the termini of *sacbeob* to mark the end points or were placed where two or more roads met (Keller 2006). Ramps, steps, and pedestrian passageways have also been noted along *sacbeob* as utilitarian features, becoming more common the closer the *sacbe* approaches the architectural core of the site. Ramps and stairs were generally used as a means to permit passage or gain access to the *sacbe* when the road's elevation significantly changed, an example being the Ichmul-Xquerol *sacbe* where steps were provided to gain entry along the road's edge (Shaw et al. 2003).

Folan (1991) has identified four principal types of ramps used in association with Maya roadways (Figures 4.2 and 4.3). Ramps associated with architecture primarily had an administrative function. Folan (1991) refers to these ramps as customs check points, which are seen along the Coba *sacbeob*. Some ramps were designed to pass over high points along the route or to occasionally provide access to the edge of water features such as *cenotes*. Four-way ramps, found at the junction of *Sacbe 1* and *Sacbe 3* in Coba, may have had a ceremonial use. Lastly, there are larger ramps not found in association with architectural features that are much harder to classify. Pedestrian passageways are rare features that were likely used to permit access between zones on either side of the *sacbe* at a point where the surface of the *sacbe* is quite high (Shaw 2008).

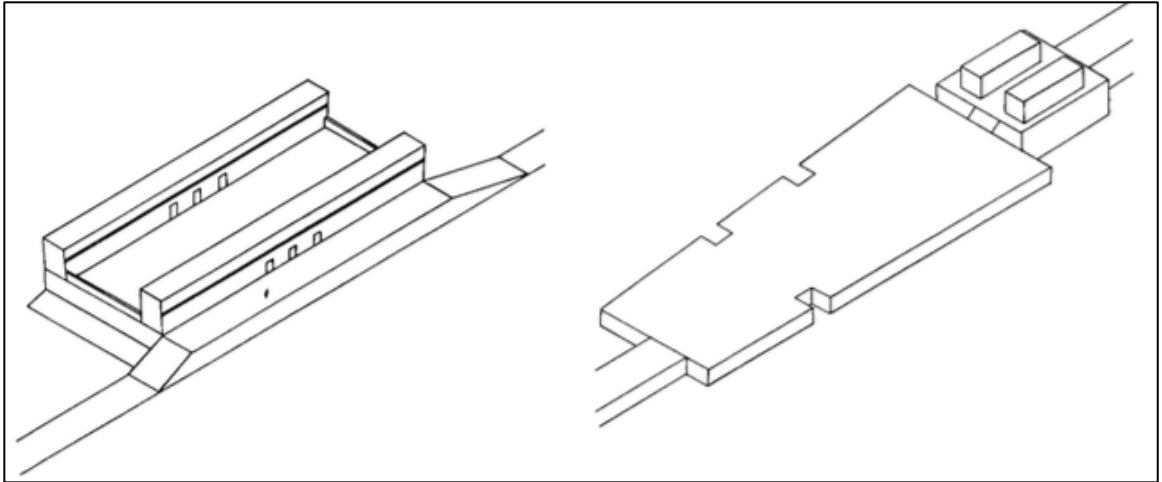


Figure 4.2 Ramps with associated architecture (after Folan 1991:Figures 18.4 and 18.6)

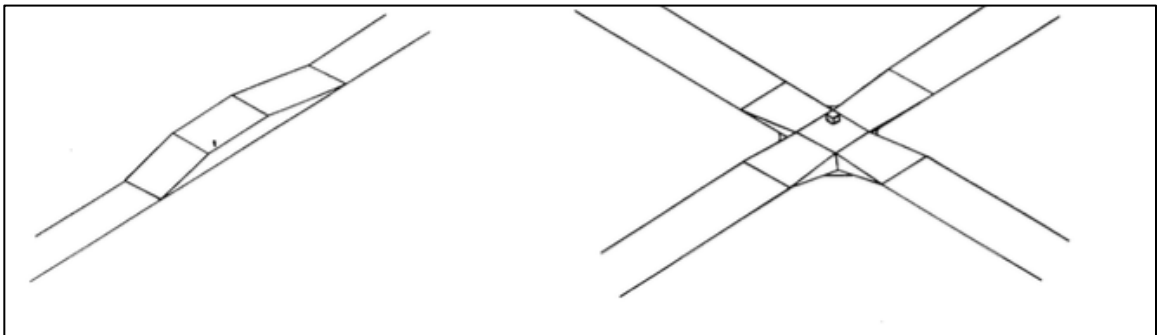


Figure 4.3 Ramp without associated architecture and a four-way ramp (after Folan 1991:Figures 18.3 and 18.5)

Architectural groups and buildings are often found adjacent to *sacbeob* and vary in terms of function. These architectural groups may have been constructed in association with the building of the roadway or were pre-existing structures that may or may not have been incorporated into the function of the *sacbe*. At Caracol, Chase and Chase (2001)

have documented unusual open plaza groups called “termini groups” located at the junction of the causeway and previously settled sites; these likely functioned as administrative courts and redistribution centers. Shrine structures related to rituals and procession have also been observed and documented along causeways. At Cozumel there is a clear association between *sacbeob* and shrine structures that are located at specific points along the roadway with the principal use aimed at processions (Freidel and Sabloff 1984). At Xunantunich, Keller (2006:444) determined that Structure A-21, located at the terminus of *Sacbe* II, was a shrine structure directly related to ritual processions that took place on the causeway. Ball courts and large open plazas are two other architectural features commonly found adjacent or near *sacbeob* that may augment the use of the roadway as a more ritual or practical construction (Shaw 2001).

Natural features that predate the construction of the *sacbe* such as water features and caves may have promoted and influenced the *sacbe* course. Numerous water features have been documented in close association with *sacbeob* with some terminating at a water feature such as at Chichen Itza, where Causeway 1 terminates at the Sacred Cenote (Shaw 2008). Causeways are also found in association with reservoirs. At Caracol, reservoirs are often situated on one side of a causeway (Chase and Chase 2001), and at the small site of X-ual-canil the site’s causeway has a close association with the site’s water source (Shaw et al. 2003). Additionally, some *sacbeob* have been found to be directly associated with caves. The causeway at Cahal Uitz Na connects the site core to Aktun Nak Beh Cave over 700 m away, and several small *sacbeob* at Chichen Itza terminate near cave features (Shaw 2008). Water features and caves can have symbolic

and ritualized meaning to the ancient Maya and are important natural features that were integrated into cities through carefully placed *sacbeob*.

Classification Systems of *Sacbeob*

Rather than focusing on the construction materials or height, causeways are instead classified based on the distance traversed and the locations or architectural features to which the causeway connects. The most widely used classification system of causeways is the intrasite versus intersite system. The intrasite classification refers to a causeway connecting major architectural groups within the site core. Intrasite causeways are local roads that remain within the site core. The intersite classification refers to long-distance roadways passing through low density or uninhabited areas. An intersite causeway could also connect centers that were once politically distinct at one point in time but were subsequently incorporated into the larger realm of a polity (Shaw 2001; Chase and Chase 2001). Justine Shaw (2001), however, has redesigned the classification of causeways to consist of three categories: local intrasite, core-outlier intrasite, and intersite.

Local intrasite *sacbeob* are the most common causeways that appear across the Maya area. Local intrasite *sacbeob* are defined as being less than 1 km in length and connecting major architectural groups within and immediately around the site. They tend to remain within the high-density areas of the site core (Shaw 2001). Examples of the intrasite causeways can be found throughout the northern and southern lowlands.

Kurjack (1977) believes that these internal, shorter causeways are examples of the earliest forms of *sacbeob* as exemplified by the causeways at Tamanché, which have

been dated to the Late Preclassic period. Other sites have causeways that date to the Late Preclassic period, although it would be inaccurate to state that all intrasite causeways are the earliest forms of Maya roadways. Shaw (2001) noted that most *sacbeob* have not been dated directly, and, when they are it is difficult to obtain an accurate date of the construction of the roadway. Causeway age is typically estimated using the associated architecture, which could be iterations of earlier architecture destroyed by the construction of the road and would be a more accurate date for the causeway.

Core-outlier intrasite is a type used to differentiate roads that continue outside the core of the site but still remain within what is considered to be a single political and social unit (Shaw 2008). Core-outlier intrasite causeways range from 1 to 5 km and connect the site core to more distant areas of the site, including to architectural groups that may predate the construction of the *sacbe*. These roadways leave the area of monumental architecture and often travel through an area of lesser density before arriving at their destination (Shaw 2001, 2008). Core-outlier causeways tend to be associated with large-scale sites such as Calakmul and Caracol that have intricate and complex political and social orders (Shaw 2008). Folan (1991) argues that these intermediate causeways link the site core with less closely affiliated smaller centers. Shaw (2008), however, believes that these causeways functioned as a single social unit that, as opposed to politically affiliated sites, connected smaller architectural groups that were not closely associated on a day-to-day level of interaction with the main epicenter. The core-outlier type is primarily found in the northern lowlands, although some have been documented in the south.

The final category is the intersite *sacbeob*, which connect spatially distinct sites that are at least 5 km away from the site core (Shaw 2001). The two sites are independent from one another, although the relationship between the two sites may have included one being a vassal state to the other (Shaw 2001). Intersite causeways extend beyond the political and social limits of the site, represented archaeologically by settlement density drop-off. These types of causeways may have functioned as a means of extending and maintaining political boundaries (Shaw 2001). This final group is present primarily in the north with examples that include the 100-km Coba-Yaxuna *sacbe* and Caracol and El Mirador to the south (Shaw 2001). All of these sites have causeways that connect the main epicenter of the site to other independent sites.

The large Maya sites of Caracol and Calakmul have extensive roadway systems radiating out from the site core and are cities that boast examples of all three types of causeways. Research of Caracol's (Chase and Chase 1987, 1989, 1996, 2001) extensive roadway system has revealed a total of 39 causeways, three of which have been detected through LANDSAT, including at least eight core-outlier causeways. Chase and Chase (2001:273-276) have classified Caracol's causeways as dendritic; they radiate out from the epicenter to culminate in two distinct rings of architectural groups, called termini. The first ring terminates at groups located 2.7 to 3.0 km from the epicenter, containing plazas similar in size to the major plazas at the epicenter that are surrounded by low range buildings along with other non-residential monumental architecture. Similar to the epicenter of Caracol, spur causeways connect elite residential groups and their associated temple-pyramids with these outlying termini groups. The Chases believe that these core-outlier causeways were loci for exchange, in addition for reinforcing social ties (Chase

and Chase 2001). The second ring of architectural termini extends to locations ranging from 4.5 to 7.5 and possibly up to 9.5 km from the epicenter. These are primarily intrasite causeways, along with intersite using Justine Shaw's classification of the causeways. This ring of termini represents centers that were engulfed by the urban spread of Caracol's settlement that have been connected to the epicenter by the causeway. The architectural groups are similar in form to the first ring of termini groups, and likely functioned as administrative plazas (Chase and Chase 2001).

Calakmul, a site located in the lowlands, has a complex road system that has been well documented (Folan 1995, 2001). A total of 15 causeways have been recorded with the potential for more to be uncovered. Of the 15, at least three fit the description of core-outlier. The Calakmul causeways have yet to be dated, although there exists a possible connection to the Late Preclassic period site of El Mirador, indicating that at least a portion of Calakmul's road system may be quite early in date (Shaw 2008).

Causeways are predominately classified by the length of the road itself and what the causeway is connecting (Shaw 2008). Many Maya sites generally have one or two causeways, however there are some sites that have multiple causeways that can be considered a *sacbe* system (Shaw 2001). These *sacbe* systems vary in terms of spatial layout and can reflect the sociopolitical systems of the city. Several scholars have identified linear systems, cruciform systems, radial systems, and dendritic systems from the resultant forms of *sacbeob* visible today (Shaw 2008).

Radial or solar *sacbe* systems stress a single site core from which causeways originate (Shaw 2008). The causeways emanating from the site core do not follow strict cardinal directions as characterized by cruciform *sacbeob*, but rather are characterized by

a variety of different angles. Coba is one of the most famous examples of this system (Figure 4.4). In its final form, the Coba causeways linked peripheral groups to the site core, with 23 km² being associated with the site core through these links (Shaw 2008).

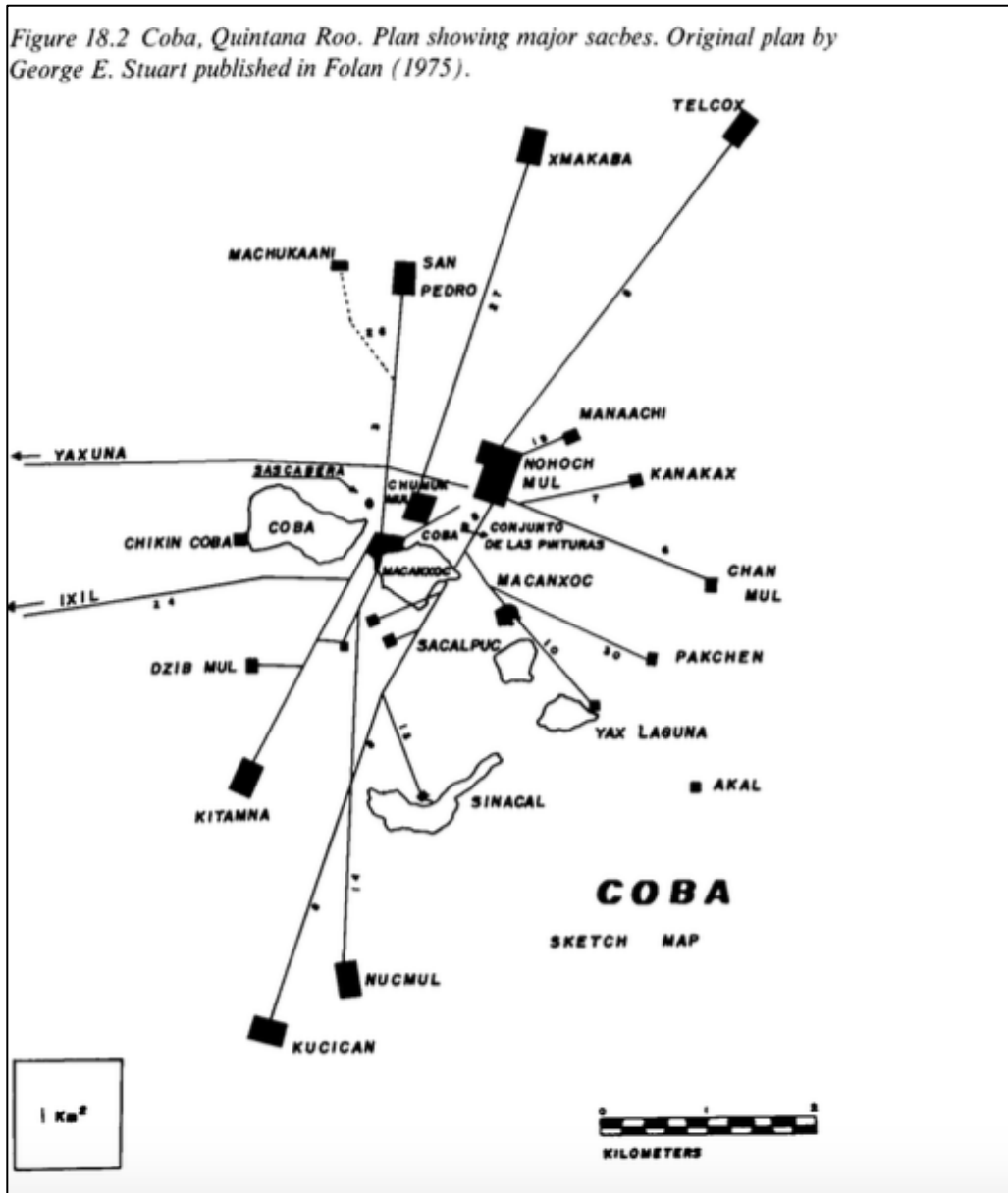


Figure 4.4 Site map of Coba depicting radial *sacbe* system (after Folan 1991:Figure 18.2).

Cruciform *sacbe* systems radiate from the site core in four directions, usually following the cardinal directions. This type of *sacbe* arrangement references a number of concepts that is reminiscent of many Maya and Mesoamerican cosmological belief systems, including a quincunx or quadripartite concept. The *sacbe* pattern may be described as quincunx when one includes the central point of origin in addition to the four extensions, while quadripartite emphasizes the termini (Shaw 2008:98). Quadripartite motifs are symbolic of cyclical completion and may relate more to the positions relative to the path of the sun than to our Western concept of cardinal directions (Friedel et al. 1993; Shaw 2008). The world tree, with its main trunk and two primary branches has also been compared to this form of *sacbe* system in ancient and post-contact Maya cosmologies (Shaw 2008:98). The site core from which roadways originate are either formed by monumental architecture or cenotes, with the most common being architecture-centric configurations (Shaw 2008). At Ek Balam the site plan includes three causeways to the north, east, and west with two shorter roadways to the south and southwest (Ringle et al. 2004). These causeways connect smaller architectural groups to the site core. Numerous sites exemplify this *sacbe* system, while other sites such as Copan and Caracol contain imagery idealizing this cosmological scheme (Shaw 2008).

A dendritic *sacbe* system involves architectural groups concentrated into concentric rings around the site core, with roadways connecting the groups to the epicenter (Cobos and Winemiller 2001). Dendritic *sacbe* systems closely relate to radial systems with the prime difference being the cluster of significant architecture associated with each ring. Caracol is the best example of this system, with causeways radiating from the site center to plaza termini groups located in two different rings (Figure 4.5). As

noted above, one set of roadways leaving the epicenter leads to the first ring at a distance of 2.7 to 3.0 km and terminates at plaza groups that likely served as locations for exchange and had other administrative and social functions. The second ring is linked to the epicenter by causeways measuring 4.5 to 7.5 km that connect formerly distinct sites engulfed by the growth of Caracol (Chase and Chase 2001:275). In its final form, the *sacbe* system of Chichen Itza is another example of dendritic *sacbe* system. Terminus groups located in concentric rings were linked to the Great Terrace located at the site core by roadways (Cobos and Winemiller 2001).

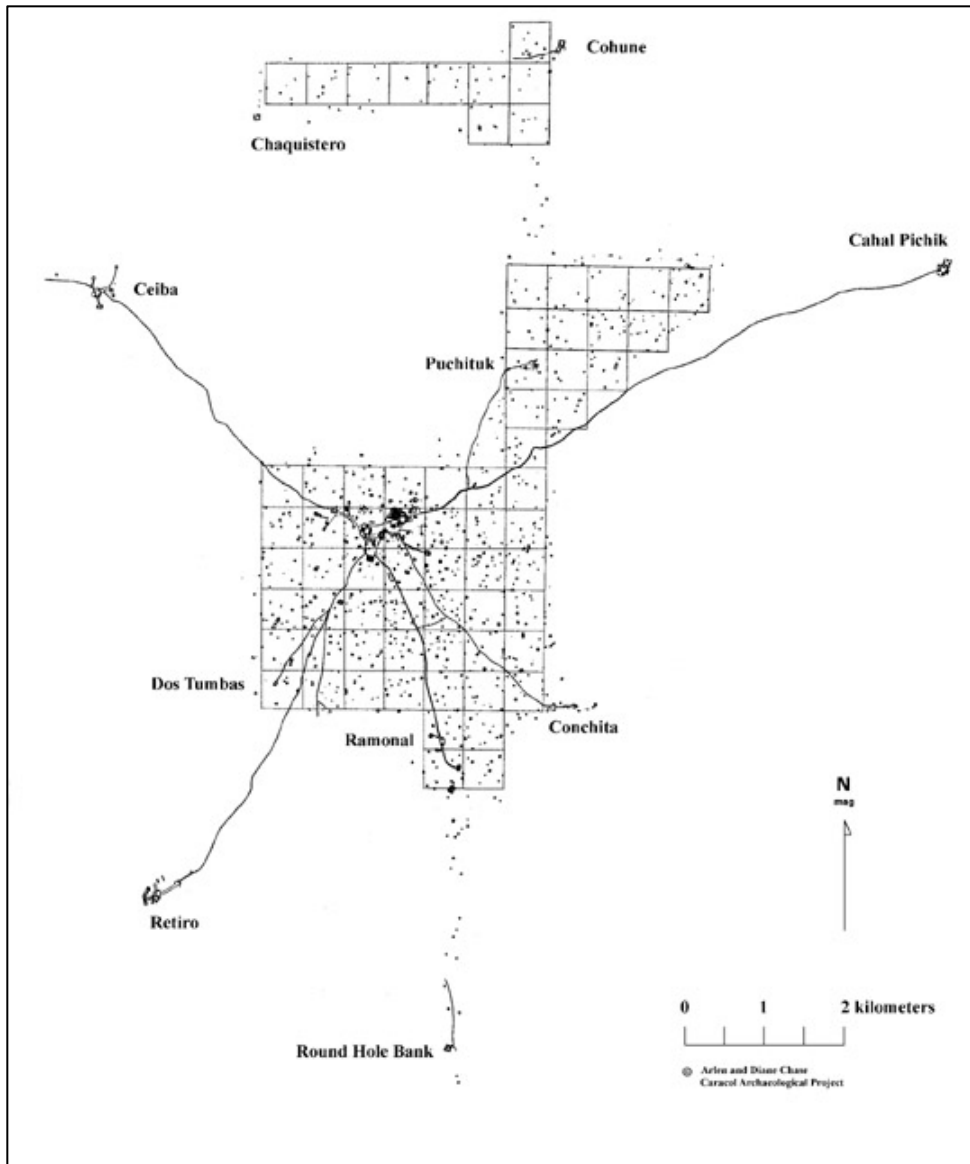


Figure 4.5 Site map of Caracol showing dendritic *sacbe* system (after Chase and Chase 1999:Figure 3).

Linear *sacbe* systems are unlike the other systems, as they do not indicate a clear hierarchy in their stipulation of a center. Linear systems connect architectural groups of a similar scale and importance to the site core, thus implying a relatively equal relationship between the loci being connected to the epicenter (Shaw 2008). The best-known linear *sacbe* system is found at the site of Sayil. The *sacbe* system at Sayil links major

architectural groups to four roadways, with various nodes that may have served as stops along a ritual procession leading from the royal residence to the southern complex that includes the site's ball court (Shaw 2008).

Functions of *Sacbeob*

Sacbeob represented significant building events that required a large labor force and significant construction time and are comparable to the construction of other massive architectural units such as plaza platforms and pyramidal structures. Each *sacbe* likely had several different functions, with the potential to incorporate a myriad of functions over the course of its use. Some *sacbeob* functioned in a practical sense in terms of transportation of goods and communication and as mechanisms for economic, political, and social integration, while other *sacbeob* were constructed primarily for ritual use, such as processions. It is very probable that causeways served dual purposes and utilized all or several of these functions, with the primary focus being the practical use of transportation and providing structure and organization to large cities.

Practical and Transportation Functions

As Justine Shaw (2008:73) states, although religious and social purposes may have been motivations to build roadways, economic functions were one of the primary motivations for road construction. Also, due to the variability of causeways and the difficulty of studying roads in an archaeological sense, the practical functions are the most straightforward ones to explore. These practical functions include the movement of goods and people, from one point to the next. Causeways were an easy way to get from

point A to point B in the shortest and most direct way and provided a practical way for people to traverse the rough and sometimes flooded terrain. Causeways also served the purpose of connecting distant architectural groups to the site core, thus making it easier for the transportation of goods. Folan (1991:25) explained that *sacbeob* “represent a twenty-four hour, twelve-month-a-year communication network and facilitate the transportation of goods and services from near and far.” Arlen Chase and Diane Chase (2001:4) state, “causeways serve to link entities together and promote the flow of foot traffic.” The natural features that causeways connect to the epicenter, such as *cenotes* and *aguadas*, as well as the cultural features that promote ease of travel, like ramps and stairs, support the practical and transportation functions of causeways.

Chase and Chase (2001) describe Caracol’s *sacbe* system as a functional road system that supported the economic and practical functions of the city. Extending outward dendritically from the epicenter, Caracol’s causeways were narrow compared to those at other sites. Wider *sacbeob* were more likely used for ritual processions. The narrower causeway’s principal function was likely to channel the site’s population to open plazas surrounded by low range structures. Furthermore, no ritual paraphernalia is associated archaeologically with any of the special function termini groups. Instead, these termini groups connect non-ritual and non-domestic loci with the epicenter and functioned as administrative and market locations, with the system as a whole geared toward managing the flow of goods through the epicenter and termini groups. The *vias* that provided direct access between the causeway and elite and non-elite households suggest that the roads were used on a daily basis, and movement around Caracol would have been greatly enhanced by these roads (Chase and Chase 2001). The causeways at

Caracol were designed to facilitate the movement of goods and foot traffic, thus making the function of the causeways practical in use.

At Chichen Itza, two phases of *sacbe* construction are present. The earlier *sacbe* system that was constructed during the Late and Terminal Classic period was associated with settlement areas, limestone quarries, and a potential market system that distributed obsidian that were administered by a local government (Shaw 2008). A more centralized government was likely responsible for the second phase of *sacbe* construction, which was contemporaneous with the construction of the Great Terrace and a new settlement core; the late system of causeways connected architectural groups to the site core (Shaw 2008). The earlier *sacbe* systems at Chichen Itza would have functioned strictly in the practical sense, while the later *sacbeob* would have melded this use with further emphasis on political and ritual functions (Shaw 2008).

Political Functions

The political functions of Maya causeways may overlap with the economic associations, and generally the two are intertwined. However, some Maya causeways may have served primarily to exert power, control, or ownership of territory, while economic, ritual, social, and other functions were possibly secondary (Shaw 2008). The power of a causeway is implied by its design, construction, and use. Maya centers were the primary seat of power in the ancient Maya world, and by extension the impressive masonry roads emanating from these centers likely functioned to convey that power along specific courses to specific destinations (Keller 2006). The political implications of any causeway are likely to increase the longer the causeways is, meaning intersite and

core-outlier intrasite causeways have the most political implications. At the same time, larger sites with more political power may have strong political relationships between architectural groups at one or more parts of the city.

There are several different political functions a causeway could have served, one being to maintain boundaries. It is probable that regional causeways were constructed as a means for a large polity capitol to maintain influence and power over a large and extended territory (Shaw 2008). Causeways were used as a way to integrate the territory and the surrounding people to the site center. In addition to serving as a political symbol to other polities in the area, causeways also provided a means for demonstrating political power and control, specifically over a large populace. Causeways can be considered monumental architecture and can indicate a universally understood statement of power to the large populace and surrounding polities in the region. Causeways also served the function of solidifying political power and control. The process of building causeways would have been a large undertaking requiring a large labor force, and the elite control of labor for monumental construction such as causeways would have been important to the Maya. The labor-intensive project of building a causeway gave the elite the opportunity to integrate and manage a population (Shaw 2008). Constructing causeways served as a way for elites to unify workers and establish a collective identity that would further establish the power of the polity while simultaneously solidifying the power and control of the elite.

Many Maya sites throughout the northern and southern lowlands seem to emulate or reference other larger polities in terms of site planning. Ashmore and Sabloff (2002:203) note that an “important means of enhancing the political aura of a place is by

constructing it to resemble locales of established stature: If a place looks like a recognized seat of authority, people will behave there accordingly”. Rulers at smaller cities likely attempted to mimic the site plan of a polity they may conceive as more powerful or a polity with historical significance, and in doing so, they attempted to establish their site’s importance within the region or may have been competing with neighbors in regard to monumental architecture (Ashmore and Sabloff 2002;Kurjack 2003). Numerous smaller sites have been identified where this type of urban planning was clearly exploited (Ashmore 1989:273).

Ashmore and Sabloff (2002:207) proposed that the epigraphic data and site plan of Xunantunich suggest that the center emulated the established but declining center of Naranjo in its Late Classic design. Both Naranjo and Xunantunich may have been modeled after the massive site of Calakmul, their architects looking to mimic the much larger and longer-established capital (Ashmore and Sabloff 2002:207). Ashmore and Sabloff (2002:208) provide another example between the sites of Sayil and Labná, where the smaller city of Labná appeared to have copied its larger neighbor, Sayil, directly in its basic civic plan. Both sites have a causeway—although Labná’s causeway is only 150 m long compared to the 1-km-long causeway at Sayil—that connects residential palaces on the northern end to nonresidential compounds on the southern end (Ashmore and Sabloff 2002:208). “The orientation of the principal buildings at each end of the causeway are similar at both sites and the observed buildings and spaces are broadly parallel in form and array”... and “Labná’s civic buildings and core civic plan seem miniature replications of Sayil” (Ashmore and Sabloff 2002:208). Fash (1991) believes that the

layout of Quiriqua was constructed to emulate that of Copan. This is largely due to Quiriqua's ruler Cauac Sky's deliberate attempt to surpass his previous rulers at Copan.

In the Three Rivers regions, Houk (2003) suggests that the sites of Dos Hombres and Chan Chich represent Late Classic imitations of the larger polities of La Milpa and La Honradez, respectively. Chan Chich has radial causeways extending east and west from the Main Plaza and the Western Causeway exhibits a rare sunken type in which low parapets create a corridor (Houk 2015a:274). Houk (2015:274) believes that the sunken causeway style may have been borrowed from La Honradez where three radial sunken causeways enter the site core from the west, the north, and the northeast, or possibly from the site of San Bartolo. Similarly, both Chan Chich and La Honradez exhibit an attached ball court with one structure physically integrated into a completely separate building (Houk 2015a).

Houk (2003) explains that this voluntary mimicry by the smaller sites was a means for the rulers to link themselves to the rulers of more powerful sites in the area. He also proposes an alternative hypothesis in which Dos Hombres and Chan Chich are Late Classic period colonies of the two larger sites. By mimicking larger more established sites, rulers at smaller polities attempted to solidify their personal political power while creating real or desired affiliations with powerful cities. Along with other monumental architecture emulated in site plans, *sacbeob*, which are large-scale features that linked various architectural and natural elements, were among the key features included in site emulation, and provide a plausible explanation to the layout and function of a site's causeways.

Social Functions

In all cultures, roadways along with other architectural features have been used to enhance and augment social integration within the polity and surrounding communities. Causeways could have unified social units on varying scales from related kin groups, to entire settlements, to multiple communities (Shaw 2008). As previously stated, the causeways at Caracol had practical and economic functions, however the causeways there likely also functioned as a form of social integration. Both *sacbeob* and *vias* connect certain residents to specific architectural groups, which may have reinforced social ties within particular social units (Chase and Chase 2001). The *vias* at Caracol connected elite residential groups directly to the causeways, integrating the residences directly to the site core. Causeways that linked spatially discrete sites that may or may not have been politically independent polities at the time of the construction of the causeway also provided a means of social integration and relationship maintenance. At Caracol, the distant ring of causeway termini was added after the site core had engulfed the formally distinct settlements (Chase and Chase 2001). In the northern lowlands, the causeway at Coba linked a smaller site of Yaxuna to its center, enhancing communication and social ties between the two cities. (Shaw 1998).

Water Management

It is not uncommon for causeways to be associated with water features, such as *cenotes* and reservoirs, so it would be reasonable to suggest that causeways were incorporated into the overall water-management system at some sites. Several sites, like Calakmul and El Mirador, utilized their causeways to traverse *bajos* or *aguadas*

(Scarborough 1993). However, Shaw (2008) points out that merely using causeways to cross such obstacles do not necessarily imply a function in water management. Vernon Scarborough has extensively researched and documented the ways in which site configuration, including causeways, helped to manage water. Scarborough (1991:102) defines water management as “the interruption and redirection of the natural movement or collection of water by society.” The ancient Maya began using water management system as early as the Preclassic period. They pioneered intensive, complex water management systems such as swamp agriculture, terrace systems, and dams for the deliberate entrapment of water within naturally low-lying areas (Scarborough 1983). The causeway at Cerros was constructed to create reservoirs and divided the area into two water sources. The *sacbe* system of El Mirador had gaps in four of the six *sacbeob* that appear to have been designed to allow the flow of water through the *sacbeob* system. Other roads at the site function as dams and are positioned to either trap or divert water to select locations (Scarborough 1983, 1993).

By the Classic period a significant increase in water management occurred at several sites across the lowlands. Located away from a permanent source of water, Tikal illustrates the archetypical management of water within a center during the Classic period (Scarborough 1993). The success of the Classic and Late Classic period water management of sites is due to what Scarborough (1993) has identified as the convex microwatershed adaptation, which is unlike the concave system used during the Preclassic period, in that the core of the site is elevated, allowing for the runoff, diversion, and catchment of water. Tikal’s extensive core utilized the monumental construction of temples, palaces, and causeways to direct and store water. Six water

catchment areas or microwatershed divisions were engineered at Tikal, with five centered on the site core (Scarborough 1993). Although the *sacbeob* at Tikal connected various portions of the dispersed-compact site core, they also functioned to dam water within sizable catchment areas. At several elevated locations within and immediately outside the central site core, reservoirs were formed behind well-defined causeways. The reservoirs had a combined storage capacity of 100,000-250,000 m³ and allowed the planned release of water during the dry season through posited sluice gates located under the causeway system. (Scarborough 1991:126, 1998:141).

At Xunantunich, Keller (2006:340) notes a possible relationship between *Sacbe* I and an aguada. The low area enclosed by the curve of *Sacbe* I likely held a small reservoir or aguada during the Late and Terminal Classic periods that would have required regular maintenance to prevent it from breaching the *sacbe*'s walls. At the site of X-ual-canil, the Lahkin *sacbe* is associated with drainage features that lead to agricultural fields below the site. The site of El Pilar has similar water management functions as El Mirador. The Bryan and Murphy Causeway at El Pilar contains breaks that allow the flow of water where major drainage channels cross the road (Shaw 2008).

Pilgrimages

Pilgrimages are generally long-distance journeys to ritually charged loci both constructed and natural, and entail either solitary trips or a large group of people (Palka 2014). Post-conquest evidence shows that causeways served as pathways for ceremonial processions and pilgrimages among the nobility (Palka 2014). Bishop de Landa was the first to point out that the roads of the Maya were used as processional routes and

eventually pilgrimage routes to large cities (Tozzer). Joel Palka (2014) notes that pilgrimage was important for the ancient Maya, and, in order to facilitate pilgrimages, the Maya would utilize causeways. Maya centers were common destinations for Maya pilgrimages, and the temples surrounding large plazas, public rituals performed at these cities, and the display of carved monuments would draw large crowds from surrounding areas to witness and take part in events. Palka (2014) also explains that the causeways of these large centers would converge on specific temples and plazas, thus bringing Maya pilgrims to their destination points. During both the Classic period and Post-conquest period, causeways were used to make pilgrimages to these large cities (Palka 2014). The causeways would funnel pilgrims into the center to witness large spectacles during the Classic Period, or to provide offerings during the Post-conquest period.

Ritual Functions

Ritual *sacbe* functions can be seen at a number of Maya sites, and most if not all processions took place on *sacbeob*. Causeways are elaborate structures, some being more elaborate and larger than necessary to serve strictly practical functions. The use of causeways for processions illuminates part of the reason for their ornate construction (Sanchez 2007). It is important to note that at some cities the ritual nature of the causeway was not as significant, at other cities causeways were an essential component of Maya rituals and ceremonies (Shaw 2008). For the cities where causeways were an important component, causeways were probably consciously built to facilitate processions and to accommodate the overflow of audience members (Inomata 2006a).

The use of causeways for stages for processions and spectacles is similar to carnivals and parades in modern society (Inomata 2006a; Sanchez 2007; Shaw 2001).

As mentioned above, some cities' causeways were constructed primarily for practical functions, thus their causeways may be narrow. Caracol's causeways averaged from 2.5 m to 12 m in width making the causeways too narrow to be able to accommodate a procession or to allow the audience to congregate along the edges. Tikal's causeways can be interpreted as primarily binding ritual loci together, which would have channeled people to massive temples (Chase and Chase 2001). Tikal has four primary causeways that link temples together. The Mendez Causeway measures 50-80 m in width, the Tozzer Causeway measures 30-40 m, the Maler Causeway measures 20 m, and the Maudslay Causeway is 30-50 m in width (Figure 4.6). Segments of these causeways were as large as plazas at some smaller cities; much too large to serve the daily practical needs such as transport (Chase and Chase 2001; Inomata 2006a). The causeways at Tikal were probably constructed this wide to provide stages for processions by the elite, while still having enough room to allow an audience to occupy the spaces along the edges to witness the procession (Inomata 2006a). Other evidence of processions comes from the lintels of Temples I and IV at Tikal, which depict rulers seated on elaborate litters, on which they were presumably carried along the causeways before they reached the main stage in front of temples (Figure 4.7) (Inomata 2006a). In contrast to the network of causeways at Caracol, Tikal's *sacbe* system was likely not designed to integrate outlying communities. Instead, it was ideal for the use of ritual processions between ceremonially significant architectural groups within the core area (Shaw 2008).

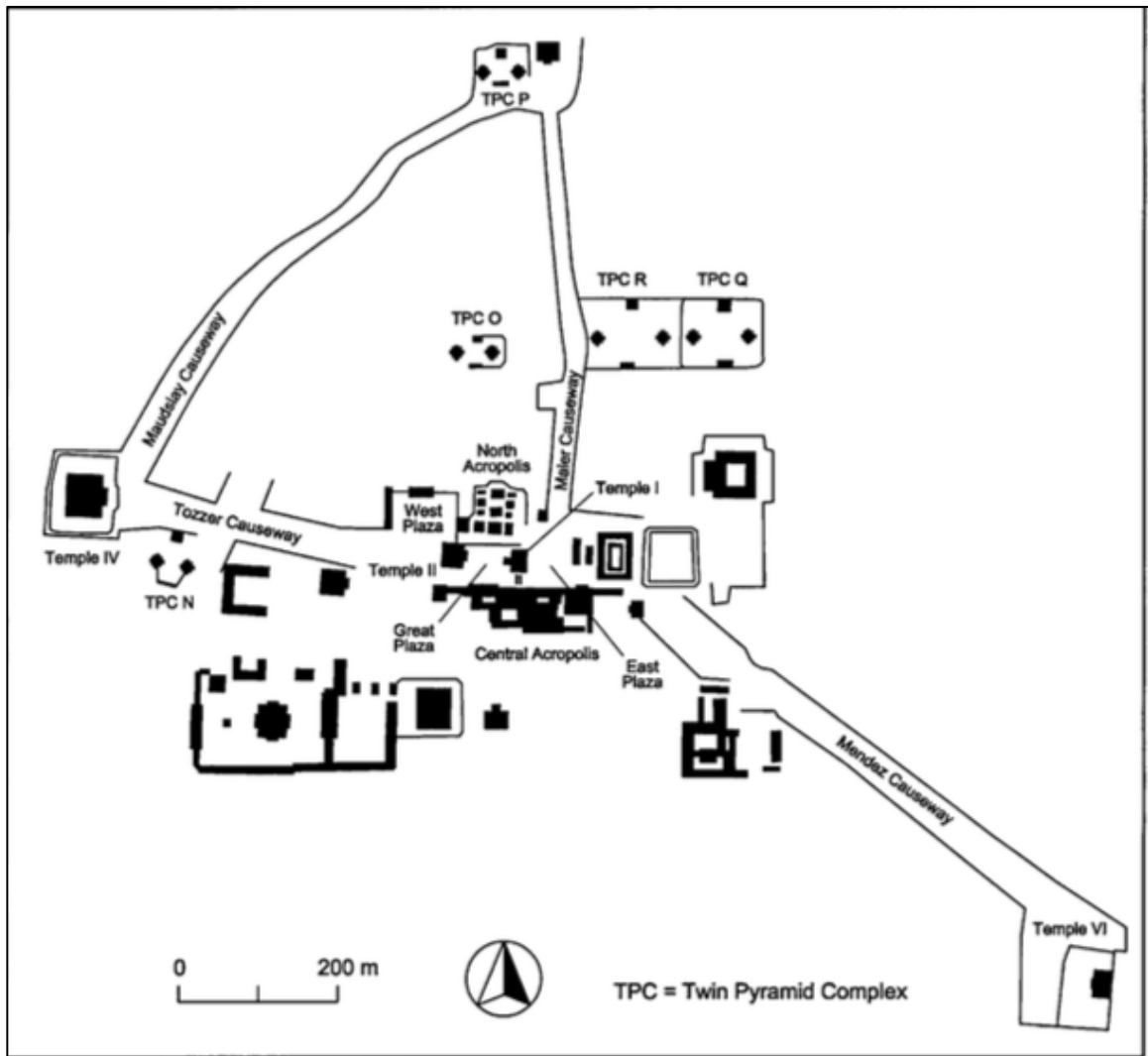


Figure 4.6 Map of the site core of Tikal (after Inomata 2006a; Figure 4)

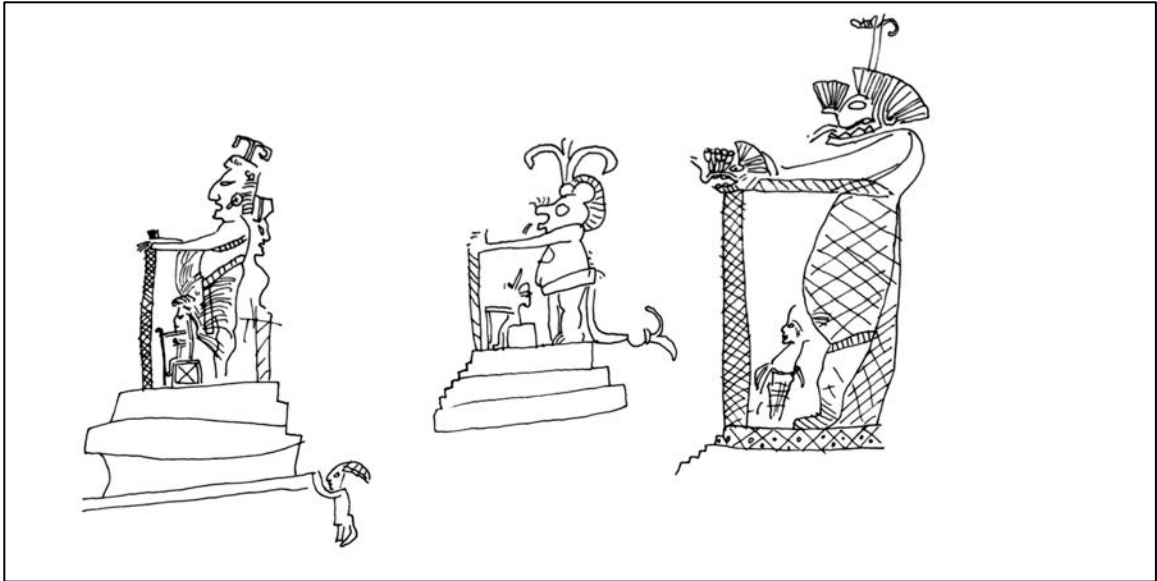


Figure 4.7 Graffiti from Tikal depicting a ruler being carried on a large litter with a statue, courtesy of FAMSI. Drawings by Linda Schele.

Other Classic Maya sites exhibit what appear to be internal procession ways. At the site of Sayil, internal causeways connect numerous functionally distinct locations, serving as a ritual procession path from elite residential groups to other architectural groups including the site's ball courts. Ek Balam's road system consisted of five *sacbeob* that terminate at elite architectural complexes that generally reflect temple groups (Shaw 2008).

