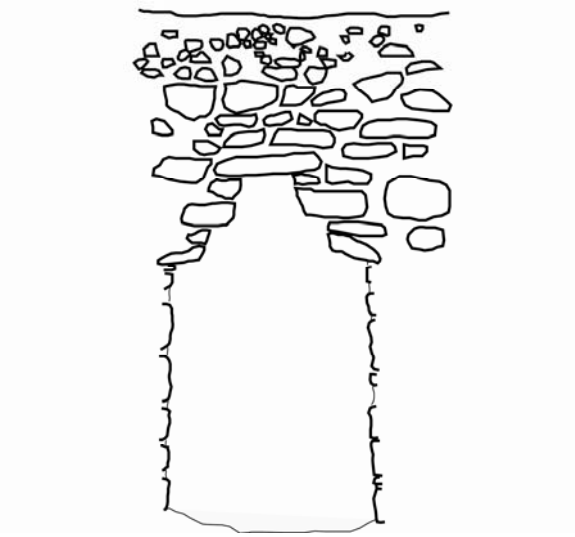
Final Report

of the

Cochuah Regional Archaeological Survey's

2008 Field Season



edited by Justine M. Shaw

with contributions by Alberto G. Flores Colin, Jorge Pablo Huerta Rodríguez, Dave Johnstone, Adam Kaeding, Johan Normark, Justine M. Shaw, and Tatiana Young

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Cover illustration of Yo’okop’s Sacbe 2 Vaulted Passage by Dave Johnstone

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NOTE: Copies of this CRAS report, and prior CRAS and Yo'okop reports, are available on our web page:

http://online.redwoods.cc.ca.us/yookop/

The web page also contains photographs and updates not included in this report.

Acknowledgements

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Finally, and most importantly, we would like to thank the people of Huay Max, Ichmul, Sacalaca, Saban, San Felipe, Tabasco, and Xquerol who have graciously allowed us to live and work in their *ejidos* during our summers. In addition to the crew members we were able to hire (following pages), we received countless archaeological (and survival) tips and assistance from individuals throughout the *ejidos*.

Saban *Ejido*

Group 1
Ernesto Moo Moo
Guermo Canche Zansores
Bonifacio Kauil Chi
Justino Tuyub May
Pablo de la Cruz Uc Poot
Victoriano Tuyub May
Gregorio Dzib Tuz
Alfonza Uc Batun
Mauro May Hau
Tiofilo Moot Poot

Group 2
Joselito Moo Koyoc
Emeterio Chan Pech
Antonino Poot Poot
Virginia Chan Poot
Aquilina Moo Tuz
Gregorio de Jesus Hernandez
Aurerio Tuyub May
Jose Hun May
Teodora Moo Cupul
Bartolome Poot Poot

Group 3
Gregorio Blanca Kauil Chan
Jose Tuyub Tun
Laurinano Kauil Chi
Wiliberto Tun Canul
Victoriano Moo Moo
Arsenio Moo Arjona
Idelfonzo Uc Tuz
Floro Kauil Chan
Ababerto Poot Moo
Mauro Poot Dzib
Pedro Regalado Tuz Arjona

Group 4
Rufino Moo Balam
Marcelino Chiamal Herrera
Santos Susano Chan Poot
Pedro Pablo Moo Poot
Gonzalo Canche Puuc
Ismael Han Dzib
Pedro Pablo Poot Moo
Jacinta Canche
Graciano Uc Batun
Artemio Poot Poot
Margarito Kauil Ake
Benito Uc
Jorge Arjona Chan
Pedro Selestino Moot Pat

Sacalaca *Ejido*

Group 1
Asuncion Pech Moo
Beato Cocom Mahay
Francisco Un Caamal
Buenaventura Un Dzib
Desiderio Noh Mex
Modesto Chi Dzib
Eleriterio Noh Huchim
Federico Noh Uc
Eduardo Alverez Canul
Alejandro Alverez Canul

Group 2
Leopoldo Chi Cohuo
Macario Dzul Un
Juan de la Cruz Ake Chan
Benjamin Chi Dzib
Bartolomen Canul Alvares
Francisco Ake Chan
Juan Bautista Ake Moo
Federico Noh Uc

Group 3
Eluterio Chi Dzib
Noe Cohuo Noh
Antonio Chi Dzib
Buenaventura Cahuich Chuc
Eliseo Cohuo Mahay
Marcelino Caamal Cahun
Casiano Chi Cohuo
Pascual Chi Caamal
Federico Cahum Poot
Isidro Chi Cohuo

Group 4
Geronimo Un Pech
Gregorio Canul Alvares
Isidro Chan Poot
Modesto Dzul Un
Victor Chan Cano
Eduardo Cahum Un
Fausto Dzul Noh
Martin Chan Be
Catalino Noh Cahum
Nicolas Noh Cahum

Group 5
Julian Un Noh
Modesto Un Noh
Anastacio Cahum Mahay
Hilario Noh Mahay
Ocavio Noh Huchin
Jose Ines Noh Pech
Roberto Cahum Poot
Jose Anacieto Un Noh
Juvencio Nunez Castillo

Group 6
Monge Cahum Moo
Savina Chuc
Celestino Cahuich Chuc
Renato Poot
Nicanor Poot Cohuo
Demetrio Noh Pech
Fernando Dzib Canche
Fausto Noh Pech
Juan de la Cruz Mahay Noh

Sacalaca *Ejido*
(continued)

Group 7
Roberto Pech Mahay
Fernando Cocom Poot
Maria Milca Can
Margarito Chan Poot
Virgelio Cahum Mahay
Alejandro Mahay Cahum
Agustin Noh Cahum
Bonifacio Chi Dzul
Geremias Canul Alvares

Group 8
Jose Leonardo Chi Tun
Demetrio Cocom Mahay
Jose Stalo Chum Mahay
Liverio Ake Mahay
Buenaventura Can Cab
Cesario Pech Cahum
Martin Chi Tun
Nazario Ake Poot
Alfredo Un Caamal

Group 9
Juan Bautista Dzib Pat
Jonas Mahay Noh
Valerio Noh Mahay
Andres Noh Uc
Martin Mahay Cahum
Tranquilino Dzul Noh
Vicente Noh Pech
Isidro Noh Uc
Susano Chi Cohuo

Group 10
Maximiliano Alvarez Chay
Artemio Ake Poot
Arsenio Camaal Pech
Francisco Cahum Poot
Claudio Un Mahay
Maximiliano Noh Chi
Bernabe Mahay Kahuil
Candido Un Noh
Juan Bautista Pech Mahay
Silvestre Cahum Mahay

Group 11
Areli Mahay Cohuo
Claudia Cohou Noh
Ipolito Un Noh
Victor Mahay
Ebolito Cahum
Venustiano Mahay Chi
Francisco Un Noh
Cecilio Canul
Silvino Un Camaal
Gonzalo Un Noh

Group 12
Edilberto Alvarez Mex
Bonifacio Alvarez Chay
Juvencio Poot Mahay
Enrique Cahum Cohuo
Antonio Cahum Mahay
Justo Cahum Moo
Carlos Cahum Poot
Aurelio Cahum Poot
Wilfrido Canul Alvarez
Modesto Chi Dzib

Sacalaca *Ejido*
(continued)

Group 13
Armando Noh Chi
Humberto Noh Mahay
Arcenio Ake Chan
Bravilio Un Pech
Idelfonza Hu Noh
Justina Noh Pech
Santos Jose Chan Cano
Susano Noh Ake
Eusebio Ake Moo
Urbano Chi Dzib

Group 14
Eulogio Briceno Castillo
Eliseo Can Cabarnet
Florencio Can Cab
Angel Un Un
Gilberto Hernandez Ake
Florentino Un Mahay
Jesus Mahay Cahum
Silvestre Cocom Dzib
Jose Luis Un Un
Sebastian Ake Mahay

Group 15
Alejandro Un Un
Geraldo Chi Tun
Valentin Cocom Poot
Eriberto Un Noh
Lazaro Noh Pech
Raul Noh Uc
Victoria Cahum Mahay

Group 16
Alberto Noh Chi
Francisco Noh Uc
Bonifacio Can Can
Francisco Can Can
Enrique Dzib Canche
Jose Maria Morelos Dzib
Paulino Pech Moo
Alejandro Diaz
Jose Carlos Ake

Group 17
Valeria Hernandez Poot
Francisco Mahay Noh
Jose Nestor Munoz Un
Remedios chan Beh
Bernardo Moo Hai Cocom
Gustavio Camaal Mahay
Urbano Chi Dzul
Carlos Ake Mahay
Adolfo Chi Un
Luciano Cahuich Chuc

Group 18
Trancito Pech Cohuo
Severiano Huicab Hu
Felipe Un Koyoc
Navor Un Noh
Fernando Canul Cocom
Zacarias Chi Dzib
Francisco Noh Uc
Jose Santos

Sacalaca *Ejido*
(continued)

Group 19
Armando Noh Chi
Vincente Noh Pech
Jose Luis Un Un
Hipolito Cahum Moo
Bravlio Un Pech
Sebastian Can Cab
Jose Anaclito Un Noh
Jose Isabel Chi Un
Anastacio Un Noh
Iginio Noh Ake

San Felipe *Ejido*

Grupo 1
Eulogio Itza poot
Luis Felipe Pech Itza

Grupo 2
Francisco Villanueva
Walberto Borges Poot
Jacobo Alamia Coyí
Sergio de la Cruz Yam Pech
Jorge Borges Itza

Grupo 3
Luis Pech Itza
Gabriel Arcangel Poot Haban
Francisco Villanueva
Walberto Borges Poot
Sebastian Yam
Sergio de la Cruz Yam Pech

Grupo 4
Walberto Borges Poot
Sebastian Yam
Wilbert Poot
Sergio de la Cruz
Luis Pech Itza
Francisco Villanueva
Luis Alberto Borges Poot
Victor Villanueva

Grupo 5
Jacobo Almilla Coyí
Walberto Borges Poot
Javier Avé Uc
Esteban Aké
Felipe de Jesus Aké Uc

Grupo 6
Jeremias Alamilla Coyí
Francisco Villanueva
Pedro Pool Noh
Luis Felipe Pech Itzá
Sebastian Yam
Sergio de la Cruz Yam Pech

Grupo 7
Sergio de la Cruz Yam Pech
Luis Felipe Pech Itzá
Jeremia Alamilla Coyí
Francisco Villanueva
Walberto Borges Poot
Pedro Pool Noh

Grupo 8
Sergio de la Cruz Yam Pech
Luis Felipe Pech Itzá
Jaime Rafael Tut Yam
Francisco Villanueva
Sebastian Yam
Jorge Borges Itza

Grupo 9
Macario Tut Poot
Sergio de la Cruz Yam Pech

Grupo 10
Carlos Borges Yam
Jorge Borges Itza
Jeremias Alamilla Coyí
Jaime Rafael Tut Yam
Sergio de la Cruz Yam Pech

Grupo 11
Walberto Borges Poot
Luis Pech Itza
Jeremias Alamilla Coyí
Jacobo Alamia Coyí
Sergio de la Cruz Yam Pech

Grupo 12
Walberto Borges Poot
Luis Felipe Pech Itzá
Jacobo Alamia Coyí
Sergio de la Cruz Yam Pech
Sebastian Yam
Victor Manuel Villanueva Poot

San Felipe *Ejido*
(continued)

Grupo 13
Walberto Borges Poot
Luis Felipe Pech Itzá
Sebastian Yam
Sergio de la Cruz Yam Pech
Ezequiel Poot
Victor Manuel Villanueva Poot
Luis Alberto Borges Pool

Grupo 14
Sebastian Yam
Luis Alberto Borges Pool
Victor Manuel Villanueva Poot
Oscar Tut Yam
Victor Manuel Villanueva Poot
Ricardo Poot
Ezequiel Poot

Grupo 15
Sebastian Yam
Gaspar Pool Yam
Jorge Borges Itza
Vicente Yam Itza
Sergio de la Cruz Yam Pech
Jacobo Alamia Coyí
Jeremias Alamilla Coyí

Grupo 16
Walberto Borges Poot
Sergio de la Cruz Yam Pech
Jorge Borges Itza
Jacobo Alamia Coyí
Jeremias Alamilla Coyí
Oscar Tut Yam
Wilbert Poot Borges
Victor Manuel Villanueva Poot
Gaspar Pool Yam
Vicente Yam Itza

Grupo 17
Eladio Chi Balam
Walberto Borges Poot
Jorge Borges Itza
Sebastian Yam
Sergio de la Cruz Yam Pech
Luis Pech Itza
Vicente Yam Itza
Francisco Villanueva
Oremias Alamilla Coyí
Aurelio Itza Coyí
Gaspar Pool Yam
Oscar Tut Yam
Gabriel Poot Abam
Wilbert Poot Borges
Victor Manuel Villanueva Poot
Luis Alberto Borges Pool
Ezequiel Poot