Many Maya sites would have used their roadways in a practical sense to accommodate transportation of commerce and ideas as well as aid in water management. Causeways also served political and social functions and served as a physical reminder of the political, economic, and social relationships from within the community to the broad surrounding area. The functions of Maya roads are variable and the purpose of Maya

causeways likely changed through time, melding to the specific need of the polity at a given time. During the Classic and Late Classic periods, causeways were not only used to transport goods and people, but were an expression of power, and used to delineate boundaries, and integrate communities. During the Postclassic period, the function of causeways shifted as sites were abandoned, and *sacbeob* were instead utilized as pilgrimage routes to funnel masses of people to the once populated site core.

Summary

Sacbeob represented significant construction events that required an extensive labor force and time, and are comparable to other monumental architecture. *Sacbeob* are highly variable throughout the Maya area in terms of construction methods, form, and dimensions, which were dependent upon availability of construction materials as well as the specific function it was to serve. The myriad of natural and cultural features associated with *sacbeob* likely augmented the function of the sacbe or was the reason for the construction of the roadway. These features were likely incorporated into the overall function and meaning of the causeway.

The potential and actual functions of a *sacbeob* are highly variable and likely changed through time. *Sacbeob* functioned as a way to transport commodities, aided in water management, and served to link architectural groups to the site core. *Sacbeob* also supported the flow of intangible concepts such as political, social, and ideological views between and among cities. At times, *sacbeob* likely functioned in a ritual capacity by either supporting processions or provided space for witnesses to congregate. The functions of *sacbeob* would have likely varied and changed throughout its use, likely incorporating numerous functions. While some causeways were more or less suited or

constructed for a particular purpose, it is unlikely that a causeway had only one function throughout its use.

Chapter 5

Research Design and Methodology

Research Questions

The research goal at the outset of work on Chan Chich's causeways was to expand our understanding of the role of ritual function within the development of urban planning at Chan Chich. The Eastern and Western Causeways had not previously been excavated, which limited our understanding of the form and function of the site's causeways to what could be gleaned from mapping data alone. The processional architecture research project targeted the site's Eastern and Western Causeways and associated termini structures to determine the age, form, and function of each. The research conducted in 2014 was used as a platform to design our 2015 research that incorporated extensive testing of Courtyard D-1. Our research questions for the 2014 and 2015 seasons were:

- What are the construction sequences for the Eastern and Western Causeways?
- What are the architectural forms of the Eastern and Western Causeways
- Are there concentrations of artifacts along the margins of the causeways that might be related to ritual processions?
- How similar in size, form, and age are Structures C-17 and D-48?
- Are there concentrations of artifacts on or near Structures C-17 and/or D-48 that might be related to ritual behavior?
- What is the age and construction history of Courtyard D-1?

- Is Courtyard D-1 functionally related to the Eastern Causeway?

Provenience System

Investigations conducted at Chan Chich are carefully recorded using a hierarchical provenience system to document excavations (Houk and Zaro 2015). This intricate system documents the site, unit, architectural feature, and artifact. This makes it easy to reference features and artifacts to a specific site within a single operation and to a specific area in that operation. The highest level of provenience is the site, in this case Chan Chich, which is abbreviated and referred to in the database as CC. Within each site is a specific area of excavation referred to as an operation (Op). An operation can be defined by an architectural grouping where all work for that operation is being conducted, such as the Upper Plaza, or defined by research questions, such as the processional architecture research project. All excavations pertaining to the processional architecture research project were designated Op CC-14, which was the fourteenth operation conducted at Chan Chich. Operations contain suboperations (Subops) that are alphabetically assigned, so the first suboperation for the processional architecture research was Subop CC-14-A. Suboperations are specifically targeted areas within an operation that are usually squares or rectangles, although they can be any shape the excavator needs. Each suboperation contains lots, the smallest level of provenience, that are sequentially numbered and follow the site designation (CC), operation (14), and suboperation (A): for example, Lot CC-14-A-01. A lot can be anything within a suboperation so long as it can be methodically defined. A lot can consist of arbitrary levels, architectural features, cultural material, or an abrupt change in the soil matrix.


File Maker Pro Database

In the field, all excavations adhered to the guidelines established in the *Chan Chich Archaeological Project Field Manual* (Houk and Zaro 2015). Traditionally, excavations in the Maya area were recorded on paper and subsequently compiled into a spreadsheet to create a database. Excavations can generate a large amount of paper work, and as a result typically do not get compiled into a searchable database. To remedy this, the CCAP utilized an electronic, relational database, deployed on iPads to create and store excavation forms, all of which were integrated using a customized FileMaker Pro database (Houk 2012b). The database automatically populates information throughout the linked excavation forms. For example, the operation director would begin by creating an operation definition form. For each excavation unit opened within the defined operation, the supervisor creates a suboperation form, and for each suboperation form a lot form is created for each excavated lot. As the lower level forms are created, they supply the higher level forms with updated information. For example, when a lot form is created, it updates the suboperation definition form that in turn updates the operation form and so forth (Houk 2012b, 2014). The database allows users to upload sketches, maps, and pictures to specific forms. The information collected in the field on the iPad is then imported and synced to the master database housed on an iMac in the field laboratory. At the end of the field season, all excavation forms, field maps, lab analysis, photos, and photolog are imported, linked, and made accessible through the relational database. The utilization of the database significantly increased productivity in the field and provided a hierarchal, organized system for recording and documenting excavations.

Chan Chich Archaeological Project
Lot Form

Op Subop Lot

Chan Chich Archaeological Project



Chan Chich, Belize - Central America

Recorder iPad

Date Opened 10/5/2015

Date Closed

Lot Type

Unit Datum

Datum Elevation

Describe Lot's Location

Lot's Corner Depths (mbl)

Top			
NW			NE
SW			SE
NW			NE
SW			SE
Bottom			

Comments, Observations, Etc.

Field Collection: Common Materials

Material Type	Obs.	Col.	App. #	# of Bags	Lab
	<input type="checkbox"/>	<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>			

Sketch Map of Lot

Field Collection: Small Finds and Samples

Material Type	ID/Sample #	App. #	# of Bags	Lab

Chan Chich Archaeological Project
Lot Form

Matrix Photos Samples Catalog Spec. Its

Relationship of Lot to Others

Lots in Same Subop

Below	<input type="text"/>	<input type="text"/>	<input type="text"/>
Associated	<input type="text"/>	<input type="text"/>	<input type="text"/>
Above	<input type="text"/>	<input type="text"/>	<input type="text"/>

Lots in Other Subops

Equivalent	<input type="text"/>	<input type="text"/>	<input type="text"/>
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Figure 5.1 Screenshot of a lot form.

Structure from Motion (SfM)

The CCAP uses Structure from Motion (SfM) to document excavation units and architecture that is deemed important or interesting to the operation director. SfM software uses an algorithm to create a three-dimensional model based on a series of overlapping two-dimensional photographs. In 2014, SfM was implemented to document architecture exposed within a single unit. In 2015, SfM was used on entire buildings with exposed architecture as well as ceramic vessels. SfM photos were recorded on the same memory card as other excavations photos, but were not entered into the photolog. SfM photos are systematically taken moving around the excavation area ensuring that each photo overlaps with the previous photo (Houk and Zaro 2015). The technique for taking SfM photos varies depending on the size of the area being photographed. For small units, a series of photographs are taken by moving around the edges of the unit as seen in Figure 5.2. For SfM photography of entire structures, photos are taken from the outside followed by a series of overlapping photography from the inside of the building as seen in Figure 5.3 (Houk and Zaro 2015).

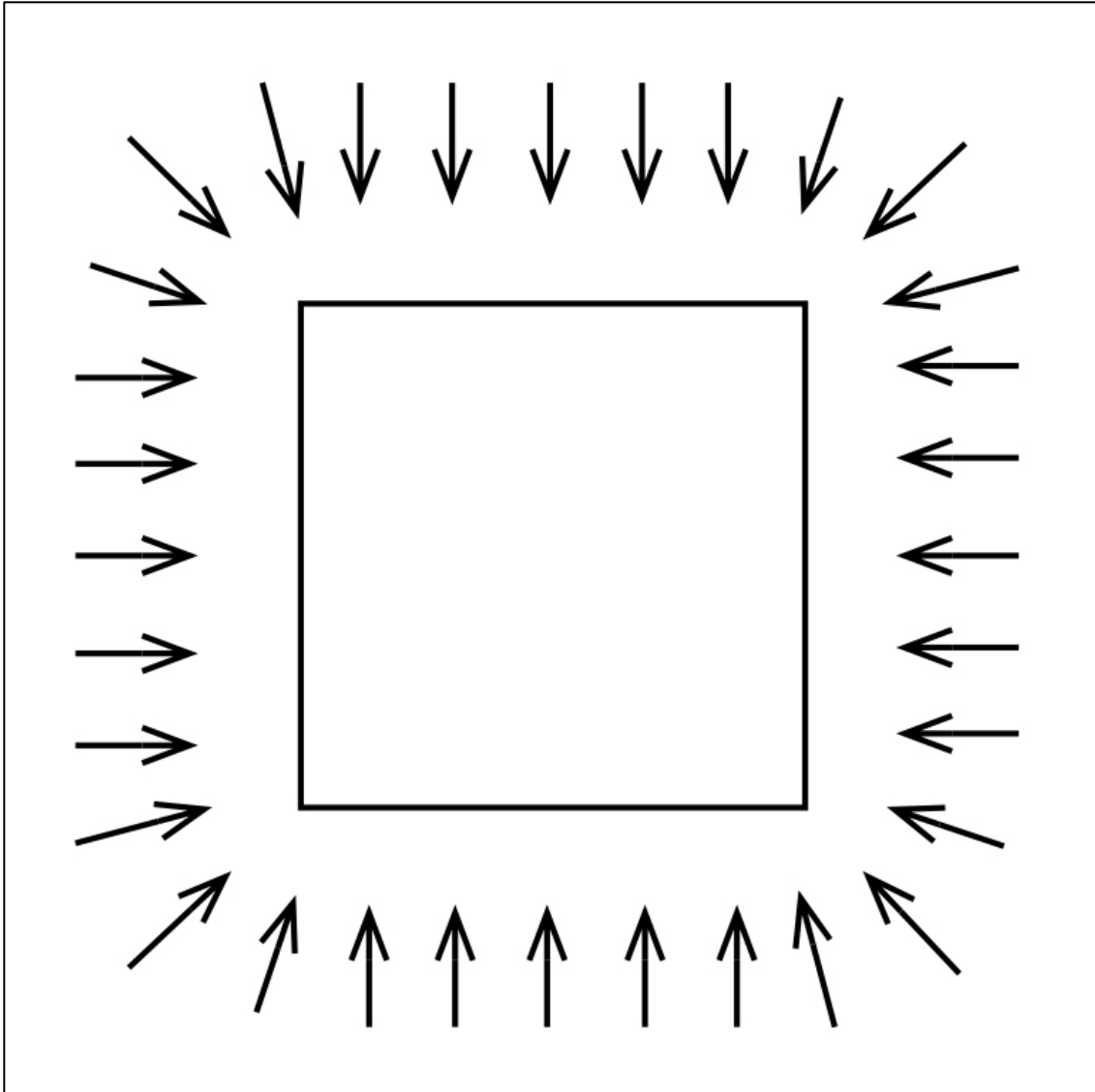


Figure 5.2 SfM methodology for small units (after Houk and Zaro 2015:Figure 4.1).

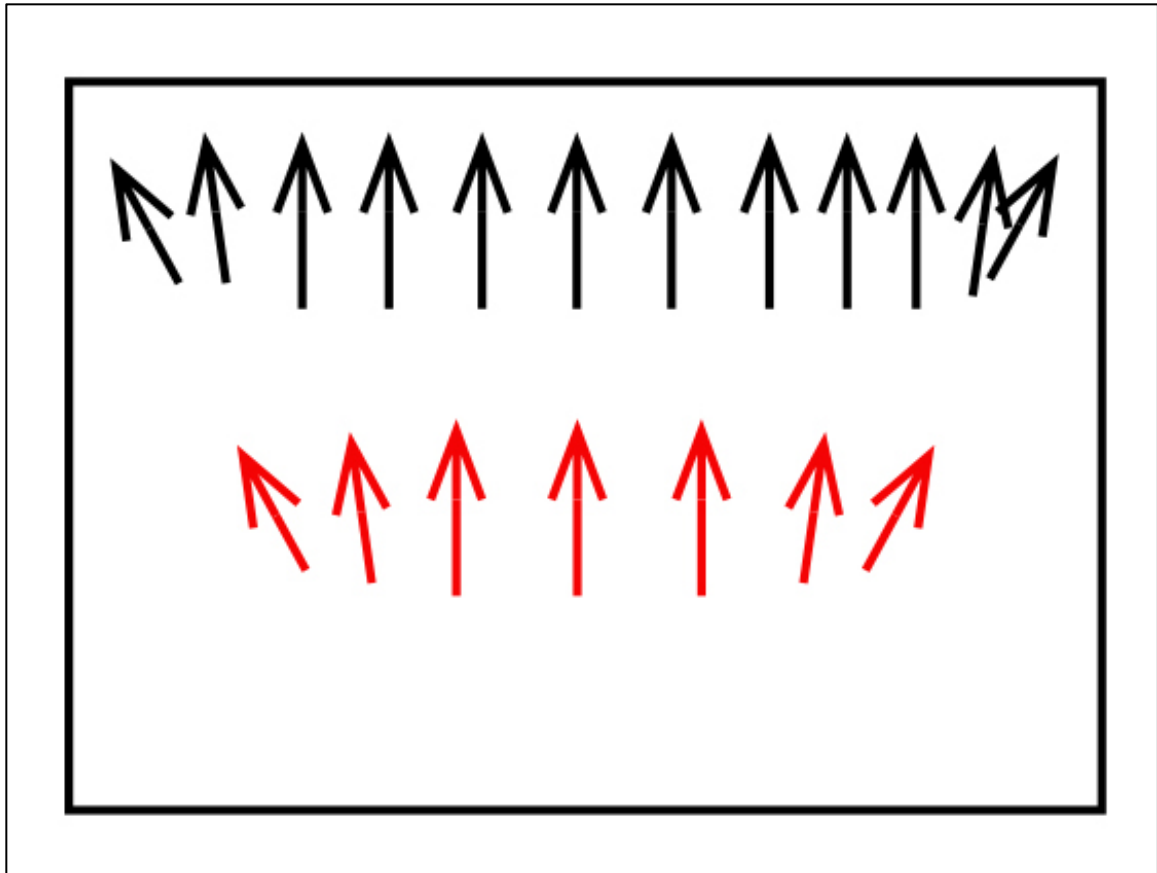


Figure 5.3 SfM methodology for larger units (after Houk and Zaro 2015:Figure 4.2).

The series of SfM photographs are then imported in Agisoft (2013) PhotoScan Pro. The program can then superimpose geo-referenced excavation units or structures to create a 3D model, which can be exported as an orthophoto. Figure 5.4 shows an orthophoto from an excavation unit from Structure D-1, and Figure 5.5 shows an orthophoto of the entire exposed section of Structure D-1 after the completed excavations



Figure 5.4 Orthophoto of Subop CC-14-D.



Figure 5.5 Orthophoto of Structure D-1.

Excavation Methodologies

The processional architecture research project was a two-year project that began during the second session of the 2014 archaeological season. The *sacbe* excavations began on June 20, 2014, and encompassed a four-week period. The 2015 research took place over a 28-day session followed by a 25-day session. Students participating in the Texas Tech University Field School in Maya Archaeology, along with several workers from Chan Chich Lodge and local high school students on summer break, conducted the excavations. Project Director Brett Houk and Operation Director Ashley Booher oversaw the excavations. Suboperation director Carolyn Nettleton assisted with excavations in 2014. Alyssa Farmer, Valorie Aquino, and Paisley Parmer served as suboperation directors during the 2015 season. The 2014 field season followed the excavation and

recording procedures outlined in *the La Milpa Core Project Field Manual* (Houk and Zaro 2011). The 2015 season followed the recording procedures established in the *Chan Chich Archaeological Project Field Manual* (Houk and Zaro 2015).

Once the area to be investigated was cleared of debris, initial suboperations were placed according to surface indications that suggested a potential to uncover architectural features. Additional suboperations were opened based on new information uncovered during excavations. When necessary, the soil matrix was screened through ¼-inch mesh. The topsoil of the patio structures adjacent to Structure D-48, along with the topsoil of the structure excavations was 50 percent screened.

Clearing Unit Methodology

This thesis research followed the work and methodology utilized by Angela Keller (2006) and her work on the Xunantunich causeways. Keller was successful in uncovering artifacts that are potentially related to ritual processions and functions of Maya causeways. Keller excavated what she called “clearing units” that she placed along the edges of the causeways where she thought trash might accumulate during a procession. Keller was able to collect sherds from ceramic drums along both causeways, near Structure A-21, and along the western end of *Sacbe* II, as well as numerous other artifacts related to rituals. Keller concluded that the artifacts she collected were associated with processions that took place along the causeways.

At Chan Chich, clearing units were placed along the edges of both causeways to look for any trash deposits that might contain artifacts related to ritual processions. The Eastern Causeway clearing units were placed along the edges of the causeway, however,

due to the use of parapets, the Western Causeway clearing units were placed on the *sacbe*, inside the parapet walls. The placement of the units depended upon access, vegetation, and preservation. We proposed to excavate a minimal of two 4-x-4-m clearing units per causeway, screening all material that was excavated. Due to access and overgrowth, the standard size of the clearing units was modified to be 2 x 2 m. If the unit yielded a substantial amount of material culture, the unit was expanded to a 2-x-4-m unit. We suspected that any artifacts associated with ritual procession would be either directly below the surface or above the causeway, thus clearing units were excavated to the final causeway surface or subfloor ballast.

Burial Excavation and Analysis Methodologies

Two burials, Burials CC-B12 and CC-B14, were exhumed from a bench located in Structure D-1. Burial CC-B12 was uncovered during the 2014 season and was carefully documented and removed. The preservation of the bones was poor, with very few identifiable bones as most were too fragmented to accurately identify. The burial was excavated revealing as many bones as possible *in situ* and a map was created documenting the elevation, location, and orientation of each. Each bone was sequentially numbered on the plan map and subsequently placed in a small plastic bag reflecting the bone number and provenience information. The map scale was 1:5 to allow for maximum clarity, resulting in several maps being produced. After all bone was removed from the burial, an additional 5-6 cm were excavated to the south and below the placement of the burial to assure that all bone had been collected. The bones were transported to the lab,

where they were allowed to dry, before being placed into sealed bags to avoid the accumulation of moisture by Lab Director Lori Phillips.

Burial CC-B14, excavated during the 2015 season, had slightly different procedures due to the position of the body. The individual was in a seated position, requiring the burial to be excavated in layers. Each layer corresponds to a specific plan map. The bones in each layer were exposed and mapped on the corresponding plan map before being carefully removed from the soil matrix. Similar to Burial CC-B12, the elevation of each bone was recorded, along with the location and orientation of the bone. If possible, the excavator would identify any whole bones that were removed. Unlike Burial CC-B12, the bones were placed in aluminum foil packets, which prevented the accumulation of moisture, and labeled with the corresponding number and provenience information. The bones were transported to the lab, where Lab Director Sara Van Oss weighed each bone packet and laid the bones out to dry before being placed back into the original foil packets. The author documented Burial CC-B12 with SfM in addition to the plan maps.

Dr. Houk was granted permission by the Institute of Archaeology of Belize to export both burials back to Texas Tech University to be analyzed under the supervision of Dr. Anna Novotny (Novotny et al. 2015). Novotny, Samantha Mitchell, and myself performed a complete osteological analysis for both burials. All skeletal data were collected and analyzed in accordance with the *Standards for Collection of Data from Human Skeletal Remains* (Buikstra and Ubelaker 1994). Analysis of the dentition was done according to *Standards* and supplemented by Simon Hillson's (1996) text *Dental Anthropology* and Timothy D. White's and Pieter A. Folkens' (2005) text *The Human*

Bone Manual. Pathologies were identified with reference to *Identification of Pathological Conditions in Human Skeletal Remains* (Ortner 2003).

Laboratory Methodology

The laboratory methods for CCAP were first outlined in the 2013 Chan Chich interim report (Nettleton 2013) and subsequently updated by Lori Phillips (2014) the following year to reflect changes in lithic and faunal analysis. Sarah Van Oss (2015) authored another update based on the 2015 season. All artifacts collected in the field were placed in Tyvek bags corresponding to the artifact material type such as ceramics, lithics, ground stone, faunal, and special finds. Each bag was labeled with the correct provenience information, and a bag tag with identical provenience information was placed into the bag. At the end of the field day, bags from closed lots only are brought from the field to the lab, and placed in a designated trunk for incoming bags (Nettleton 2013). All artifacts enter the lab in a bag with other artifacts of the same category found within the same lot. The lab director using the FileMaker Pro database system checked in the artifacts, verifying that the material reported on the field form was actually submitted to the lab. Artifacts that could be washed were carefully rinsed with water by field students on their designated lab day and laid out on a rack to dry. Dry artifacts were then cataloged, labeled, and photographed and properly stored until further analysis could be completed.

The collection and analysis of ceramic artifacts were integral to establishing date ranges for occupation and construction events. Therefore, all artifacts larger than 10 mm (approximately dime size) were collected in the field and brought back to the lab for

analysis. Dr. Fred Valdez, Jr. and Dr. Lauren A. Sullivan completed ceramic analysis for both seasons utilizing the long established and successful type:variety-mode system of analysis (Valdez and Sullivan 2014). The ceramicists provided chronological assessments for the ages of individual lots based on the associated ceramics, and, although Chan Chich has its own established ceramic complexes, ages are expressed in terms of the long-standing sequence from Uaxactun shown in Figure 2.4 in which Late Classic ceramics, for example, are assigned to the Tepeu ceramic phase, with finer chronological subdivisions when possible.

Aside from ceramics, lithics are the most common artifact type collected and brought to the lab. Lab directors Lori Phillips and Sarah Van Oss analyzed the lithic assemblage for the 2014 and 2015 seasons, respectively. Lithics are classified into different forms and subforms, measured, and identified (Nettleton 2013; Phillips 2014). The information is recorded on an Artifact Analysis form in the FileMaker Pro database, and each analyzed artifact is given a Spec. # (Houk 2014). Lithic tools, ground stone, and obsidian were labeled with the corresponding Spec. # using a fine point, acid-free pen away from the edges of the artifact to avoid any possible hindrance to future edge analysis. Once the ink dried, it was sealed with a layer of Acryloid B-72 solution (Nettleton 2013; Phillips 2014).

Photographs of artifacts were taken on black felt with a scale, in natural light, supplemented by LED lights if needed (Phillips 2014). In some cases, the lab director photographed individual artifacts as part of the analysis stage, and in other cases the operation director photographed artifacts for publication and presentation purposes.

Lori Phillip conducted faunal analysis on site for both seasons. Faunal remains collected in the field were placed in aluminum foil packets and labeled with the correct provenience information.

Special finds are artifacts considered to be unique or rare and require special treatment (Houk and Zaro 2015). Special finds, such as shell beads, spear points, shells, obsidian, and spindle whorls, were placed in small plastic bags or plastic bottles with the corresponding provenience information in the field. Special finds are brought in at the end of each day regardless if the lot was closed, and placed in a small, separate special finds box (Houk and Zaro 2015).

Charcoal samples collected for radiocarbon dating were carefully collected using a trowel and placed into aluminum foil packets. Samples were sequentially numbered, and a sample form was created in the iPad with correct sample number and provenience information.

Chapter 6

Results

The following sections provide a brief overview of the 2014 and 2015 excavations. The overviews for each section follow the chronological order in which the suboperations were opened and are intended to reflect the evolution of our excavations as new questions arose. In total, 51 suboperations were opened over the course of two summers; 10 suboperations were opened in 2014, and the remaining 41 suboperations were opened in 2015. Of the 51 suboperations opened, 41 pertained to the processional architecture research; the other 10 suboperations were conducted at Structure D-36, which is not be discussed in this thesis, but is described in Booher et al. (2015). Figure 6.1 shows the various locations of suboperations opened over the course of this research.

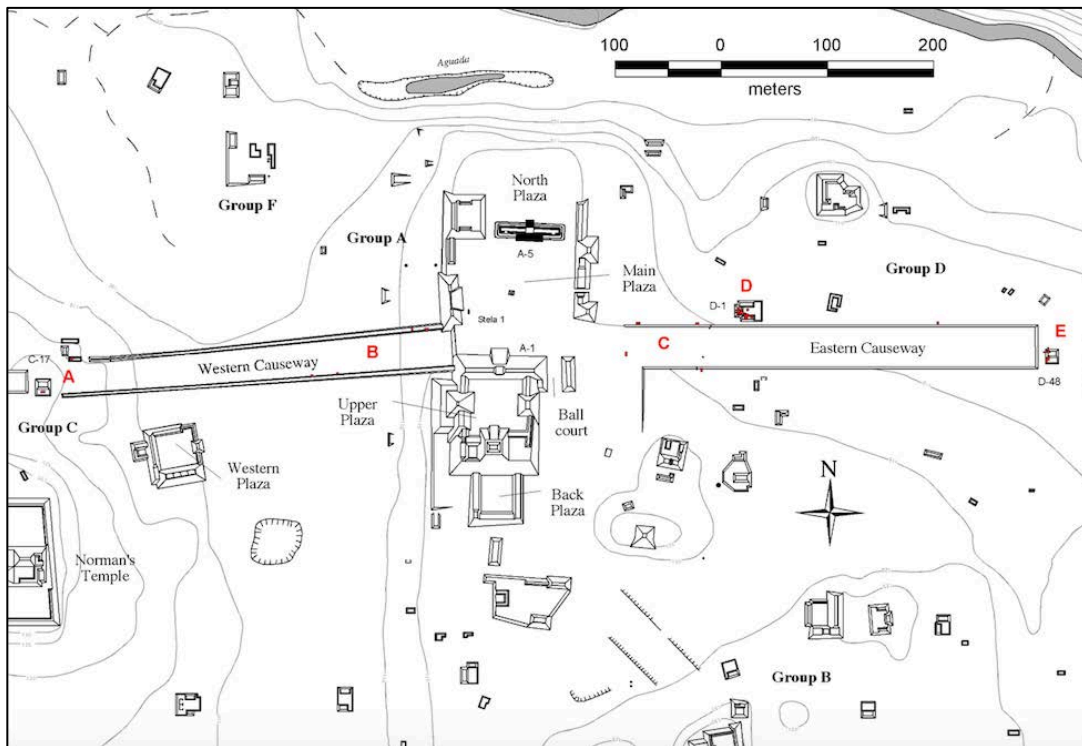


Figure 6.1 Map of Chan Chich with excavation units from 2014 and 2015. A) see Figure 6.30; B) see Figure 6.41; C) see Figure 6.36; D) see Figure 6.2; E) see Figure 6.26.

Preliminary excavations of Chan Chich's causeways and related structures began during the second session of the 2014 Chan Chich archaeological field school. The primary objective of the 2014 investigations was to gather data on processional architecture that would lay a foundation on which the 2015 research would build. The planned 2014 excavations primarily focused on determining the construction phases, age, and architectural forms of the Eastern and Western Causeways and locating and excavating the two termini structures. Courtyard D-1 was not initially a part of the planned excavations into processional architecture, but was excavated due to its close proximity to the Eastern Causeway. A test trench was placed on the east façade of Structure D-1 to expose the final phase architecture of the building, as well as to gather chronological information from the courtyard in an attempt to discern the possible function and relation, if any, to the Eastern Causeway. Due to time constraints and unforeseeable weather conditions, the termini structures and clearing units were not excavated, but were addressed in 2015.

The 2015 excavations built on and expanded upon the previous year's research. In 2015 we continued excavations at Courtyard D-1 and further exposed the interior of Structure D-1. Structure D-3 was excavated for the first time in 2015. During the 2015 season, we located the termini structures and assessed them for excavations. Clearing units were also placed along the Eastern and Western Causeways to collect any artifacts related to processions that took place on the causeways. Additionally, Structure C-18A was discovered and excavated due to its close proximity to the terminus of the Western Causeway and a small cave.

Research for this thesis work was conducted over the span of two summers and consisted of 12 total weeks of excavations. The excavations pertaining to the processional architecture research focused on three distinct groupings: Courtyard D-1, terminus structures (Structures C-17 and D-48 along with Structure C-18A), and clearing units along the Eastern and Western Causeways. The following sections describe the excavations results from the 2014 and 2015 processional architecture research project.

Courtyard D-1

Courtyard D-1 is a small courtyard located approximately 167 m east of the Main Plaza and lies just to the north of the Eastern Causeway. Courtyard D-1 consists of three structures that share a common courtyard that is opened to the east. Structure D-1 is the largest of the three structures and is orientated north to south. Structures D-3 and D-2 are relatively the same size and are orientated east to west. Structures D-1 and D-3 were extensively excavated over the course of two years, with a total of 19 suboperations opened. Figure 6.2 shows the location of each suboperation opened at Courtyard D-1.

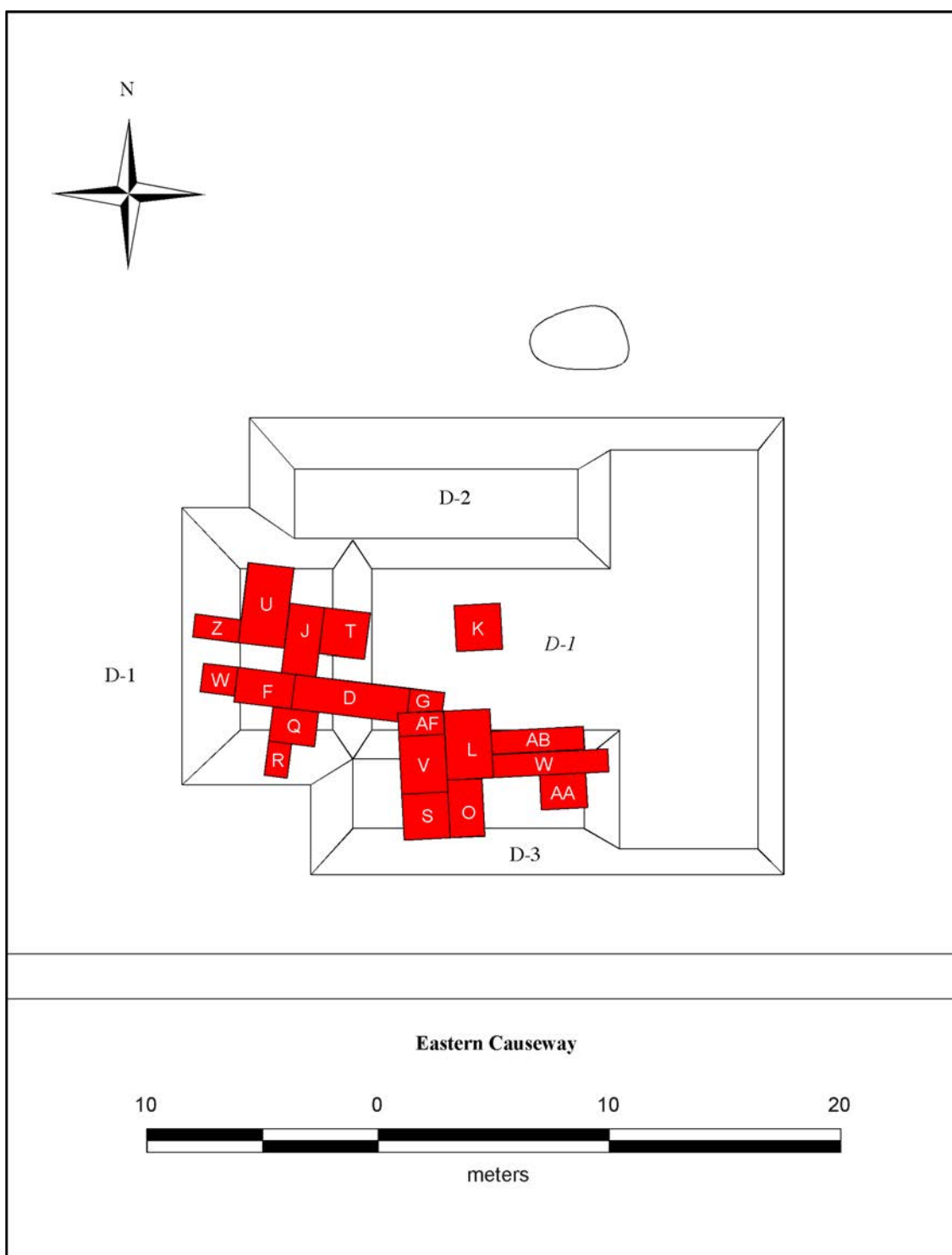


Figure 6.2 Locations of suboperations at Courtyard D-1 (after Booher et al. 2015:Figure 2.2).

Excavations at Structure D-1

Structure D-1 was excavated over the course of two seasons during 2014 and 2015 with a total of 10 suboperations opened. In 2014, Subop CC-14-D, a 1.5-x-5-m trench, was placed on the east façade of the building, extending onto the courtyard surface. Subop CC-14-D was opened to simultaneously expose the final phase architecture of the structure and to determine the chronology of the courtyard. Subops CC-14-F and CC-14-G were placed adjacent to the west and east of Subop CC-14-D. Subop CC-14-F was opened to further expose the interior architecture of the structure, while Subop CC-14-G was opened to further expose a rock alignment in the east profile of Subop CC-14-D.

In 2015, Subop CC-14-F was reopened to further expose the interior of Structure D-1, a task that was hindered in 2014 by the discovery of Burial CC-B12. Subop CC-14-J was a 1.5-x-3-m unit placed adjacent to the north of Subop CC-14-F to follow the east exterior wall exposed in 2014 and further explore the interior of the building. Subop CC-14-M was the third suboperation opened on Structure D-1 in 2015 and was a 1.25-x-1.50-m unit placed adjacent to the west of Subop CC-14-F to expose the west exterior wall of the building. Subop CC-14-Q, a 1.50-x-2-m unit adjacent to Subop CC-14-F, was opened to expose the southern limits of the building. Due to poor preservation experienced in Subop CC-14-Q, Subop CC-14-R, a small 1-x-1.5-m unit, was opened adjacent to the south of Subop CC-14-Q in an attempt to expose the south exterior wall of Structure D-1. Subops CC-14-T and CC-14-U were simultaneously opened to expose architecture that was uncovered in Subop CC-14-J. Subop CC-14-T was a 2-x-2-m unit opened adjacent to Subop CC-14-J on the east side of Structure D-1 to further expose the doorway jambs,

and the step that separated the exterior surface from the interior surface. This step exposed in Subop CC-14-T accounted for the 17 cm discrepancy encountered in 2014. Subop CC-14-U was a 3.5-x-2-m unit adjacent to the west of Subop CC-14-J and opened to further expose the bench surface documented in Subop CC-14-J. Subop CC-14-Z was a 2-x-1-m unit located on the west face of Structure D-1 adjacent to Subop CC-14-U and was opened to simultaneously expose the bench surface and the west exterior wall. Table 6.1 provides a brief summary of the suboperations and lots opened on Structure D-1.

Table 6.1 Summary of Suboperations and Lot Descriptions for Structure D-1

Suboperation	Lot	Lot Description	Age
CC-14-D	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2
	03	Latest courtyard surface	
	04	Earlier east exterior patio surface	Chicanel
	05	Step	
	06	Latest east exterior patio surface	
	07	Exterior east wall	
	08	Interior floor surface	
	09	Earlier courtyard surface	Tepeu 2
	10	Earliest courtyard surface	Chicanel/Tzakol 1
CC-14-F	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 3
	03	Burial CC-B12	
	04	Backfill	
	05	Construction fill	
	06	Bench	
	07	Bottom base of bench	
CC-14-J	01	Humus	Tepeu 2-3
	02	Collapse debris	Tepeu 1
	03	Ceramic vessel deposit	Tepeu 1
	04	Burial CC-B14	Tepeu 2
	05	Faunal bone (deer)	
	06	Floor artifacts	Mamon
	07	Interior floor	
	08	Exterior east wall/ east doorway jamb	
	09	Bench	
	10	West door	
	11	Earlier interior floor surface	
	12	Construction fill Surrounding burial	

Table 6.1 (Continued)

Suboperation	Lot	Lot Description	Age
CC-14-M	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 1
	03	West exterior wall	
	04	Terrace	Tepeu 2
CC-14-Q	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2-3
	03	Construction fill in west profile	
	04	Surface (possible bench surface?)	
	05	Interior floor	
	06	East exterior wall	
	07	Later construction of east exterior wall	
	08	Southern wall	
CC-14-R	01	Humus	
	02	Collapse debris	Tepeu 2
	03	Exterior southern floor	
CC-14-T	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2
	03	Exterior patio surface	
	04	Step	
	05	Southern doorway jamb	
	06	Northern doorway jamb	
CC-14-U	01	Humus	Tepeu 2-3
	02	Collapse debris	Tepeu 2
	03	Bench	
CC-14-Z	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2-3
	03	West exterior wall	

Excavation Results of Structure D-1

The excavations of Structure D-1 revealed the eastern and western exterior wall, along with the exterior patio and associated platform. The interior of the building was partially exposed, uncovering a bench and two burials. Excavations also documented several renovations to the structure. Preservation of Structure D-1 was variable, with the east exterior wall and patio surface exhibiting the best preservation, and the southern portion exhibiting the worst preservation. Table 6.2 displays the architecture and corresponding lots on Structure D-1.

Table 6.2 Lots and Suboperations with Corresponding Architecture and Ages on Structure D-1

Context	D	F	G	J	M	Q	R	T	U	Z	Age
Topsoil	01	01	01	01	01	01	01	01	01	01	Tepeu 2-3 (Late Classic to Terminal Classic)
Collapse debris	02	02	02	02	02	02	02	02	02	02	Tepeu 2-3 (Late Classic to Terminal Classic)
Earlier patio surface	04										Chicanel (Late Preclassic)
Final patio surface	06							03			
Earlier exterior step			04								
Final exterior step	05										
Interior floor				07		05					
East wall	07			08		06					
South doorjamb				08				05			
North doorjamb				10				06			
Step								04			
Bench		06		09					03		
West wall					03					03	

The architecture exposed indicates that the final form of Structure D-1 had an exterior patio surface adjacent to the east face of the building, separated from the courtyard surface on the east by a platform face. An earlier Preclassic period step (Lot CC-14-G-04) was constructed on the east portion of the structure and separated the courtyard surface from Structure D-1's platform. This earlier step is highly eroded and is associated with an equally eroded patio floor surface (Lot CC-14-D-4). The earlier Preclassic step was later covered over with a plaster surface (Lot CC14-D-3) and a new step (Lot CC-14-D-5) was constructed to replace the previous step. This new step elevated the exterior patio surface (Lot CC-14-D-06) above the courtyard floor. The new

step would have presumably stepped down onto the final courtyard surface of Lot CC-14-D-03 (Booher and Nettleton 2014:74).

The final exterior patio (Lot CC-14-D-06) surface was very well preserved, and excavators encountered one large cut stone (60 cm by 50 cm by 21 cm thick) and a drainage stone resting on the surface of the patio. The drainage stone, the first of its kind to be recorded at Chan Chich, is an elongated limestone block with a 3 cm deep, concave channel carved into the length of the stone. The final patio surface is associated with a platform face (Lot CC-14-D-06). The platform was highly eroded, but presumably was the distinction between the patio surface and the courtyard surface. Located to the west of the exterior patio surface is a 75-cm thick east exterior wall of the building (Lot CC-14-D-07). The top stones of the wall had collapsed and fallen away, but the bottom three courses of stones were preserved. The base of the exterior wall exhibited a 7-cm high footer, stones that are offset from the rest of the wall by 3-4 cm (Figure 6.3).



Figure 6.3 Orthophoto of Subop CC-14-D on Structure D-1, orientated west/southwest. The drain stone is the elongated cut stone in the left foreground of the image (after Booher and Nettleton 2014:Figure 5.8).

The west exterior portion of Structure D-1 was terraced. Subops CC-14-M and -Z exposed the poorly preserved west exterior wall that had partially collapsed down the western face of the mound. The wall measured 1.12 m thick. Beneath the wall is a

terrace face that would have rolled onto another face below, although the lower terrace face was located outside the limits of our unit. A smooth, roughly spherical stone was found within the collapse debris of Lot CC-14-M-02. The stone resembles the shape and weight of a cannon ball (Figure 6.4; Spec. # CC1166-01) and measures 24 cm in diameter. This type of spherical stone ball has been recorded at various other Maya sites ranging from smaller round stone balls similar to the one recorded at Chan Chich, to larger, less imperfect spherical balls. At the sites of Xunantunich and Calakmul, the larger stone spherical balls have been recorded. The smaller stone balls seem to be more frequent and have been recorded at sites such as Bajo Del Lago, Cahal Pech, Lamanani, and Kinal (Awe, personal communication, 2015; Farrior 2003). These larger stone balls have been found in association with numerous architectural features, such as shrines as seen at Calakmul and with hearth stones, as described by Taube (1998) at Tonina. At Lamanai and Caracol, smaller stone balls were recorded in close proximity to metates. The functions of spherical stone balls are still unknown and it is likely that there are several different functions given the varied locations where these stone balls are recorded.



Figure 6.4 Spherical stone ball found in Lot CC-14-M-02; Spec. # CC1166-01.

Excavations suggest that Structure D-1 likely had vaulted entranceways, given the numerous vault stones encountered within the collapse debris in and around the entrance, with the rest of the superstructure composed of a perishable structure. At one point, Structure D-1 had two entrances into the building, one located on the north end of the building, and the other on the south. During a renovation episode of the building, the south entrance was infilled (Figure 6.5). The east and west doorway jambs frame the north entrance, creating a 1.35-m entrance into the building. The southern doorway jamb (Lot CC-14-J-08) was exposed in its entirety, and connected to the east exterior wall exposed in Lot C-14-D-07. Only one course of stones was preserved of the east exterior wall where it meets the bench face inside the building. The south doorway jamb was four

courses high and roughly 55 cm in height. The preservation of the south doorway jamb is variable, partly because the doorway jamb was partially excavated through before it was identified. The north doorway jamb (Lot CC-14-J-10) was located in the north profile of Subop CC-14-J, and its associated wall extended outside the limits of our excavation unit. The preservation of the north doorway jamb was poor, thus making it difficult to determine the exact measurements of the doorway jamb. A rough estimate places the doorway jamb at 75 cm in width and approximately 55 cm high. The volume of collapse debris found inside the doorway along with numerous vault stones observed on the surface and throughout the collapse indicates that the north and south doorway jambs likely supported a vaulted entrance. While excavating around the south doorway jamb, a faunal long bone belonging to a deer and three pieces of deer antler were collected (Lori Phillips, personal communication, 2015). Associated with the north and south doorway jambs is a highly eroded step that is 14 cm high and spans the width of the door (Figure 6.6). Parts of the step still retain remnants of plaster, while other areas are highly degraded, leaving no indication of a step. The step divides the interior surface from the patio surface and accounts for the 17 cm discrepancy between the two surfaces that was first observed in 2014.

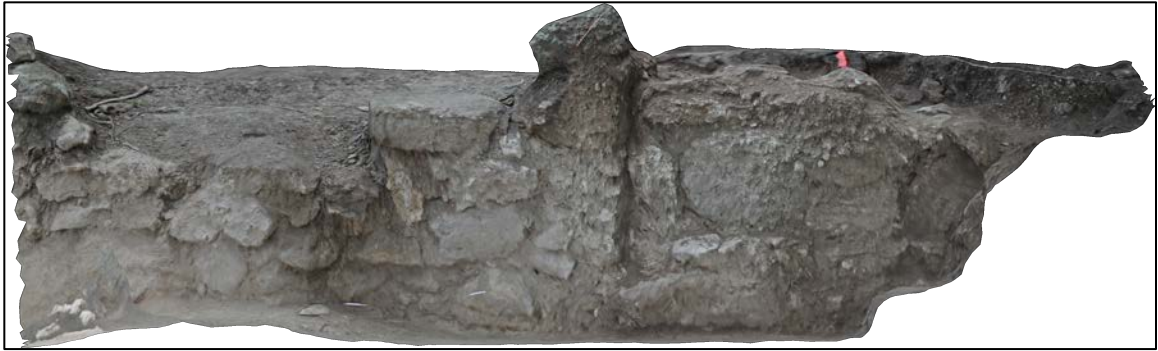


Figure 6.5 Orthophoto of southeast wall and infilled doorway jamb. View from west (after Booher et al. 2015:Figure 2.8).

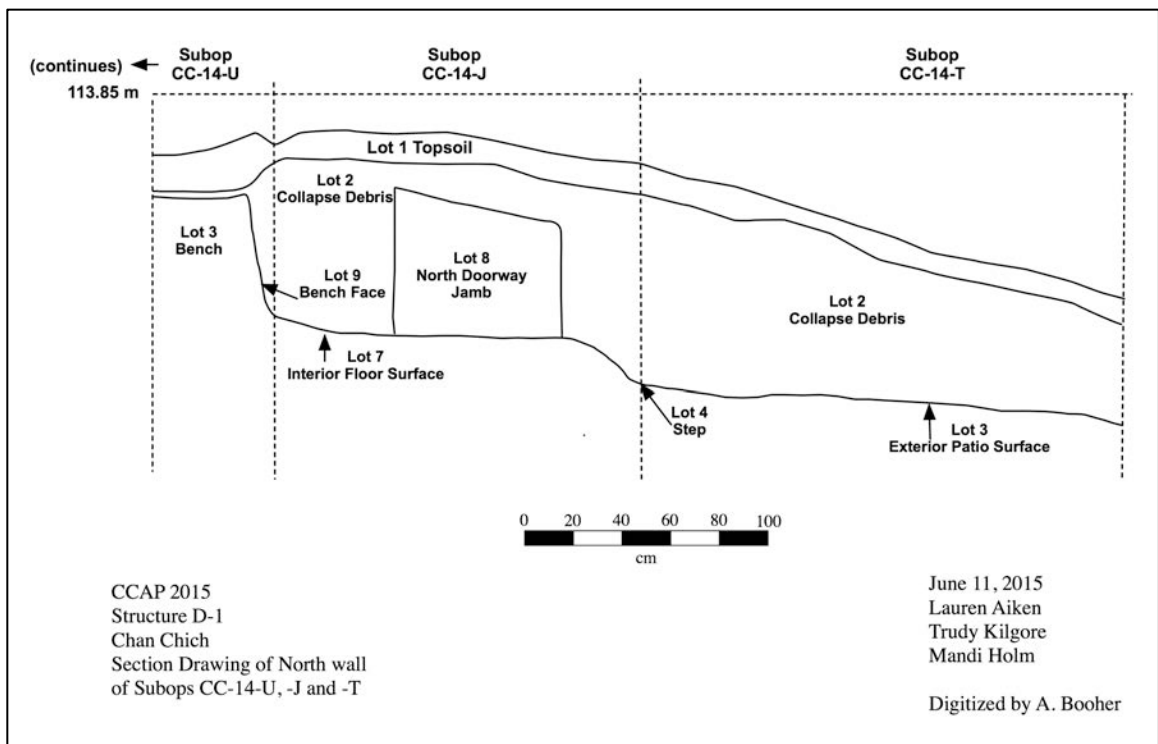


Figure 6.6 Cross-section drawing of Subops CC-14-U, -J, and -T.

Excavations atop Structure D-1 revealed that the interior of the building largely consisted of a C-shaped bench resulting in minimal usable floor space. The interior floor

is well preserved with evidence of re-plastering around the base of the bench face.

Several artifacts were found lying on top of the floor, including fragments of a ceramic drum base (Figure 6.7) re-fit back together in the field lab, along with three sherds of a middle Preclassic Mamom ceramic vessel. A large metate fragment was also found upside down on the floor surface. The edges of the metate fragment had been chipped away, but the center was smooth (Figure 6.8).



Figure 6.7 Ceramic drum base; Spec # CC1134-01.

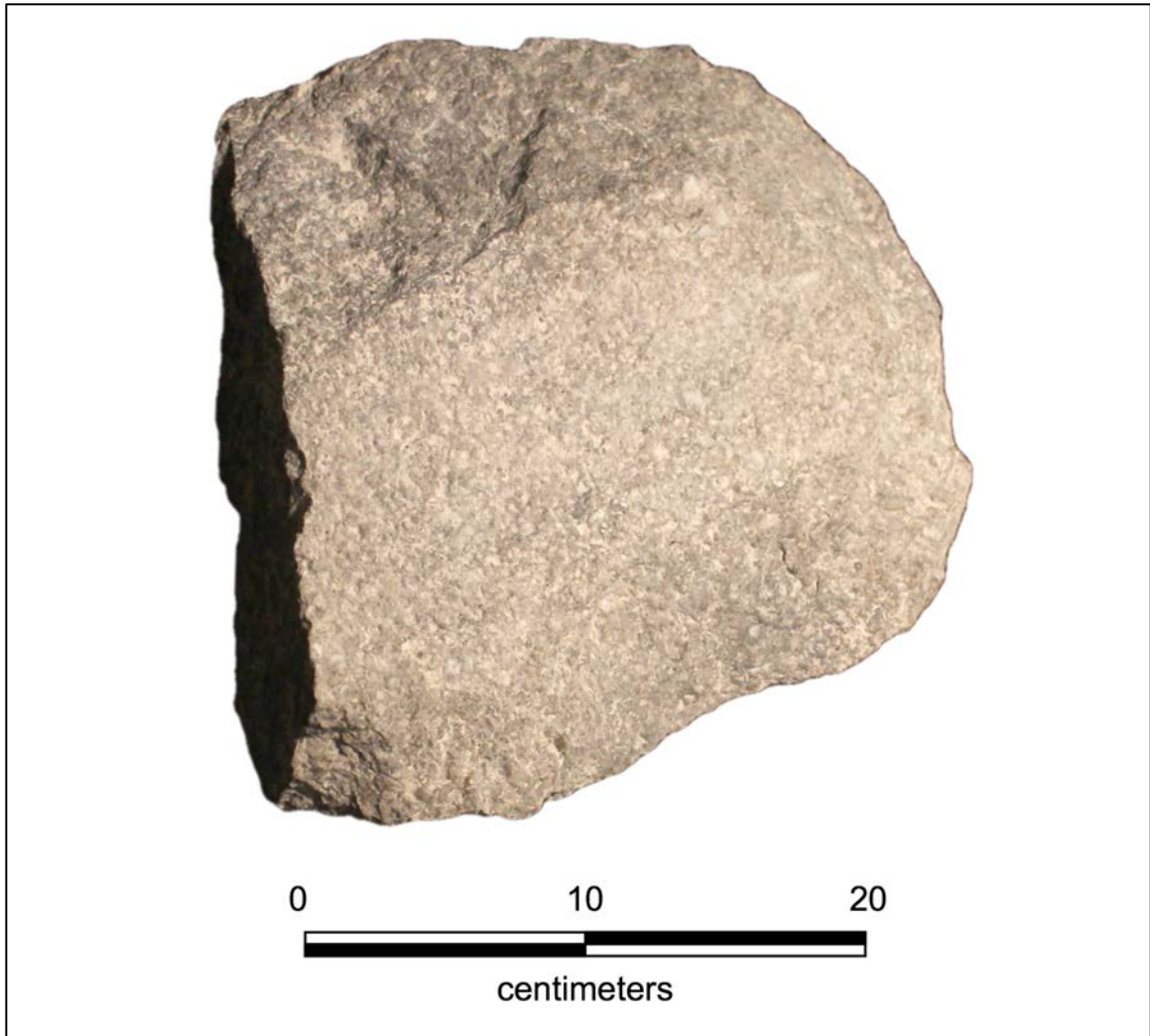


Figure 6.8 Metate fragment; Spec # CC-1125-01.

The interior floor articulates with a C-shaped bench (Lot CC-14-09) that dominates the interior of Structure D-1. Subops CC-14-F, -J, and -U exposed the bench face and surface. The façade of the bench (Lot CC-14-J-09) is 60 cm high, although the preservation is poor with only the bottom base stones visible on the southern portion of the bench. The bench surface (Lot CC-14-U-03) extends 1.44 m to 1.64 m, depending on preservation, to where the west exterior wall (Lot CC-14-Z-03) of the building would

have been located. The wall, as previously stated, had collapsed away and is not visible in this section of the building. The northern portion of the bench is located outside the limits of the excavation unit, thus the exact north/south length of the bench is unknown. The surface of the bench is highly eroded, likely due to its shallow depth below modern ground surface. A renovation to the interior of the building expanded the bench toward the south (Lot CC-14-F-06), which is likely when the south entrance to the building was infilled. The southern extension to the bench was partially excavated through due to the location of Burial CC-B12 (see below).

The southern portion of the building was excavated to determine the limits of the interior room and expose the south exterior wall of the structure. Subop CC-14-Q further exposed the eastern wall (CC-14-Q-06), which revealed a second, southern doorway jamb that had been infilled, likely after the bench was extended to the south. The interior floor from Lot CC-14-D-08 continued toward the south and stops at a faced stone (CC-14-Q-08) on the southeast side of Subop CC-14-Q. Whether or not this stone denotes the southern limits of the room and building is still unknown. The western profile of Subop CC-14-Q consisted of pockets of construction fill located above a plaster surface (CC-14-Q-04). Given the construction fill observed in the southern profile of Subop CC-14-F, it is possible that this plaster surface is part of the southern addition to the interior bench, although the interface between the architectural feature and the construction fill had completely deteriorated away.

To further explore the faced rock on the southeast side of Subop CC-14-Q that could possibly represent the southern exterior wall and limits of the building, Subop CC-14-R was placed adjacent to the south of Subop CC-14-Q. A poorly preserved southern

exterior surface was exposed (Lot CC-14-R-03). In the northwest corner of the subop, 1-3 cm above the exterior surface, 24 pieces of fragmented conch shell were collected along with numerous ceramic sherds, a human femoral head, and faunal bone. A minimum of two vessels, one being a plate and other a jar with thick rim and punctuation, were collected from the collapse debris (Lot CC-14-R-02). Due to poor preservation, excavations were unable to expose the southern exterior wall.

Burial CC-B12

Burial CC-B12 was excavated during the 2014 archaeological season in the southern extension (Lot CC-14-F-05) of the bench in Structure D-1. Designated Burial CC-B12 and Lot CC-14-F-03, this feature contained a single individual placed in an extended position and orientated east to west, with the feet located at the east and skull at the west (Booher and Nettleton 2014:72). The preservation of the burial was poor, with most of the bones too fragmented to identify, likely due to the close proximity of the burial to the modern ground surface. A total of 156 bones and 28 teeth was collected. In general, the feet and hand bones exhibited the best preservation. The teeth that were collected did not have any signs of modification (Figure 6.9). Given that the small bones of the feet and hands were present, and the large amount of teeth collected, this was the primary place of interment.

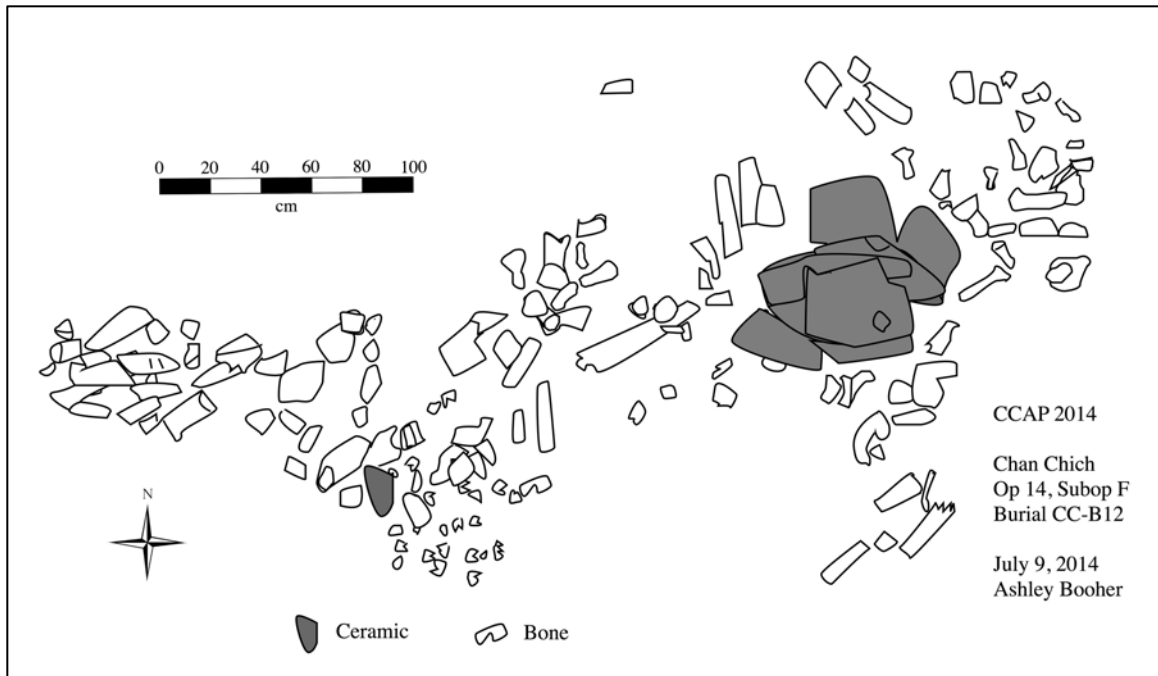


Figure 6.9 Plan map of Burial CC-B12.

A fragmented long bone produced a radiocarbon age that dates the individual to the Late Classic or Terminal Classic period. The uncalibrated radiocarbon age for Sample CC-14-S04 is 1220 ± 20 BP (UCAIMS-154712; bone; $\delta^{13}\text{C} = -10.5\text{‰}$), and the calibrated age range is cal AD 713–885 ($p = .954$). As Figure 6.10 shows, the highest probable age for the sample, however, is cal AD 673 to 779 ($p = .873$). A single, broken grave good was placed up-turned over the middle of the individual as depicted in Figure 6.11, and was the only grave good found associated with the burial. The offering was an Achote Black bowl (Spec. # CC0962-01) with post-firing graffiti—incised quadripartite designs—on two exterior sides and in the middle of the vessel’s interior (Lauren Sullivan, personal communication, 2015; Booher et. al 2015:30). The ceramic vessel was pieced back together in 2015, allowing us to see the designs of the bowl as depicted in Figure 6.12.

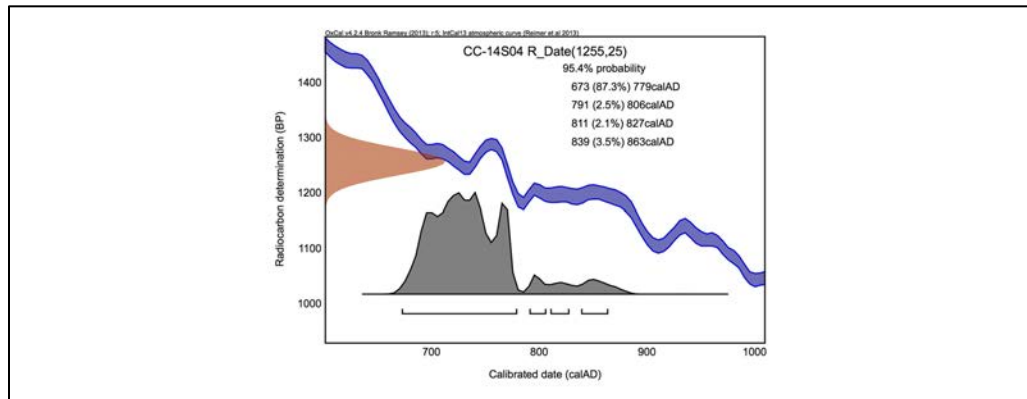


Figure 6.10 Uncalibrated Radiocarbon date for Sample CC-14-S04.



Figure 6.11 Photo of upturned ceramic vessel in Burial CC-B12



Figure 6.12 Photo of reconstructed ceramic vessel from Burial CC-B12.

In 2015, graduate student Samantha Mitchell completed osteological analysis on the bones from Burial CC-B12 at Texas Tech University (Novotny et al. 2015). The burial contained very few cranial fragments, and those present could not contribute to sex estimation. Pieces of long bones constituted a large portion of the fragments in the burial.

The only possible identifiable elements belonged to the humerus, radius, and femur, but siding of these bones was not possible. The average weight of a human skeleton (1,625 g) was used to estimate the percent of skeletal remains removed from the interment (see Mckinley 1993). The unidentifiable fragments weighted 150 g and comprised 9.2 percent of the total burial (Novotny et al. 2015). This percentage indicates that a large portion of the skeleton was not preserved. Age is estimated to be adult due to significant wear present on the teeth. Sex was indeterminate.

Table 6.3 Burial CC-B12 Skeletal Inventory Table (after Novotny et al. 2015:Table 5.5)

Element	Side	Completeness
Skull	---	>10%
Parietal	---	>10%
Occipital	---	>10%
Zygomatic	---	>10%
Scapula	--	>25%
Ribs	---	>5%
Mandible	---	>10%
Humerus	---	>10%
Radius	---	>10%
Femur	---	>10%
Tarsals	---	>50%
Cuneiform	---	>50%
Navicular	---	>10%
Metacarpal	---	>50%
Metacarpal	Right	>25%
Metacarpal	Left	>25%
Carpal	---	>25%
Capitate	---	>25%
Scaphoid	Right	>25%
Manual Phalanges	---	>10%
Manual Distal Phalanges		>10%
Manual Proximal Phalanges	---	>5%

Table 6.3 (Continued)

Element	Side	Completeness
Metatarsals	Right	>10%
Pedal Distal Phalange	---	>10%
Pedal Intermediate Phalange	---	>50%
Pedal Proximal Phalange	---	>5%

A total of 28 teeth was collected and documented for analysis (Table 6.4), and all belong to the same individual, providing evidence of single interment. Dental modification was not noted on any of the teeth collected. The teeth displayed significant signs of calculus build up and significant wear on the LM₃, LM₂, and LM₁ on the mandible and RM₃, RM₂, LM₁, LM₃ of the maxilla. Dental caries were noted on the LM₂ and LM₁ of the mandible (Novotny et. al 2015). The individual displayed no pathologies or trauma.

Table 6.4 Dental Inventory of Burial CC-B12 (after Novotny et al. 2015:Table 5.6)

RM ₂	RM ₁	RP ₄	RP ₃	RC ₁	RI ₂	RI ₁	LI ₁	LI ₂	LC ₁	LP ₃	LP ₄	LM ₁	LM ₂	LM ₃
X					X						X		X	
X		X				X	X			X		X		
RM ₂	RM ₁	RP ₄	RP ₃	RC ₁	RI ₂	RI ₁	LI ₁	LI ₂	LC ₁	LP ₃	LP ₄	LM ₁	LM ₂	LM ₃

Burial CC-B14

Burial CC-B14 was discovered while excavators were excavating what was thought to be collapse debris. Upon discovery, the bones were further exposed and it was determined that the burial was located within the C-shaped bench (Lot CC-14-J-09) located in the interior of Structure D-1 (Figure 6.13). Designated Burial CC-B14 and Lot

CC-14-J-04, the burial contained a single female individual interred in a seated position. The body was positioned northwest to southeast, with the skull facing the northwest. The individual was seated on a plaster floor (Lot CC-14-J-11) that is 11 cm lower than the interior plaster floor (Lot CC-14-J-07) outside the burial, suggesting that the burial pit cut through the later floor and stopped on an earlier floor surface. The burial crypt measured 60 cm by 50 cm and consisted of dry fill, small rocks, and limestone. The burial was remarkably well preserved with approximately 75 percent of the skeletal remains present. The skull and os coxa were relatively complete *in situ*, but, once the bones were removed from the soil matrix, the preservation of the iliac blades deteriorated. Figure 6.14 is a plan map of Burial CC-B14, and Figure 6.15 shows the individual layers from the burial as they were recorded during excavation. Figure 6.16 shows the preservation of the os coxa *in situ*. The good preservation of the bones was likely due to the dry fill surrounding the individual and the protected location within the bench. The location of the arms and hands indicated that the seated individual had her arms crossed over her chest. The leg bones were found in vertical positions, further suggesting a seated position. The feet were found articulated and not crossed. The bones were found in the correct anatomical position and maintained joint articulation of the feet. The articulated feet and amount of skeletal remains indicates this burial as a primary interment (Booher et al. 2015).

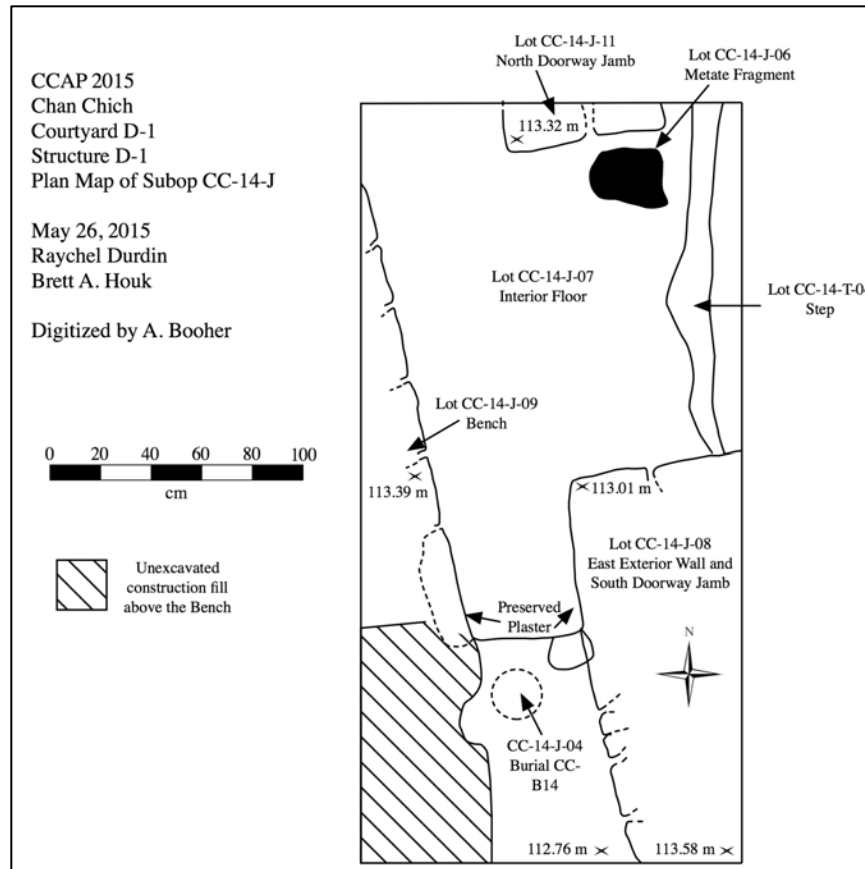


Figure 6.13 Plan map of Subop CC-14-J with location of Burial CC-B14.

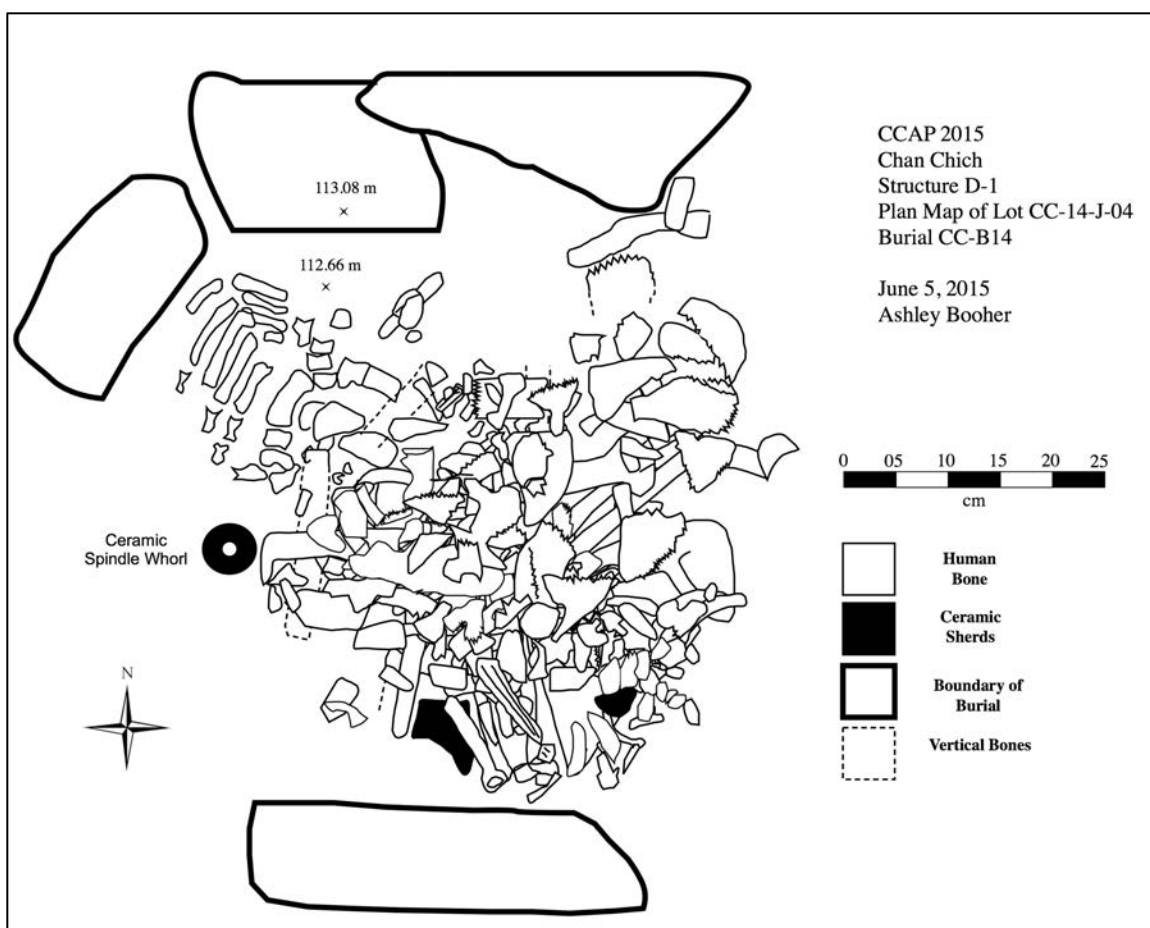


Figure 6.14 Plan map of Burial CC-B14

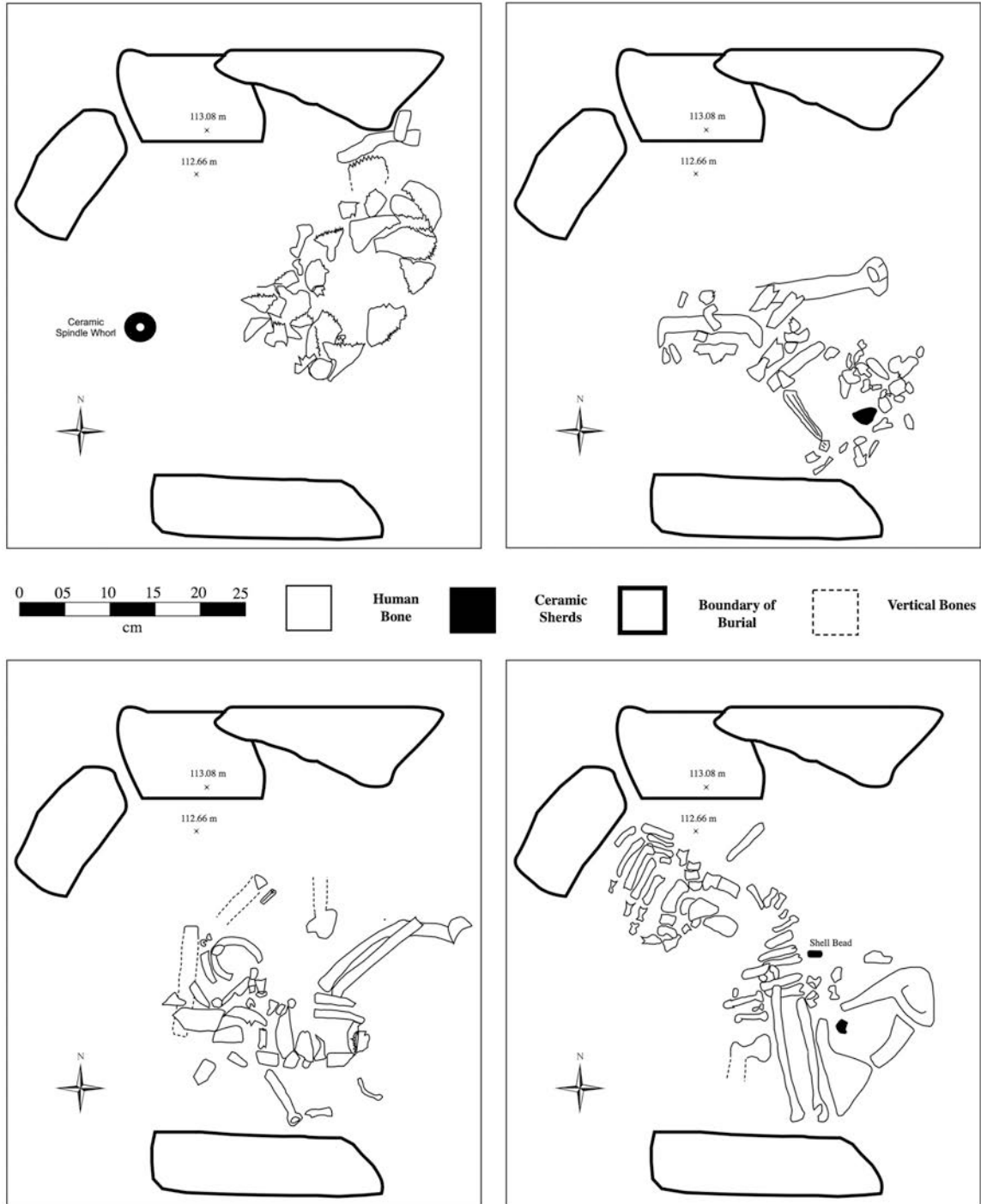


Figure 6.15 Plan Map of individual layers of excavated bones from Burial CC-B14. Top row, from left to right, are the first and third layers drawn during excavations. Bottom row, from left to right, are the fourth and sixth layers drawn during excavations (after Booher et al. 2015:Figure 2.13).

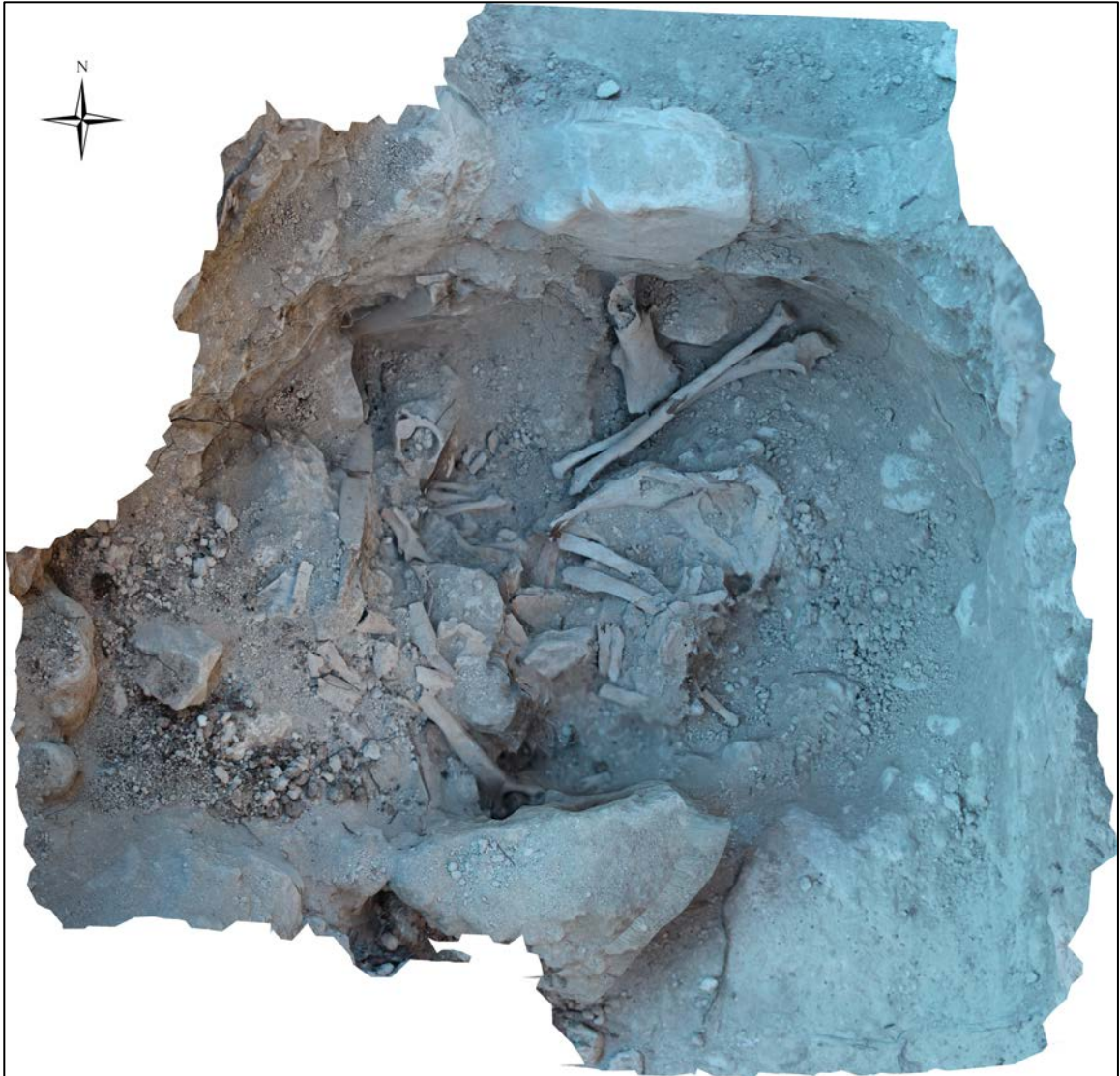


Figure 6.16 Orthophoto of pelvis *in situ* in Lot CC-14-J-04, Burial CC-B14 (after Booher et al. 2015:Figure 2.14).

The author completed the osteological analysis of the bones collected from Burial CC-B14 (Novotny et al. 2015). A total of 276 pieces of bone and 12 teeth was collected (Table 6.4). The bones collected ranged from complete long bones to small unidentifiable fragments. The long bones, hands, and feet displayed the best preservation, and roughly

50 percent of the cranium was present but fragmented. Sex was estimated to be female based on the morphology displayed by the os coxa. The subpubic concavity of the right os coxa was concave, and both the right and left pubic symphyses showed evidence of parturition scars, which are acquired during pregnancy. The diameter of the femoral head was 39.2 (see Bass 1995), and the long bones were very gracile, corroborating the assessment from the os coxa. Age was estimated to be an older female based on the skeletal development and dental wear. The complete epiphyseal fusion of the femoral head and the morphological changes of the pubic symphyses and auricular surface of the os coxa indicate that she was between 38-48 years at the age at death (Brooks and Suchey 1990).

Table 6.5 Burial CC-B14 Skeletal Inventory (after Novotny et al. 2015:Table 5.9)

Element	Side	Completeness
Mandible	Left	75%
Maxilla	Left	>25%
Mandible	Right	50%
Frontal	Left	>25%
Temporal	Left	>25%
Sphenoid	Left	50%
Frontal	Right	>25%
Occipital	---	25%
Clavicle	Right	75%
Scapula (body)	Left	>25%
Scapula (Glenoid fossa)	Left	25%
Humerus	Left	50%
Radius	Left	100%
Ulna	Left	100%
Humerus	Right	25%
Radius	Right	100%
Ulna	Right	100%
Femur	Left	50%
Tibia	Left	25%
Femur	Right	25%
Patella	Right	100%
Fibula	---	50%
Sternum	---	75%
C2	---	>25%

Table 6.5 (Continued)

Element	Side	Completeness
C7	---	100%
C3-6	---	50%
L1-5	---	25%
1 st Rib	Left	100%
1 st Rib	Right	100%
Ilium	Left	50%
Pubis	Left	25%
Acetabulum	Left	25%
Ilium	Right	25%
Pubis	Right	50%
Acetabulum	Right	75%
Auricular Surface	Right	50%
Carpals	Left and Right	100%
Metacarpals	Left and Right	100%
Hand Phalanges	Left and Right	100%
Tarsals	Left and Right	75%
Metatarsals	Left and Right	75%
Pedal Phalanges	Left and Right	25%

The dentition of the present teeth was reasonably preserved and displayed moderate occlusal wear. Several teeth showed dental pathologies. Table 6.5 depicts the teeth that were present for analysis. A moderate amount of dental calculus was observed on the lingual aspects of the left and right P₁ and L₁ and on the lingual and buccal aspects of the RM¹. RP₁ and both the RI₁ and RI₂ exhibited extreme dental calculus. Interproximal carries were present on the RM¹, RC¹, LC, LP², RP₁, and RP₂. The LI², LC and the left and right M¹ and M² had fully resorbed alveolar sockets, indicating the teeth were lost antemortem. The LP₁, LP₂, and LC¹ were still in occlusion. The LC₁, LI₁, and RI₂ showed evidence of a B4 modification, a 90-degree angle modification of the edge of the tooth (Figure 6.17; Romero 1958). The LI₁ and RI₂ modification notch is lateral, however the LC₁ notch is medial, which is not as common as a lateral notch modification. The RI₂ has evidence of extreme diagonal wear to the lateral edge, although it is unclear whether the wear is a result of attrition, intentional modification, or a combination of the

two (Novotny et. al 2015). Vera Teisler (2010) and Karl Mayer (1983) have suggested the B4 filing resembles the Maya calendar day name “Ik.” In colonial Maya dictionaries, Ik is frequently translated to air, wind, breath, the life, the spirit, etc. Mayer (1983) has suggested that the Ik-shaped incisors were not only intended as simply adornments, but also had a religious or esoteric significance.

Table 6.6 Burial CC-B14 Dental Inventory (after Novotny et al. 2015:Table 5.10)

RM ²	RM ¹	RP ²	RP ¹	RC ¹	RI ²	RI ¹	LI ¹	LI ²	LC ¹	LP ¹	LP ²	LM ¹	LMI ²	LMI ³
	X			X					X		X			
			X		X	X	X		X	X	X	X		
RM ₂	RM ₁	RP ₂	RP ₁	RC ₁	RI ₂	RI ₁	LI ₁	LI ₂	LC ₁	LP ₁	LP ₂	LMI ₁	LMI ₂	LMI ₃



Figure 6.17 LC₁ with B4 notch lateral modification (after Novotny et al. 2015:Figure 5.11).

The female individual from Burial CC-B14 had no evidence of trauma, although, of the cervical and lumbar vertebrae present for observations, several displayed osteoarthritis on the centra and articular facets. A cervical vertebra (C3-6, exact number unknown) had coalesced porosity on the surface of the left superior articular facet and on the surface of the right inferior articular facet. A small spot of eburnation was visible on the left superior articular facet indicating the space between the joints was completely degenerated. Cervical vertebra C7 had evidence of osteoarthritic degeneration located on the superior articular surface of the left inferior articular facet and on the surface of the centrum (Figure 6.18). The surface of the C7 centrum showed pinpoint-type porosity on half of the surface and mid lipping on approximately one-third of the anterior superior edge. The left inferior articular facet had a porosity coalesced with formation of a lytic lesion and an observable point of eburnation (Novotny et al. 2015). The inferior and superior centrum articular surface exhibited coalesced porosity on a cervical vertebra fragment (C2-6, exact number unknown), along with inferior articular facet lipping along one-third to two-thirds of the lateral edge. The lumbar that were present for analysis were highly fragmented, thus difficult to assess. Only a small fragment of a lumbar vertebra (L1-5) shows a pinpoint porosity on the surface of the centrum, although it is unknown whether the surface is superior or inferior. Lipping and curved spicules on the anterior aspect of the centrum were also observed (Novotny et al. 2015). Squatting facets were observed on the inferior aspects of the left and right talus (Figure 6.19). Squatting facets are a posterior continuation of the medial calcaneal articular surface and are typically caused by habitual hyperdorsiflexion of the ankle joint, which results from sitting in a squatting position (Novotny et al. 2015).



Figure 6.18 Cervical vertebra showing osteoarthritic degeneration of the right anterior articular surface (after Novotny et al. 2015:Figure 5.12).



Figure 6.19 Medial trochlear extension from Burial CC-B14 (after Novotny et al. 2015:Figure 5.13).

Grave goods were found in association with Burial CC-B14 and aided in dating the burial. Two pieces of deer antler were found southeast (behind) the skull, within the same layer and elevation as the skull. It is possible that the female individual was wearing a headdress when buried given the location of the deer antler. A small, tubular red ceramic bead was collected from in front (northwest) of the skull and under the location of several vertebrae near the left leg along with a spire-lopped *jute* shell. Several small ceramic sherds with a black slip were collected throughout the burial, all at different levels. Of the grave goods that were collected from the burial, the most notable and important was a tan

paste, mold-made, ceramic spindle whorl (Figure 6.20). The less protruding face of the spindle whorl presented the image of an incised bird, while the opposing face displayed geometric designs. Remains of blue and red pigments were present on the image of the bird. The bird has a long beak and stylized wings, which, along with the rest of the geometric body, conformed to the circle of the spindle whorl. The ceramic assemblage collected from the burial date to Tepeu 2 ceramic phase.



Figure 6.20 Photo and illustration of the spindle whorl (Spec. # CC1375) found in association with Burial CC-B14 (after Booher et al. 2015:Figure 2.15).