Tabasco *Ejido*

Group 1 and 9
Juan Francisco Ek Balam
Mariano Poot Poot
Jesus Canche Dzih
Paulino Poot Pat
Bernardino Poot Najera
Jose Alfredo Poot

Group 2 and 10
Creoencio Canul Camal
Jose Canche Chi
Ernesto Mezeta
Juan B. Poot Balam
Silverio Balam Chan
Bernardino Poot Po

Group 3 and 11
Roberto Vidal Herrera
Eleazar Morales Cruz
Humberto Na Uk
Adelaido Mezeta Pat
Jose Magdaleno Herra Uchin
Filiberto May Canul

Group 4 and 12
Jorge Poot Pat
Sixto Poot Cohuo
Jose Ramos Canche
Luis Poot Pat
Luis Ernesto Poot Palomo

Group 5 and 13
Placido Tuyub Canul
Sebastian Poot Cohuo
Arcenio Camaal Noh
Eladio Mezeta
Marcos Tuyub May
Eulogio Canul Xilum

Group 6 and 14
Eladio Chi Balam
Eulugio Camal Camal
Manuel Chiu Castro
Fernando Mezeta Palomo
Marcelino Tek Chi
Sebastian Poot Cohuo

Group 7
Raul Mezeta Palomo
Margarito Mezeta Bojorquez
Marcelino Tek Chi
Isidro Balam Poot
Cosme Daniel Ek Caamal
Ramiro Canul Xijun

Group 8
Antonio May Ay
Miguel Antonio Ku Pool
Ricardo de Jesus Oy Cutz
Filiberto May Canul
Leoncio May Canul
Milcueres Poot

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Part 1: Introduction to the 2008 CRAS Field Season

Chapter 1: Goals of the 2008 CRAS Season

Justine M. Shaw

The 2008 season of the Cochuah Regional Archaeological Survey focused upon the location and recording of new sites, as well as the more complete mapping of previously known sites, within the *ejidos* of Saban, Sacalaca, San Felipe, and Tabasco. Additional significant natural and cultural features were located using a GPS. The hope is that the sites recorded during this season can be dated, and used to test hypotheses concerning settlement dynamics and a north-south dichotomy, with excavations in future seasons.

Since 2003, the Cochuah Regional Archaeology Survey (CRAS) has been engaged in documenting archaeological sites within the territory defined by the Postclassic province of Cochuah (Shaw et al. 2003, 2004, 2005). This includes an area of approximately 500 sq km between the large primary sites of Yo'okop in Quintana Roo, and Ichmul in Yucatan (Figure 1). Broadly speaking, the survey is intended to provide the comparative regional framework that would permit the identification of systemic change as opposed to site-specific historical variability. Prior to the 2008 season, CRAS project members had added 23 new sites to the 4 previously documented sites within the study area. Following this summer, the project has now studied a total of 62 archaeological sites and an additional 6 caves without archaeological remains (Figure 2).

As a survey project, one of the CRAS project's foci has been the manner in which sites are distributed across the landscape, as well as how these distributions have shifted through time. In the absence of excavated or collected samples in 2008, our only means to estimate the date of a given settlement, or individual feature, was through diagnostic architectural elements. Late Formative platforms tend to have walls built of massive, roughly-shaped to unshaped, flat-faced boulders. Early Classic constructions may include well-shaped, megalithic elements. In the Terminal Classic, diagnostic elements include Puuc-style cut stones. Postclassic ritual activities are represented by small altars and shrines built of borrowed architectural elements from nearby structures. The Late Classic, and many structures from other time periods, remain unknown in the absence of dateable materials.

This 2008 season, we believe that we may have isolated a Postclassic residential signature, simple round foundation braces that are fairly recent in date stratigraphically, relative to the occupations at several sites within our study area. These had not been documented previously and, to date, appear to be largely limited to the southern portion of the study area. Observable Early Classic constructions follow this same distribution pattern, with the exception of Ichmul to the north. Interestingly, this same southern part of the region, grossly defined as the *ejidos* of Saban, San Felipe, and Tabasco, has deeper soils and is lacking in caves and *cenotes*.