Table 6.7 Table of Artifacts with Corresponding Spec. #'s Collected from Burial CC-B14

Artifact	Spec #	Description
Spindle Whorl	CC1375-01	Mold-made ceramic spindle whorl with an incised design of a bird on the protruding face and a geometric design on the opposing face.
Worked Shell Bead	CC1379-01	Small, red costume jewelry bead.
<i>Jute</i>	CC1401-01	Spire-lopped <i>jute</i> shell.
Deer Antler	CC1384-01	Total of three pieces, two pieces refit for one deer antler. Possibly young white tail deer but may also be brocket due to diameter.
Ceramic Sherds	N/A	Four pieces with a black slip found throughout the burial.
Shell	N/A	Seven pieces of shell found throughout the burial.

Spindle whorls are typical finds at many Maya sites and often are interpreted by excavators as evidence of craft specialization. Spindle whorls found in association with burials, especially female burials, are not uncommon, and according to Kamp (2006:419) may have been viewed as important tools for Maya women in the afterlife. Spinning and weaving were primarily a craft specialization involving women as depicted by Classic Maya figurines showing women sitting at a loom or holding thread. Carved monuments depict elite women wearing elaborately embellished woven garments that many scholars believe women produced in domestic settings throughout the Classic period. The close association between cloth production and female gender roles was commemorated in death through elaborate weaving tools deposited in funerary tombs of queens at Copan, Palenque, Naranjo, and elsewhere (Arden et al. 2010:275). The combination of the spindle whorl, the location of the deer antler, and the Ik-shaped incisors potentially suggest she was a ritual specialist, or at the very least an important spinner and weaver or even the head of a weaving guild.

3D Modeling and ArcScene Analysis of Burial CC-B14

To further understand the taphonomic processes of decomposition observed within Burial CC-B14, SfM and GIS were utilized in the analysis of Burial CC-B14 (Mitchell and Booher 2015). The CCAP has extensively used SfM modeling of excavation units to document exposed architecture. Recently, SfM was employed for the first time on Burials CC-B11 and CC-B13 by Herndon and colleagues (2014) to document the interred individuals and associated ceramic material. In 2015, the author used SfM to document two separate excavation layers of Burial CC-B14 in the field. Samantha Mitchell produced a 3D model of the burial from the SfM photos and subsequently mapped each skeletal element and associated ceramic material inside ArcScene (Mitchell and Booher 2015). A series of 3D polylines and polygons was used to map the anatomical position of each skeletal element recovered in the burial. Each anatomical layer was separated in a shareable layer file (.lyr) and linked to an associated attribute table. The linked attribute table provided in field excavations notes and osteological information of each bone (Mitchell and Booher 2015). The ArcScene analysis digitally enhanced the skeletal elements within Burial CC-B14, which allowed us to view and analyze the skeletal elements according to their anatomical grouping in a 3D format (Mitchell and Booher 2015). Mitchell performed a necrodynamics analysis on the hands, feet, pelvis, and long bones to analyze the level of preservation, disarticulation, articulation, skeletal position, and displacement of skeletal elements (Mitchell and Booher 2015). The SfM 3D model and the ArcScene database allowed for further analysis of Burial CC-B14 after the excavation season concluded and provided excellent data on the taphonomic and decomposition processes affecting the interred individual.

The necrodynamic analysis of the hands show that 75 percent of the hand bones were articulated, with the other 25 percent displaced from their expected anatomical position. The view of the 3D model in ArcScene indicates that both the left and right hands were in a loose flexed position with the left hand placed over the right hand, corroborating the original in field assessment. The 3D model also indicated that the bones of the feet were largely articulated, with less than 10 percent disarticulated. The feet were in correct anatomical position with minimal fragmentation and cracking. The combined preservation and minimal displacement of the feet from the primary position signifies the burial was not disturbed after interment and had minimal bioturbation within the interment after the initial deposition (Mitchell and Booher 2015). The ulna and radius were not articulated with the humerus, but the 3D model indicates that the distal portions of the ulna and radius were articulated with the carpals of the right and left hand, and positioned horizontally crossed. Analysis of the pelvis accounts for the fragmented condition of the iliac blades. The pelvic bones were uncovered in a seated position, and the seated placement of the individual placed the primary weight on the ischium. The weight of the decomposition and push of gravity from the surrounding construction fill accounts for the fragmented state of the pelvis (Mitchell and Booher 2015).

The decomposition processes of the interred were also analyzed using necrodynamics and were combined with osteological analysis and field notes to determine how the individual was interred and the effects of taphonomic process on the skeletal elements. As previously mentioned, 75percent of the remains were collected from the burial. The burial was surrounded by tightly compacted soil and construction fill, which aided in the preservation of the individual. Several researches have noted that

tightly compacted burial chambers can manipulate the decomposition process and the resultant placement of the skeletal elements. As the body decays, voids are created in the surrounding cavity, which can allow the skeletal elements to fill those respective voids (Duday and Guillon 2006; Dupras et al. 2011; Mann et al. 1990). Inside of Burial CC-B14, the decomposition of the individual likely created voids in the surrounding fill, allowing skeletal elements to fill the adjacent gaps as the body decomposed. This provides an explanation for significantly displaced elements or crushed fragmented remains. Additionally, the tightly compacted soil allowed for the individual to decompose in a seated position. Overall, the analysis suggests that the soil and surrounding construction fill were placed almost directly after the initial interment, which helped to maintain the articulation of the joints observed upon excavation (Mitchell and Booher 2015).

The SfM models of the first and final excavation layers of the burial were compared, and increased cracking, fragmentation, and disarticulation of elements were observed in the final (deepest) excavation layer. The final results of the analysis indicate that the individual was likely placed within the bench just prior to the final construction phase of the bench. Furthermore, the limited bioturbation and the significant amount of articulated skeletal elements indicate that the burial was not disturbed after the initial placement of the body (Mitchell and Booher 2015).

Excavations at Structure D-3

Structure D-3 was excavated for the first time in 2015 with the placement of Subop CC-14-L, a 2-x-3 m unit positioned on the north face of Structure D-3 (see Figure 6.2).

The purpose of this unit was to further expose the platform face uncovered in Subop CC-14-G the previous year. Subop CC-14-O was a 1.50-x-2.50-m unit placed adjacent to the south of Subop CC-14-L on Structure D-3 to further follow and expose the surface found in Subop CC-14-L. Subop CC-14-S was a 2-x-2-m unit opened adjacent to Subop CC-14-O on the west side of Structure D-3 to follow a wall and surface that was exposed in Subop CC-14-O. Subop CC-14-V was a 2-x-2.5-m unit adjacent to Subop CC-14-S and opened to further expose the artifact deposit uncovered in Subop CC-14-S. Subop CC-14-W was a 1-x-3-m unit opened on the east of Structure D-3 and adjacent to Subop CC-14-L. This unit was opened to expose the eastern half of Structure D-3. Subops CC-14-AA and -AB were opened on the north and south edges of Subop CC-14-W, respectively. Subop CC-14-AA was opened to further expose a rock alignment and the interior of the second room in Structure D-3. Subop CC-14-AB was opened to follow the east exterior wall exposed in Subop CC-14-W. Table 6.8 provides a summary of the suboperations and lots opened on Structure D-3.

Table 6.8 Summary of Suboperations and Lot Description for Structure D-3

Subop	Lot	Description	Age
CC-14-L	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2
	03	Bench surface	
	04	Platform face	
	05	Exterior north surface	
CC-14-O	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2-3
	03	Bench surface	
	04	South exterior wall	

Table 6.8 (Continued)

Subop	Lot	Description	Age
CC-14-S	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2-3
	03	Bench surface	
	04	South exterior wall	
	05	West exterior wall	
	06	Artifact deposit	
	07	Final west exterior surface	Tepeu 2
	08	Earlier east exterior surface	Tepeu 2
CC-14-V	01	Humus	
	02	Collapse debris	Tepeu 2
	03	Artifact deposit	Tepeu 2
	04	West Exterior Wall	
	05	Final west exterior surface	
	06	Construction fill	Tepeu 2
	07	Earlier platform face	
	08	Earlier west exterior surface	
	09	Final platform face	
CC-14-W	01	Humus	Tepeu 3
	02	Collapse debris	
	03	Floor	
	04	East exterior wall	
	05	Northeast exterior wall	
	06	Interior dividing wall	
	07	East exterior surface	
	08	Collapse debris	Tepeu 2
	09	Interior floor of smaller room	
	10	Interior floor of larger room	Tepeu 2
	11	Bench	
	12	West doorway jamb	
	13	Interior step between rooms	
CC-14-AA	01	Humus	Tepeu 2
	02	Collapse debris	Tepeu 2-3
	03	Interior floor	
	04	East exterior wall	
	05	Interior dividing wall	
	06	South exterior wall	
CC-14-AB	01	Humus	
	02	Collapse debris	Tepeu 2
	03	Artifact deposit	Tepeu2
	04	North exterior surface	
	05	Northeast exterior wall	
	06	Interior floor	
	07	West doorway jamb	
	08	Exterior step	

Excavations Results of Structure D-3

Structure D-3 is located on the southern side of Courtyard D-1; it is orientated east to west and faces the open courtyard. The structure shares a common platform face with Structure D-1. Two construction episodes were exposed for Structure D-3, with the final form of the building composed of a low platform supporting low masonry walls that would have been topped by a perishable structure (Table 6.9). The interior of the building was composed of two, unequal rooms with the larger room primarily composed of a bench, and a single entrance on the north side of the building (Figure 6.21). Two dense artifact deposits were discovered associated with the west and north exterior walls during excavations of the structure.

Table 6.9 Lots and Suboperations with Corresponding Architecture and Ages on Structure D-3 (after Booher et al. 2015:Table 2.3)

Context	L	O	S	V	W	AA	AB	AF	Age
Topsoil	01	01	01	01	01	01	01	01	Tepeu 2-3
Collapse debris	02	02	02	02	02	02	02	02	Tepeu 2-3
North exterior surface	05		08	08			04	03	
North platform face	04							04	
Earlier west platform face				07					
Later west platform face				09				05	
Earlier west exterior surface			08	08					Tepeu 2
Later west exterior surface			07	05					Tepeu 2
South wall		04	04			06			
West wall			05	04					
East wall					04	04			
North wall					05	05			
East door jamb					05		05		
West door jamb					12		07		
Exterior step							08		
Bench			03						
Interior floor					09/10	03	06		Tepeu 2
Interior wall					06	05			
Interior step					13				
Bench	03	03			11				



Figure 6.21 Orthophoto of Structure D-3 showing the exposed final architecture of the building. View to the southeast (after Booher et al. 2015:Figure 2.16).

The 2014 excavations revealed a platform face in Subop CC-14-G that was presumed to be associated with Structure D-3. In 2015, excavators removed the backfill and re-exposed the platform face; Subop CC-14-L was placed adjacent to the east of the location of Subop CC-14-G to further expose the platform face. Subops CC-14-L and -AF exposed the north platform face associated with Structure D-3 and associated exterior patio surface. The exterior patio surface (CC-14-L-05 and -AF-03) is well preserved. Located approximately 1-3 cm above the exterior surface, faunal bones were collected that are likely associated with the faunal bones collected from Subop CC-14-G the previous year (see Booher and Nettleton 2014:74) The platform face (Lot CC-14-L-04 and -AF-04) was constructed on top of the exterior surface and comprised two courses of cut stone that are well preserved. It continues toward the west to articulate with the platform face (Lot CC-14-AF-05) associated with Structure D-1. The platform face was not followed toward the east, but would have presumably continued the length of the

building.

Subops CC-14-S and -V exposed the west exterior portion of Structure D-3 and identified two different construction episodes. The earliest architecture discovered was a well-preserved exterior plaster floor (Lots CC-14-S-08 and -V-08), which corresponds to the exterior surface exposed in Lots CC-14-L-05 and -AF-03. The earlier floor is associated with the west (Lots CC-14-V-04 and -S-05) and south exterior walls (Lots CC-14-O-04 and -S-04) of Structure D-3 and an earlier platform face (Lot CC-14-V-07) associated with Structure D-1. The west exterior wall (Lots CC-14-S-05 and -V-04) aligns with the north facing platform face (Lot CC-14-L-04) to form the northwestern corner of the building and extends to the south and meets the back (south) exterior wall (Lots CC-14-O-04 and -S-04), forming the southwest corner of the building. The west wall is composed of cut, faced stones four to five course high depending on preservation and is 60 cm thick. The south exterior wall is poorly preserved compared to the west exterior wall and is four courses high. The south exterior wall extends past the west exterior wall, creating a small exterior patio surface on the west face of the structure. A construction event reduced the overall exterior west patio and raised the exterior surface approximately 20 cm. The north facing platform face (Lot CC-14-04) was extended toward the west and created a new, higher exterior platform on the western side of the building. This new platform face was constructed on top of the earlier exterior surface (Lots CC-14-S-08 and -V-08) and articulated with the platform face (Lot CC-14-AF-05) associated with Structure D-1. The earlier exterior floor (Lot CC-14-S-08 and -V-08) was covered with cobble fill, and a new exterior surface was constructed. The earlier platform face associated with Structure D-1 was replaced with a later platform (Lot CC-14-V-09)

that articulates with the platform face discovered in Lot CC-14-AF-05). The construction of the new platform face associated with Structure D-1 diminished the exterior west patio of Structure D-3 by 20 cm and reduced the overall height of the west exterior wall by two courses.

While excavating through collapse debris (Lot CC-14-V-02) on the west portion of Structure D-3, copious amounts of artifacts were collected including obsidian, ground stone, ceramics, lithic tools, and faunal remains (Table 6.10). An *Oliva* cylindrical shell bead, often referred to as a tinkler and likely a piece to costume jewelry (see Garber 1989), was also collected that. Located directly below the collapse debris was the final west exterior surface (Lots CC-14-S-07 and -V-05). The exterior surface had been heavily burned, indicated by the ashy, gray matrix encountered.

Table 6.10 Lot CC-14-V-02 Artifacts and Corresponding Catalog and Spec. #'s (after Booher et al. 2015: Table 2.4)

Artifact	Spec. #	Quantity	Description
Metate	CC1406-01	1	Basin fragment
Lithic Tools	CC1408-01-09	9	Three bifaces, three unifaces, and one core
Ceramic Vessel	CC1443-01	1	Partial ceramic vessel
Shell	CC1501-01	12	Spire-lopped <i>jute</i>
Shell Tinkler	CC1584-01	1	Barrel cylindrical shell tinkler
Bone	CC1551-01	1	Faunal bone (large mammal, either deer or tapir)
Obsidian	CC1571-01	1	Blade

A dense artifact deposit (Lots CC-14-S-06 and -V-03) was placed on top of the exterior surface and in front of the west exterior wall. The artifact deposit extended nearly the entire length of the west exterior wall, with a dense concentration of the deposit located toward the centerline of the wall; although still present, the deposit decreased in density north of the centerline. The surface the artifact deposit was on was

heavily burned, but the artifacts themselves, aside from fire cracked rocks and burned metate fragments, presented no evidence of burning, suggesting that the surface was burned before the majority of the artifacts were placed. An abundance of artifacts were collected from the deposit including lithic tools, metate fragments, obsidian, fire-cracked rock, and fragmented ceramic vessels and plates. Among the ceramics collected, 90 percent were sherds from jars, 5 percent belonged to bowls or basins, and 15 sherds (5 percent of the assemblage) came from a Belize Red plate. The ceramic assemblage collected from the deposit dates to the Tepeu 2 ceramic phase. Table 6.11 exhibits the artifacts collected from the deposit, and Figure 6.22 shows the location of the artifact deposit in relation to the west exterior wall and Structure D-3. A West Indian chank shell (*Turbinella angulata*) and nine pieces of human bone were found in the artifact deposit. The West Indian chank shell had the tip taken off and smoothed down, likely for noise making, and two-thirds of the outermost layer was broken off. Given these modifications to the shell, the West Indian chank probably functioned as a trumpet.

Table 6.11 Artifacts Collected from the Artifact Deposit in Lots CC-14-S-06 and -V-03 with Corresponding Spec. #'s (after from Booher et al. 2015:Table 2.5)

Lot CC-14-	Artifacts	Spec. #	Quantity	Description
S-06	Ceramic sherds	CC1330	141	
	Debitage	CC1279	61	
	West-Indian chank	CC1312-01	1	2/3 of outermost layer removed along with the tip of the shell.
	Obsidian	CC1277-01	1	Blade
	Human bone	N/A	9	One humerus and one radius. Other 7 bones fragmented
	Metate	CC1278-01-04	24	Three metate basins
	Fire cracked rock	CC1276	6	
V-03	Ceramic vessel (reconstructed)	CC1430-02	15	Dark red slipped serving plate
	Ceramic vessel (partial)	CC1430-01	2	Eroded red-slipped exterior with incised decoration
	Biface	CC1425-01	1	Biface
	Metate	CC1425-01-08	8	Granite Basin form metate



Figure 6.22 Photo of the artifact deposit in association with the west exterior wall.



Figure 6.23 Photo of the West Indian chank shell and human remains *in situ*.

Of the nine isolated human skeletal remains collected from the artifact deposit, only a humerus and fibula could be identified. The other six fragmented bones were unidentifiable in terms of a specific bone, but it was clear that the bones were pieces of long bones (Novotny et al. 2015). The bones were likely left unprotected at the base of the west exterior wall, thus resulting in poor preservation. The shaft and distal end of a left humerus bone were present and refit back together in the lab. The West Indian chank shell and one of the human bones are visible in Figure 6.23 *in situ*. The head of the humerus was not present, likely due to poor preservation from the nature and placement of the bones. The olecranon fossa located on the distal end has a small pinhole septal

aperture. The trochlea, capitulum, and lateral epicondyle were present for observation, but the medial epicondyle was missing. Only the shaft of the fibula was present for analysis, preventing accurate siding of the bone (Novotny et al 2015). The bones were disarticulated and likely removed from the original place of interment and replaced at the base of Structure D-3. It is unclear if the bones belonged to the same individual. Both the humerus and the fibula exhibit root marks throughout the bone surface. The fibula has a postmortem crack expanding the entire length of the shaft, likely due to environmental causes from expanding from exposure to moisture.

Burned deposits like this are often interpreted as a termination ritual. Termination deposits may occur as above-floor phenomena and may manifest at the public, private, community or domestic level and may also include a wide variety of material components (Navarro-Farr 209:87). Termination rituals are distinguished from middens or reverential deposits on the basis of several criteria (Harrison-Buck 2016). These include intensive burning, structural damage, pot smashing and scattering, rapid deposition of material, dense concentrations of large sherds with sharp, angular breaks, and large quantities of “elite” artifacts (Pagliario et al. 2003: 79-80). Unlike most domestic trash deposits, a key feature of desecratory termination is primary or secondary human remains (Harrison-Buck 2016:62). Navarro-Farro (2009:312) notes that a primary distinctive feature that sets apart a termination ritual from a trash midden is the significant presence of human remains and the absence of faunal remains. The location of a deposit can also distinguish between a termination deposit and a midden. Instead of being located along the side or behind structures, which is typical of middens, termination deposits are usually located at key points of transition, in areas that block

access to rooms or elite residential plaza groups, and/or on the front steps of buildings (Harrison-Buck 2016; Houk 2016).

It is unclear if the artifact deposit from Lots CC-14-S-06 and -V-03 is associated with a termination ritual of the building or a midden. The deposit included a dense amount of fragmented ceramic vessels and plates as well as obsidian, ground stone, and lithics. Importantly, the artifact deposit included a complete West Indian Chank chell, likely a trumpet given its modifications, and human remains. There were not any faunal remains recovered in association with the artifact deposit. The above evidence could suggest that the artifact deposit is associated with a termination ritual of the structure. Following Navarro-Farr's (2009) criteria, the presence of human remains and the complete absence of faunal remains indicate a possible termination ritual, and distinguish the deposit from a midden. However the location of the artifact deposit proves problematic. As noted above, termination rituals are located at key transitional points such as entranceways to rooms or the front steps of the building. The artifact deposit was found along the side of the west exterior wall of Structure D-3, which suggests the deposit is actually a midden and not associated with a termination ritual.

The west portion of Structure D-3 is composed of low masonry walls that would have supported a perishable structure. The exterior surface that was exposed in Lots CC-14-L-05 and -AF-03 was exposed on the northeast portion of the structure. The exterior surface (Lot CC-14-AB-04) is well preserved and is associated with the northeast exterior wall (Lot CC-14-AB-05). Lying on top of the exterior surface and in front of the northeast exterior wall was an artifact deposit (Lot CC-14-AB-03) similar to the artifact deposit from Lots CC-14-S-06 and -V-03. The exterior surface the artifact deposit was

placed on also had evidence of burning, although not as severe as the exterior surface associated with the previous deposit. The artifacts collected from this deposit showed evidence of burning, thus indicating the possibility that the artifacts were placed before the surface was burned. The artifact deposit included ceramic sherds from at least three different vessels, a thin laurel leaf spear point and seven pieces of faunal bone that likely belonged to the same mammal (Table 6.12). The ceramic sherds collected from the deposit date to the Tepeu 2 ceramic phase and are contemporaneous with the ceramic assemblage collected from the artifact deposit associated with the west exterior wall and surface.

Table 6.12 Artifact Collected from Lot CC-14-AB-03 (after Booher et al. 2015:Table 2.6)

Artifacts	Spec Number	Quantity	Description
Partial vessel base	CC1435-01	2	Partial vessel base
Partial ceramic vessel rim	CC1439-01	8	Partially reconstructed rim from a large red slipped jar
Partial ceramic vessel	CC1534-01	2	
Faunal bone	CC1567-01	7	Large mammal (unknown). 6 belong to a long bone (possibly femur) that refit back together
Thin laurel leaf biface	CC1380-01	1	Remnants of hafting material on proximal end

The northeast exterior wall (Lot CC-14-AB-05) is 2.11 m in length and 52 cm thick. It articulates with the east exterior wall forming the northeast corner of the structure and extends to the west forming the east portion of the structure's doorway jamb. The wall is four to five courses high with two distinct construction phases. The bottom three courses of the wall are composed of large faced cut stones. In a separate construction event, the wall was extended upward with another two courses of smaller, more irregularly faced stones (Figure 6.24). The northeast exterior wall is well preserved

at the base, but the top two courses of the wall were poorly constructed and collapsing over. The adjacent east exterior wall (Lots CC-14-W-04 and -AA-04) is four to five courses high and 52 cm thick. The north portion of the wall that articulates with the northeast wall is well preserved, but the southern portion of the east wall is highly eroded with evidence of severe burning. The east exterior wall (Lot CC-14-AA-06) articulates with the south exterior wall uncovered in Lots CC-14-S-04 and -V-05, forming the southeast corner of the structure. The south exterior wall on the eastern portion of the building has completely collapsed and eroded away with only wall core providing an indication of the presence of the wall.



Figure 6.24 Orthophoto of Structure D-3, orientated north showing the northeast wall's two construction episodes (after Booher et al. 2015:Figure 2.19).

Structure D-3's north entrance, the only entrance into the building, is framed by the east and west doorway jambs, creating a 94-cm wide entryway. The east doorway jamb (Lot CC-14-AB-05) is connected to the northeast exterior wall and is four courses high and three courses thick (67 cm). The west doorway jamb (Lot CC-14-AB-07) is not associated with an exterior wall, but instead is attached to the exterior platform face since

the west portion of the building does not have an exterior wall. The west doorway jamb is two to three courses high, depending on preservation, and is constructed from faced, cut stones that are well preserved. To the north of Structure D-3's entryway is an elevated surface (Lot CC-14-AB-06) that is 13 cm higher than the exterior patio surface (Lot CC-14-AB-05), thus creating a small step (CC-14-AB-08) up from the exterior patio surface to the interior of the building. Located above the elevated surface and between the east and west doorway jambs in the collapse debris (Lot CC-14-AB-02), excavators noticed several vault stones, although the superstructure of Structure D-3 would not have been capable of supporting a vaulted entrance. The vault stones were likely robbed from other buildings at the site and repurposed for the final phase construction of Structure D-3, as documented at the Black Plaza (Vazquez et al. 2014), the Western Plaza (Harrison 2000:88), and Structure A-5 (Herndon et al. 2013). Between the east and west doorway jambs within the collapse debris, excavators collected a fragmented mano (Spec. # CC1435-01), an obsidian blade (Spec. # CC1719-01), and an *Oliva* shell tinkler (Spec. # CC1552-01).

The interior of Structure D-3 is composed of two interior rooms that are not equal in size. The larger room is accessed via the north entrance way and consists of a C-shaped bench that dominates most of the interior room, limiting the amount of available floor space. The room extends 6.4 m east to west and 4.5 m north to south with the C-shaped bench extending to the south and west exterior walls of the structure. The bench (Lot CC-14-W-11) face is composed of well-preserved cut, faced stones and is four courses high. The top course of stone is slightly offset from the bottom three courses, creating a 5 cm overhang. Benches with this type of overhang have not been previously

documented at Chan Chich. The surface of the bench (Lots CC-14-L-03 and -O-03) continues westward and toward the back (south) wall (Lot CC-14-O-04). The preservation of the bench surface is variable, with the best preservation located above the stone facade of the bench; the surface begins to deteriorate toward the south. Within the collapse debris (Lots CC-14-L-02 and -O-02) above the bench surface several artifacts (Table 6.13) were collected including faunal bone, ground stone—two of which refit back together—one side-notched stemmed lithic point, approximately 120 *jute* shells (concentrated in the northwest area), and 11 sherds from a large ceramic vessel with incised decorations and a brown slip. An obsidian fragment and a shell tinkler with a barrel form and a perforation through the center, similar to the one found between the structure's doorway jamb, were also collected above the bench surface.

Table 6.13 Artifacts Collected from Lots CC-14-L-02 and CC-14-O-02 (after Booher et al. 2015: Table 2.7)

Lot CC-14-	Artifact	Spec. #	Quantity	Description
L-02	<i>Jute</i>	CC111-01	98	Spire-lopped <i>Pachychilus</i> ; concentrated in NE portion of subop
	Faunal bone		1	2 pieces refit for 1. Thin bone with a possible articular end. Maybe the ulna of a UID mammal
	Side-notched stemmed point	CC1089-01	01	Fine grained with a white patina and gray raw material
	Plano-convex mano	CC1113-01	01	Evidence of wear on all faces.
	Square mano	CC1102-01	02	Two pieces that refit back together

Table 6.13 (Continued)

Lot CC-14-	Artifact	Spec. #	Quantity	Description
O-02	Ceramic vessel	CC1127-01	11	Large partial vessel with brown paste and incised decoration
	Shell tinkler	CC1163-01	01	Small barrel formed tinkler with perforation through center
	Obsidian	CC1344-01	01	Blade
	Lithic tools	CC14221-01-03	03	Two bifaces and one core
	<i>Jute</i>	CC1147-01	14	Spire-lopped <i>Pachychilus</i>

The interior floor (Lots CC-14-W-10 and CC-14-AB-06) is very well preserved with a small concentration of ceramics found on the floor surface just on the inside of the doorway jambs. The ceramic sherds are presumably a part of the same Tinaja Red vessel and date to the Tepeu 2 ceramic phase. The interior floor rolls up onto the bench face and to a small step (Lot CC-14-W-13) located on the east edge of the larger room. The step is roughly 12 cm high, composed of two stones, and one course high. The step differentiates between the larger room and the smaller room. A small dividing wall (Lot CC-14-W-05) that runs north to south divides the larger room from the smaller room. The wall is two courses wide and extends to the south wall of Structure D-3. The base of this wall shows evidence of severe burning along with the interior floor (Lot CC-14-W-09) of the smaller, eastern room.

The smaller room is located to the east of the larger room and is accessed via the step from the larger room. The dimensions of the room are 1.60 m east to west and 1.40 m north to south with heavy burning located along the edges of the room's walls. The interior floor (Lots CC-14-W-09 and -AA-03) is well preserved and is 20 cm higher than

the interior floor found in the larger room. The interior southeast portion of the east exterior wall along with the interior dividing wall exhibits evidence of severe burning along with the edges of the interior floor.

Excavations in Courtyard D-1

The eastern edge of Subop CC-14-D exposed three courtyard surfaces. Consequently, Subop CC-14-G, a 1.5-x-1.5-m unit, was placed adjacent to the east of Subop CC-14-D to further expose the surfaces and the platform face located in the east profile. Subop CC-14-K, a 2-x-2-m unit was placed in the middle of the courtyard to obtain chronological data of the courtyard. The courtyard excavation units revealed that Courtyard D-1 was substantially modified over its occupation period dating from the Late Preclassic period through the Terminal Classic Period.

During the Late Preclassic period, a large construction event, employing large boulders and cobble fill, raised the courtyard surface approximately 75 cm from the ground surface. This event created the earliest courtyard surface (Lots CC-14-D-10). Unfortunately, the excavators of Subop CC-14-K did not recognize this floor and they excavated through it; it was only evident in profile, thus resulting in a mixed ceramic assemblage making it difficult to corroborate the Late Preclassic date obtained from Lot CC-14-D-10. However, the date range from the assemblage from Subop CC-14-K provided a large date range from the Middle Preclassic period to the Terminal Classic period. A second construction event raised the courtyard surface another 12 cm. This surface (Lots CC-14-D-09 and K-03) was highly eroded in both subops. The ceramic assemblage collected from Lot CC-14-D-09 dates the second construction event to the

Late Classic period. A final construction event during the Late Classic period raised the courtyard surface an additional 28 cm, creating the final courtyard surface (Lots CC-14-D-03 and -K-02). The final courtyard surface was virtually gone in Lot CC-14-D-03, but was present in Lot CC-14-K-02 although in poor condition. The final courtyard surface corresponds to the exterior surface exposed from Lots CC-14-L-05 and -AF-03.

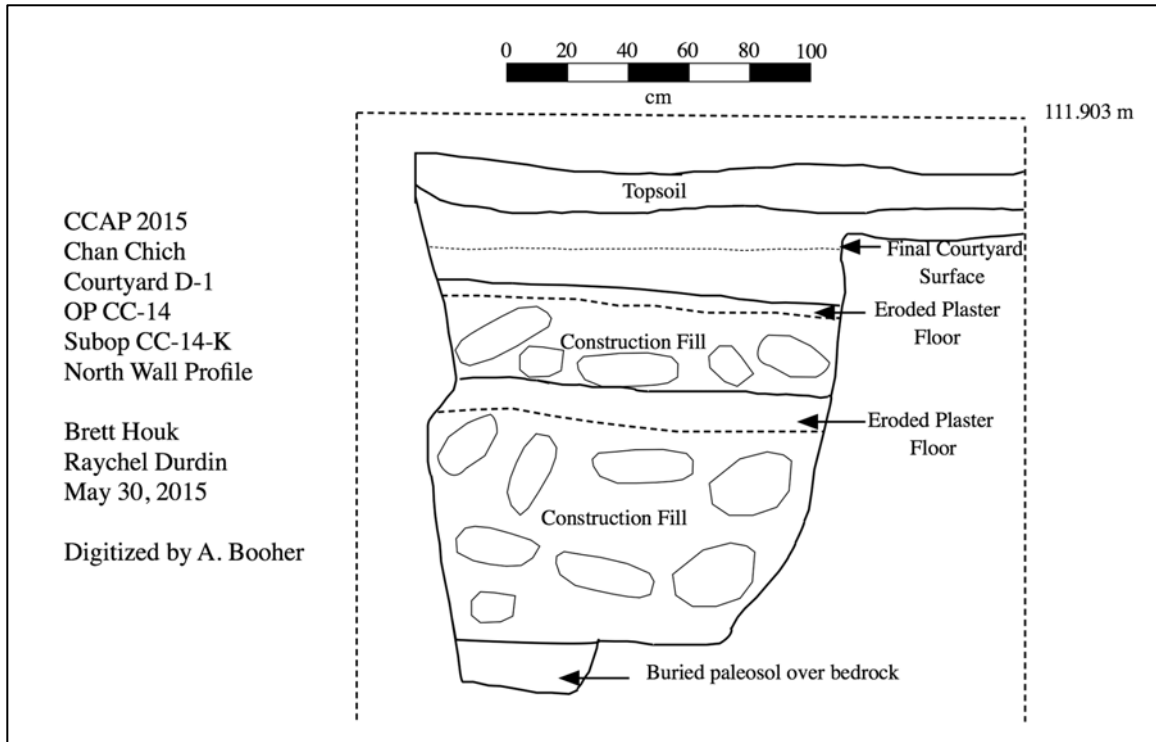


Figure 6.25 Profile of north wall of Subop CC-14-K.

Termini Structures

Structures D-48 and C-17 are located at the terminus of the Eastern and Western Causeway, respectively, and were targeted for investigations to determine if the buildings were shrine structures related to ritual processions that took place on the causeways. Both structures are similar in size with an adjacent patio structure located to the south.

Structure D-48's and Structure C-17's patios were excavated to collect artifacts that may be related to ritual procession and to gather chronological information, as both were excavated to bedrock. Architectural investigations were not conducted on Structure C-17 due the growth of trees prohibiting any excavations on the summit of the building. Similarly, the architectural investigations conducted on Structure D-48 were inconclusive in determining the architectural form of the building. Due to the limited amount of excavations on Structure D-48 and the overgrowth prohibiting excavations on Structure C-17, no definitive architectural conclusions can be made concerning the two structures.

Structure D-48

Structure D-48 is located approximately 450 m east of the Main Plaza at the terminus of the Eastern Causeway. The mound is approximately 16 m long, 9 m wide, and 1.5 m high. A total of six suboperations was opened at Structure D-48 - three on the adjacent patio structure and three on Structure D-48. Excavators screened 50 percent of the soil matrix for the topsoil and collapse debris from the patio and the topsoil from the structure excavations. Figure 6.26 shows the various suboperations opened at Structure D-48.

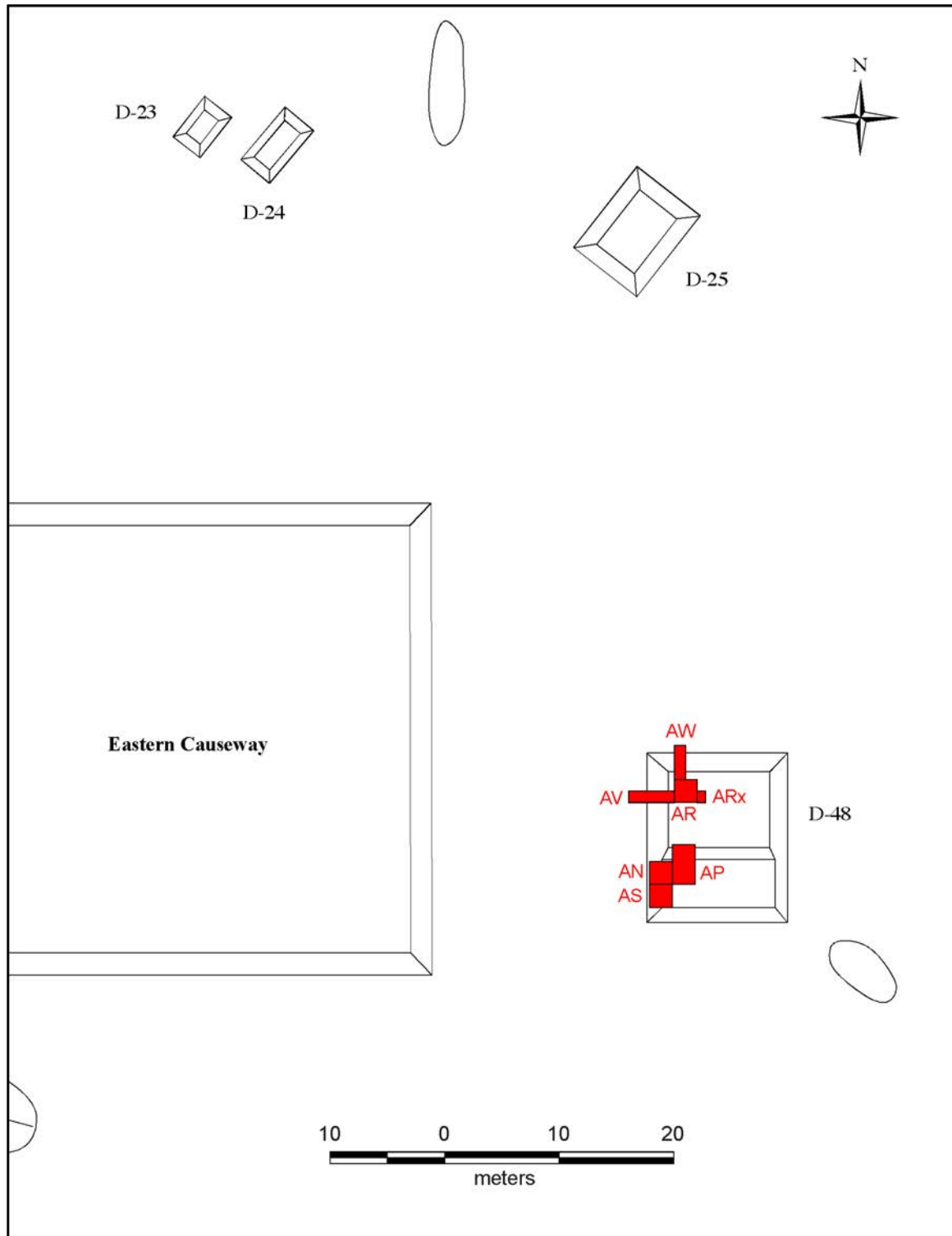


Figure 6.26 Map of Structure D-48 with suboperations (after Booher et al. 2015:Figure 2.24).

Structure D-48 Excavations

Subop CC-14-AN was a 2-x-2-m unit placed on the west edge of the patio structure to simultaneously expose the final patio surface and the west platform face. Subop CC-14-AP was a 3.5-x-2-m unit placed adjacent to Subop CC-14-AN to further expose the patio surface and to determine the location of the interface between the patio structure and the building. Subop CC-14-AS was a 2-x-2-m unit placed adjacent to the south edge of Subop CC-14-AN, creating a 2-x-4-m trench exposing the western platform face and patio surface. Excavations on the structure itself began with the placement of Subop CC-14-AR, a 2-x-2-m unit located on the summit of the building to expose the final phase architecture of the building. Subsequently Subop CC-14-ARx, a small extension adjacent to the east of Subop CC-14-AR, was placed to further expose the summit of the structure. Subops CC-14-AV and -AW were simultaneously placed on the west and north façades of the building, respectively. Both subops were placed adjacent to Subop CC-14-R to determine if the façade of the building was composed of a series of terraces or instead composed of single platform face. Table 6.14 shows the subops and corresponding lots opened at Structure D-48.

Table 6.14 Summary of Suboperations and Lot Descriptions for Structure D-48

Subop	Lot	Description	Age
CC-14-AN	01	Humus	Tepeu 3
	02	Collapse debris	Tepeu 2-3
	03	Patio surface	
	04	West platform face	
	05	Construction fill	
	06	Exterior surface	
CC-14-AP	01	Humus	Tepeu 2
	02	Collapse debris	
	03	Patio surface	
	04	Core face	
	05	Wall backing	
	06	Construction fill	
	07	Bedrock	
CC-14-AS	01	Humus	Tepeu 2
	02	Collapse debris	
	03	Patio surface	
	04	West platform face	
	05	Exterior surface	
CC-14-AR	01	Humus	
	02	Collapse debris	
	03	Floor	
CC-14-ARx	01	Humus	
	02	Construction fill	
CC-14-AV	01	Humus	
	02	Collapse debris	
	03	Platform face	
CC-14-AW	01	Humus	
	02	Collapse debris	
	03	Platform face	

Excavations Results of Structure D-48

The patio suboperations uncovered the final patio surface (Lots CC-14-AN-03, -AP-03, and -AS-03) and the west platform face (CC-14-AN-04 and -AS-04). The platform face was constructed of two courses of crudely faced rocks that were beginning to collapse toward the south end of the patio structure. It was constructed on top of a highly deteriorated exterior surface (Lots CC-14-AN-05 and -AS-05) shown in Figure 6.27. The exterior surface had completely eroded away with the only subfloor fill left as

any indication of the presence of a floor surface. The final patio surface was in a similar condition as the exterior surface, with only subfloor fill present. The topsoil (Lots CC-14-AN-01, -AS-01, and -AP-01) and the collapse debris (Lots CC-14-AN-02, -AP-02, and -AS-02) above the final patio surface yielded a substantially large amount of artifacts including copious amounts of ceramics and debitage, lithic tools, obsidian, and a small, circular stone disk with a perforation through the middle, likely a jewelry piece (Spec. # CC1898-01). The ceramic assemblage yielded a date corresponding to the Tepeu 2-3 ceramic phase. Table 6.15 displays the various artifacts collected above the final patio surface. To obtain chronological information of the patio structure, a 2-x-1-m subunit (Lot CC-14-AP-06) was excavated in the south end of the Subop CC-14-AP. The lot was excavated to bedrock, which was approximately 20 cm below the patio surface, with no other patio floors uncovered, indicating only one construction episode for the patio structure (Figure 6.28). The ceramics from this lot have yet to be analyzed, so the age of this construction has yet to be dated, but is presumably Late Classic.



Figure 6.27 Photo of the western platform face of the patio adjacent to Structure D-48, facing east.

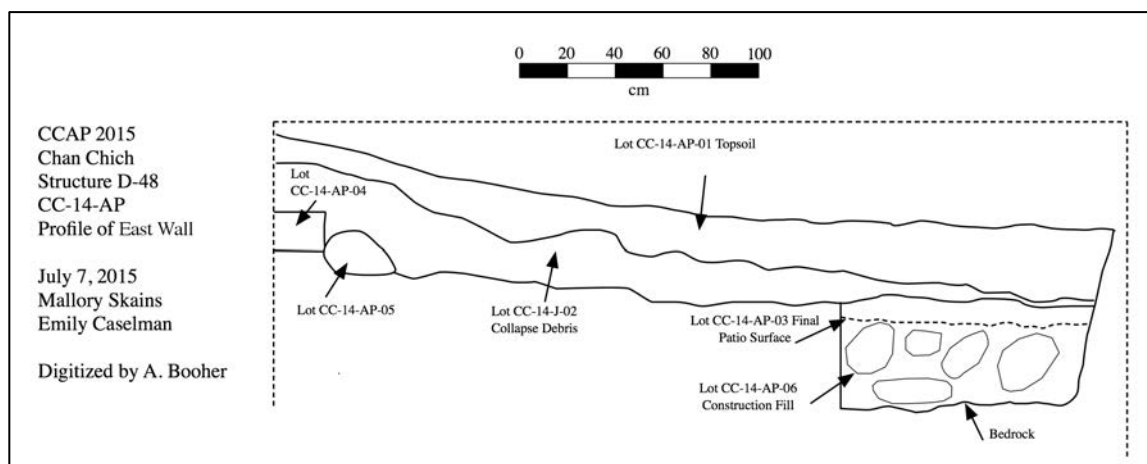


Figure 6.28 Profile of east wall of Subop CC-14-AP.