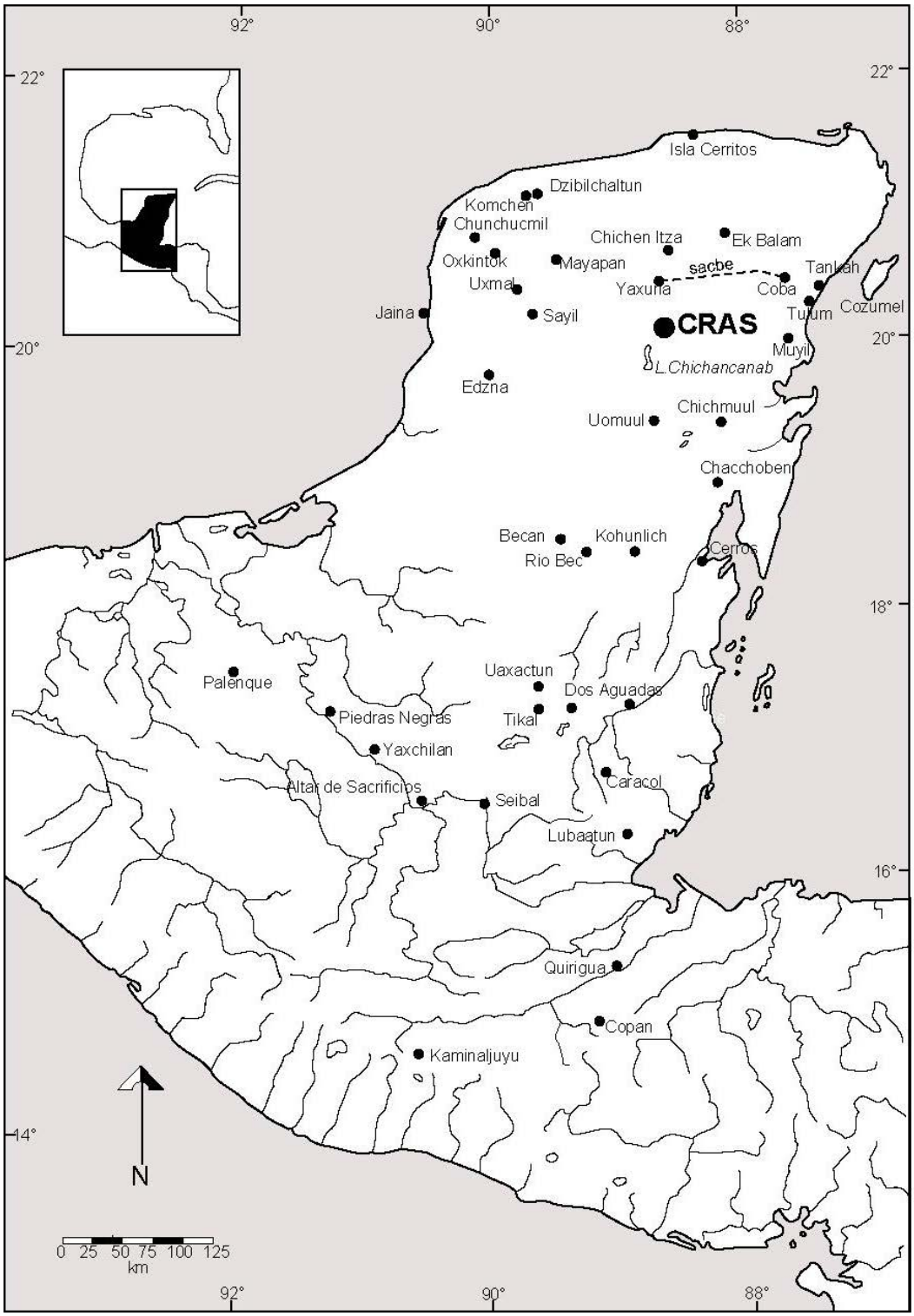

Figure 1. Location of the CRAS Study Area

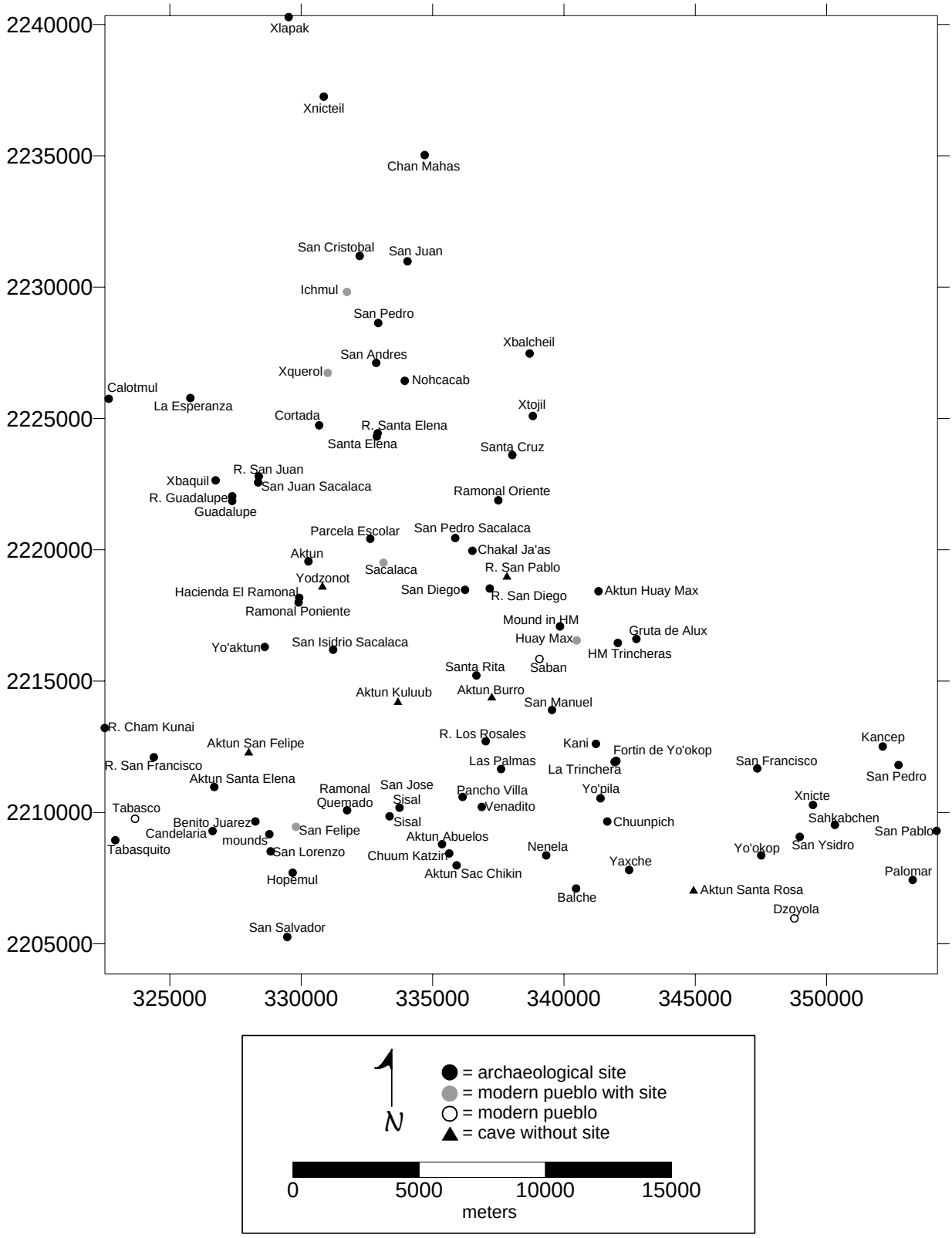

Figure 2. Sites Within the CRAS Study Area

We have long wondered how the Prehispanic occupants of much of the Cochuah region, particularly those in the south, supplied themselves with water. Possible water retention features, small *aguadas*, have been defined at Nohcacab (Shaw et al. 2003) and other sites; potential natural and culturally-created *aguadas* continued to be evidenced at a number of sites this season. Additionally, Flores and Shaw raise the possibility that many of the wells in use in the region may actually be Prehispanic, reused by historic occupations, at which time a rock and cement ring and wooden bar to support a pulley system was installed. Nearly all sites boasting such a well have been found to have a Prehispanic settlement associated with them (those that have not evidenced such settlement were visited before the discovered this pattern and were therefore not thoroughly searched for Prehispanic remains). The settlement is nearly always to the west of the water source, although in some cases the site appears to have grown to encircle the well. The mouths of wells contain deep grooves from long-term wear from ropes passing across their edges to retrieve water. These are visible under the later constructed circles atop the wells. Shaw and Flores believe that historic re-use of the wells may be masking these Prehispanic features. In one case, San Salvador, such as well was only recently discovered and is not associated with any historic occupation, just with a Prehispanic site. A modern seasonal camp was only constructed after the discovery of the well in 1970. In the future, we would like to excavate and/ or core a sample of wells to attempt to demonstrate their Prehispanic origin. This could potentially answer some of the questions about how extensive settlements were possible outside the *cenote* zone. Additional *chultunes* located in 2008 may have also been used to store water.