Table 6.15. Artifact Counts for Subops CC-14-AN, -AP, and -AS

Lot	Description	Ceramic Sherds	Lithic Tools	Obsidian Fragments	Debitage	Ground Stone	Shell
CC-14-AN-01	Topsoil	1371	14	2	291	2	0
CC-14-AN-02	Collapse debris	1861	18	0	169	5	1
CC-14-AP-01	Topsoil	137	1	2	21	0	0
CC-14-AP-02	Collapse debris	855	5	1	203	3	0
CC-14-AS-01	Topsoil	675	2	0	86	2	0
CC-14-AS-01	Collapse debris	958	12	0	87	2	0

North of the patio surface was a rock alignment (Lot CC-14-AP-04) orientated east to west. The alignment was composed of very crude, faced rocks that were only one course high. Given the location of the rocks on the mound, it was probable that this alignment was the interface between the patio and Structure D-48. Due to the simple construction of the alignment, the northeast portion of the alignment was plan mapped and then subsequently removed. Immediately behind the alignment was a second rock alignment (Lot CC-14-AP-05) composed of large, unfaced stones orientated east to west, similar to the previous alignment. Following Loten's and Pendergast's (1984) terminology, excavators determined that the first rock alignment (Lot CC-14-AP-04) was the platform face of Structure D-48 and the second rock alignment (Lot CC-14-AP-05) was the core face to the platform (Figure 6.29).



Figure 6.29 Photo of the platform between the patio structure and Structure D-48, facing north.

Excavations atop Structure D-48 exposed the well-preserved final floor surface (Lot CC-14-AR-03) that continued outside the limits of the suboperation. In the southeast corner of the suboperation, the floor gradually appeared to roll upward onto what was assumed to be an architectural feature located just to the east of the limits of the unit. A 1-x-0.75-m extension (Subop CC-14-ARx) was placed adjacent to the east of Subop CC-14-AR to further expose the floor and potential feature. Unfortunately, the architectural feature had completely eroded and collapsed away, so it is unknown onto what the plaster once rolled.

The north and east facades of Structure D-48 were partially exposed, although it is still unclear whether the structure was composed of a series of terraces, or a single

platform with low masonry walls. Excavations of the north and east portion of the structure did expose a potential platform or step at the base of the mound. The north platform/step (Lot CC-14-AW-03) is a crude alignment constructed from limestone that is only one course high. The west platform/step (Lot CC-14-AV-03) consist of only one faced stone that appeared to be in alignment with the west platform face (Lots CC-14-AN-04 and -AS-04) associated with the patio structure. Due to time constraints the associated exterior surface or any other architectural features higher on the mound were not exposed, leading to inconclusive results of the architecture for Structure D-48.

Structure C-17

Structure C-17 is located approximately 400 m west of the Main Plaza at the terminus of the Western Causeway. The mound measures approximately 12 m by 8 m and is 3 m high, taller then Structure D-48. Architectural excavations were prohibited due to the growth of trees on the summit of the structure. Consequently, only one suboperation with a small extension was opened at Structure C-17. Subop CC-14-AM was a 2-x-4-m unit placed on the patio structure adjacent to the south face of the mound. The subop was excavated to bedrock, revealing two construction episodes for the patio. Subop CC-14-AMx is a small extension placed adjacent to the north end of Subop CC-14-AM to further expose the earlier phase platform face. Table 6.16 shows the lots opened on Structure C-17, and Figure 6.30 shows the placement of Subop CC-14-AM on Structure D-48 and its relation to Structure C-18A and the cave feature, discussed below.

Table 6.16. Summary of Subop and Lot Descriptions for Structure C-17

CC-14-AM	Description	Age
01	Humus	Tepeu 2
02	Collapse debris	Tepeu 2
03	Final patio surface	
04	Final platform face	
05	Construction fill	
06	Earlier patio surface	
07	Earlier platform face	
08	Artifact concentration	
09	Construction fill	
10	Cut in the floor	

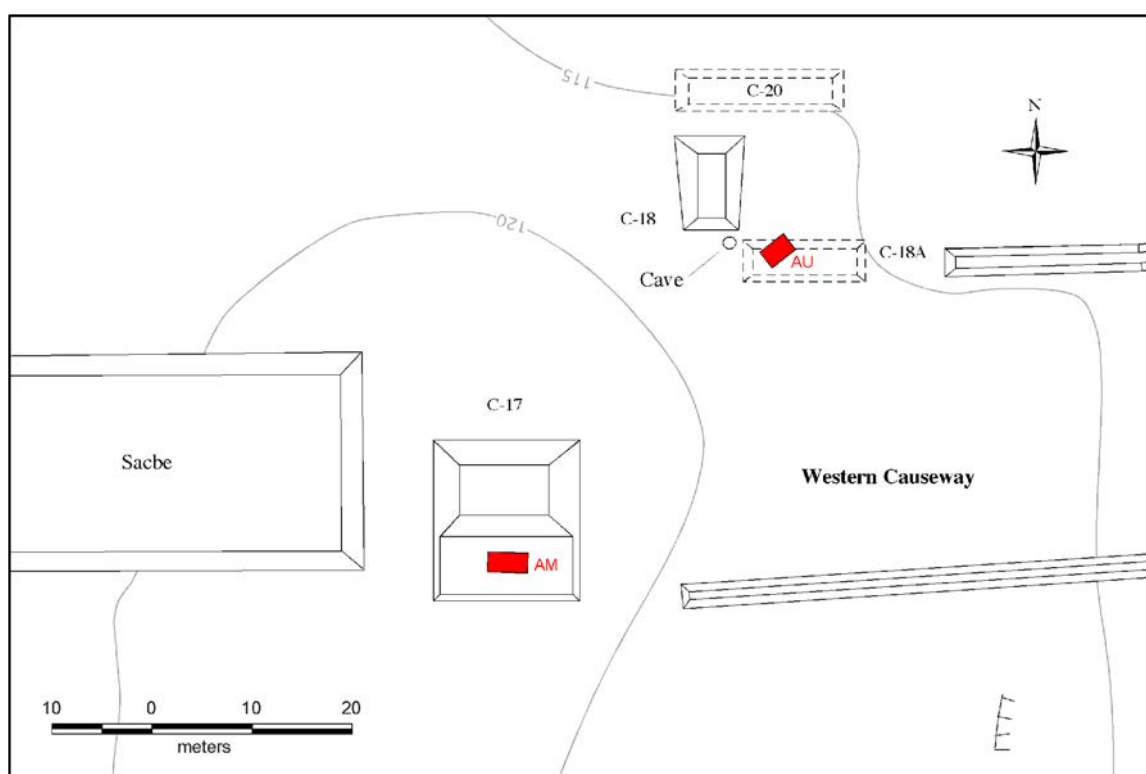


Figure 6.30 Map of Structures C-17, C-18, and C-18A with corresponding suboperations (after Booher et al. 2015:Figure 2.27).

Excavation Results of Structure C-17

The earliest patio surface (Lot CC-14-AM-06) is elevated approximately 30 cm above undulating bedrock and is associated with a platform face (Lots CC-14-AM-07 and -AMx-03) (Figure 6.31). The patio surface was well preserved with a small concentration of ceramic sherds (Lot CC-14-AM-08) located on the floor surface in the southwest corner of the subop. The deposit consisted of five ceramic sherds, all from the same vessel, with a brown slip. A 2-x-1-m subunit (Lot CC-14-AM-09) was excavated in the east portion of the subop to bedrock. No other floors were encountered, denoting only two construction episodes for the patio. At the northern edge of the unit, there was a possible cut in the floor (Lot CC-14-AM-10) that appeared to have been filled with small rocks. Excavators explored this probable cut in the floor but encountered bedrock approximately 20 cm below. Associated with the earlier patio surface is a platform face or step associated with Structure C-17 (Lot CC-14-AM-07 and -AMx-03) located at the northern edge of the subop orientated east to west. The platform face is constructed from cut, limestone rocks one course high that is poorly preserved on the east, but exhibits better preservation the farther west the platform extends. The artifact assemblage has yet to be analyzed, preventing any accurate dating of the earliest patio floor and associated platform face.



Figure 6.31 Photo of earlier platform face on Structure C-17's patio structure.

A second construction event raised the earlier patio surface 20 cm and a new patio surface (Lot CC-14-AM-03) and platform face (Lot CC-14-AM-04) were constructed. The final patio surface had completely deteriorated, and students excavated through the floor inadvertently. On top of the final patio surface was the final platform face or step to the structure. To construct to the new platform face, 40 cm of construction fill (Lot CC-14-AM-05) was placed in front of the earlier platform face. The platform face is one course high and crudely constructed with large, irregular and unfaced stones (Figure 6.32). Located directly above the final patio surface and platform face was approximately 25-30 cm of collapse debris (Lot CC-14-AM-02) that contained a large amount of

artifacts including copious amounts of ceramic sherds and debitage along with lithic tools, ground stone, faunal remains, and obsidian. The topsoil (Lot CC-14-AM-01) did not yield very many artifacts, especially compared to Structure D-48. The ceramic assemblage collected from this lot yielded a date corresponding to the Tepeu 2 ceramic phase, corresponding to the Late Classic date for material on the surface of Structure D-48. The artifact assemblage is similar to that of Structure D-48, but much less dense. Table 6.17 shows the artifact counts collected from the topsoil and collapse debris from Subop CC-14-AM.



Figure 6.32 Photo of the final platform face from Structure C-17.

Table 6.17. Artifact Counts from Lots CC-14-AM-01 and CC-14-AM-02

Lot	Artifact Type	Count	Description
CC-14-AM-01 (Topsoil)	Ceramic sherds	26	Tepeu 2
	Debitage	14	
CC-14-AM-02 (Collapse Debris)	Ceramic sherds	976	Analysis pending
	Debitage	182	
	Lithic tools	5	One blade and core, and three bifaces
	Obsidian	5	All fragments from blades; four were found concentrated in the NE corner of the subop
	Ground stone	3	One square fragmented mano and one rectangular fragmented mano
	Faunal bone	1	Unknown
	Shell	1	Spire-lopped <i>jute</i>

Structure C-18A

Structure C-18 is located approximately 25 m east of Structure C-17 and near the end of the Western Causeway, adjacent to a small cave. The cave has a circular, vertical opening approximately 2 m in diameter and appears to extend south of the opening approximately 5 m. The cave is roughly 5 m wide with the ceiling of the cave is approximately 1 m above the cave's floor (Booher et al. 2015). For safety reasons, the cave was not explored or excavated.

The 1996 CCAP mapping project originally mapped Structure C-18 as a low platform oriented north-to-south adjacent to the cave feature. Once the platform structure, cave, and surrounding area were cleared of overgrowth, it became evident that other structures were in the vicinity that had not been previously mapped. Two other structures were uncovered and subsequently labeled. Structure C-18A is located to the east of Structure C-18 and the cave feature. Structure C-18A is a small mound orientated east to west and possibly adjacent to the platform that is Structure C-18. Labeled during the 2015 CCAP project, Structure C-20 is a low, elongated mound orientated east to west

located to the north of Structures C-18 and C-18A. Due to time constraints and dense vegetation, the project did not map either of the newly discovered structures in 2015, and their placements on Figure 6.30 are approximate. It is still unclear whether Structures C-18A and C-20 are physically attached to Structure C-18 or are stand alone structures associated with the cave and platform. Further extensive testing of both structures will need to be conducted to determine the relationship, if any, to the cave and Structure C-18 and the function of the structures.

Originally Structure C-18 was to be excavated to look for any evidence of ritual activity associated with the cave. Due to the growth of a tree excavations were impossible, prompting Structure C-18A to be assessed for excavations. A 2-x-3-m unit (Subop CC-14-AU) was placed on the summit and extended down the northeast face of the structure after visual survey of the mound revealed potential alignments. While excavating through collapse debris (Lot CC-14-AU-02) a large concentration of ceramic sherds from several different vessels was found in approximately the middle of the subop (Figure 6.33). The ceramics did not appear to have been placed on a floor surface. Analysis of the ceramics dated the deposit to the Tepeu 2 ceramic period (Late Classic) and determined that 90 percent were from jars and 10 percent were from bowls. Rocks surrounded the artifact deposit (Lot CC-14-AU-03), but whether those rocks delineate the boundary of the artifact deposit or are unrelated is still unknown. The ceramics appeared to be broken in antiquity and displayed evidence of burning along with the rocks surrounding the deposit, however there was not any charcoal present. Given the absence of charcoal or burned soil, the artifacts were likely burned elsewhere before being placed at Structure C-18A. West of the artifact deposit was the final floor surface (Lot CC-14-

AU-05) to the structure. The floor surface was well preserved with a complete mano (Spec. CC1794-01) found on top of the floor as depicted in Figure 6.34. The floor did not extend past the artifact deposit indicated by the profile of the unit. Due to time constraints, further excavations of the structure's architecture were not completed. While the artifact deposit was dated to the Late Classic period (Tepeu 2), that does not definitively date the structure since penetrating excavations were not conducted.



Figure 6.33 Photo of artifact deposit (Lot CC-14-AU-03) on Structure C-18A.



Figure 6.34 Final floor with complete mano (Spec. CC1794-01) on Structure C-18A.

Eastern and Western Causeway Excavations

Chan Chich's Eastern and Western Causeways are linear roadways radiating from the site core to terminus structures. The Eastern Causeway is approximately 435 m long and the Western Causeway is approximately 380 m long and are both 40 m wide, much wider than necessary to function only as walking corridors or routes for transportation. The Eastern and Western Causeway converge in the Main Plaza in front of Structure A-1, a large tandem range building that separates the Main Plaza from the more restricted Upper Plaza (Figure 6.35). Attached to the east of Structure A-1 is the site's ball court. These architectural elements likely formed a stage for processions along the causeways

that lead to public spectacles on or near Structure A-1 and the ball court. The Main Plaza would have been able to accommodate a large group of people to witness the procession and public spectacle (Houk 2014, 2015).

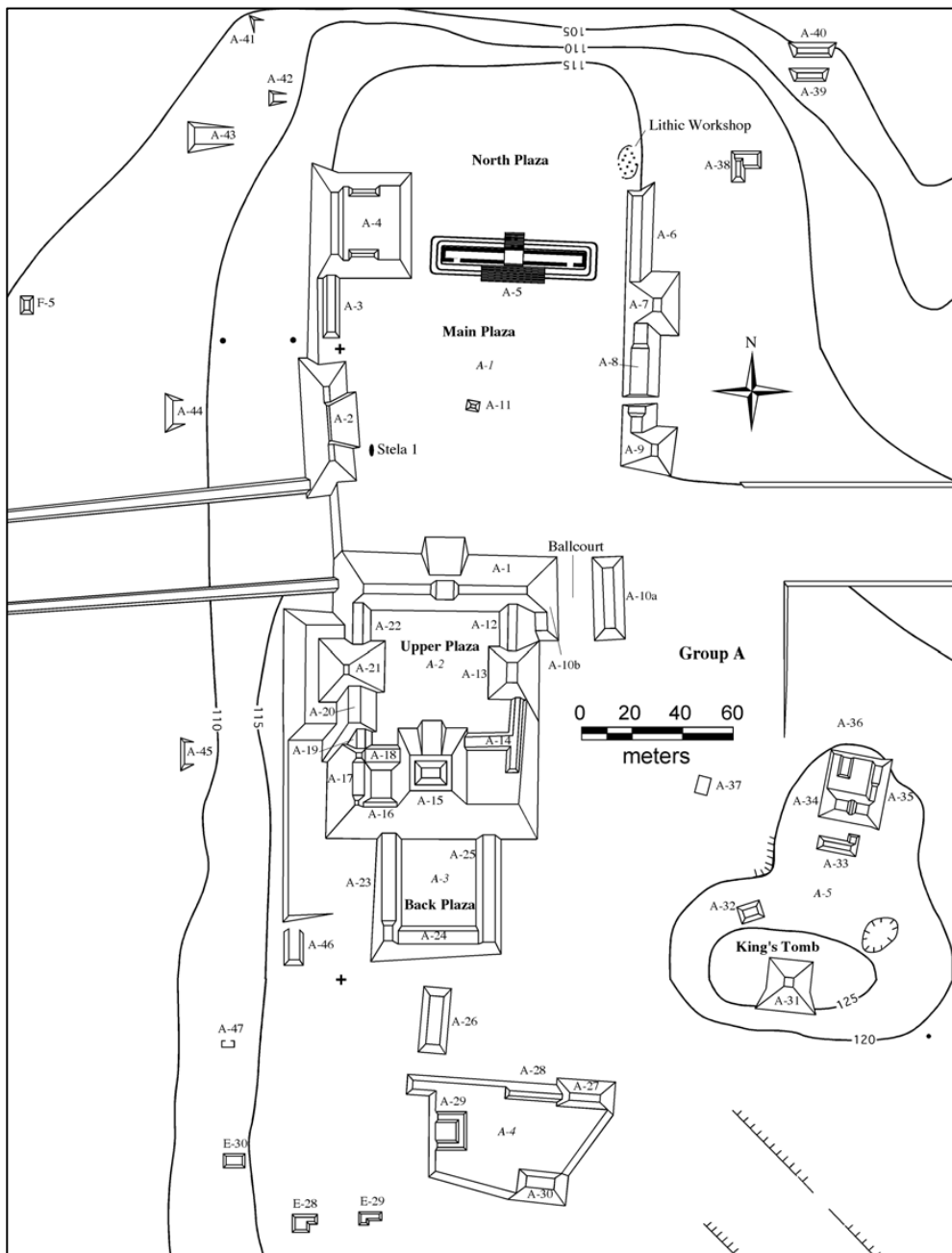


Figure 6.35 Map of Chan Chich site core, courtesy of the CCAP.

The Eastern and Western Causeways were excavated to determine the construction phases and ages of both causeways and to determine the architectural forms of the causeways. To assess the probability of ritual processions taking place on the Eastern and Western Causeways, clearing units were placed along the margins of the causeways where debris from processions would accumulate after being swept off the roadways (Keller 2006). Because our excavations targeted deposits on top the final occupation surface, only the topsoil—down to the final Late Classic surface—of the clearing units was excavated. The matrix from each clearing unit was screened through ¼-inch mesh. The clearing units were placed in accessible areas with the least overgrowth with the original size of the unit depending on the location and aforementioned parameters, although after the placement of the first two units, we decided to standardized the clearing units to 2-x-2-m units. If a unit produced positive results, it was expanded to at 2-x-4-m unit. A total of nine clearing units was opened; six located along the Eastern Causeway and three along the Western Causeway.

Eastern Causeway Excavations

The north and south edges of the Eastern Causeway were excavated to reveal the architectural form of the causeway. Subops CC-14-A and -C were placed where there was visible architecture and perpendicular to the causeway, although Subop CC-14-A was orientated 37 degrees east of north (Figure 6.36).

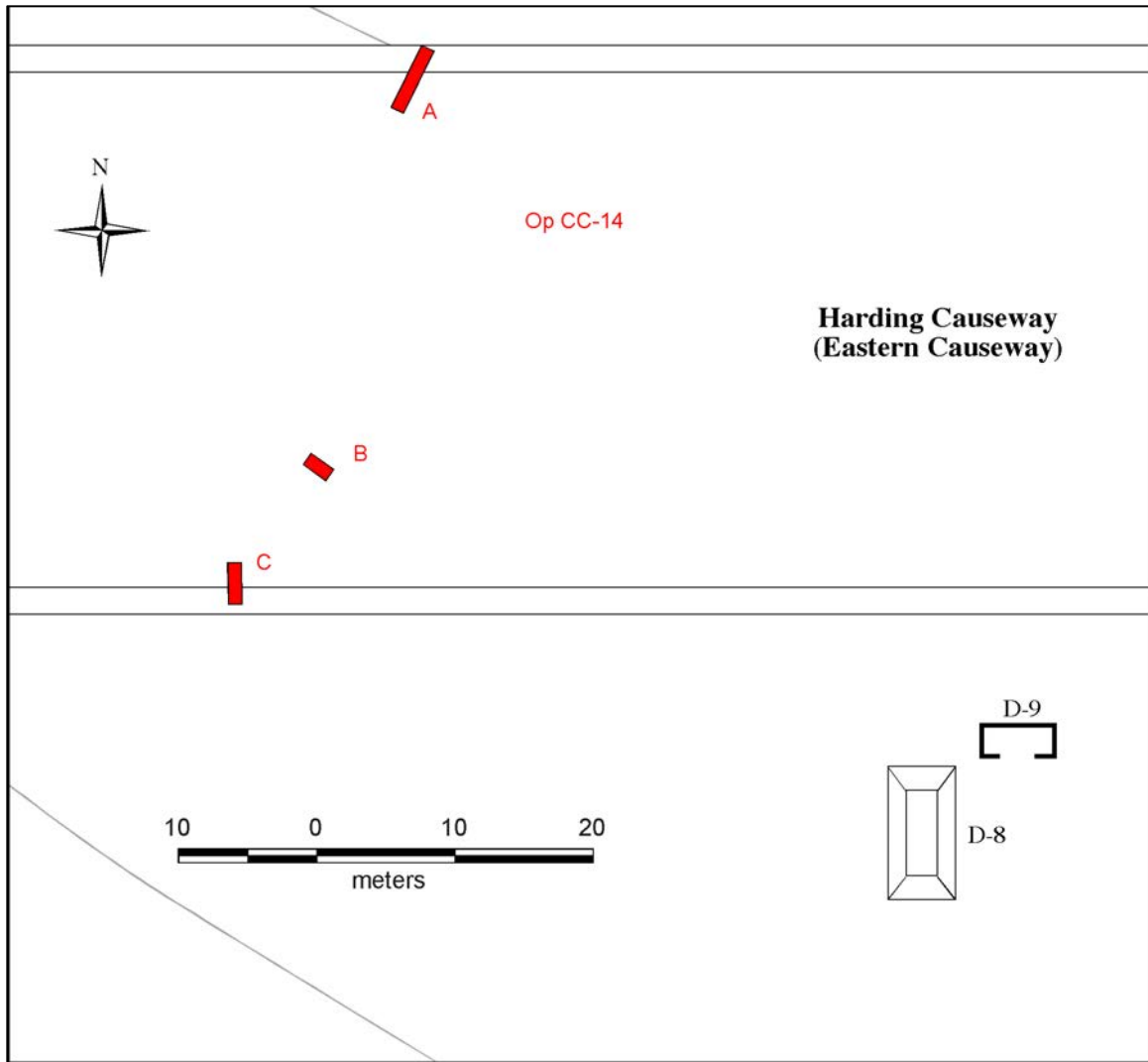


Figure 6.36 Map of the Eastern Causeway excavations (after Booher and Nettleton 2014; Figure 5.5).

Subop CC-14-A was placed on the north edge of the Eastern Causeway and was a 1-x-5-m trench that extended from the surface of the causeway 5 m north to the ground surface. After excavating through collapse debris (Lot CC-14-A-02) excavators encountered a platform face (Lot CC-14-A-03) that was one course high (approximately 15 cm high) that consisted of unfaced, crudely shaped rocks. Approximately 1 m to the south of and higher than Lot CC-14-A-03 was a rock alignment (Lot CC-14-A-04) two

courses high orientated in the same direction as the previous platform face. Similar to the platform face from Lot CC-14-A-03, this alignment comprised unfaced stones stacked on top of one another. To the north of Lot CC-14-A-04 was construction fill that was used to elevate the causeway (Figure 6.37). It is possible that the two rock alignments formed one large wall measuring a little over a meter thick that would have functioned as a large retaining wall for the construction fill. If this scenario were true, Lot CC-14-A-03 would be the northern face of the wall and Lot CC-14-A-04 would be the southern face of the wall. It is also possible that two alignments are independent of each other. Given that the alignment in Lot CC-14-A-04 is taller than the alignment in Lot CC-14-A-03, it is possible that these two alignments were stair stepped to aid in stabilization. Although it is a possibility that the alignment in Lot CC-14-A-03 was partially excavated through or the upper courses of rocks had collapsed, thus suggesting the first scenario as a more probable explanation.

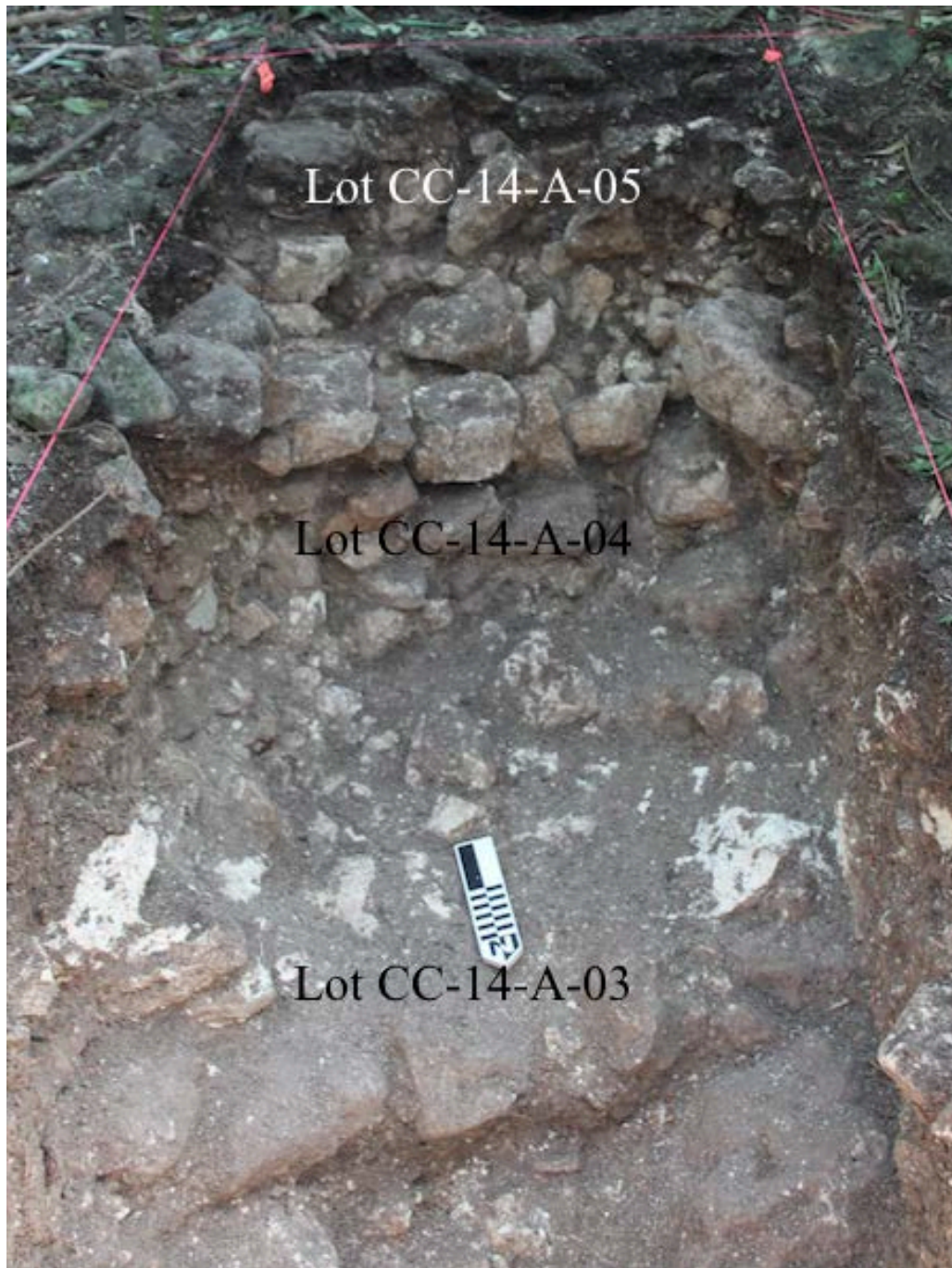


Figure 6.37 Photo of Subop CC-14-A positioned along the Eastern Causeway.

Subop CC-14-C was a 1-x-3-m unit placed on the south edge of the Eastern Causeway and yielded similar results as Subop CC-14-A. A platform face similar to the one exposed in Lot CC-14-A-03 was uncovered toward the southern end of the unit. The platform face (Lot CC-14-C-03) was three courses high and approximately 30 cm in height. The rocks were unfaced and stacked on top of one another creating a crudely constructed platform face. To the north of the platform face was construction fill (Lot CC-14-C-04). Figure 6.38 depicts Subop CC-14-C and the platform face retaining the construction fill. The excavations from Subop CC-14-C determined that the southern edge of the Eastern Causeway utilized only one platform face to retain the construction fill used to elevate the causeway.



Figure 6.38 Photo of Subop CC-14-C showing platform face and construction fill.

Both subops produced similar results, although the architecture slightly varied between the north and south edges of the causeways. The architectural data from both subops revealed rudimentary constructed platform faces that functioned as retaining walls to contain the construction fill that was used to elevate the causeway. There was a difference between the two suboperations though, in terms of the platform faces. The north face of the causeway utilized a large retaining wall or stair stepped platform faces to retain the construction fill, while the southern edge utilized one platform face to retain the construction fill. Even though the architecture varies slightly between the southern and northern faces of the causeway, the excavations determined that the Eastern Causeway was constructed using platform faces to retain the construction fill used to elevate the causeway. Neither side had cut stones in the small excavation areas. It is unclear if the platforms were ever faced with finer masonry than the crude stones revealed in our excavations. Very few artifacts were collected from Subops CC-14-A and -C (Table 6.18), but the ceramic assemblages collected from both were dated to the Late-to-Terminal Classic period.

Subop CC-14-B was placed in the approximate center of the Eastern Causeway and was excavated to bedrock to establish the construction sequence. Approximately 10 cm below topsoil, the excavations encountered dry-laid fill consisting of small cobbles near the surface and transitioning to larger boulders. The construction fill (Lot CC-14-B-03) averaged between 35 cm and 65 cm in thickness, which is due to undulating bedrock below the construction fill (Figure 6.39). A large amount of ceramic sherds was collected from Subop CC-14-B (see Table 6.18) that aided in dating the construction of the causeway. The topsoil (Lot CC-14-B-02), which would have encompassed the final

surface of the Eastern Causeway, produced dates consistent with a construction date during the Late Classic period with use into the Terminal Classic period. Interestingly, the construction fill (Lot CC-14-B-02) produced ceramics that dated to the Late Preclassic and Early Classic periods mixed with Late Classic period ceramics. Although the ceramics span multiple time periods from the chronological test pit, the Late Classic sherds indicate the Eastern Causeway was constructed in one phase during the Late Classic period, coinciding with the construction of both terminus structures and final construction phase of Courtyard D-1.

Table 6.18 Artifact Counts for Suboperations CC-14-A, CC-14-B, and CC-14-C

Lot	Description	Ceramic Sherds	Lithic Tools	Obsidian Fragments	Debitage	Shell
CC-14-A-01	Topsoil	2	0	0	0	0
CC-14-A-02	Collapse debris	58	4	0	0	1
CC-14-B-01	Topsoil	21	0	0	1	0
CC-14-B-02	Collapse debris	273	1	0	4	0
CC-14-C-01	Topsoil	5	0	0	0	0
CC-14-C-02	Collapse debris	29	0	0	2	0
CC-14-C-04	Construction fill	10	0	0	1	0

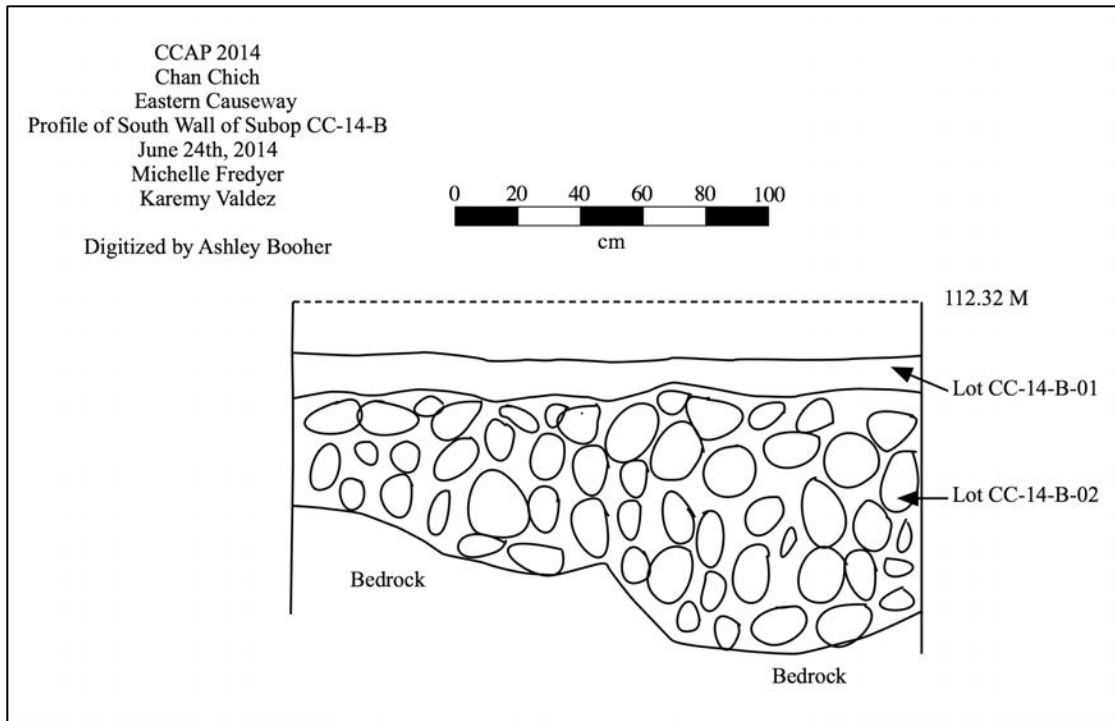


Figure 6.39 Profile of the south wall of Subop CC-14-B.

Eastern Causeway Clearing Units

Six clearing units were opened along the Eastern Causeway to look for artifacts related to processions. The six clearing units along the Eastern Causeway were more or less clustered into two identifiable groups; three located near Courtyard D-1 (Subops CC-14-N, -P, and -AL) and three located near the Main Plaza (Subops CC-14-AE, -AG, and -AH). Figure 6.40 shows the location of each clearing unit.

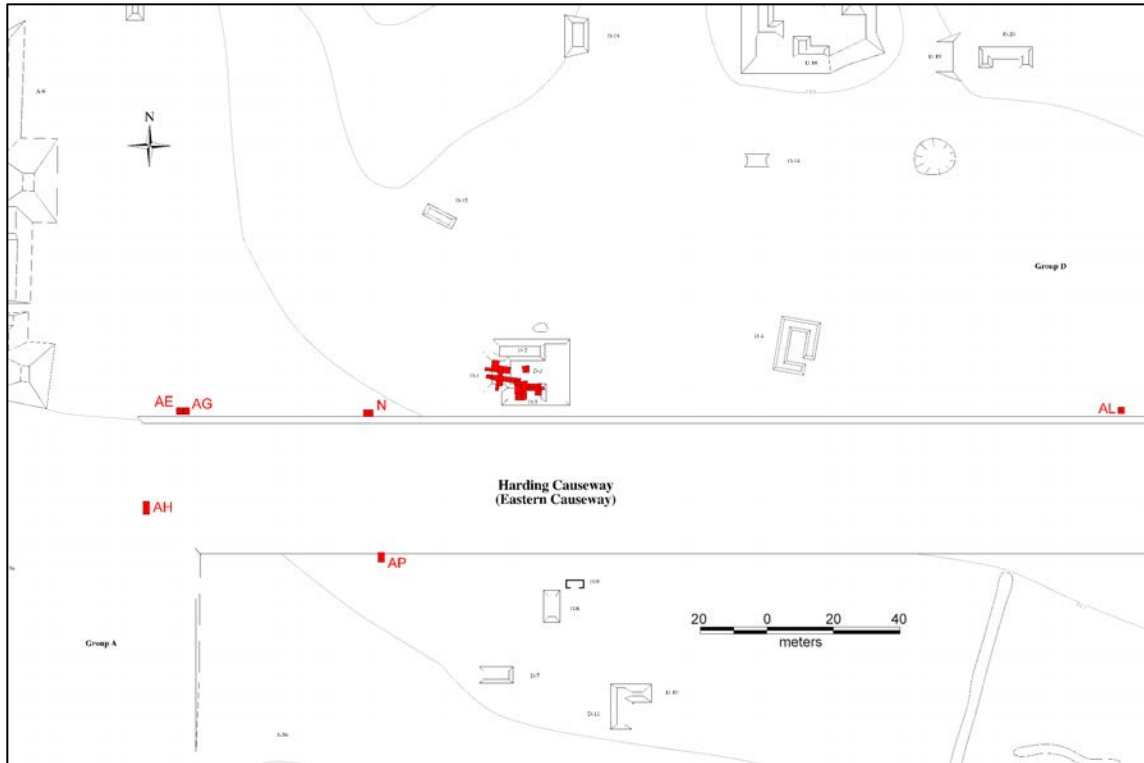


Figure 6.40 Map of the Eastern Causeways clearing units (after Booher et al. 2015:Figure 2.30).

Subops CC-14-N, -P, and -AL

Subops CC-14-N, -P, and -AL were clearing units placed near Courtyard D-1. Subops CC-14-N and -P were along the north and south edges of the Eastern Causeway, respectively. Both subops were 2-x-3-m units that yielded very little in terms of artifacts (Table 6.19). The small amount of ceramics collected from both subops dated to the Tepeu 2 ceramic phase. Subop CC-14-AL was a 2-x-2-m unit located between Courtyard D-1 and Structure D-48 on the north edge of the Eastern Causeway. Compared to Subops CC-14-N and -P, Subop CC-14-AL produced a larger sample of ceramics; approximately 40 ceramic sherds were collected that dated to the Tepeu 3 ceramic phase.

Subops CC-14-AE, -AH, and -AG

Subops CC-14-AE, -AH, and -AG were clearing units placed near the Main Plaza. Subops CC-14-AE and -AG were 2-x-2-m clearing units placed adjacent to each other on the north edge of the Eastern Causeway. Due to the large amount of ceramics collected from the placement of Subop CC-14-AE, Subop CC-14-AG was placed adjacent to the east, which created a 2-x-4-m combined unit. Both clearing units produced a substantially larger amount of ceramics than the clearing units near Courtyard D-1 (see Table 6.19). Approximately 50 ceramic sherds were collected from Subop CC-14-AE, and 100 ceramic sherds along with three obsidian fragments from Subop CC-14-AG were collected. The ceramic assemblage collected from Subops CC-14-AE and -AG was a mix of Tepeu 2 and Tepeu 3 ceramic phase types, with the forms of the ceramic consistent with jars and bowls.

Subop CC-14-AH was a 2-x-2-m clearing that was expanded to a 2-x-4-m unit due to the large amount of artifacts collected. Subop CC-14-AH was located to the south of Subops CC-14-AE and -AG near the site's ball court. Unlike the previous clearing units, Subop CC-14-AH was placed on the Eastern Causeway and was excavated to the subfloor ballast. Approximately 350 mixed Tepeu 2 and Tepeu 3 ceramic sherds were collected.

Table 6.19 Artifact Counts for the Eastern Causeway Clearing Units

Suboperation	Artifact Type	Count	Description
CC-14-N	Ceramic sherds	22	Tepeu 2
	Debitage	13	
CC-14-P	Debitage	3	
CC-14-AL	Ceramic sherds	39	Tepeu 3
CC-14-AE	Ceramic sherds	62	Tepeu 2 and 3
	Shell	1	
CC-14-AH	Ceramic sherds	339	Tepeu 2 and 3
	Debitage	308	
CC-14-AG	Ceramic sherds	107	Tepeu 2 and 3
	Debitage	158	
	Obsidian	3	

Western Causeway Excavations

A segment of the Western Causeway was targeted for excavations to obtain chronological and architectural data on the construction phase of the causeway. Subop CC-14-E was a 1.5-x-4-m unit placed on the north edge of the Western Causeway, approximately 40 m from the Main Plaza, as shown in Figure 6.41. The placement of Subop CC-14-E targeted an area with visible architecture on the ground surface and minimal overgrowth. The subop was orientated north to south, to better expose the north parapet and the surface of the causeway. Once excavations began, we quickly realized that the northern edge of the subop was too close to the north face of the parapet, thus limiting our ability to fully expose the parapet. To correct this, a 0.5-x-1-m extension (Subop CC-14-Ex) was placed adjacent to the north edge of Subop CC-14-E. The extension provided the room needed to expose the north face of the parapet, but also gave us an opportunity to excavate the northern edge of the causeway. Subop CC-14-E was partially excavated to bedrock on the southeast side, which allowed us to see the

stratigraphy of the causeway and the sequence of events that lead to the construction of the Western Causeway.

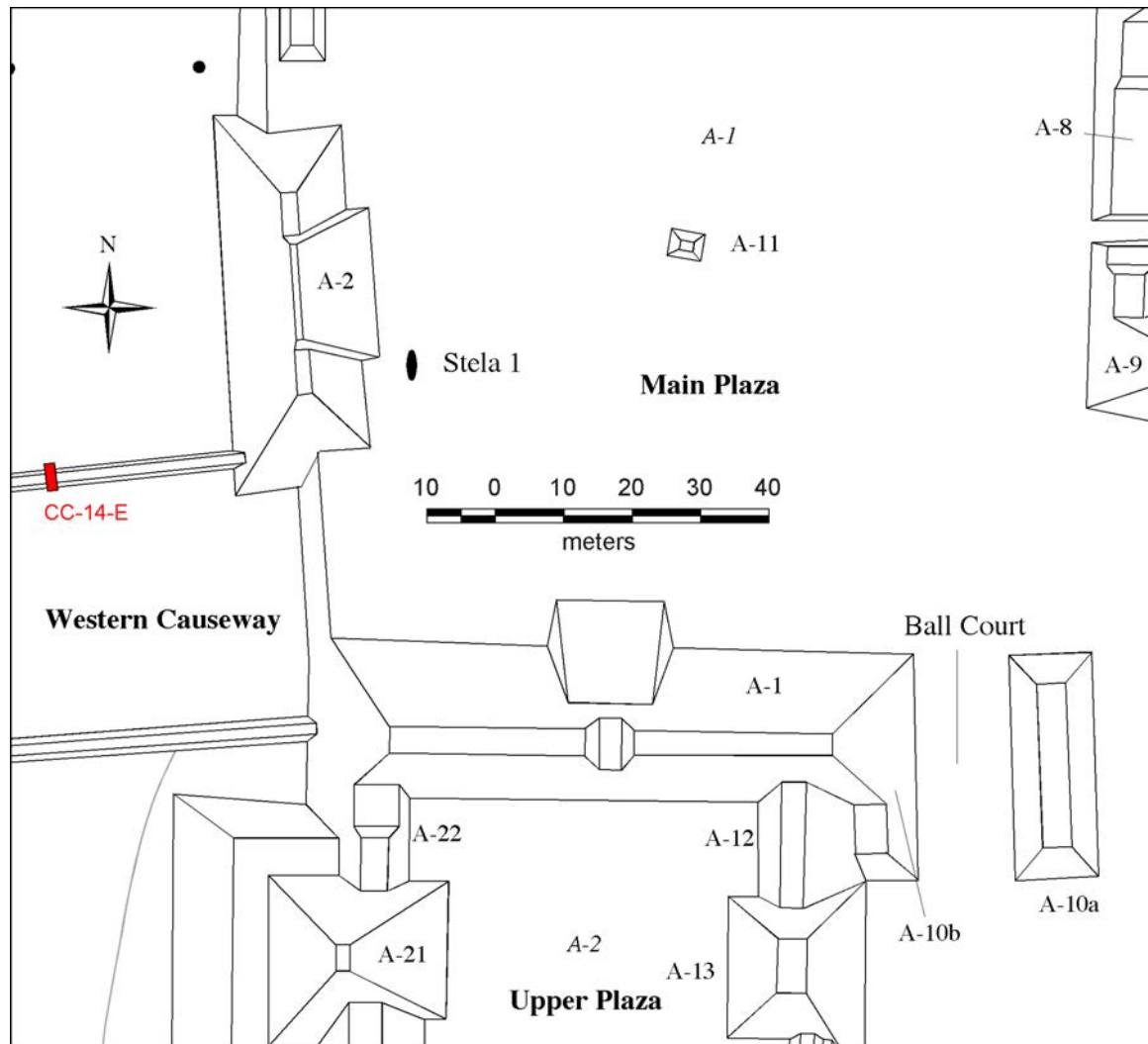


Figure 6.41 Map of the location of Subop CC-14-E.