The southern portion of the study area contains a series of well-organized sites focused upon small acropoli. A zone of domestic architecture surrounds the acropoli in one or more directions. These sites are positioned along higher natural terraces, leaving the adjacent deeper soil zones largely devoid of architecture, probably having been used for agricultural fields in the past. Based upon informal reconnaissance, there is a very long zone of what appears to be fairly continuous settlement for several kilometers through the *ejidos* of Tabasco and San Felipe. In the future, mapping a swath of this zone could confirm or refute that we have a very large “site” (or a real problem defining what a site actually is). This season, the “sites” that have been recorded in this zone are only the larger architectural groups, which may not actually be distinct settlements.

The number of *ranchos* and other historic settlements that have been recorded has substantially increased. As part of his dissertation research, Adam Kaeding has been focusing upon this time period in order to understand the events that led up to the Caste War. He believes that land tenure issues may have played a significant role in the instigation of the War. Our study area includes the end of the zone that was used for such sites, with territory further to the south being too distant from Merida and Valladolid to be controlled.

Sacbeob also continued to be a focus in 2008, with the discovery of new examples at the sites of San Felipe and Sacalaca, and the detailed mapping of Yo’okop’s Sacbe 2. This task took longer than anticipated in that both Wilson’s estimate and the GPS readings taken in 2002 have proven to underestimate its length of 1.8 km. The *sacbe* contains two segments, in that a *sacbe* leaves the northern portion of Group

B and continues to Structure N11E1-2. The *sacbe* continues along the southern face of the mound and then extends to Group C. We believe that the GPS measurements taken in 2002 must have begun at this pyramid, rather than at Group B, as the sum total of the road length is longer than originally reported. In order to minimize confusion, the road that arrives at Group C will continue to be known as Sacbe 2, Section B, and the first portion of the roadway will be known as Sacbe 2, Segment A. Sacbe 2 is an extremely massive construction, maintaining a constant grade for a long distance. It is more than 4 m high for portions of its length and contains a vaulted passage. According to local crew members, the vault was standing, supported by a wooden lintel, until a fairly recent *milpa* fire escaped and burned that portion of the *sacbe*. The lintel may still be in the collapse and might yield a radiocarbon date if it could be excavated in the future.

Other features of note include two ballcourts, at the sites of Ramonal Quemado and Hopemul. Both are in the southern portion of the study area, in the zone that seems to be more closely affiliated with the south through the Peten Corridor. The architectural style of both is not particularly diagnostic, as structures at both sites are built of large cobbles and boulders, almost entirely lacking cut stone or even smaller gravel components.

Although the interiors of caves were not studied in 2008, Johan Normark focused upon the relationship between settlements and cave sites, as well as water sources and sites. He believes that he has documented a change in the use of water sources related to the Colonial regime. Additionally, he has noted that there are no known large Colonial settlements in the southern portion of the survey area, that outside the Chicxulub fracture zone.

In sum, the 2008 season has allowed us to formulate a number of interesting hypotheses that can be tested in future seasons through targeted excavations. While we still have not attained close to 100% coverage of our study area, we now have a sufficient sample for real patterning to emerge.

Part 1: Introduction to the 2008 CRAS Field Season

Chapter 2: CRAS Research Methods

Justine M. Shaw

The 2008 Cochuah Regional Archaeological Survey (CRAS) involved archaeological reconnaissance of the *ejidos* of Saban, Sacalaca, San Felipe, and Tabasco. As the sites included in the survey area had received only cursory from archaeologists in the past, it was determined that CRAS should perform basic documentation on the largest architecture and main plazas at each site, with surrounding smaller features included as time permitted. For this reason, investigators made use of local consultants as their primary means to locate sites and features. Since the local Maya have been utilizing their territory for *milpas*, hunting, and procuring natural resources throughout their lives, most adult men are able to readily report the location of *montículos* (or *mul*). Such features are generally at least 3 m tall, decidedly skewing our sample. However, archaeologists made an effort to record the existence of adjacent smaller constructions in all zones that were mapped in detail.

A number of Global Positioning Systems (GPS - Garmin Colorado 300 and Garmin etrex) were used to locate the modern *pueblos* and archaeological sites within the region. More detailed mapping was done using two Topcon GTS-213 total stations with TDS-48 data collectors and a Nikon NPL-352 Total Station with a TDS Ranger Data Collector operated by the principal investigators and/or other archaeologists. Topographic relief, as well as any *in situ* archaeological elements, was recorded. The resulting maps are presented with a 50-cm contour interval (unless otherwise noted) in order to display some subtle terrain changes. Crews from each *ejido* were hired to clear all features to be mapped and to help locate features. Due to the structure location procedure, mapping generally began near a large mound and proceeded to the surrounding territory as time permitted. Data on each point (recorded as coordinates N, E, and Z relative to the site datum, as well as with a descriptive code and notes) were saved on the data collector and then downloaded onto a laptop computer each night. Data were e-mailed home each weekend to ensure their safety. Using Surfer (version 8.0), maps were generated daily to allow ground-truthing. This strategy permitted maps of the documented regions to be prepared and given to INAH-QR and local authorities at the time the field season was completed.

No test pits or surface collections took place during the 2008 field season.

At the end of the season, maps and preliminary summaries were presented to local authorities so that interested individuals could begin to see the products of our research as soon as possible. Spanish-language versions of the completed report will be delivered to the *ejidos* in the future.

Part 2: The *Ejido* of Saban

Chapter 3: U chibal be: A Road of Linage, the Mapping of Yo'okop's Sacbe 2

Alberto G. Flores Colin, Dave Johnstone, Justine M. Shaw,
Jorge Pablo Huerta and Johan Normark

This year, the aim of CRAS Project, inside the area that composes the ancient city of Yo'okop, was only focused on the mapping of the denominated Sacbe 2, the largest causeway registered to date at the settlement (Figure 3). This *sacbe* was previously visited by Clapp, a member of Wilson's expedition occurring on mid-1970s (Wilson 1974: 11-14). Clapp designated a series of structures located on Sacbe 2 as Group C, including the terminus mound (*idem*). After Wilson's expedition and the sole visit of Clapp to this area, in 2002 a member of the Yo'okop Archeological Project, Christopher Lloyd, led by local guides, conducted a one-day survey along the ancient causeway to its terminus mound (Lloyd 2002: 21-27). Lloyd (*idem*) registered the course of the *sacbe* with a GPS, photos, and sketches, as well as reporting the existence of a vaulted passage that bisects the causeway. Both researchers described several *sascaberas* along the course. Furthermore, they emphasize an apparent isolation of the terminus mound, which lies without any other structure in the vicinity (Lloyd 2002: 21; Wilson 1974: 12).

Based upon these findings, the Cochuah Regional Survey Project (formerly the Yo'okop Archaeological Project) decided to conduct a topographic mapping of this *sacbe*, in order to determinate its orientation, length, associated elements, and the structures that it connects. This new documentation of the construction, through the use of more detailed methods, reveled to us other structures along the course of this causeway that has not been previously reported. Furthermore, it revealed the possibility that Sacbe 2 was divided into two different sections, one wider and taller than the other, that probably belong to two different phases and/ or were divided due to technical difficulties, such as the topographic relief in some areas. Although we initially supposed that there were two different causeways, the analyses of the topographic maps indicates to us that both stretches of the two *sacbeob* sections follow the same angle, but seems that one of the sides was enlarged. While it is true that these two sections have different dimensions and construction styles, and perhaps belongs to two separate phases, it is highly probable that both sections are part of the same construction project. Therefore, instead of designating them as different *sacbeob*, as we conceived of doing in the beginning, we decided to divide the causeway into two sections, Section A and B. In the following text, we describe the findings and features registered by our research along Sacbe 2.

Methods

Due time constrains and the need to finish the mapping of this causeway, as well as the thick vegetation that covers the area, it was decided to give priority to the clearing of the northwest side, while the southeast side was only partially cleaned of vegetation. However, uncleared sections were visually inspected in order to avoid a

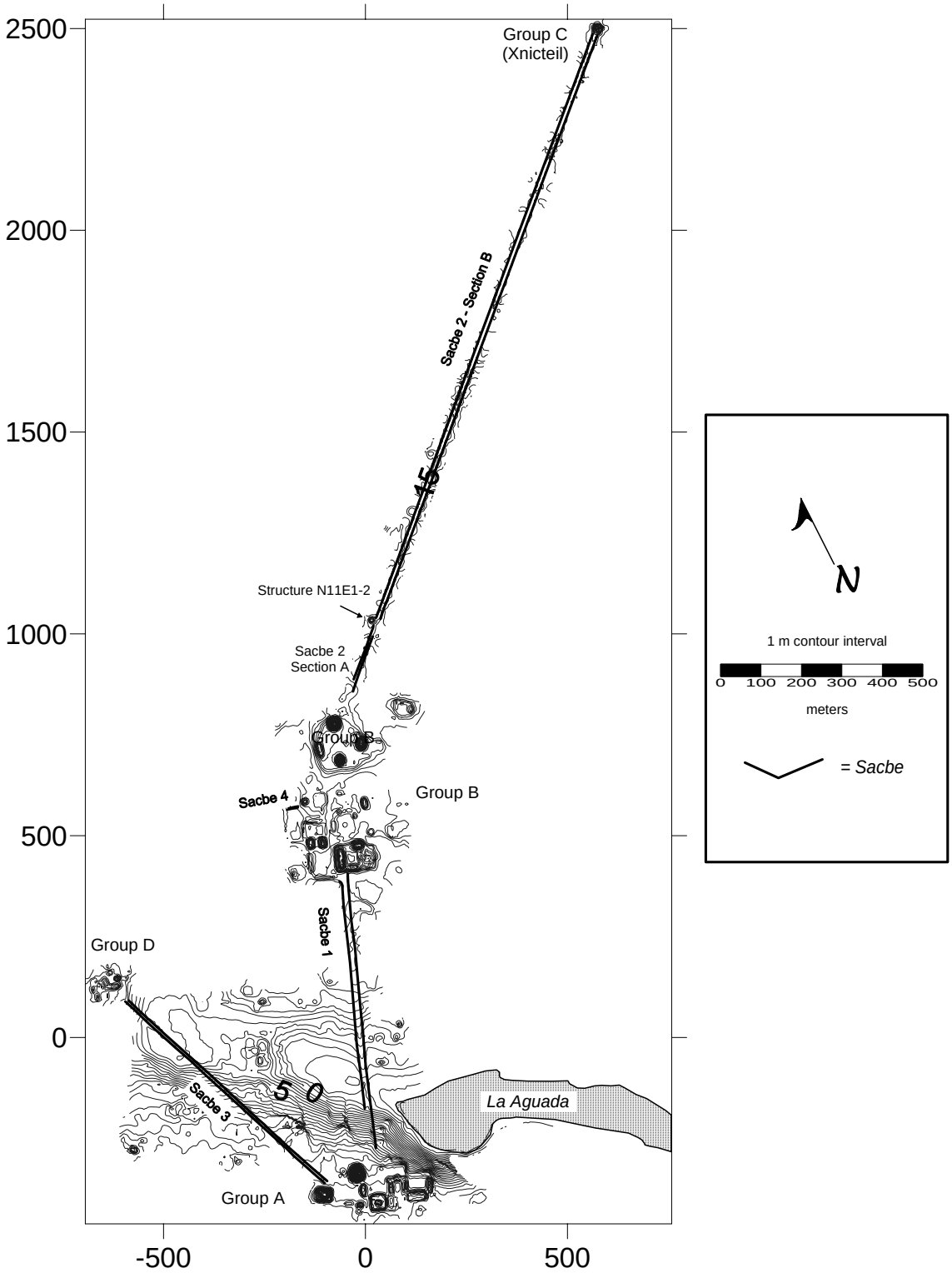

Figure 3. Yo'okop Site Map Including Group C

possible omission of any archeological feature. The topographic mapping started from the edge of the map carried out by the Yo'okop Project in 2001, which continued only until the northern end of the North Acropolis in Group B, to the area where a thick wall, possibly built for defensive purposes, is located (Shaw et al 2001: 24-29). From this point until the terminus mound, on the northwest side a 3- or 4-m-wide *brecha* was cleared to facilitate the mapping process. The southeastern side was registered through transverse cleared strips that radiated from the stations where the transit was placed. In order to observe the context within which the causeway is located, the terrain next to the *sacbe* was also mapped for an average distance of 15 m on each side. Whenever it was possible, taking into consideration the time it takes to clear and map, all adjacent and/ or associated structures were also recorded, although two structures, due to their distance and/ or the thickness of the vegetation, were only partially mapped. Furthermore, in order to register the surrounding topography, several transects were carried out in some sections for a distance of roughly 70 m on each side of the *sacbe*, in order to record the presence or absence of other structures. In the majority of the cases, no other structures were located. Distances along the survey of this causeway mentioned in the following text are measured from the edge of the North Acropolis of Group B, where the thick defensive wall was located (Shaw et al. 2001: 24-29).