Subop CC-14-E comprised of a thick layer of collapse debris (Lot CC-14-E-02), approximately 40 cm that had to be removed. The dense amount of collapse was likely due to the collapse of the parapet walls. Below the collapse debris in the northern portion of the subop, excavators uncovered the Western Causeway's northern parapet wall. The

parapet wall was constructed from cut limestone blocks that were well preserved on the northern face of the parapet, but slightly eroded and deteriorated on the southern face. The parapet measured 1.40 m thick and was preserved to a height of approximately 45 cm. On the north edge of the parapet wall, underneath the parapet, excavations uncovered foundation stones used to elevate the causeway's platform.

In the southern part of the subop, a thin layer of sediment was observed below the collapse debris and above construction fill. Although the sediment was recognizable during excavations, it was not visible in the profile of the subop, except beneath the parapet stones in the southern section of the subop. The layer of sediment aligns with the bottom of the parapet wall, suggesting that it is the deteriorated final surface of the causeway. Beneath the layer of sediment is 30-40 cm of construction fill (Lot CC-14-E-03) that was used to elevate the causeway's surface, similar to the Eastern Causeway, which further strengthens the argument that the thin layer of sediment is the final causeway surface. Beneath the construction fill was the original natural ground surface overlying bedrock (Figure 6.42)

Unlike the Eastern Causeway's architectural units, which produced very few artifacts, the Subop CC-14-E yielded a larger sample size. Above the causeway surface and on either side of the parapet wall, approximately 25 ceramic sherds (Figure 6.20), which date to the Late Classic period, and lithics were collected along with two lithic tools and two obsidian fragments. It is possible that the artifacts collected above the causeway surface and the parapet walls could be related to the function of the causeway, although we cannot rule out the possibility that these artifacts could be from the fill of the collapsing parapet. Within the construction fill of the causeway, approximately 30

ceramic sherds were collected that date the construction of the Western Causeway to the Late Classic period, similar to the Eastern Causeway.

Table 6.20 Artifact Counts for Suboperations CC-14-E and CC-14-Ex

Lot	Description	Ceramic Sherds	Lithic Tools	Obsidian Fragments	Debitage	Shell
CC-14-E-01	Topsoil	23	0	1	20	0
CC-14-E-02	Collapse debris	27	0	0	56	1
CC-14-E-03	Construction fill	16	0	0	0	0
CC-14-Ex-01	Topsoil	2	0	0	3	0
CC-14-Ex-02	Collapse debris	95	2	0	29	0

Excavations of the Western Causeway determined that, at least where it enters the Main Plaza, the Western Causeway is elevated, although not as high as the Eastern Causeway. Houk (2003:60) previously proposed that the Western Causeway was a ground-level corridor defined by two parapets. Garrison (2007:317) refers to these types of causeways as “sunken.” However the excavations of the Western Causeway determined that the causeway is actually elevated with parapets along its margins, comparable to El Pilar, Xunantunich, and Caracol, which are the only other sites in Belize with parapet-lined causeways (Houk 2015a).

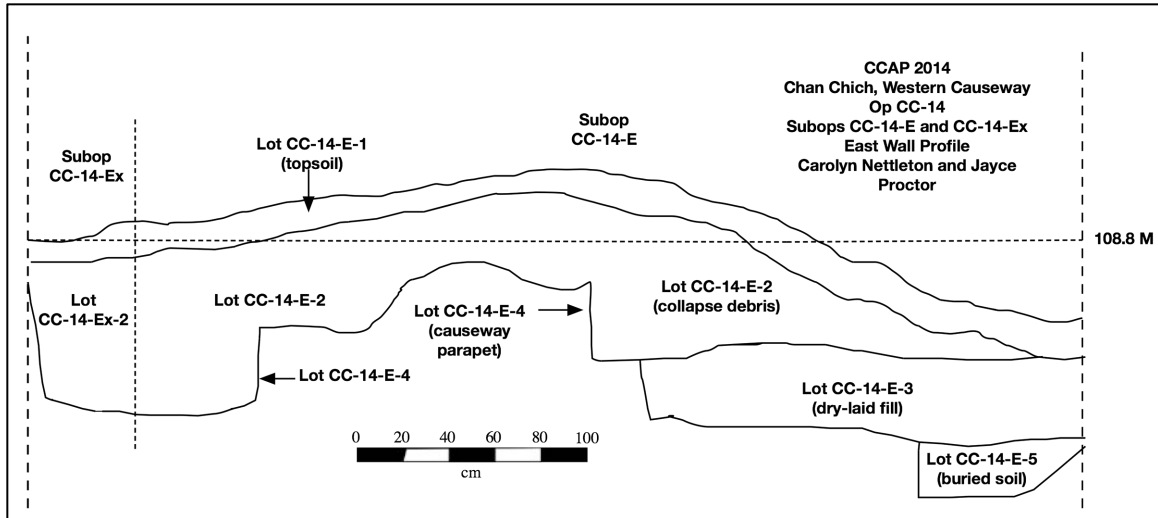


Figure 6.42 Profile of the eastern wall of Subops CC-14-E and -Ex.

Western Causeway Clearing Units

The architecture of the Western Causeway varies from that of the Eastern Causeway, requiring a modification to the original methodology of placing clearing units along the edge of the causeway. Due to the construction of parapets along the edges of the causeway, the Western Causeway clearing units were placed inside the parapet's wall on the causeway itself and excavated to the final causeway surface. Figure 6.43 shows the location of the Western Causeway clearing units.

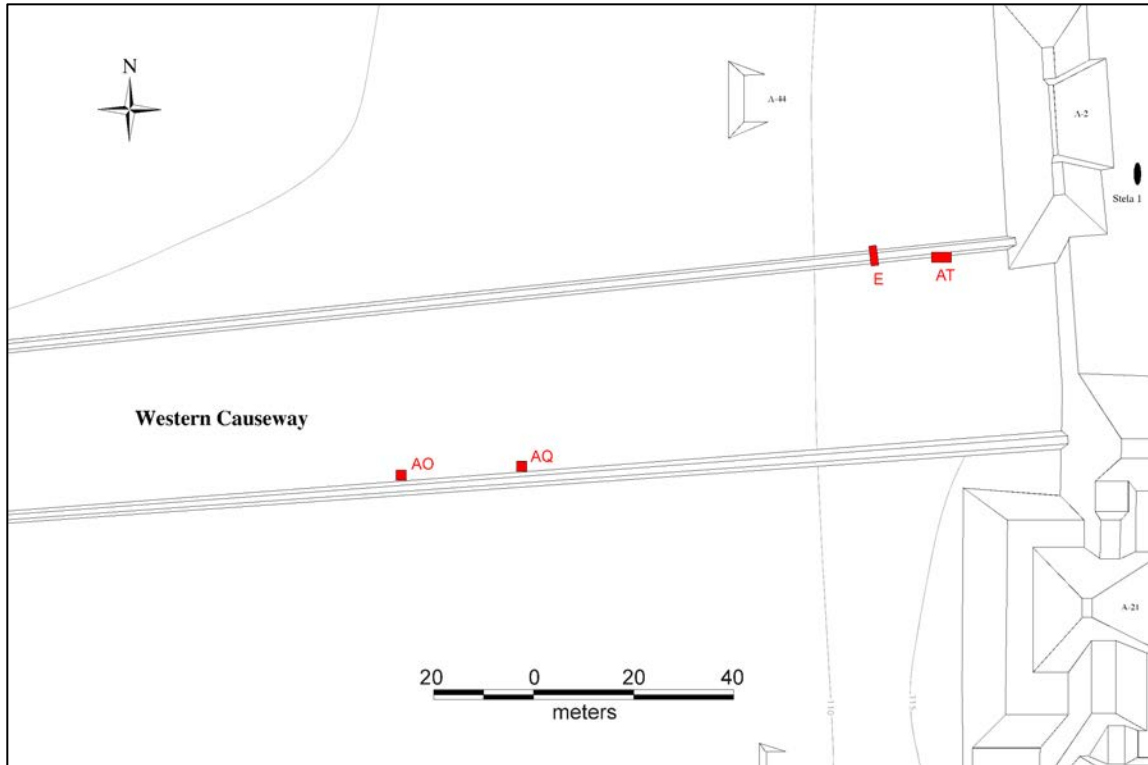


Figure 6.43 Map of the Western Causeway clearing units (after Booher et al. 2015:Figure 2.31).

Three clearing units were placed along the parapet wall of the Western Causeway. Subops CC-14-AO and -AQ were 2-x-2-m units located on the south edge of the Western Causeway near the Main Plaza. Both subops were excavated to the final causeway surface and yielded very few artifacts. Approximately 10-15 ceramic sherds were collected from each of the two subops. Subop CC-14-T was placed on the north edge of the Western Causeway, approximately 25 m from the Main Plaza. The subop was originally a 2-x-2-m unit, but was expanded to a 2-x-4-m unit due the amount of ceramics collected. Approximately 50 ceramic sherds and lithic debitage were collected from above the final causeway surface of Subop CC-14-T. Ceramic analysis from the three clearing units along the Western Causeway is still pending.

Table 6.21 Artifact Counts for the Western Causeway Clearing Units

Suboperation	Artifact Type	Count	Description
CC-14-AO	Ceramic sherds	12	Analysis pending
	Debitage	4	
CC-14-AQ	Ceramic sherds	4	Analysis pending
	Debitage	17	
CC-14-AT	Ceramic sherds	129	Analysis pending
	Debitage	105	

Summary

The excavations conducted during the 2014 and 2015 field season provided information on the architectural form, age, and chronology of Chan Chich's Eastern and Western Causeways and associated structures. Excavations of the Eastern and Western Causeways exposed the architectural differences between the causeways and determined that both causeways were elevated, although the Western Causeway was not as high as the Eastern Causeway. Both causeways were constructed during one construction event during the Late Classic period with use through the Terminal Classic period, which corresponds to the final architectural phase of Courtyard D-1 and the patio's of the termini structures. The artifacts collected from the excavations are discussed in terms of artifact categories and quantities in the next chapter. Chapter 8 further discusses the artifacts in terms of discerning possible function for the Causeways and associated structures.

Chapter 7

Artifact Analysis

Introduction

The processional architecture research project collected copious amounts of artifacts that provide insight on the function and age of the *sacbeob* and associated structures. The material culture collected consisted of formalized tools, unfinished tools, debitage, and obsidian along with ceramics, shell, ground stone, and faunal and human remains. Artifacts can provide useful, chronological information, and the presence or absence of artifacts can delineate specific building functions. This chapter discusses and analyzes the artifact assemblage collected from the processional architecture project and highlights important artifacts found. Artifacts are divided into categories based on type, with lithics further subdivided into chipped stone and ground stone. A comparative analysis between structures and *sacbeob* is also included. Table 7.1 shows the total number of artifact types collected from each subop along with the total number for each artifact category. The possible function of the artifacts discussed below is addressed in the following chapter.

Table 7.1 Artifact Count by Suboperation Collected from Op CC-14

Subop	Structure	Ceramic	Debitage	Lithic Tool	Obsidian	Ground Stone	Faunal	Shell
CC-14-A	Eastern Causeway	2	0	0	0	0	0	0
CC-14-B	Eastern Causeway	294	5	1	0	0	0	0
CC-14-C	Eastern Causeway	45	2	0	0	0	0	0
CC-14-D	Structure D-1	415	509	0	2	1	1	1
CC-14-E	Western Causeway	63	76	2	1	0	0	1
CC-14-F	Structure D-1	223	176	23	3	0	7	1

Subop	Structure	Ceramic	Debitage	Lithic Tool	Obsidian	Ground Stone	Faunal	Shell
CC-14-G	Structure D-1	242	31	1	1	0	10	33
CC-14-J	Structure D-1	103	25	5	2	1	5	8
CC-14-K	Courtyard D-1	703	150	9	1	0	0	3
CC-14-L	Structure D-3	177	31	3	1	1	1	123
CC-14-M	Structure D-1	37	31	0	0	0	0	0
CC-14-N	Eastern Causeway	22	13	0	0	0	0	0
CC-14-O	Structure D-3	45	14	3	1	0	0	31
CC-14-P	Eastern Causeway	0	3	0	0	0	0	0
CC-14-Q	Structure D-1	154	19	0	1	3	23	1
CC-14-R	Structure D-1	204	20	1	0	0	42	11
CC-14-S	Structure D-3	356	134	4	1	12	2	12
CC-14-T	Structure D-1	155	24	0	1	1	19	2
CC-14-U	Structure D-1	44	33	0	1	0	1	0
CC-14-V	Structure D-3	1297	91	15	1	16	4	42
CC-14-W	Structure D-3	164	15	1	0	1	1	2
CC-14-Z	Structure D-1	21	3	0	0	0	0	0
CC-14-AA	Structure D-3	49	26	1	0	0	1	3
CC-14-AB	Structure D-3	194	33	1	2	1	9	5
CC-14-AE	Eastern Causeway	62	0	0	0	0	0	1
CC-14-AF	Structure D-3	18	0	1	0	0	1	4
CC-14-AG	Eastern Causeway	107	161	0	3	0	0	0
CC-14-AH	Eastern Causeway	339	310	0	0	0	0	0
CC-14-AL	Eastern Causeway	39	0	0	0	0	0	0
CC-14-AM	Structure C-17	1567	292	17	6	5	2	6
CC-14-AN	Structure D-48	3232	478	22	2	4	0	1
CC-14-AO	Western Causeway	12	4	0	0	0	0	0
CC-14-AP	Structure D-48	1214	420	10	3	5	0	9
CC-14-AQ	Western Causeway	15	18	0	0	0	0	0
CC-14-AR	Structure D-48	196	111	1	0	1	2	0
CC-14-AS	Structure D-48	1633	173	14	0	4	0	0
CC-14-AT	Western Causeway	129	105	0	0	0	0	0
CC-14-AU	Structure C18A	507	8	4	1	2	0	0
CC-14-AV	Structure D-48	199	34	5	1	0	0	1
CC-14-AW	Structure D-48	37	4	1	6	0	1	0
	Total	14,315	3,582	145	41	58	132	301

Ceramics

Ceramics were the most common artifacts collected with a total of 14,315 sherds recovered that consisted of small fragmented pieces to large ceramic vessels and plates. Ceramics are crucial for interpreting age and function due to their diagnostic traits. The ceramics collected from the processional architecture project were used to establish date

ranges for occupational and construction sequences. Ceramic also provide information on the potential function and use of a building.

The highest concentration of ceramic artifacts was recovered from the patios of the termini structures. At Structure D-48, a total of 5,857 ceramics was collected above the final patio surface from Subops CC-14-AN, -AP, and -AS. Several of the ceramic sherds collected from above the patio structure had incised designs. Two Fine Orange sherds (Figure 7.1C and D) and one Imitation Fine Orange sherd (Figure 7.1E) were also collected from above the patio surface. At Structure C-17, a total of 1,002 ceramics was collected from above the final patio surface. The fragmented ceramics were consistent with the forms of jars and bowls and dated to the Late-to-Terminal Classic periods.

The highest concentration of ceramics from Courtyard D-1 came from the artifact deposit (Lots CC-14-S-06 and -V-03) located on the west exterior surface of Structure D-3. Lot CC-14-S-06 produced 141 ceramic sherds, and Lot CC-14-V-03 had 205 ceramic sherds collected. The ceramic assemblage consisted of jars and bowls, although large fragments fit together to form a Belize Red plate. The collapse debris located above the artifact deposit also had a high concentration of ceramics. A total of 253 ceramic sherds was collected from Lots CC-14-S-02 and -V-02, with 229 collected from Lot CC-14-V-02 alone.

The Eastern and Western Causeway excavations and clearing units generated the smallest amount of ceramics, with less than 100 pieces of ceramics collected from the Eastern Causeway clearing units and less than 75 collected from the Western Causeway clearing units. The excavations units along both causeways produced a larger amount, although the excavations of the Western Causeway nearly doubled that of the ceramics

collected from the excavations of the Eastern Causeway. The ceramics collected from the clearing units and excavation units dated the causeways to the Late Classic period with use through the Terminal Classic period.



Figure 7.1 Photo of ceramics collected from Operation CC-14. A) Cubeta Incised ceramic sherd from Lot CC-14-AN-02, Spec. # CC1738-01. B) Torro ceramic sherd from Lot CC-14-AS-01, Spec. # CC1846-01. C) Fine Orange ceramic sherd from Lot CC-14-AN-01, Spec. # CC1721-01. D) Fine Orange ceramic sherd from Lot CC-14-AN-02, Spec. # CC1738-02. E) Imitation Fine Orange ceramic sherd from Lot CC-14-AN-01, Spec. # CC1721-03. F) Joventud Red ceramic sherd from Lot CC-14-J-07, Spec. # CC1138-01.

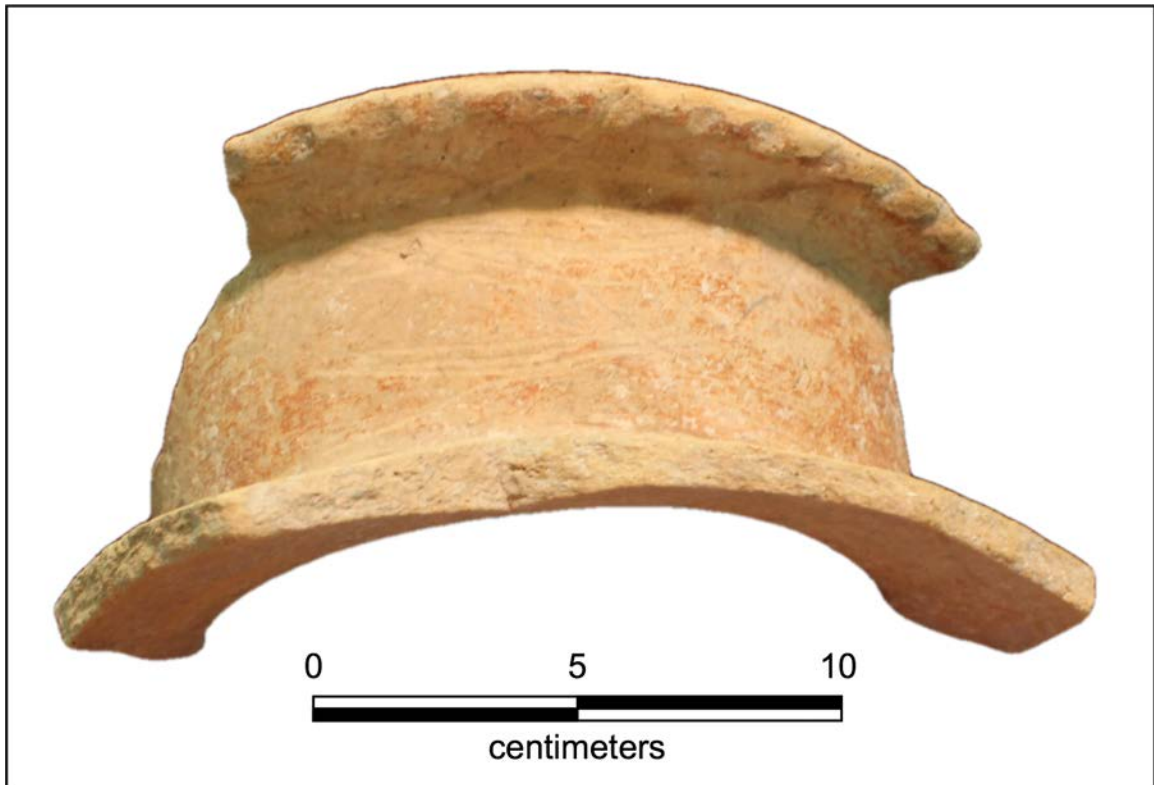


Figure 7.2 Vessel rim from Lot CC-14-AB-03, Spec. # CC1535-01

Ground Stone

Ground stone implements were fundamental, domestic tools used by the Maya that consisted of manos and metates made from several different materials, including granite, limestone, basalt, and quartzite. Manos are hand-held tools, typically with a square or rectangular cross section that are used along side stone-basin metates for processing maize, wild grains, and other foods (Hammond 1975:343; Hayden 1987). Manos and metatas were also used in the preparation of pottery clay and processing mineral pigments for paints (Garber 2011). Broken metates and manos often continue to be used as temper grinders for grinding salt, pigments, sugar, coffee, or cacao; or pestles or mortars for breaking up calcite temper, or for crushing medicinal herbs (Hayden

1987). Manos and metates can be found in numerous different contexts, although they are typically found in association with buildings of domestic use (Hayden 1987).

A total of 58 pieces of ground stone was collected from the field: 21 manos and 22 metates—some of the ground stone fragments were pieced back together in the lab, therefore only counting as one, bringing the total number of individual artifacts to 43 (Table 7.2). The highest concentration of ground stone was collected from Structure D-3 with 17 fragmented pieces of metates and four manos. Structure D-1 had a low number of ground stone collected when compared to Structure D-3, with two metates and two manos. Ground stone was collected from both termini structures, although Structure D-48 doubled the amount collected at Structure C-17. There were not any pieces of ground stone collected from the causeway excavations. The raw materials used in manufacturing the manos and metates largely consisted of white-gray granite. Two limestone manos, two quartzite manos, and one sandstone mano were also collected. Four of the metates collected were manufactured using schist, which is a coarse-grained metamorphic rock. All four pieces were collected from the artifact deposit (Lots CC-14-S and -V) on Structure D-3.

Table 7.2 Ground Stone Artifacts and Given Spec. #s by Structure

Structure	Spec #	Lot	Form	Material	Weight (g)	Completeness
Structure D-1	CC0924-01	CC-14-D-02	Metate	Granite	3664	Fragment
	CC1125-01	CC-14-J-06	Metate	Granite	6750	Fragment
	CC1422-01	CC-14-Q-02	Mano	Granite	740	Complete
	CC1413-01	CC-14-Q-03	Mano	Granite	315	Medial Fragment
	CC1413-02	CC-14-Q-03	Mano	Granite	600	Fragment
	CC1328-01	CC-14-T-02	Mano	Granite	202	Fragment

Structure	Spec #	Lot	Form	Material	Weight (g)	Completeness
Structure D-3	CC1459-01	CC-14-AB-02	Mano	Granite	293	Fragment
	CC1113-01	CC-14-L-02	Mano	Limestone	523	Complete
	CC1102-01	CC-14-L-02	Mano	Granite	475	Medial Fragment
	CC1275-01	CC-14-S-06	Metate	Granite	423	Fragment
	CC1275-02	CC-14-S-06	Metate	Schist	37	Fragment
	CC1275-03	CC-14-S-06	Metate	Granite	765	Fragment
	CC1278-01	CC-14-S-06	Metate	Granite	872	Fragment
	CC1278-02	CC-14-S-06	Metate	Schist	357	Fragment
	CC1278-03	CC-14-S-06	Metate	Schist	53	Fragment
	CC1278-04	CC-14-S-06	Metate	Unknown Igneous	224	Fragment
	CC1406-01	CC-14-V-02	Metate	Granite	222	Fragment
	CC1425-01	CC-14-V-03	Metate	Granite	503	Fragment
	CC1425-02	CC-14-V-03	Metate	Granite	319	Fragment
	CC1425-03	CC-14-V-03	Metate	Granite	449	Fragment
	CC1425-04	CC-14-V-03	Metate	Schist	617	Fragment
	CC1425-05	CC-14-V-03	Metate	Granite	1229	Fragment
	CC1425-06	CC-14-V-03	Metate	Granite	118	Fragment
	CC1425-07	CC-14-V-03	Metate	Unknown Igneous	427	Fragment
	CC1425-08	CC-14-V-03	Metate	Schist	28	Fragment
	CC1460-01	CC-14-W-08	Metate	Granite	231	Fragment
Structure D-48	CC1459-01	CC-14-AB-02	Mano	Granite	293	Fragment
	CC1724-01	CC-14-AN-01	Metate	Granite	270	Fragment
	CC1724-02	CC-14-AN-01	Mano	Granite	589	Fragment
	CC1812-01	CC-14-AN-01	Mano	Granite	189	Fragment
	CC1812-02	CC-14-AN-01	Metate	Granite	456	Fragment
	CC1812-03	CC-14-AN-01	Mano	Granite	280	Fragment
	CC1810-01	CC-14-AP-02	Metate	Granite	380	Fragment
	CC1858-01	CC-14-AP-02	Mano	Quartzite	285	Fragment
	CC1710-01	CC-14-AR-01	Mano	Quartzite	78	Fragment
	CC1845-01	CC-14-AS-01	Mano	Granite	430	Fragment
	CC1845-02	CC-14-AS-01	Mano	Granite	178	Fragment
Structure C-17	CC1809-01	CC-14-AM-02	Mano	Granite	920	Fragment
	CC1809-02	CC-14-AM-02	Mano	Granite	645	Complete
	CC1828-01	CC-14-AM-05	Mano	Sandstone	423	Complete
	CC1828-02	CC-14-AM-05	Mano	Limestone	209	Fragment
Structure C-18A	CC1794-01	CC-14-AU-02	Mano	Granite	653	Fragment
	CC1779-01	CC-14-AU-04	Metate	Granite	1083	Complete

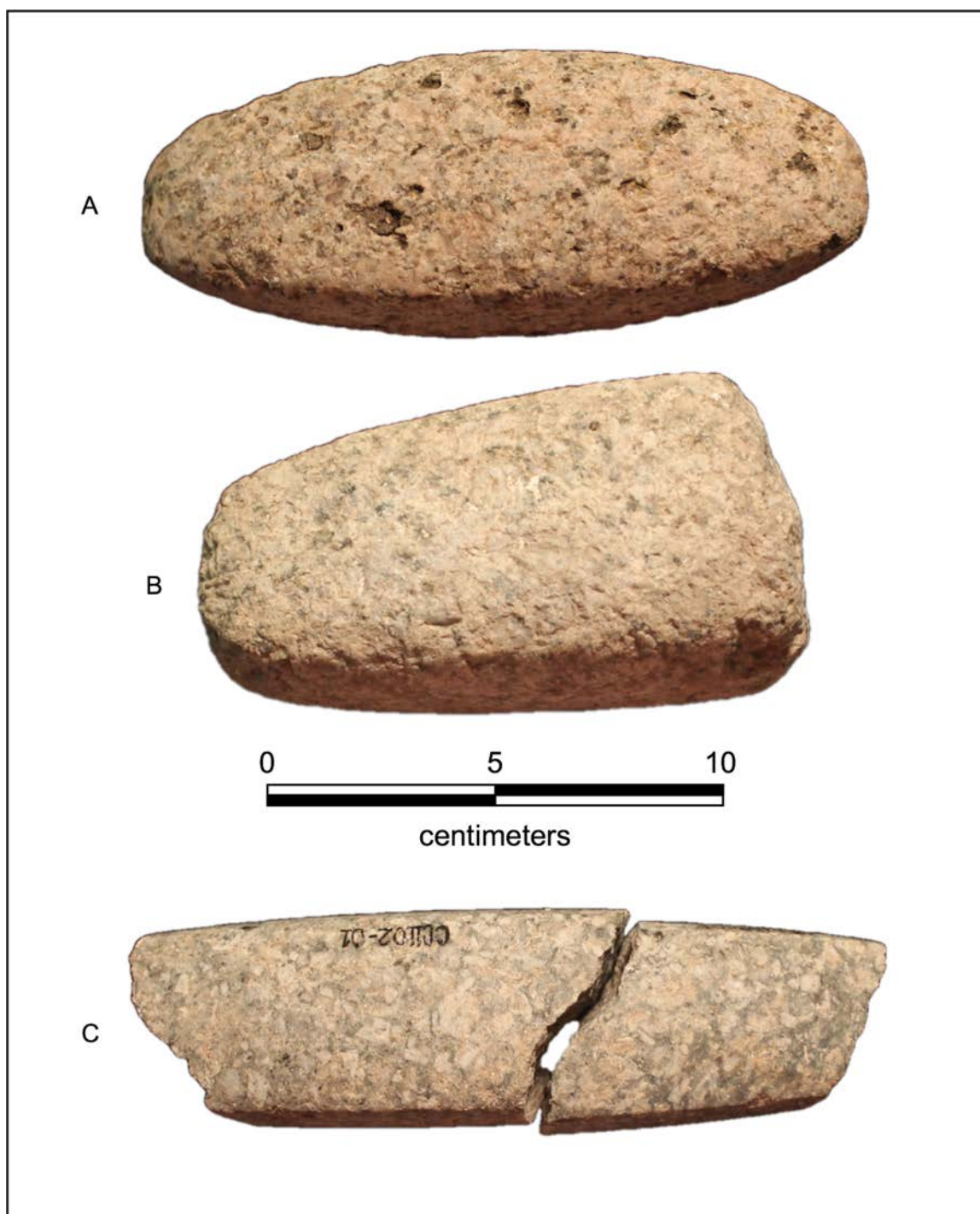


Figure 7.3 Manos. A) granite mano from Lot CC-14-AM-02, Spec. # CC1809-01. B) granite mano from Lot CC-14-Am-02, Spec. # CC1809-02. C) limestone mano from Lot CC-14-L-02, Spec. # CC1113-01.



Figure 7.4 Manos. A) granite mano from Lot CC-14-Q-02, Spec. # CC1422-01. B) granite mano from Lot CC-14-AS-01, Spec. # CC1845-01. C) granite mano from Lot CC-14-Q-03, Spec. # CC1413-01. D) sandstone mano from Lot CC-14-AM-05, Spec. # CC1828-01. E) granite mano from Lot CC-14-L-02, Spec. # 1102-01.

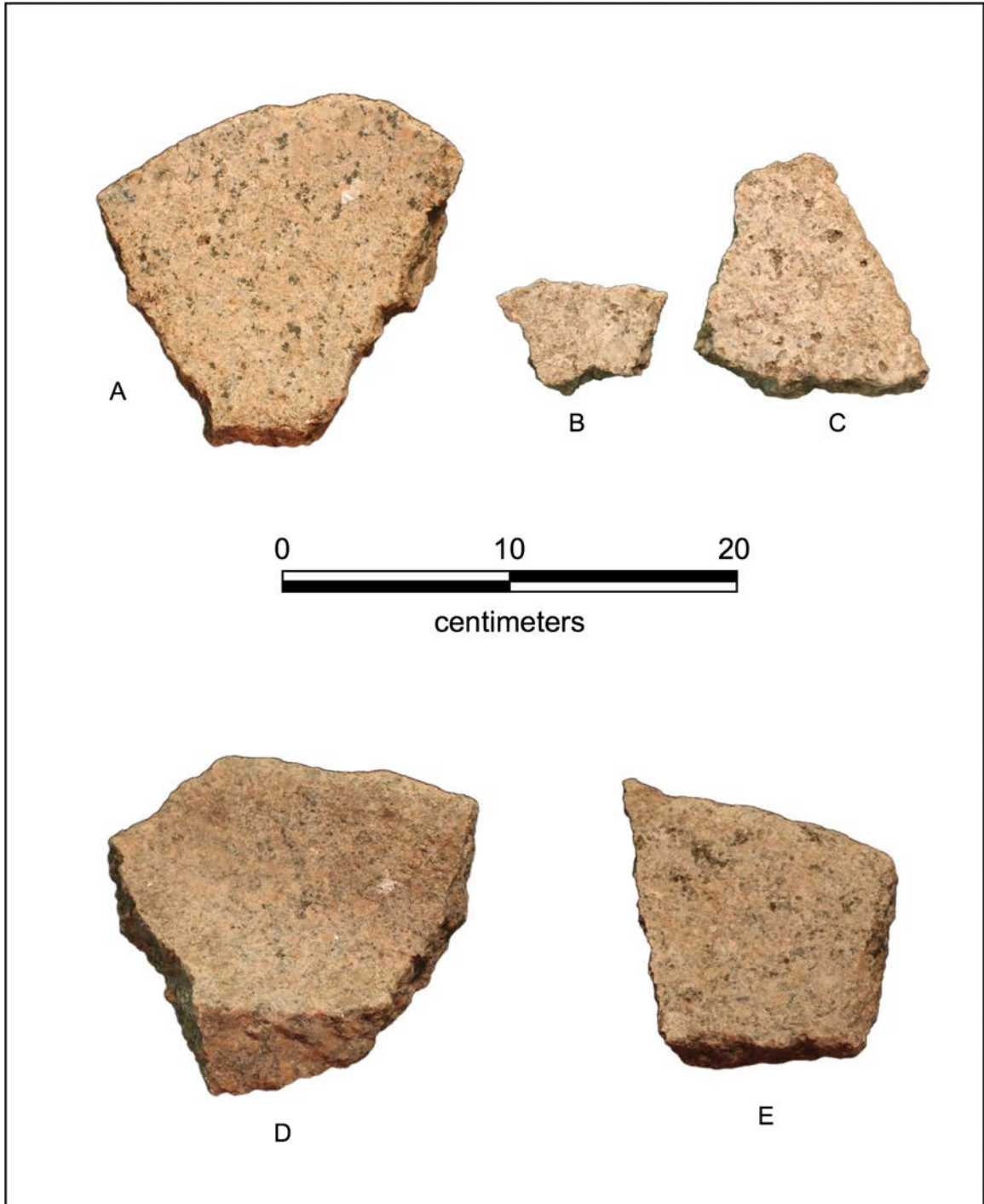


Figure 7.5 Metates A) granite metate basin from Lot CC-14-AN-01, Spec. # CC1724-01. B) granite metate basin from Lot CC-14-AP-02, Spec. # CC1810-01. C) granite metate from Lot CC-14-Ap-02, Spec. # CC1810-01. D) granite metate basin from Lot CC-14-S-06, Spec. # CC1275-01. E) granite metate basin from Lot CC-14-AU-02, Spec. # CC1779-01.

Chipped Stone Artifacts

Chipped stone artifacts are stones that have been intentionally worked and include debitage, cores, stone tools, hammer stones scrapers, and spear points. A total of 3,727 chipped stone artifacts was collected, with 3,582 consisting of debitage, and the remaining 145 consisting of lithic tools such as bifaces and cores.

Debitage

Debitage comprises lithic flakes produced by the manufacturing of stone tools and is considered refuse left over from tool production. Debitage was the most common form of chipped stone artifact collected, although this thesis did not specifically look at debitage in terms of determining function or stage of production. The debitage collected in the field was weighed and analyzed, but not given spec. #s.

Cores

Cores are considered non-bifacial tools and not debitage due to the obvious evidence of human modification. David Hyde (2003:78) defines a core as an objective piece that has had flakes removed from its surface. Following this typology, a core is considered a modified mass of chippable stone that is neither a flake nor a biface, and does not refer to a specific function (Hyde 2003). Cores are subdivided into two categories based on the direction flakes were removed. Unidirectional core tools have detached pieces that have been removed from a single direction. Conversely, multidirectional core tools have detached pieces removed from more than one direction

(Hyde 2003:79). A total of 39 cores was collected, and most were found at Courtyard D-

1. Table 7.3 lists the cores that were collected.

Table 7.3 Cores and Given Spec. #'s by Structure

Structure	Spec #	Lot	Material	Weight (g)	Completeness
Structure D-1	CC1128-03	CC-14-F-02	Chert	198	Unknown Fragment
	CC1128-10	CC-14-F-02	Chert	92	Unknown Fragment
	CC1128-11	CC-14-F-02	Chert	116	Unknown Fragment
	CC1128-12	CC-14-F-02	Chert	24	Unknown Fragment
	CC1128-13	CC-14-F-02	Chert	68	Unknown Fragment
	CC1128-14	CC-14-F-02	Chert	825	Complete
	CC1128-14	CC-14-F-02	Chalcedony	267	Complete
	CC1128-16	CC-14-F-02	Chert	204	Complete
	CC1128-17	CC-14-F-02	Chert	478	Complete
	CC1128-18	CC-14-F-02	Chert	127	Complete
	CC1128-19	CC-14-F-02	Chert	555	Complete
	CC1054-01	CC-14-F-02	Chert	572	Complete
	CC1644-01	CC-14-J-02	Chert	178	Complete
	CC1644-02	CC-14-J-02	Chalcedony	124	Fragment
	CC1644-03	CC-14-J-02	Chalcedony	166	Fragment
	CC1644-05	CC-14-J-02	Chalcedony	315	Complete
Structure D-3	CC1421-01	CC-14-O-02	Chert	97	Fragment
	CC1652-01	CC-14-R-02	Chert	132	Fragment
	CC1642-01	CC-14-S-07	Chert	N/A	Complete
	CC1642-02	CC-14-S-07	Chalcedony	140	Lateral Fragment
	CC1642-03	CC-14-S-07	Chert	328	Fragment
	CC1408-01	CC-14-V-02	Chert	130	Complete
	CC1410-01	CC-14-V-06	Chert	123	Complete
	CC1410-02	CC-14-V-06	Chert	303	Complete
	CC1410-03	CC-14-V-06	Chert	219	Complete
	CC1410-04	CC-14-V-06	Chert	330	Complete
	CC1645-01	CC-14-V-06	Chalcedony	97	Fragment
	CC1645-03	CC-14-V-06	Chert	149	Complete
	CC1651-02	CC-14-W	Chert	459	Complete
Courtyard D-1	CC1121-01	CC-14-K-02	Chert	565	Complete
	CC1121-02	CC-14-K-02	Chert	411	Complete
	CC1121-03	CC-14-K-02	Chalcedony	1126	Complete
Structure D-48	CC1723-01	CC-14-AN-01	Chert	333	Complete
	CC1723-04	CC-14-AN-01	Chert	162	Fragment
	CC1723-03	CC-14-AN-01	Chalcedony	325	Complete
	CC1856-02	CC-14-AS-02	Chert	615	Complete
	CC1856-05	CC-14-AS-02	Chalcedony	286	Complete
	CC1856-10	CC-14-AS-02	Chalcedony	556	Complete
	CC1856-11	CC-14-AS-02	Chalcedony	311	Complete
Structure C-17	CC1705-01	CC-14-AM-02	Chert	146	Complete
Eastern Causeway	CC1648-01	CC-14-A-02	Chert	109	Fragment

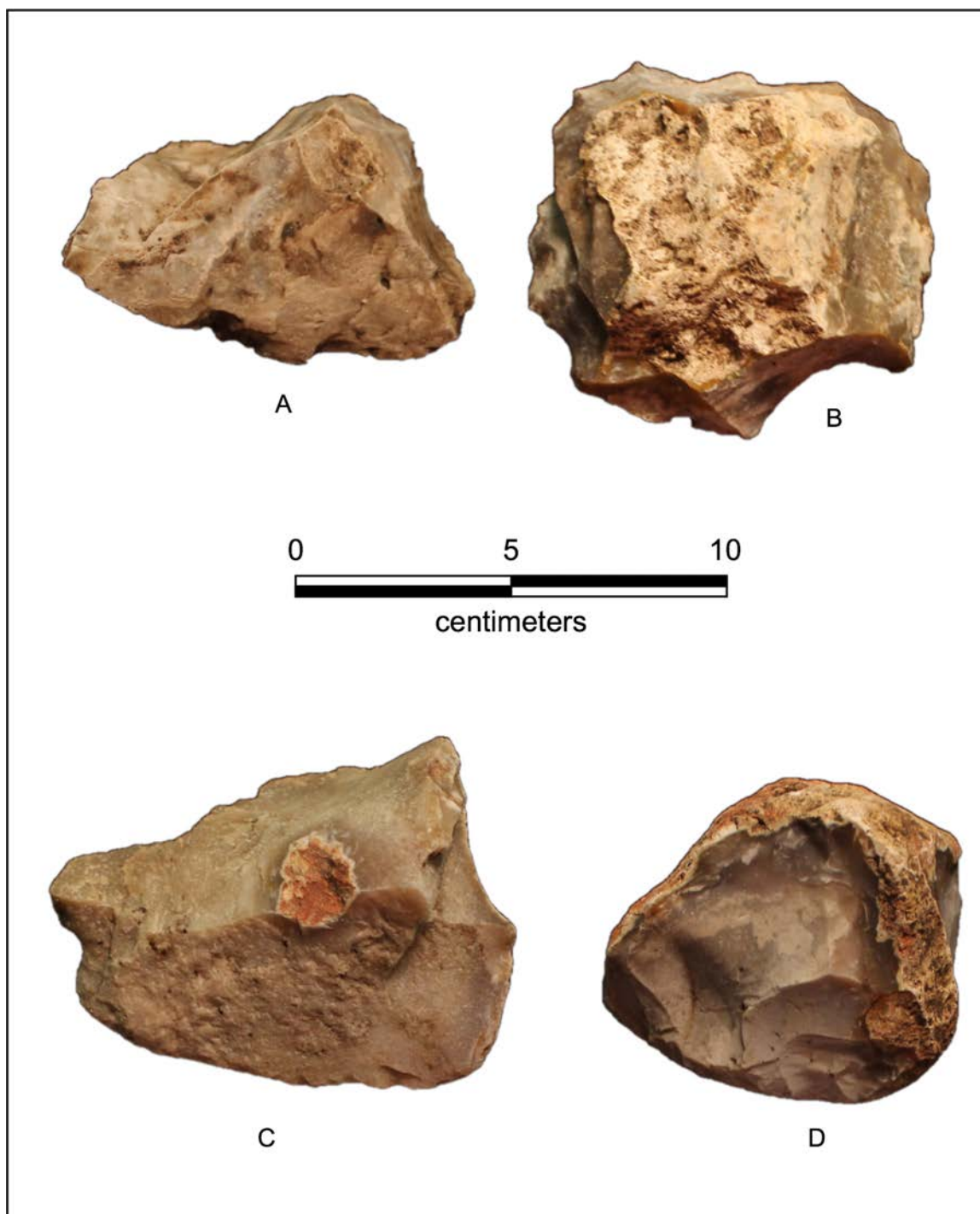


Figure 7.6 Cores. A) core from Lot CC-14-AN-01, Spec. # CC1723-01. B) core from Lot CC-14-F-02, Spec. # CC1128-14. C) core from Lot CC-14-S-02, Spec. # CC1642-02. D) core from Lot CC-14-A-02, Spec. # CC1648-01.

Unifaces

Unifaces are chipped stone stools that have been worked on only one side. Flake tools, informal tools, and expedient tools are types of unifaces distinguished from each other by the degree of intentional modification. Utilized flakes are tools made from a detached piece with little to no additional modification except that caused by use (Hyde 2003:82). These tools are typically considered as tools made for the needs of the moment that are then discarded (Hyde 2003). A total of 11 unifaces was collected, but not all were photographed. Table 7.4 lists the various unifaces and Spec. #'s collected.