Sacbe 2

As has been mentioned, Sacbe 2 was previously described by Clapp and Wilson (Wilson 1974: 12-14). Apparently Clapp only visit the causeway on the ground during one occasion, although he flew over the area several times. The total length estimated by the researchers varied, at "5450 feet or 1630 meters" or "one mile (almost 2 km)", but these measurements were calculated from the air (*idem*). Furthermore was noted that the causeway has an angle of 50 degrees, relative to magnetic north. No other description was made by the two, except that the *sacbe* was preserved in fairly good condition in some sections (*idem*: 14). Lloyd, in 2002, estimated a total length of 1800 m, with an orientation of 22.5 degrees from magnetic north. Also, he reported the presence of several cuts along the course of the *sacbe*, which were attributed to later human activities (Lloyd 2002: 21-23). In this way, Lloyd mainly focused upon a description of associated features, *sascaberas*, and terminus structure, but didn't provide much description of the *sacbe* itself, except to first mention and document the vaulted passage that bisects the *sacbe* close to its midway point (*idem*).

According with our research, Sacbe 2 is about 1800 m long, with an orientation of 48 degrees from magnetic north. The height of the *sacbe* is quite varied, from close to ground level in some sections to more than 4 m tall in others. At the same time, the causeway maintains the same grade between the points that it connects, while the terrain rises and falls, and the terrain dictates the height that the *sacbe* has to be raised in order to preserve a constant grade. Nevertheless, while several missing or hard to detect sections were observed, the course of the *sacbe* was relatively easily distinguished from the surface principally by the degree to which it stands out above the ground level that it cross over. A few sections of the *sacbe* course were not easily detected; it is possible that in these segments the causeway lies directly upon the ground level, and is currently covered by sediment. One of these missing sections, about 10 m long, is the point at which both sections of the *sacbe* converge; this will be

explained later on. As will be seen in maps of the causeway, only some portions of the feature's lateral walls were found *in situ*. These have been designated with wide lines, while the *sacbe* course that has collapsed, leaving only a straight mass of debris, has been marked with a dashed line. It is likely that, under this collapse of the lateral sides of the causeway surface, the base of the side walls of the *sacbe* remains intact. The highest expanse of the *sacbe*, where the ground level is lower and the causeway needed to be increased in height, the lateral side walls are almost totally collapsed, giving the causeway a sort of trapezoidal shape in cross-section, while in lower sections, where the causeway was raised only a few centimeters above the ground, the side walls are still well preserved (Figure 4). Although we could not found a visible transverse cut along the *sacbe* that could indicate us how it was built, as has occured with other examples in our survey area, according to our observations it seems that the *sacbe* was built with large, smooth-faced stones forming its lateral sides. These also served as its retaining walls. After building the side walls, the core of the causeway was filled with boulders, cobbles and *chich* (gravel), which was covered with a thin layer of plaster or *sascab*.

Lengthwise, Sacbe 2 has been divided in two sections, which show different features, morphological, contextual and perhaps also temporal. A detailed description of the *sacbe* will be discussed below.

Sacbe II: Section A

This section of the *sacbe* corresponds to the area between the North Acropolis and the area where Structure N11E1-2 lies, which has been called Xa'aybeh, meaning "cross roads" in Maya (Ciudad Real 2005). Although some considerable tracts of this Section A are missing, it has a length of 250 m and maintains an average height of about 2 m, relative to the surrounding surface (Figure 5). On this section, the most prevalent stone that remains is mainly composed of boulders, blocks and cobbles, although it is possible that well cut stones have been taken in later periods and/ or lie covered by debris.

Starting on the edge of Group B's North Acropolis, just after a thick, potentially defensive, wall, located a few meters north of Structure N8W1-2 (Shaw et al. 2001: 24-29), Structure N9W1-1 was found. The latter is possibly a rectangular foundation brace, located close to the northwestern side of the *sacbe*'s course. As has been said before, the *sacbe*'s course in this initial segment is fairly uncertain, since we could not found evidence of its walls on the surface. This may be due to the fact that this portion of the terrain under the causeway is relatively high, and it may be that the *sacbe* was only marked thought a low line of stones and/ or a pavement, that perhaps has been covered with sediment. Structure N9W1-1, if contemporary with the causeway, could have been an initial station of the journey, where some sorts of ceremonies were carried out, or a check point that controls the access of the roadway, or a place to obtain provisions. About 15 m ahead of said structure, the *sacbe* course was clearly identified, at least along its northwest side, which continues for 25 m until it is abruptly interrupted for 10 m. The absence of this segment may be due to the extraction of building materials conducted in later periods by inhabitants of the nearby area in the small village of San Felipe La Aguada (Wilson 1974: 3), that presumably re-used the material to construct