Table 7.4 Unifaces and Given Spec. #s

Spec. #	Lot	Material	Weight (g)	Completeness
CC0781-01	CC014-B-02	Chert	37	Complete
CC1128-01	CC-14-F-06	Chalcedony	200	Complete
CC1128-02	CC-14-F-06	Chert	100	Complete
CC1408-05	CC-14-V-02	Chalcedony	125	Complete
CC1410-06	CC-14-V-06	Chert	138	Complete
CC1484-02	CC-14-AG-02	Chert	40	Complete
CC1485-03	CC-14-AG-01	Chalcedony	173	Complete
CC1645-02	CC-14-V-06	Chert	40	Complete
CC1856-05	CC-14-AS-02	Chert	79	Complete
CC1857-03	CC-14-AP-02	Chert	4	Complete
CC1886-01	CC-14-AP-06	Chert	38	Proximal Fragment

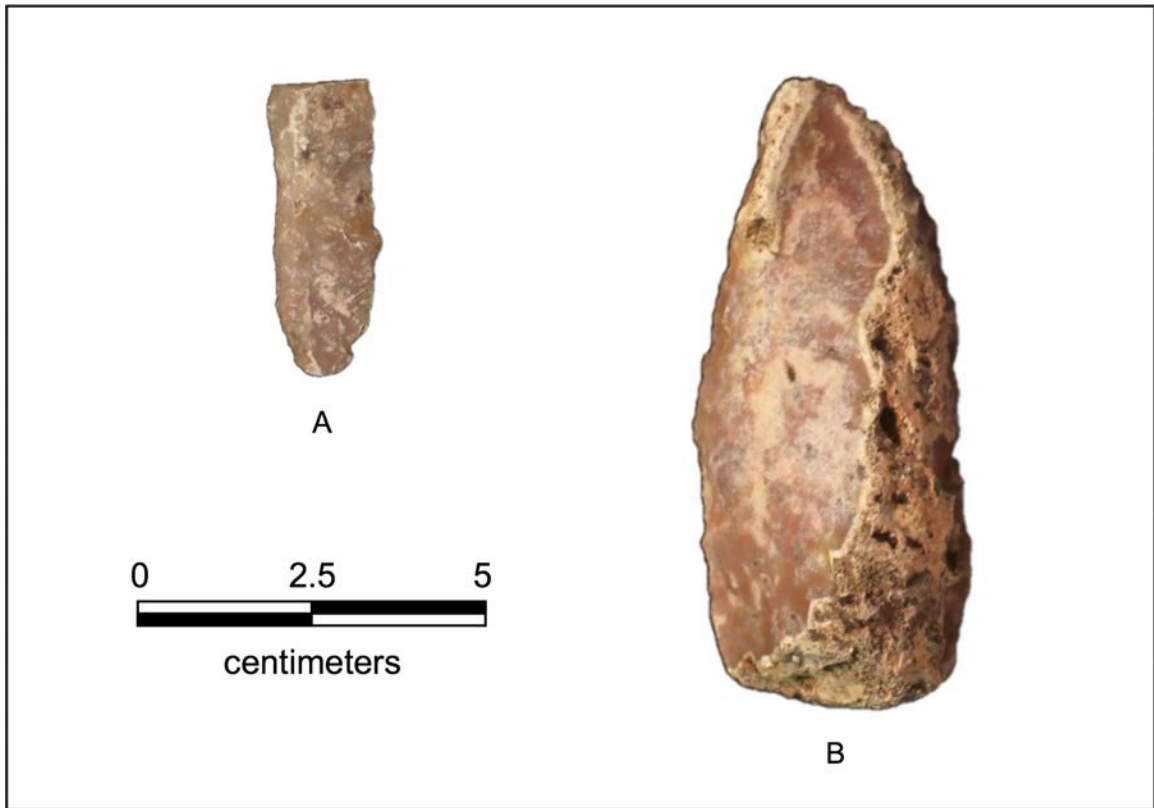


Figure 7.7 Unifaces. A) uniface from Lot CC-14-AP-02, Spec. #CC1852-03. B) uniface from Lot CC-14-AS-02, Spec. #CC1856-04.

Thin Bifaces

Thin bifaces have been worked on both sides, have a thin cross-section, and are generally well made from fine-grained chert (Hyde 2003). Thin bifaces were used as knives or multipurpose tools (Hyde 2003). Six thin bifaces were collected with two classified as thin leaf laurel bifaces. Thin leaf laurel bifaces are finely crafted from high quality chert and are oval shaped and pointed at one end (Hyde 2003:89). One thin leaf laurel biface was collected from the artifact deposit (Lot CC-14-AB-03) located on the north exterior surface of Structure D-3 (Figure 7.8B). The second was collected from Structure D-48's patio structure (Lot CC-14-AP-02) (Figure 7.8C). Three constricting stem points, two from Structure C-17 (Figure 7.8E and F) and one a surface find near the

Western Causeway (Figure 7.32), were collected. Constricting stem points are small bifaces with shoulders and stems that taper so that they are narrower at the proximal terminus than at the shoulder (Hyde 2003). One side-notched stem point was collected from Structure D-3 (Figure 7.8A). All six thin bifaces were collected from Late Classic contexts, and consisted of local and imported chert.

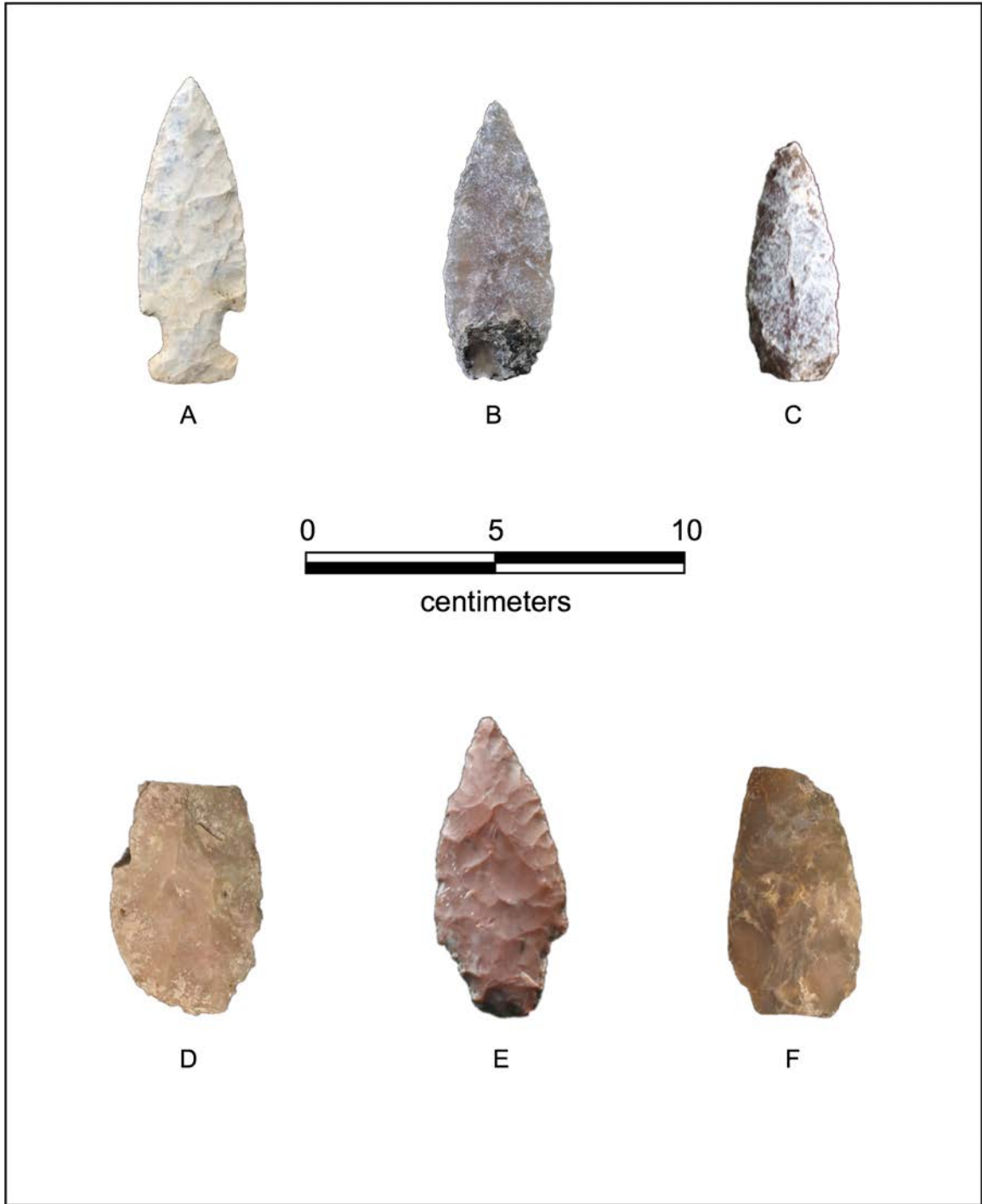


Figure 7.8 Thin Bifaces. A) side-notched spear point from Lot CC-14-L-02, Spec. # CC1809-01. B) thin leaf laurel biface with asphaltum on base from Lot CC-14-AB-03, Spec. # CC1425-01. C) thin leaf laurel biface from Lot CC-14-AP-02, Spec. # CC1781-01. D) constricted stem point biface from Lot CC-14-SF-02, Spec. # CC1623-01. E) constricted stem point biface from Lot CC-14-AM-03, Spec. # CC1780-01. F) constricted stem point biface from Lot CC-14-AM-05, Spec. # CC1829-02.

Thick Bifaces

Thick bifaces are similar to thin bifaces in that they have been worked on both sides, however thick bifaces have a thicker cross-section and are more robust. Thick bifaces were utilitarian and used as hand axes for cutting tress, plants, and crops, tools for excavating and shaping bedrock, chisels, and engravers (Hyde 2003). Oval bifaces are a common form of thick biface in the Maya lowlands. The outline of an oval biface is a teardrop with a broad, round distal bit with a tapered proximal end and a flat cross-section (Hyde 2003:80). The widest point on an oval biface is located between the medial portion and the distal terminus (Hyde 2003). General utility bifaces (GUBs) are a widespread form of a thick biface. GUBs are differentiated from ovals bifaces as thick and heavy, and marked with a biconvex or diamond-shaped cross-section and careful trimmed and shaped bits (Hyde 2003).

A total of 78 thick bifaces was collected with most of them classified as oval bifaces and GUBs. The highest concentration of thick bifaces was collected from Structure D-48 with a total of 28 bifaces. Subops CC-14-AN and -AS, which were placed on the patio structure, produced the majority of the bifaces, with 16 collected from Subop CC-14-AN and eight collected from Subop CC-14-AS. Three bifaces were collected from Structure C-17. Three bipointed bifaces were collected from the termini structures: two from Structure D-48, and the other from Structure C-17. The bifaces collected from the termini structures' patios were recovered above the final patio surface. At Structure C-18A, a large biface with a polished point was collected from the topsoil (Figure 7.11E).

A total of nine bifaces was collected from Courtyard D-1. Six bifaces were recovered from Structure D-1, with all six collected from the topsoil and collapse debris of Subop CC-14-F. Three bifaces were collected from Structure D-3 with two found above the bench surface in the collapse debris of Lot CC-14-O-02 and two found in Lot CC-14-V-02. Two oval bifaces were found in Subop CC-14-K in the construction fill used to elevate the final courtyard Surface. Four bifaces was recovered from the Eastern Causeway excavations and were found in the construction fill used to elevate the causeway. One biface was collected from a clearing unit (Subop CC-14-AH) along the Eastern Causeway. Only one biface was collected from the Western Causeway (Subop CC-14-E) from the topsoil. The bifaces collected were made from chert or chalcedony and ranged from small fragments to complete tools. Table 7.5 depicts the various bifaces collected.

Table 7.5 Bifaces and Given Spec. #s by Structure

Structure	Spec #	Lot	Subform	Material	Weight (g)	Completeness
Structure D-1	CC1128-07	CC-14-F-02	Unknown	Chert	104	Proximal Fragment
	CC1128-08	CC-14-F-02	Unknown	Chert	115	Complete
	CC1128-09	CC-14-F-02	Oval	Chert	87	Medial Fragment
	CC0912-01	CC-14-F-01	Oval	Chert	288	Proximal Fragment
	CC0912-02	CC-14-F-01	GUB	Chert	436	Distal Fragment
	CC1054-02	CC-14-F-04	GUB	Chalcedony	247	Distal Fragment

Table 7.5 (Continued)

Structure	Spec #	Lot	Subform	Material	Weight (g)	Completeness
Structure D-3	CC1089-01	CC-14-L-02	Unknown	Chert	18	Complete
	CC1421-02	CC-14-O-02	Unknown	Chalcedony	278	Complete
	CC1421-03	CC-14-O-02	Oval	Chert	215	Complete
	CC1408-01	CC-14-V-02	GUB	Unknown	340	Medial Fragment
	CC1408-07	CC-14-V-02	Unknown	Chert	22	Medial Fragment
	CC1416-01	CC-14-V-03	Unknown	Chert	25	Medial Fragment
	CC1654-01	CC-14-V-06	Oval	Chert	177	Medial Fragment
	CC1380-01	CC-14-AB-03	Unknown	Chalcedony	11	Complete
Courtyard D-1	CC0951-01	CC-14-G-02	Unknown	Chalcedony	147	Complete
	CC1116-01	CC-14-K	Oval	Chert	55	Proximal Fragment
	CC1079-01	CC-14-K-01	Oval	Chalcedony	24	Proximal Fragment
	CC1079-03	CC-14-K-01	Unknown thin biface	Chert	17	Distal Fragment
Structure D-48	CC1723-10	CC-14-AN-01	GUB	Chalcedony	91	Distal Fragment
	CC1723-06	CC-14-AN-01	GUB	Chert	160	Proximal Fragment
	CC1723-02	CC-14-AN-01	GUB	Chert	250	Complete
	CC1723-07	CC-14-AN-01	Oval	Chert	83	Distal Fragment
	CC1723-05	CC-14-AN-01	Oval	Chert	229	Complete
	CC1723-09	CC-14-AN-01	Oval	Chert	104	Distal Fragment
	CC1723-11	CC-14-AN-01	Bipointed	Chalcedony	68	Proximal Fragment
	CC1723-12	CC-14-AN-01	Oval	Chalcedony	78	Complete
	CC1723-13	CC-14-AN-01	Oval	Chert	43	Proximal Fragment
	CC1787-01	CC-14-AN-02	Bipointed	Chert	460	Complete
	CC1787-02	CC-14-AN-02	Oval	Chert	137	Distal Fragment
	CC1787-03	CC-14-AN-02	Oval	Chalcedony	189	Medial Fragment
	CC1787-04	CC-14-AN-02	Oval	Chert	133	Distal Fragment
	CC1787-05	CC-14-AN-02	Oval	Chert	209	Complete
	CC1787-06	CC-14-AN-02	Oval	Chert	119	Distal Fragment
	CC1787-07	CC-14-AN-02	GUB	Chert	349	Medial Fragment
	CC1787-08	CC-14-AN-02	GUB	Chert	270	Proximal Fragment

Table 7.5 (Continued)

Structure	Spec #	Lot	Subform	Material	Weight (g)	Completeness
Structure D-48	CC1787-10	CC-14-AN-02	GUB	Chert	448	Distal Fragment
	CC1781-01	CC-14-AP-02	Unknown	Chert	15	Medial Fragment
	CC1857-01	CC-14-AP-02	Oval	Chert	160	Distal Fragment
	CC1857-02	CC-14-AP-02	Oval	Chert	65	Distal Fragment
	CC1857-04	CC-14-AP-02	Oval	Chert	66	Distal Fragment
	CC1835-01	CC-14-AR-02	GUB	Chert	793	Proximal Fragment
	CC1856-01	CC-14-AS-02	GUB	Chert	508	Complete
	CC1856-03	CC-14-AS-02	GUB	Chalcedony	537	Complete
	CC1856-07	CC-14-AS-02	GUB	Chert	493	Distal Fragment
	CC1856-08	CC-14-AS-02	Oval	Chalcedony	12	Proximal Fragment
	CC1856-09	CC-14-AS-02	Oval	Chalcedony	78	Proximal Fragment
	CC1856-12	CC-14-AS-02	GUB	Unknown	393	Proximal Fragment
	CC1844-01	CC-14-AS-02	GUB	Chert	1090	Distal Fragment
	CC1844-02	CC-14-AS-02	Oval	Chert	152	Distal Fragment
Structure C-17	CC1780-01	CC-14-AM-03	Unknown	Chert	24	Complete
	CC1804-01	CC-14-AM-03	Bipointed	Chert	88	Complete
	CC1829-06	CC-14-AM-05	Oval	Chalcedony	7.9	Complete
	CC1705-02	CC-14-AM-05	Oval	Chert	116	Medial Fragment
	CC1829-03	CC-14-AM-05	Unknown	Chert	29	Medial Fragment
	CC1829-04	CC-14-AM-05	Oval	Chert	166	Medial Fragment
	CC1802-01	CC-14-AM-02	Unknown	Chert	92	Proximal Fragment
	CC1829-02	CC-14-AM-05	Unknown	Chert	59	Proximal Fragment
	CC1802-03	CC-14-AM-02	Unknown	Chert	39	Unknown Fragment
	CC1829-01	CC-14-AM-05	Unknown	Chert	25	Distal Fragment
Structure C-18A	CC1778-01	CC-14-AU-01	Unknown	Chert	686	Complete

Table 7.5 (Continued)

Structure	Spec #	Lot	Subform	Material	Weight (g)	Completeness
Eastern Causeway	CC1648-02	CC-14-A-02	GUB	Chert	303	Distal Fragment
	CC1648-03	CC-14-A-02	Oval	Chert	165	Distal Fragment
	CC1648-04	CC-14-A-02	GUB	Chert	155	Distal Fragment
	CC0782-01	CC-14-B-02	Oval	Chert	134	Proximal Fragment
Western Causeway	CC1623-01	CC-14-SF-02	Constricting stem point	Chert	145	Proximal fragment

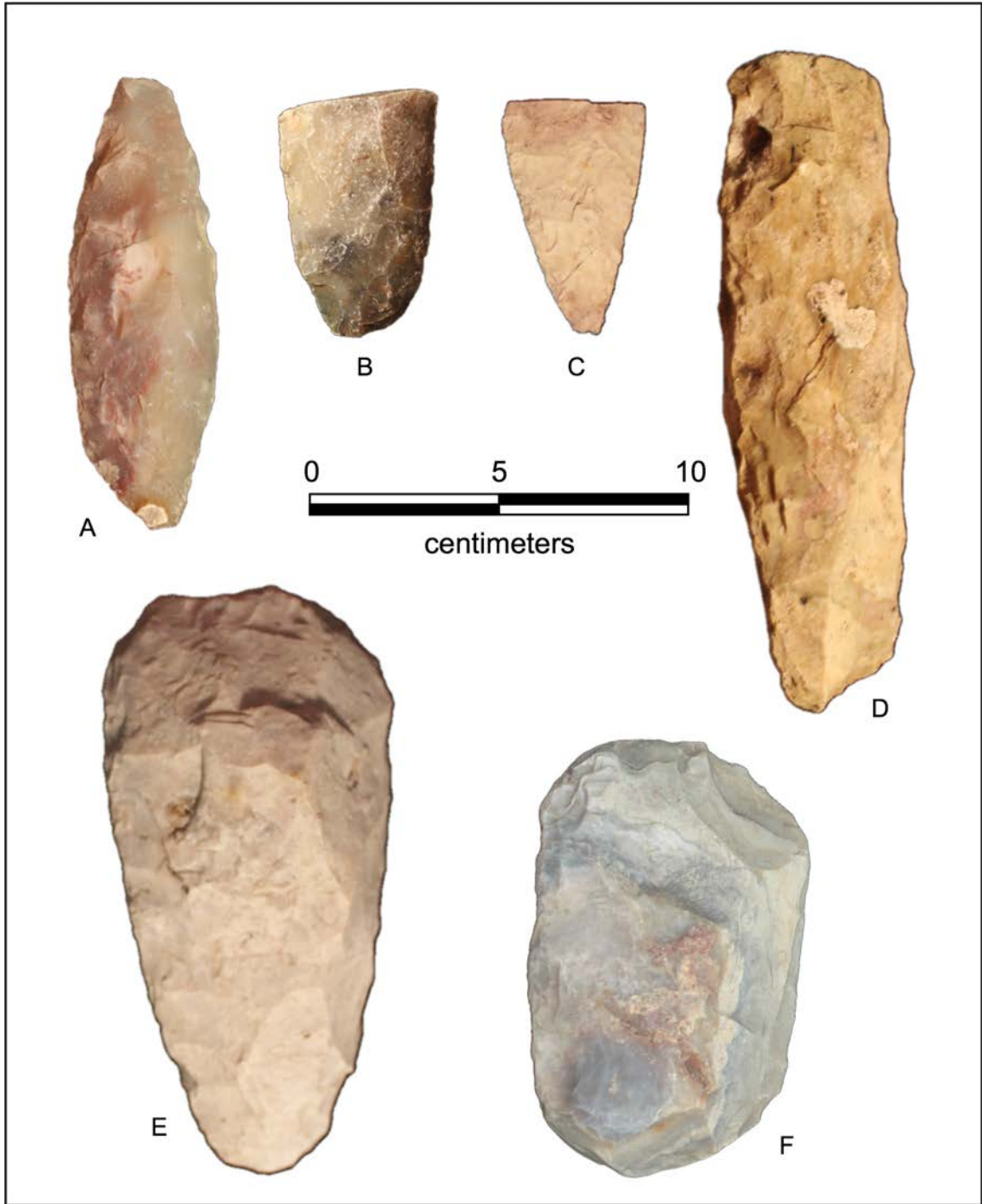


Figure 7.9 Thick Bifaces. A) bipointed biface from lot CC-14-AM-03, Spec. #CC1804-011. B) bipointed biface from Lot CC-14-AN-01, Spec. # CC1723-01 C) biface from Lot CC-14-K-01, Spec. # CC1116-01. D) bipointed biface from Lot CC-14-AN-01, Spec. #CC1723-12. E) biface from artifact deposit (Lot CC-14-V-03), Spec. #CC1416-01. F) biface from Lot CC-14-F-01, Spec. # CC0912-01.

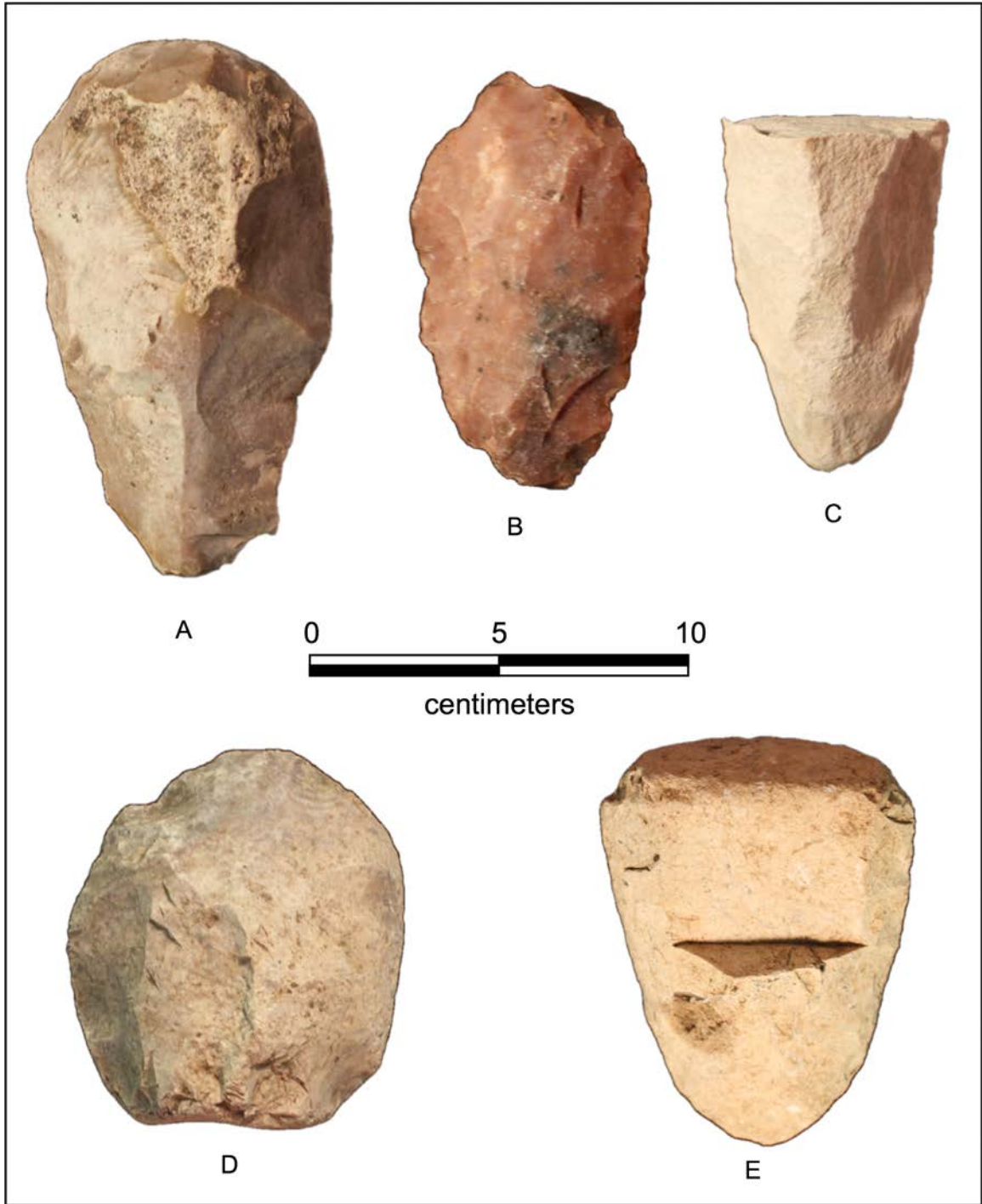


Figure 7.10 Thick Bifaces. A) biface from Lot CC-14-AN-01, Spec. #CC1723-02. B) biface from Lot CC-14-AS-01, Spec. #CC1842-01. C) biface Lot CC-14-F-01, Spec #CC-0912-02. D) biface from Lot CC-14-AS-01, Spec. #CC1842-02. E) biface from Lot CC-14-AS-02, Spec. #CC1856-03.

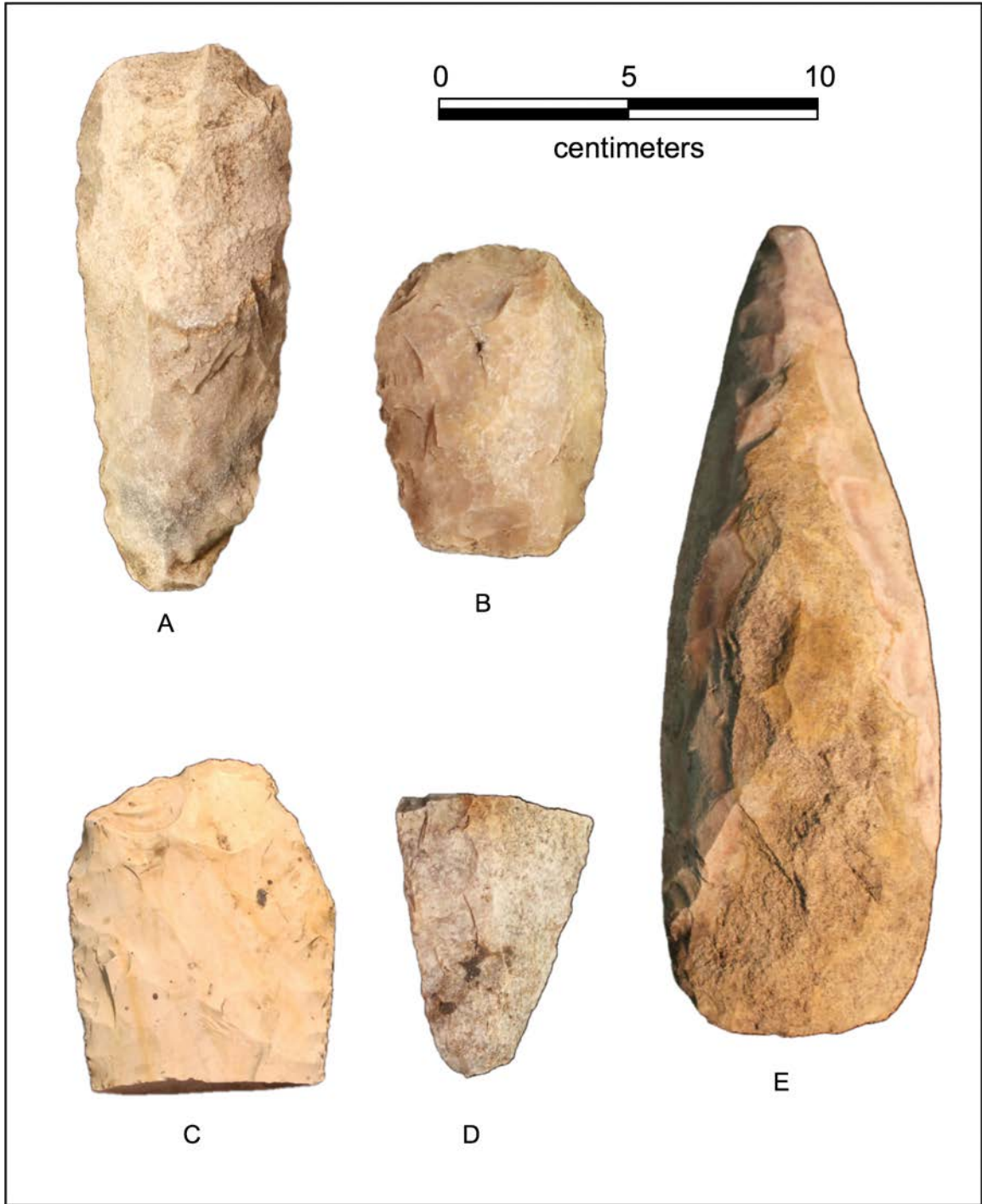


Figure 7.11 Thick Bifaces. A) biface from Lot CC-14-AN-01, Spec. #CC1723-05. B) biface from Lot CC-14-AS-01, Spec. #CC1842-03. C) biface from Lot C-14-AN-01, Spec. #CC1723-08. D) biface from Lot CC-14-AS-02, Spec. #CC1856-08. E) biface with polished proximal end from Lot CC-14-AU-01, Spec. #CC1778-01.

Hammerstones

Hammerstones are battered tools used to strike an object for the purpose of removing flakes and are generally spheroid to elongated in shape with battering on some part of the stone (Hyde 2003). Hammerstones are divided into subcategories: battered cobbles and battered bifaces. Battered cobbles have varying degrees of battering at one or more locations. The morphology of battered cobble hammerstones varies from extensive shaping and spheroid to amorphous (Hyde 2003). Battered bifaces are broken bifaces that have been recycled into hammerstones, with the entire lateral margin often possessing evidence of battering (Hyde 2003). Six hammerstones were collected with all but one recovered from Structure D-1. The remaining hammerstone was found at Structure D-48. The hammerstones collected were battered cobbles. Figure 7.12 shows an example of a hammerstone collected from the excavations at Structure D-48.

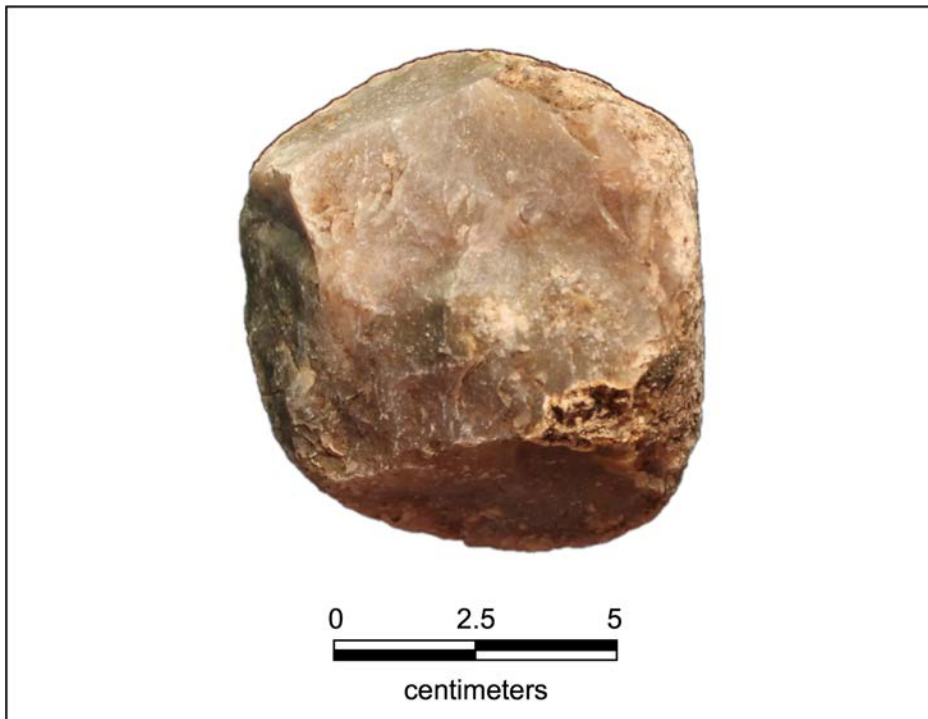


Figure 7.12 Hammerstone from Lot CC-14-AN-01, Spec. # CC1723-08

Obsidian

Obsidian is a naturally formed volcanic rock and was an important component of the material culture of the Maya. The highland Guatemalan sites of San Martín, Ixtepeque, El Chayal, and Jiltepeque have been identified as obsidian sources in the Maya area (Sidrys 1976). Obsidian has both utilitarian and ritual uses and is found throughout the Maya area in domestic and ritual settings. Difference in use-wear patterns indicates numerous functions such as elite use in bloodletting activities or as grave offerings. Obsidian is also found in domestic settings with multipurpose use such as hunting, food preparation, and agriculture (Glasscock et al. 1998). Obsidian was worked into a variety of different tools including knives, projectile points, prismatic blades, and utilized flakes (Glasscock et. al 1998). Obsidian can be sourced to the specific area in which it originated through a variety of geochemical analysis techniques and, some suggest, visual sourcing (Moholy-Nagy 2003). Table 7.6 reports the obsidian collected.

This research collected a total of 41 obsidian pieces that consisted of prismatic blades, and flakes. Prismatic obsidian blades are common domestic tools that were used as cutting utensils for the processing of animal meats and hides and working wood, bone, and shell (Glasscock et. al 1998). Obsidian flakes and debitage are the byproducts of manufacturing and retouching of obsidian blades. Obsidian flakes could be utilized as expedient tools and then quickly discarded (Glasscock et al. 1998). A total of 36 prismatic obsidian blades, two obsidian flakes, one piece of debitage, and two fragments of obsidian that were unidentifiable were collected. The highest concentration (per building) of obsidian was recovered from Structure D-48. The patio of Structure D-48

produced five pieces, and excavations of the structure yielded seven pieces of obsidian, six that were collected from Subop CC-14-AW (Figure 7.14N-S). Similarly, a high concentration of obsidian pieces, six in total, were collected from Structure C-17's patio structure. The obsidian from the termini patio structures was primarily collected from the topsoil and the collapse debris above the final patio surfaces. At Structure C-17, one obsidian piece was found in the construction fill used to cover and replace the earlier platform face. The ceramic assemblage found in association with the obsidian pieces date to the Late-to-Terminal Classic period.

Courtyard D-1 produced a total of 19 obsidian pieces with all but one classified as blades. A total of 11 obsidian blades was collected from Structure D-1 with a high concentration found in the topsoil and collapse debris, which the ceramic assemblage dated to the Late-to-Terminal Classic period. An obsidian blade was collected from Lot CC-14-U-02 (Figure 7.14K) above the interior bench surface. One obsidian piece was found in the construction fill beneath the floor of Lot CC-14-D-10, which was dated to coincide with the Late Preclassic period. Structure D-3 had a total of six pieces of obsidian, with all but one found in the topsoil and collapse debris, similar to Structure D-1. One piece of obsidian was found among the artifact deposit (Lot CC-14-S-06) located on the west exterior surface of Structure D-3. Similar to Structure D-1, an obsidian blade was found above the bench surface of Lot CC-14-O-02 (Figure 7.14H). The courtyard chronology pit produced two obsidian blades from the uppermost courtyard floor (Lot CC-14-K-02) (Figure 7.14E-F).

Of the nine clearing units placed along the Eastern and Western Causeways, only the Eastern Causeway produced any obsidian, which was concentrated in one

suboperation. Two obsidian blades and one piece of obsidian debitage were recovered from the topsoil of Subop CC-14-AG (Figure 7.14A-B). Excavations of the Western Causeway (Subop CC-14-E) yielded one obsidian blade from the topsoil, however the Eastern Causeway architectural units did not recover any obsidian.

Table 7.6 Obsidian and Given Spec. #s by Structure

Structure	Spec #	Lot	Form	Weight (g)	Completeness
Structure D-1	CC0925-01	CC-14-D-01	Blade	0.6	Fragment
	CC1021-01	CC-14-D-10	Blade	0.5	Medial Fragment
	CC0964-01	CC-14-F-02	Blade	0.7	Medial Fragment
	CC1086-01	CC-14-F-04	Blade	0.8	Medial Fragment
	CC1095-01	CC-14-F-05	Blade	0.3	Proximal Fragment
	CC965-01	CC-14-G-02	Blade	1.7	Medial Fragment
	CC1098-01	CC-14-J-01	Blade	1.2	Proximal Fragment
	CC1085-01	CC-14-J-02	Blade	0.6	Proximal Fragment
	CC1383-01	CC-14-Q-02	Blade	0.7	Distal Fragment
	CC1310-01	CC-14-T-02	Blade	3.0	Medial Fragment
	CC1272-01	CC-14-U-02	Blade	2.4	Proximal Fragment
Structure D-3	CC1097-01	CC-14-L-01	Blade	2.2	Proximal Fragment
	CC1344-01	CC-14-O-02	Blade	1.7	Proximal Fragment
	CC1277-01	CC-14-S-06	Blade	0.2	Lateral Fragment
	CC1571-01	CC-14-V-02	Blade	1.0	Proximal Fragment
	CC1367-01	CC-14-AB-01	Flake	0.7	Complete
	CC1719-01	CC-14-AB-02	Blade	0.3	Medial Fragment
Courtyard D-1	CC1096-01	CC-14-K-02	Blade	0.2	Medial Fragment

Table 7.6 (Continued)

Structure	Spec #	Lot	Form	Weight (g)	Completeness
Structure D-48	CC1720-01	CC-14-AN-01	Flake	0.3	Complete
	CC1720-02	CC-14-AN-02	Blade	0.4	Proximal Fragment
	N/A	CC-14-AP-01	N/A	N/A	N/A
	N/A	CC-14-AP-01	N/A	N/A	N/A
	CC1816-01	CC-14-AP-02	Blade	0.5	Fragment
	CC1897-01	CC-14-AW-02	Blade	2.0	Proximal Fragment
	CC1897-02	CC-14-AW-02	Blade	1.5	Medial Fragment
	CC1897-03	CC-14-AW-03	Blade	2.1	Proximal Fragment
	CC1897-04	CC-14-AW-03	Blade	1.6	Proximal Fragment
	CC1897-05	CC-14-AW-03	Blade	1.0	Proximal Fragment
	CC1897-06	CC-14-AW-03	Blade	0.8	Medial Fragment
	CC1823-01	CC-14-AV-01	Blade	1.4	Fragment
Structure C-17	CC1819-01	CC-14-AM-02	Blade	1.3	Fragment
	CC1819-02	CC-14-AM-02	Blade	0.9	Fragment
	CC1819-03	CC-14-AM-02	Blade	1.2	Fragment
	CC1819-04	CC-14-AM-02	Blade	0.5	Fragment
	CC1819-05	CC-14-AM-02	Blade	0.6	Fragment
	CC1901-01	CC-14-AM-05	Blade	0.8	Medial Fragment
Structure C-18A	CC1822-01	CC-14-AU-02	Blade	0.6	Fragment
Eastern Causeway	CC1718-01	CC-14-AG-01	Blade	0.9	Medial Fragment
	CC1718-02	CC-14-AG-02	Blade	1.0	Medial Fragment
	CC1718-03	CC-14-AG-03	Debitage	1.2	Unknown Fragment
Western Causeway	CC0384-01	CC-14-E-01	Blade	0.1	Unknown Fragment

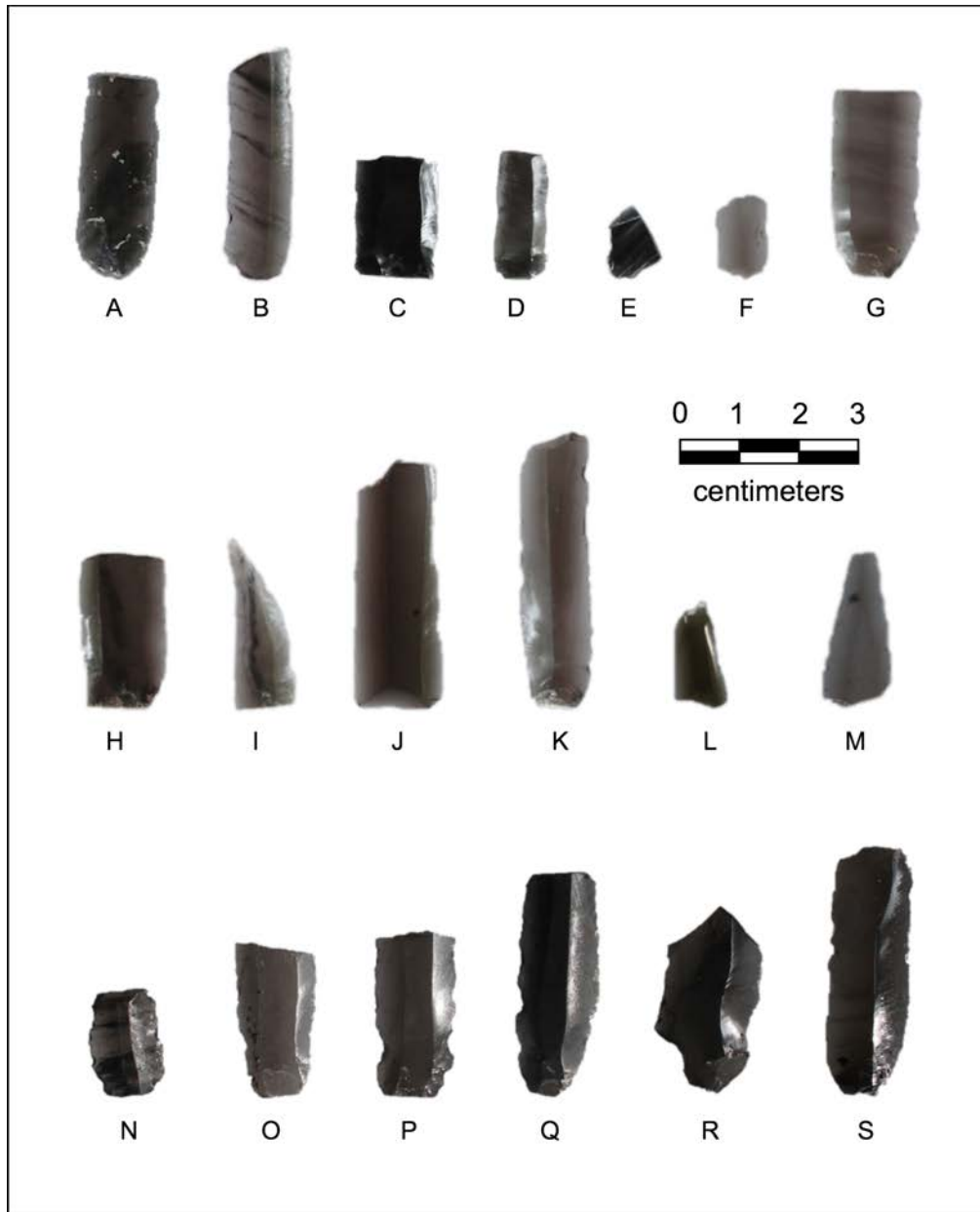


Figure 7.13 Obsidian blade fragments. A) Lot CC-14-AP-02, Spec. # N/A. B) Lot CC-14-G-02, Spec. # CC0965-01. C) Lot CC-14-J-01, Spec. # CC1098-01. D) Lot CC-14-J-02, Spec. # CC1085-01. E) Lot CC-14-K-02, Spec. # CC1096-01. F) Lot CC-14-K-02, Spec. # CC1096-02. G) Lot CC-14-L-01, Spec. #CC1097-01. H) Lot CC-14-O-01, Spec. #CC1344-01. I) Lot CC-14-Q-02, Spec. #CC1383-01. J) Lot CC-14-T-02, Spec. #CC1310-01. K) Lot CC-14-U-02, Spec. #CC1272-01. L) Lot CC-14-AB-02, Spec. #CC1719-01. M) fragment, Lot CC-14-AP-02, Spec. # N/A. N) Lot CC-14-AW-02, Spec. # CC1897-01. O) Lot CC-14-AW-02, Spec. # CC1897-02. P) Lot CC-14-AW-02, Spec. # CC1897-03. Q) Lot CC-14-AW-02, Spec. # CC1897-04. R) Lot CC-14-AW-02, Spec. # CC1897-05. S) Lot CC-14-AW-02, Spec. # CC1897-06.

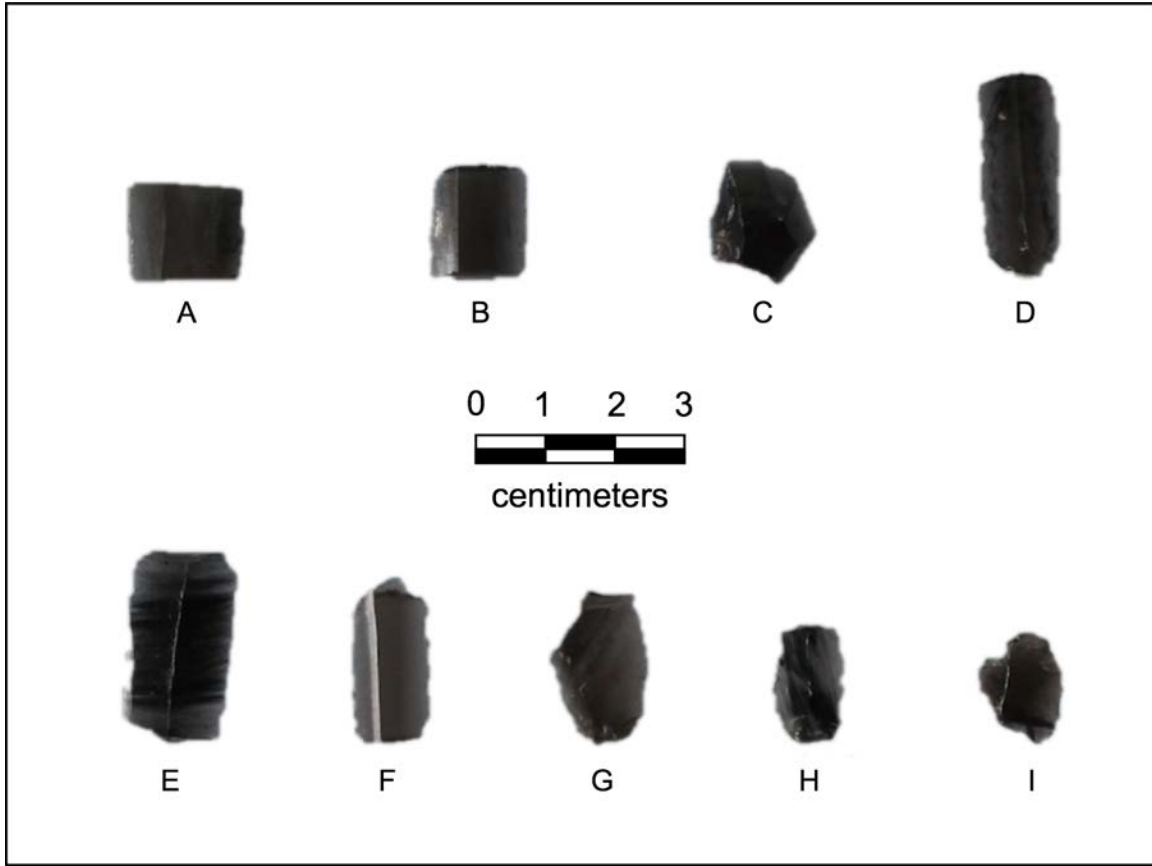


Figure 7.14 Obsidian fragments. A) Lot CC-14-AG-01, Spec. # CC1718-01. B) Lot CC-14-AG-01, Spec. # CC1718-02. C) Lot CC-14-AG-01, Spec. # CC1718-03. D) Lot CC-14-AU-02, Spec. #CC1822-01. E) Lot CC-14-Am-02, Spec. # CC1819-01. F) Lot CC-14-Am-02, Spec. # CC1819-02. G) Lot CC-14-Am-02, Spec. # CC1819-03. H) Lot CC-14-Am-02, Spec. # CC1819-04. I) Lot CC-14-Am-02, Spec. # CC1819-05.

Shell and Faunal

A total of 167 faunal remains was recovered, with all of them collected from Courtyard D-1. The faunal remains consisted of large mammals such as deer and peccary as well as small rodents such as mice. The smaller faunal remains were primary found in the topsoil and collapse debris of both Structure D-1 and Structure D-3, which could indicate the rodents are more recent and not associated with the occupation period of Courtyard D-1. Deer vertebra was found on top of the earliest west exterior floor surface

(Lot CC-14-S-08) of Structure D-3, and 46 faunal remains that refit back together to form the mandible of a white-tailed deer where found above the final north exterior patio surface in Subop CC-14-G (Lori Phillips personal communication, 2015). The location of faunal remains above floor surfaces could indicate a food consumption or preparation area, although the sample size is too small to accurately draw any definitive conclusions.

Shell was commonly encountered in all excavation locations with various types identified. *Jute* was the most common shell form collected. There are two species of *jute* found in Mesoamerica: *Pachychilus indiourm*, a small, tightly coiled and smooth shell; and *Pachychilus glaphyrus*, which is a heavy elongated shell with vertical plicae and revolving folds of shell (Healy et al. 1990; Phillips 2014). The Maya utilized *jute* as a protein supplement to their maize-based diet (Healy et al. 1990). To remove the meat from the *jute* shell, the apex of the shell would be removed, creating a spire-lopped modification to the *jute* shell. Spire-lopped *jute* are a marker of human agency and are typically interpreted as food items. *Jute* were sometimes cooked to make a broth, in which case the distal end of the shell was not removed. Thus, the absence of spire-lopping does not preclude the possibility of use as a food item and should not always be interpreted as ritual (Healy et al. 1990) A total of 211 *jute* was collected; it all came from Courtyard D-1 with most of the *jute* concentrated on Structure D-3 above the bench surface. All of the *jute* collected was spire-lopped. There were 135 *jute* shells collected from the northeast portion of Lots CC-14-L-01 and -02 and another 14 *jute* shells collected from the adjacent Lot CC-14-O-02. The remaining *jute* shells were found dispersed throughout the rest of Structure D-3 and Structure D-1. The large concentration

of *jute* shells found above the bench surface on Structure D-3 could have a function aside from food consumption, such as a ritual deposit as discussed in the following chapter.

Shell beads or tinklers were found at Courtyard D-1 and are characterized by holes punctured on the shell's surface (Phillips 2014). Three of the four shell beads collected were found at Structure D-3 above the bench surface in collapse debris (Lots CC-14-O-02, -V-02, and -AB-02). All three shell beads were barrel in form with a small perforation through the center (Figure 7.15C). The shell tinklers recovered from Structure D-3 were likely a part of costume jewelry and found in Late-to-Terminal Classic deposits. The fourth shell bead was found in association with Burial CC-B14 (Figure 7.15B), which was located within the C-shaped bench in Structure D-1. The shell bead was tubular with remnants of a red pigment. The bead was found underneath a cervical vertebra and possibly a part of a necklace placed around the neck of the interred individual.

Marine shell was also collected from various locations, but predominantly found at Courtyard D-1. Fragments of conch shell were recovered from Structure D-1 (Figure 7.15D). The only concentration of conch shell was collected from Subop CC-14-R, above the south exterior surface. Approximately 24 pieces of fragmented conch shell was collected and found in association with numerous ceramics, some of which were from the reconstructable vessels and plates, and faunal and human remains. Located on the west exterior surface of Structure D-3, a West Indian chank shell was found in association with an artifact deposit that included the remains of human long bones. The West Indian chank shell had the tip removed and smoothed and the outer lip of the shell was broken (Figure 7.15A). Given the modification to the shell, it is likely that it functioned as a trumpet.

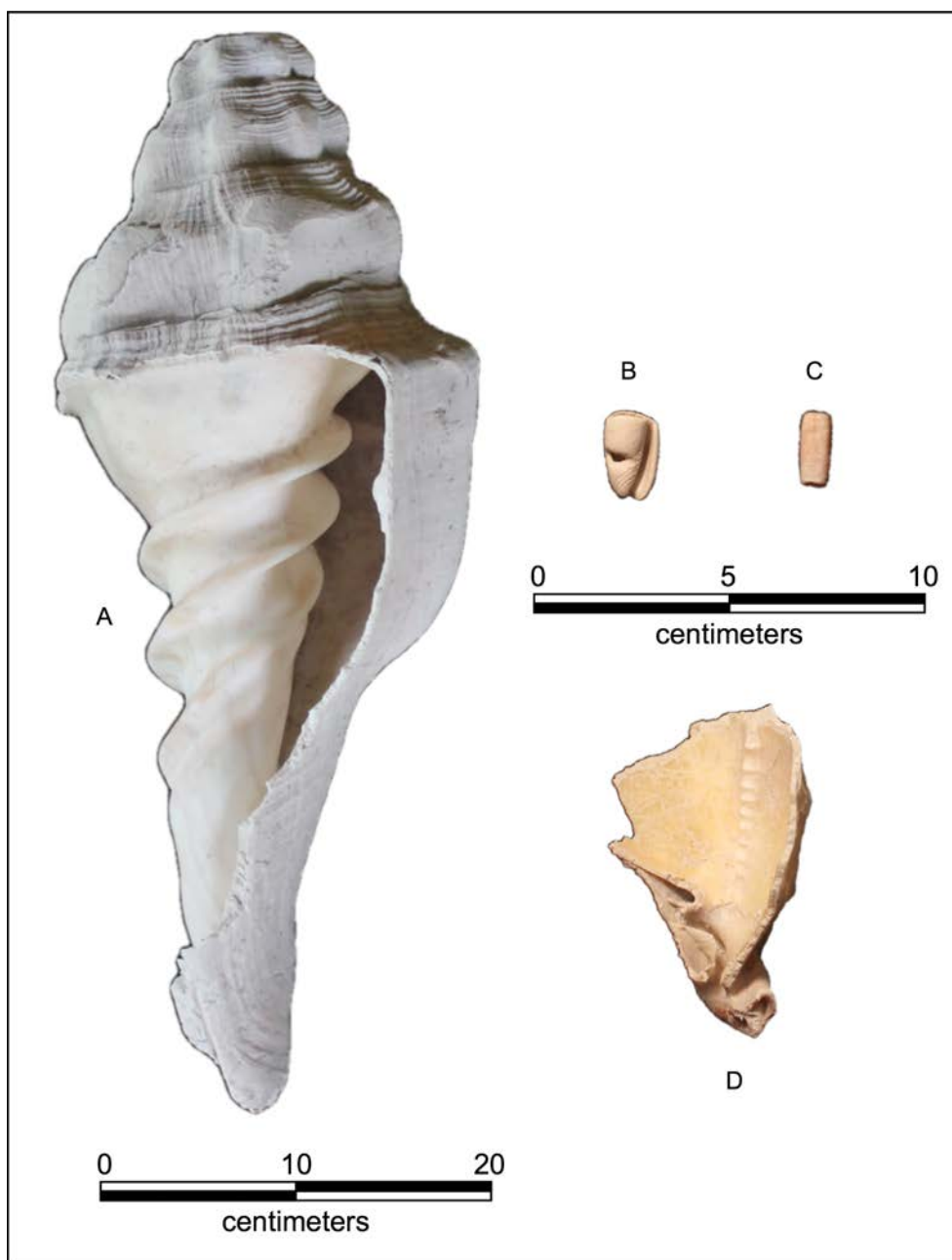


Figure 7.15 Shell artifacts A) West Indian chank shell (Lot CC-14-S-06) Spec. #CC1312-01. B) shell tinkler collected from Lot CC-14-L-02, Spec. #CC1163-01. C) shell bead Lot CC-14-L-02, Spec. #CC1163-01. D) conch shell Lot CC-14-R-02.

Summary

The collection and analysis of artifacts is an important component of excavations and provide essential information concerning the chronology and function of the structures and *sacbeob* excavated over the course of the 2014 and 2015 field seasons. Ceramics were the most common form of artifact collected and provided date ranges for the occupation of Courtyard D-1 as well as dates for the construction and use of the Eastern and Western Causeways. The artifacts collected from Courtyard D-1 and the presence of spiral-lopped *jute* and faunal remains suggest that Courtyard D-1 was primarily residential. However, the shell tinklers, the thin bifaces, and the West Indian chank shell may reflect ritual elements that could be associated with processions that took place on the Eastern Causeway. Although there was a large amount of artifacts collected from the causeway terminus structures, unfortunately, the assemblage is not consistent with what would be expected if the structures functioned as shrines. The large concentration of obsidian found on Structure D-48, specifically Subop CC-14-AW could suggest a possible ritual function, however more extensive testing of the structure is needed to definitively conclude a ritual function.

Chapter 8

Interpretations, Discussion, and Conclusions

This chapter discusses the architectural and functional interpretations of Courtyard D-1, Structures C-17 and D-48, and the *sacbeob*. These interpretations are based on the excavations conducted and the artifacts collected, and are organized and discussed by area. A comparative analysis of similar *sacbeob*, termini structures, and courtyards adjacent to causeways is used to further determine structure function. Finally, the previously proposed research questions are answered, and the chapter concludes with remarks about the function of the Eastern and Western Causeways and associated structures.

Architectural Interpretations and Functional Assessment of Courtyard D-1

Architectural Interpretations of Structure D-1

Excavations of Structure D-1 exposed several renovations and construction episodes to the building with an initial occupation period dating to the Late Preclassic period with use through the Terminal Classic period. The final architectural form of Structure D-1 was a single roomed building with an exterior patio on the east and a vaulted entryway. The remainder of the superstructure was composed of thatch and pole supported by mid-height masonry walls along the courtyard side. The final phase dated to the Late Classic period with use through the Terminal Classic period. The east exterior of Structure D-1 had a series of steps and platforms representing different construction episodes, with the earliest step and associated exterior patio dated to the Late Preclassic

period. The final-phase east exterior wall was well preserved with a 7 cm high footer offset from the rest of the wall by 2-3 cm. At one point, Structure D-1 had two entryways into the interior of the building, however a construction event filled in the south entryway, leaving only one entrance on the north. The north entryway was approximately 1.96 m wide and included a step that separated the interior floor from the exterior patio surface. The south doorway jamb is attached to the east exterior wall and approximately 55 cm tall. The north doorway jamb was visible only in profile and its associated wall was not uncovered. Excavations of the western exterior determined that the substructure was a terraced platform, although the exterior west wall was partially collapsed down the face of the mound and completely collapsed away in other areas.

A C-shaped bench with its subsequent addition to the south dominated the interior of Structure D-1. Two burials were found inside the bench structure; Burial CC-B12 was located in the southern extension of the bench, and Burial CC-B14 was located in the southern portion of the original bench near the east exterior wall. The burial cut through the final exterior surface and was placed on a surface 11 cm below, revealing an earlier construction episode. Penetrating excavations of Structure D-1 need to be conducted to further expose the earlier, unexplored architecture.

Architectural Interpretations of Structure D-3

Two construction episodes were uncovered on Structure D-3 with the final architecture dated to the Late Classic period with use through the Terminal Classic period, coinciding with Structure D-1's occupation. The final architectural form consisted of low masonry walls that would have supported a perishable structure. Numerous vault

stones were found throughout the collapse debris, although the volume of collapse debris, topography, and architecture suggest the building did not support a vaulted entryway. The vault stones were likely robbed from other areas of the site and repurposed. The north exterior consisted of a platform face that separated Structure D-3 from the courtyard surface and Structure D-1. Two construction events were uncovered on the west exterior portion of Structure D-3. The earlier architecture consisted of a small patio surface adjacent to the west exterior wall and a platform face that separated the small patio from Structure D-1. A Late Classic renovation raised the west exterior patio and a new platform face was created that diminished the overall area of the patio.

Structure D-3 had a single, 96-cm wide entryway to the north. The east doorway jamb is attached to an exterior wall that had evidence of two construction events. The west doorway jamb is attached to the platform face; the west portion of the structure did not have an exterior wall. The platform face would have extended toward the east where it would have separated the courtyard surface from the small exterior surface adjacent to the northeast exterior wall. The south exterior wall was in poor condition and had collapsed away in the majority of places, with only wall core remaining.

The interior of Structure D-3 was composed of two rooms unequal in size, with the larger room containing a bench. The larger room measures 5.4 m east to west and 4.5 m north to south and is dominated by a bench that extends to the poorly preserved south exterior wall. The bench extends to the northern edge of the building, ending at the platform face described above. The bench face is four courses high with the top course of stone slightly outset, creating a small overhang that extends 5 cm over the facade of the bench. The smaller room is accessed via the larger room by a step, elevating the interior

floor by 20 cm. The smaller room measures 1.60 m east to west by 1.40 m north to south. A cross wall divides the larger room from the smaller room and extends to articulate with the south wall.

Functional Interpretations of Courtyard D-1

Understanding the basic construction components of a Maya courtyard is critical when attempting to understand courtyard function. Andrews (1975) described Maya courtyards as paved, leveled opened space defined by the structures surrounding them. The exterior patio and/or courtyard floors were typically composed of cobble fill covered with plaster to form an impervious surface. The structures surrounding the courtyard provided differing levels of public and private spaces, and depending on building association and varying levels of accessibility, courtyards can serve as either public or private spaces or both (Andrews 1975). Public spaces are categorized as areas with high visibility such as plazas, and administrative buildings, and are not restricted in access. Private spaces were restricted areas defined by their architectural layouts with limited view (Andrews 1975).

Courtyards near the epicenter of a Maya city mostly functioned as residences for the elite, administrative facilities, servant quarters, food preparation areas, ritual spaces, or craft specialization areas (Andrews 1975; Inomata et al. 2002). Maya courtyards typically were multifunctional spaces rather than single use. To understand the multiple functions of a courtyard, the architecture and the layout (i.e., public versus private) coupled with the material assemblage found in the structures need to be analyzed (Inomata et al. 2002).

Courtyard D-1 was heavily modified throughout its use and exhibited a long occupation period beginning in the Late Preclassic period and ending in the Terminal Classic period. As with other areas of the site, there is not evidence for Early Classic construction at the courtyard, but there is strong evidence for multiple Late Classic construction events in the courtyard itself and its surrounding structures. The primary function of Courtyard D-1 was likely residential throughout much of its occupation. The restricted access of Courtyard D-1, the architecture discovered, such as the benches in Structures D-1 and D-3, the burials recovered, and the high quantity of faunal remains indicate that Courtyard D-1 was likely a residential area. The artifact assemblage collected from Courtyard D-1, which included the large quantity of manos and metates, ceramics, hammerstones, and bifaces, is also indicative of a residential function.

Elite residences are identified by spatial indicators such as restricted access to enclosed places and spatial proximity to the site core. Architecture can also denote elite residence. Varying degrees of vaulted rooms, low masonry walls with perishable superstructures, and masonry walls with thatch roofing are common characteristics of elite residences (Andrews 1975). Material assemblages recovered can also reflect elite status (Andrews 1975). The restricted access to the courtyard, and the close proximity to the site core, along with the unusual vaulted entrance of Structure D-1, and the apparent elite items such as the thin bifaces and costume jewelry found within Structure D-3 indicate that the courtyard could have functioned as an elite residential area.

While the primary function of Courtyard D-1 was residential, it is likely that the courtyard incorporated or took on a more ritual function during the Late Classic period with the construction of the Eastern Causeway. Shaw (2003) notes that structures

predating the construction of a causeway were likely incorporated into the causeway function following its completion. Following the construction of the Eastern Causeway during the Late Classic period, Courtyard D-1 shifted from a primarily elite residential function to a more ritual function. Ritual artifacts recovered from both Structures D-1 and D-3, found in Late to Terminal Classic contexts, further supports Courtyard D-1 transitioning to a ritual function, possibly associated with processions.

Structure D-1 exhibits evidence of possible ritual activity. Excavations of the interior of Structure D-1 discovered the base of a Late Classic ceramic drum on the interior floor surface at the base of the bench. Drums were one of several musical instruments used in processions along causeways. Burial CC-B14 provides strong evidence for ritual activity at Structure D-1. Burial CC-B14 contained the remains of a female individual interred in a seated position with arms crossed at her chest. The LC₁, LI₁, and RI₂ showed evidence of a B4 modification (Romero 1958). This type of filling has been identified as resembling the Maya calendar day name “Ik,” and was likely not just intended as simple adornments but carried a religious or esoteric significance (Mayer 1983; Tiesler 2010). Deer antler was found positioned behind the skull, which could indicate she was buried wearing a headdress. A mold-made spindle whorl and shell bead were also found in association with the female individual, and date to the Late Classic period. The combination of the B4 filing, location of the deer antler, and the spindle whorl suggest that the interred was a ritual specialist, or at the very least she was an important spinner or craft specialist (Booher and Houk 2015).

At Structure D-3, several artifacts recovered from throughout the structure indicate ritual activity. A dense artifact deposit was found along the west exterior wall on

the final exterior surface, which had evidence of burning. Among the numerous artifacts collected from the deposit, the most noteworthy was a West Indian chank (*Turbinella angulate*) shell, which had the tip removed and smoothed and missing two-thirds of its outer lip. Marine shells have been used as musical instruments in almost all parts of the world, including Mesoamerica, where large univalves had a utilitarian function (Novella 1991). Before being used as a trumpet, some modifications the shell had to be undertaken to control the sound. The apex of the spire was removed, usually by grinding, and the resulting orifice was usually smooth (Novella 1991). The West Indian chank shell became a trumpet when a blowhole was made through the apex. Other, special modifications such as the drilling of holes through the shell surface or the removal of an outer lip were used to modify the sound quality (Novella 1991) The trumpet was used by blowing into the apex, which allowed air to pass through the body of the shell and exit through the aperture between the main body and the lip of the shell. The sound produced could vary in intensity either by controlling the quantity of air blown in or by covering part of the body of the shell where the outer lip was removed (Novella 1991). Given the modifications observed on the West Indian chank shell recovered from Structure D-1, it is likely that the shell functioned as a trumpet.

Excavations of Structure D-3 recovered two thin spear points, one found in a second artifact deposit along the north exterior wall, three *Oliva* shell tinklers recovered from above the bench surface in the western room, and over 100 spire-lopped *jute* found concentrated above the northwest portion of the bench. Generally, *jute* are considered dietary in nature, although when found in a large concentration, *jute* could have a ritual significance. *Jute* caches have been recorded at numerous sites across Belize, suggesting

that *jute* were a part of wider, ritual tradition (Halperin et al. 2003). Large concentrations of *jute* have been recorded in association with administrative and ceremonial structures, and their presence in these contexts may demonstrate evidence of ritual feasting as recorded at Pacbitun (Healy et al. 1990). Feasting, as noted in Chapter 3, is one activity associated with ritual processions. Stanchly and Iannone (1997) use examples of *jute* having a ritual use at Late Classic period structures from Cahal Pech and Zubin where excavations yielded a substantial amount of spire-lopped *jute*. The West Indian chank shell, shell tinklers, spear points, and *jute* were recovered from Late-to-Terminal Classic deposits, and provide evidence that Structure D-3 had a ritual function during the Late-to-Terminal Classic periods.

The convergence of residential and ceremonial functions of courtyards located along a site's causeway is not atypical. Archaeological evidence from Aguateca has demonstrated that elite residences located along the causeway functioned in a ritualistic manner (Inomata 2001). These elite residences contained numerous musical instruments, such as conch horns and trumpets, ceramic flutes, ceramic whistles, ceramic drums, and bone rasps, suggesting that the elites who inhabited the courtyard engaged in musical performances and possibly processions along the adjacent causeway (Inomata and Coben 2006). At Courtyard D-1, the musical instruments, along with the costume jewelry, spear points, *jute*, and the ritual implications of Burial CC-B14 provide evidence of the courtyard shifting from a strictly residential function during its early occupation to a more ritual function after the construction of the Eastern Causeway during the Late Classic period.

Architectural Interpretations and Functional Assessment of the Termini Structures

Structures D-48 and C-17 are located at the ends of the Eastern and Western Causeways, respectively, and are approximately the same form and size, although Structure C-17 is taller. The patio structures of each building were excavated and documented. Architectural interpretations of the structures themselves are limited; Structure C-17 was unable to be excavated due large trees that encompassed the summit, and time constraints hindered any conclusive interpretations for Structure D-48.

Excavations of Structure D-48 documented the summit of the structure and the northern and western faces of the building. A highly eroded platform face was discovered at the base of the northern and western face of the structure, however any associated surfaces or other architectural features were not exposed. It is unclear whether the façade of Structure D-48 is composed of a series of terraces or a single, low platform face.

The patio structure adjacent to the south facade of Structure D-48 had a single construction event, presumably Late Classic, that elevated the patio 20 cm above bedrock. The final patio surface was completely deteriorated. The western platform face of the patio is composed of two, crudely constructed courses of faced stones that elevated the patio surface approximately 10 cm above the exterior surface on which the platform face is sitting. The interface between the patio and the structure itself followed similar crude construction methods as the western platform face. The face of the building's platform was one course of irregularly faced stones. Directly behind (north) of the platform face was a second rock alignment that was the core face to the platform and was composed of unfaced stones (Booher et al. 2015; see Loten and Pendergast 1984).

Excavations of Structure C-17's patio documented two construction events, the earliest yet to be dated. The earlier patio architecture consisted of a well-preserved patio surface elevated approximately 30 cm above undulating bedrock. The patio surface is associated with an earlier platform face that is the interface between the patio and Structure C-17. The platform face is one course high and constructed from limestone that had become severely deteriorated. A Late Classic construction event raised the patio surface 20 cm and a new surface and platform face were constructed. To construct the new platform face, 40 cm of construction fill was placed in front of the earlier platform, thus reducing the overall area of the patio. The final platform face and associated surface was crudely constructed and poorly preserved, similar to Structure D-48. The final platform was one course high and composed of irregular faced stones and was sitting on the final patio surface, which had completely deteriorated.

Functional interpretations of the Termini Structures

Structure D-48's and Structure C-17's patios are similarly built and date to the Late Classic period with use through the Terminal Classic period, contemporaneous with the construction of the Eastern and Western Causeways. Both structures are located at the terminus of their respective causeway and were excavated to determine if they functioned as shrine structures associated with ritual processions along the causeways. At Xunantunich, Structure A-21, although larger than Structures D-48 and C-17, is analogous to Structures D-48 and C-17 at Chan Chich in terms of location and architecture. Structure A-21 provides the best example of a termini structure functioning as a shrine structure related to ritual processions that took place along a causeway.

Structure A-21 is located at the terminus of *Sacbe* II at Xunantunich. The material assemblage collected at Structure A-21 consisted of censer and drum fragments found scattered along the front stair and platform of the structure (Keller 2006). Based on the artifacts recovered, Keller (2006:444) concluded that Structure A-21 “was the focus of ceremonial activity in the west area, which probably entailed processions along *Sacbe* II.” At Chan Chich, excavations of both termini structures encountered large quantities of artifacts, and, aside from the high quantity of obsidian collected, the assemblage collected from the patio structures does not reflect ritual activity. Thus, the available evidence suggests the two buildings are not ritually related to the function of the causeways.

Eastern and Western Causeways Architectural Interpretations

Excavations of the Eastern and Western Causeways determined the construction phases, age, and architectural form of the causeways. Both causeways are approximately 40 m wide, are elevated, terminate at structures similar in size and form, and have a single-phase construction dated to the Late Classic period with use through the Terminal Classic period. The Eastern and Western Causeways vary in terms of construction. The Eastern Causeway is elevated approximately 1 m above the ground surface. The northern and southern faces of the causeway were crudely built with unfaced stones stacked on top of one another to build a coarse platform face to retain the construction fill used to elevate the causeway surface (Booher and Nettleton 2014:97). The Western Causeway is elevated 30-45 cm above the original ground surface, but unlike the Eastern Causeway, the Western Causeway has 1.40-m wide parapets. The parapets were constructed from cut limestone blocks and preserved to a height of 45 cm (Booher and Nettleton 2014:94). The

sites of El Pilar, Caracol, and Xunantunich are the only other documented sites in Belize that have parapet-lined causeways (Houk 2015a). In terms of classification, both are local intrasite causeways as defined by Shaw (2001). Their widths, locations, and forms, particularly the parapet-lined Western Causeway, have their closest analogous at the larger site of La Honradez in the southwestern part of the Three Rivers region (Houk 2003) and at Xunantunich to the south.

Functional interpretations of the Eastern and Western Causeways

As previously mentioned, *sacbeob* may have numerous functions from the transportation of goods, to the integration of social and political ideologies, to ritual uses. The function of a *sacbe* is determined by its size, construction, associated structures, and the material culture collected along the roadway. The causeways at Caracol measure anywhere from 7 to 15 m in width and terminate at architectural groupings that have been identified as administrative buildings (Chase and Chase 2001). The causeways at Caracol connected distant groups to the epicenter and were constructed primarily to facilitate transportation between groups and spatially connect outlying groups to the site core. Unlike the functional purpose of Caracol's causeways, the causeways at Tikal appear to have been constructed to facilitate ritual functions. The causeways at Tikal are located within the site core and measure from 50 to 70 m in width and link architectural groups within the site core to one another. Tikal's' causeways were likely constructed as processional routes between major temples and plazas or to accommodate the overflow of audience members witnessing a mass spectacle (Inomata 2006a).

The site of Xunantunich has a similar site-planning layout as Chan Chich and provides the best comparison of causeways. Similar to Chan Chich, Xunantunich's causeways are wide and converge in Plaza A-I in front on the largest structure, the Castillo. *Sacbe* II terminates at Structure A-21, which Keller (2006) classified as a shrine structure related to the ritual activities that took place on the *sacbe*. Keller (2006:448) theorized that Xunantunich's causeways might have supported ceremonies entailing processions, dance, and musical performances. Excavations along the causeways recovered obsidian, ground stone, pyrite mirrors, eccentrics, censers, jade, and fragments of ceramic drums, and suggested that ritual processions took place along the causeways and that the artifacts recovered were a part of ritual paraphernalia worn by the performers lost during the processions (Keller 2006).

At Chan Chich, clearing units were placed along the margins of the Eastern Causeway and against the parapet walls of the Western Causeway to collect any artifacts related to ritual processions. The clearing units produced very few ceramics, and, other than five obsidian fragments, none of the artifacts collected fit into the categories Keller (2006) associated with ritual use of the causeways at Xunantunich (Booher and Houk 2015). The Eastern and Western Causeways likely had several functions throughout their use. The evidence collected from the clearing units along the Eastern and Western Causeways do not conclusively support the theory that ritual processions took place, however the sample size excavated represents less than 1 percent of the total area of both causeways; therefore we cannot completely rule out the possibility that processions took place.

Inomata (2006b) argues that the ritual paraphernalia of public performances such as processions were likely not left in the same localities where the performances occurred, thus making it difficult to infer a ritual function. Ritual paraphernalia found in storage structures, residential areas, and mortuary contexts can help archaeologists infer ritual functions of buildings. At Aquateca numerous ritual paraphernalia was found within Structure M7-22, which Inomata (2006b) interpreted as a storage chamber for dance paraphernalia. Structure M7-33, a nearby platform, likely served as a stage for performances using the costume elements and instruments found within Structure M7-22.

The excavations of the causeways at Chan Chich did not provide any conclusive evidence of ritual function, however given the musical and ritual objects collected from Courtyard D-1 and the close proximity to the Eastern Causeway, an inference can be made for a ritual function of the causeways. Other lines of evidence, including the width of the causeways and their architectural associations with Structure A-1 and the ball court, suggest the two *sacheob* served ritual functions as part of the processional architecture at the site. Further, extensive testing will need to be completed of Chan Chich's causeways to get a more comprehensive understanding of the causeways' function.

As mentioned previously, causeways likely had several functions that may have evolved through time. Chan Chich's causeways may have been constructed as part of an overall planning scheme in which the city builders borrowed or emulated other cities design elements, thus suggesting more of a political function for the causeways. The builders of Chan Chich chose to construct wide, radial causeways that extend east and west from the Main Plaza, one of which is a rare sunken causeway type in which low

parapets create a corridor (Houk 2015a). The construction of the Eastern and Western Causeways could have been constructed to emulate the cities of La Honradez or San Bartolo, approximately 19 and 31 km to the west, respectively (Houk 2015a). La Honradez has three sunken radial causeways that converge in the site core from the west, north, and northeast, as well as an attached ball court with one structure physically integrated into a separate building, which is a design element documented at Chan Chich (Houk 2015a). The original function of the causeways at Chan Chich was likely integrated into an overall city design in which the cities designers mimicked more established cities such as La Honradez (see Houk 2003).

Other functions of *sacbeob* previously mentioned include water management, social integration, and pilgrimage. At some sites, causeways were associated with water features and were integrated into the overall water management system of a site. *Sacbeobs* that function as a device for the control of water are typically found in association with *aguadas*, reservoirs, and *centoes* and functioned as either dams or catchment features to control the flow of water. The causeways at Tikal helped to form reservoirs and were designed with positioned sluice gates to allow for the planned release of water during the dry season (Scarborough 1998). The causeways at El Mirador functioned as dams and were positioned to either trap or divert water to select locations (Scarborough 1983). At Chan Chich there is not any clear evidence that the causeways functioned as a water management system for the site. The Eastern and Western Causeways are not associated with any large water features such as *cenotes*, *aguadas*, or reservoirs. Excavations of the Eastern and Western Causeways did not uncover drainage

features, such as with the Lahkin *sacbe* at X-ual-canil and the Brain and Murphy Causeways at El Pilar that controlled the flow of water (Shaw 2008).

The Western Causeway might have functioned as a form of social integration with the nearby site of Kaxil Uinic. It is likely that causeways functioned as a way to enhance social integration between and among Maya cities. A social function of a causeway can be difficult to determine because it is not a tangible function that archaeologists can observe. However, the presence of causeways and the architectural features causeways link together can provide indirect evidence of a social function. Caracol provides the best example of causeways likely functioning in a social capacity. Both *sacbeob* and *vias* connect certain residential groups to specific architectural groups, which may have reinforced social ties within particular social units (Chase and Chase 2001). Causeways that linked spatially discrete sites that may or may not be politically independent can also provide a means of social integration. The causeway at Coba linked a smaller site of Yaxuna to its center, which likely enhanced social ties between the two cities (Shaw 1998). At Chan Chich the Western Causeway terminates at Structure C-17, but picks back up again as an elevated surface and continues west towards the nearby site of Kaxil Uinic approximately 2.6 km west of Chan Chich (Harris 2012). Houk (2012) hypothesized that the *sacbe* connected Kaxil Uinic to Chan Chich, however survey has yet to determine the actual length of the *sacbe* or its connection to Kaxil Uinic.

Researched Questions Answered

What are the construction sequences for the two causeways (in other words, how many phases are represented, and what are their ages)?

Excavations of the Eastern and Western Causeways determined that both causeways were built in a single-phase construction event dated to the Late Classic period. The clearing units placed along the margins of the Eastern Causeway and on the inside of the parapets of the Western Causeway corroborated the Late Classic period construction date and provided additional information suggesting that the use of the causeways extended into the Terminal Classic period.

What is the architectural form of the parapets on the Western Causeway?

The Western Causeway was an elevated *sache* that utilized 1.40-m wide parapets along its margins. The parapets were constructed from limestone blocks that were preserved to a height of 45 cm, with stabilization stones placed beneath to further elevate the parapets. The surface of the causeway was elevated 30-45 cm above the original ground surface; this is an important discovery as it was previously believed the causeway was a ground-level corridor (see Houk et al. 1996).

What is the architectural form of the Eastern Causeway?

The Eastern Causeway did not utilize parapets along its margins. Instead the causeway had crudely constructed platform faces that retained the construction fill used to elevate the causeway. The Eastern Causeway was elevated approximately 1 m above the ground surface.

Are there concentrations of artifacts along the margins of the causeways that might be related to ritual processions?

A total of nine clearing units was placed along the edges of the causeways to look for artifacts related to ritual processions. In general, the clearing units produced low-to-moderate densities of ceramics and lithics. Other than five obsidian fragments collected along the margins of the causeways, the clearing units did produce any conclusive evidence, such as ceramic drums, censers, eccentrics, or jade, that points toward ritual processions taking place on the causeways.

How similar in size and form are Structures C-17 and D-48?

Both Structures C-17 and D-48 have small, south facing patio structures adjacent to the façade of the building that are similar in form, although Structure C-17 is taller than structure D-48. Neither structure was extensively excavated, so it is not possible to compare the architecture. Structures C-17 and D-48 have several commonalities between the patio structures associated with the building. The final phase patio architecture consisted of a poorly preserved surface on which the final platform face is constructed. The final platform face for both patios were one course high and crudely constructed of faced stones. Associated ceramics dated the final patio architecture of both structures to coincide with the Late Classic period with use through the Terminal Classic period. Structure D-48's patio excavations revealed only one construction phase, however excavations of Structure C-17's patio uncovered an earlier patio surface and platform face that has yet to be dated.

Are there concentrations of artifacts on or near Structure C-17 and/or Structure D-48 that might be related to ritual behavior?

Excavations of Structures C-17 and D-48 patios recovered copious amount of artifacts such as ceramics, lithic tools, ground stone, and obsidian above the final patio surface, however the assemblages are not consistent with what we would expect to find if the structures functioned as shrines related to ritual behavior.

What is the construction history of Courtyard D-1?

Courtyard D-1 showed evidence of an occupation spanning the Late Preclassic period to the Terminal Classic period. The chronology excavation unit (Subop CC-14-K) placed in the middle of the courtyard, along with Subop CC-14-G placed adjacent to Structure D-1 on the courtyard surface, uncovered three construction episodes. A Late Preclassic period construction event raised the courtyard 75 cm above the original ground surface. A second construction event during the Late Classic raised the courtyard surface another 12 cm. A final Late Classic renovation raised the surface an additional 28 cm, creating the final courtyard surface.

Structural excavations revealed earlier architecture for both Structures D-1 and D-3. Earlier, unexplored Late Preclassic architecture at Structure D-1 consisted of a series of steps and platforms that separated the exterior patio surface from the courtyard surface. At Structure D-3, an earlier exterior patio surface and platform face was uncovered on the western end of the structure, but has yet be dated.

Is Courtyard D-1 functionally related to the Eastern Causeway?

During its early occupation, Courtyard D-1 functioned as an elite residential area. Following the construction of the Eastern Causeway, Courtyard D-1 likely took on a ritual function. The West Indian chank shell, the ceramic drum, the shell tinklers, the spear points, and numerous *jute* shells are all items that could have been utilized during a procession or ritual (including feasting) and all came from Late-to-Terminal Classic deposits. The artifacts recovered from Courtyard D-1, the unusual vaulted entrance of Structure D-1, and Burial CC-B14 with its strong ritual connotations provide circumstantial evidence of processions taking place on the Eastern Causeway and of Courtyard D-1 being functionally related through ritual performances to the Eastern Causeway during the Late Classic period.

Conclusion

This thesis research considered the role of ritual function in urban planning at Chan Chich, specifically focusing on the site's causeways. It worked within the theoretical framework of performance theory to understand the importance of performance, space, and ritual to the ancient Maya. For the ancient Maya theatrical performance worked to solidify the power of the elite and create a cohesive community identity for the general public. Understanding the importance of performance from an archaeological perspective is difficult because these events cannot be directly observed. Thus theatrical space, images, and the material culture used in a performance provide a means of analysis for theatrical events in Maya society. At Chan Chich, the Eastern and

Western Causeways may have functioned as theatrical space for processions that lead into the Main Plaza.

The 2014 and 2015 processional architecture research project documented the age, architectural form, and construction sequence of Chan Chich's Eastern and Western Causeways and associated structures. This thesis research provided detailed information on previously unexplored portions of Chan Chich. Excavations of the Eastern and Western Causeway determined that the causeways were built in a single construction event during the Late Classic period with continued use through the Terminal Classic period, which coincides with the final architectural phases of the termini structures and Courtyard D-1. The causeways likely had multiple functions, although this thesis specifically focused on the idea that processions took place on the causeways. As noted in Chapter 3, detecting performance in the archaeological record is difficult. The clearing units placed along the margins of the Eastern and Western Causeways did not provide any conclusive evidence that processions took place on the causeways, however only a small portion of the causeways were excavated. Furthermore, the artifacts recovered from Structure's C-17 and D-48 patios did not resemble the types of artifacts expected if both structures functioned as shrine structures related to ritual processions on the causeways. However, the artifacts collected from Courtyard D-1 provide circumstantial evidence for a ritual use of the Eastern and Western Causeways. The West Indian chank shell, that likely functioned as a trumpet, the ceramic drum base, costume jewelry, and spear points, which came from Late-to-Terminal Classic deposits, are all items that could be utilized during a procession. The close proximity of Courtyard D-1, the vaulted entrance to

Structure D-1, the artifacts collected, and Burial CC-B14 provide evidence of a ritualized function for Courtyard D-1 during the Late Classic Period.

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