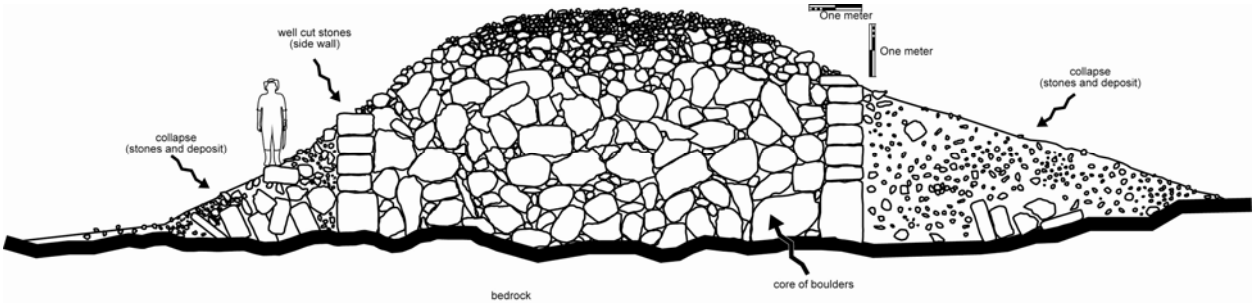

Figure 4. Hypothetical View of Sacbe Cross-Section

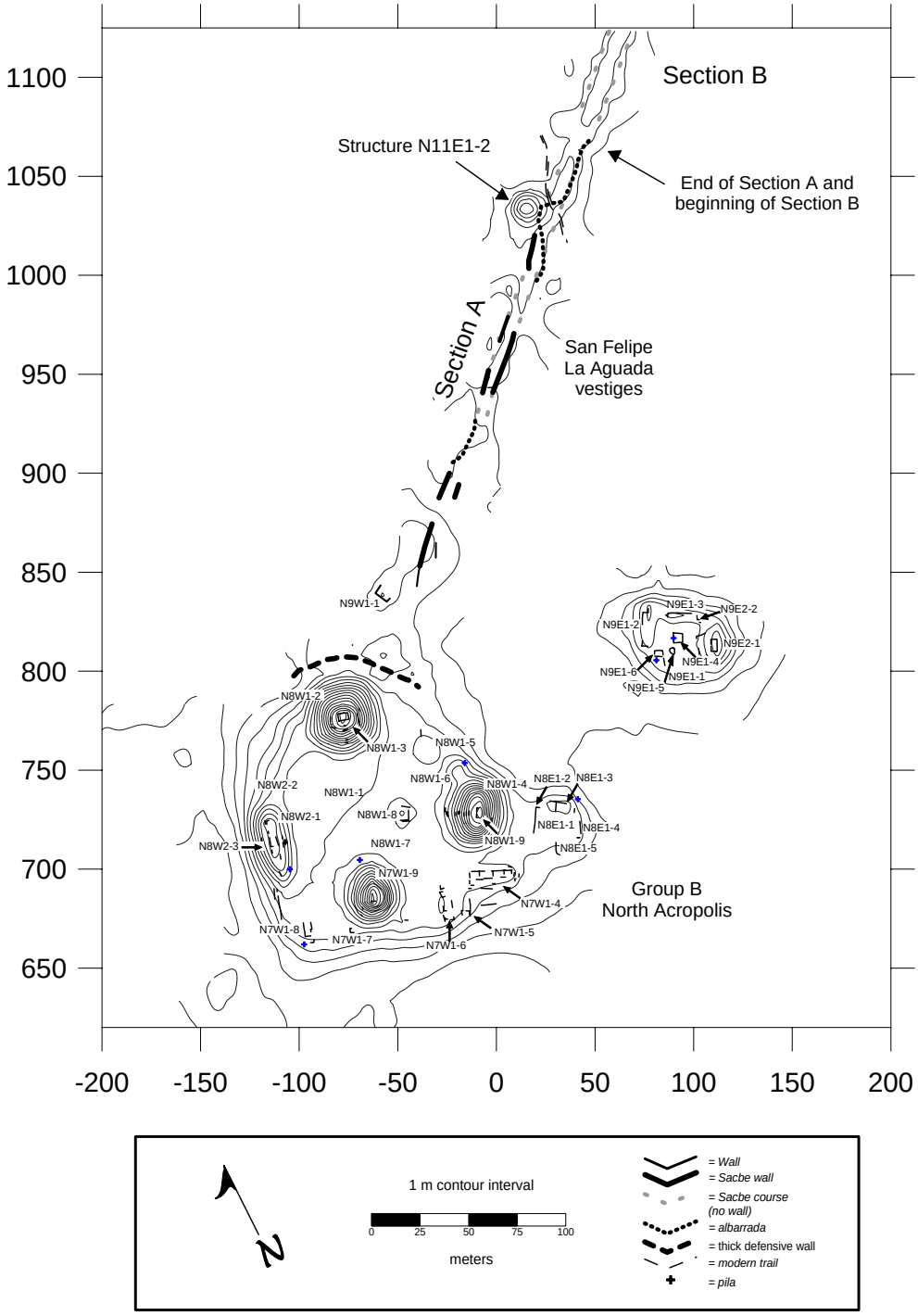

Figure 5. Yo'okop's North Acropolis and Sacbe 2, Section A

albarradas and house foundations, from colonial times until the mid-1970s. A colonial well in the vicinity indicates that this area was occupied since, at least this period of time. Beyond this missing section, the *sacbe* course was found again. However, both sides are well defined, a condition that prevails for 20 more meters until another abrupt interruption. This time, *albarrada* extends along the course of the *sacbe* for about 15 m, right into the missing section of the *sacbe*. The lack of fill may indicate to us that the missing sections of the causeway were never built, or that they were not unfinished and were covered by some sort of bridge or another element that allow the transit upon the missing segments. However, due the vestiges of later activity, we assume that the material from these missing sections was re-used. Segments that remain of the *sacbe* near the missing sections have, on average, a height of 1.5 m. As they were not very tall, it may be that the material composing the causeway was completely extracted. After this segment, causeway course is continuous until it reaches Structure N11E1-1, a rectangular platform that supports a pyramidal structure (Structure N11E1-2), which will be described below. On the southeast side of the causeway, about 20 m before it reaches Structure N11E1-1, a low platform with no visible architecture was located (Structure N10E1-1). This was only partially mapped. The function of, or relationship between, Structure N10E1-1 and the *sacbe* is, for the moment, unknown, although it doesn't show the same alignment and is a bit distant from the *sacbe*. Structure N10E1-1 may date to a previous or a later period, but since we lack much information, we cannot say more about the structure. This next segment of the causeway is continuous for 80 m more and the side walls are easily distinguished on surface. At this point, the causeway goes into an area that we have designated as Xa'aybeh, described below (Figure 6).

Xa'aybeh (Crossroad)

Both sections, section A and B of Sacbe 2 converge in this area (Figure 7) that has been called a "crossroad," or xa'aybeh in Yucatec Maya (Álvarez 1997). The area is composed of a 1.5 m tall, and 25 x 20 m base platform (Structure N11E1-1), which supports a 6-m-tall pyramidal structure (Structure N11E1-2), with no architectural features *in situ*, except for what appears to be a Postclassic shrine (Figure 8), Structure N11E1-3. One of the door jambs of this shrine is a large *pila* (*metate*) that has been re-used. Another *pila* was located on the surface of Structure N11E1-1, near and in front of the pyramidal structure (Structure N11E1-2). An *albarrada* crosses over both sections of the *sacbe* and southeast side of the Structure N11E1-2, while a modern path bisects the final of Section A. It is probable that the removal of stones in the missing sections was caused by the re-use of material in later periods, both in the construction of *albarradas* and the house foundations of San Felipe La Aguada. The modern path also affects the area, making it impossible to locate remains of the walls on surface. However, it is relatively easy to detect the course of the causeway through surface level changes if one walks along the path and crosses the remains of the *sacbe*. It may be that the modern path was placed there because it was a relatively easy segment to cross. It is at the intersection of Structure N11E1-2 and the last portion of Section A when the *sacbe* begins to increase in height (Figure 9). It seems probable that the

Figure 6. Yo'okop's Sacbe 2, Section A

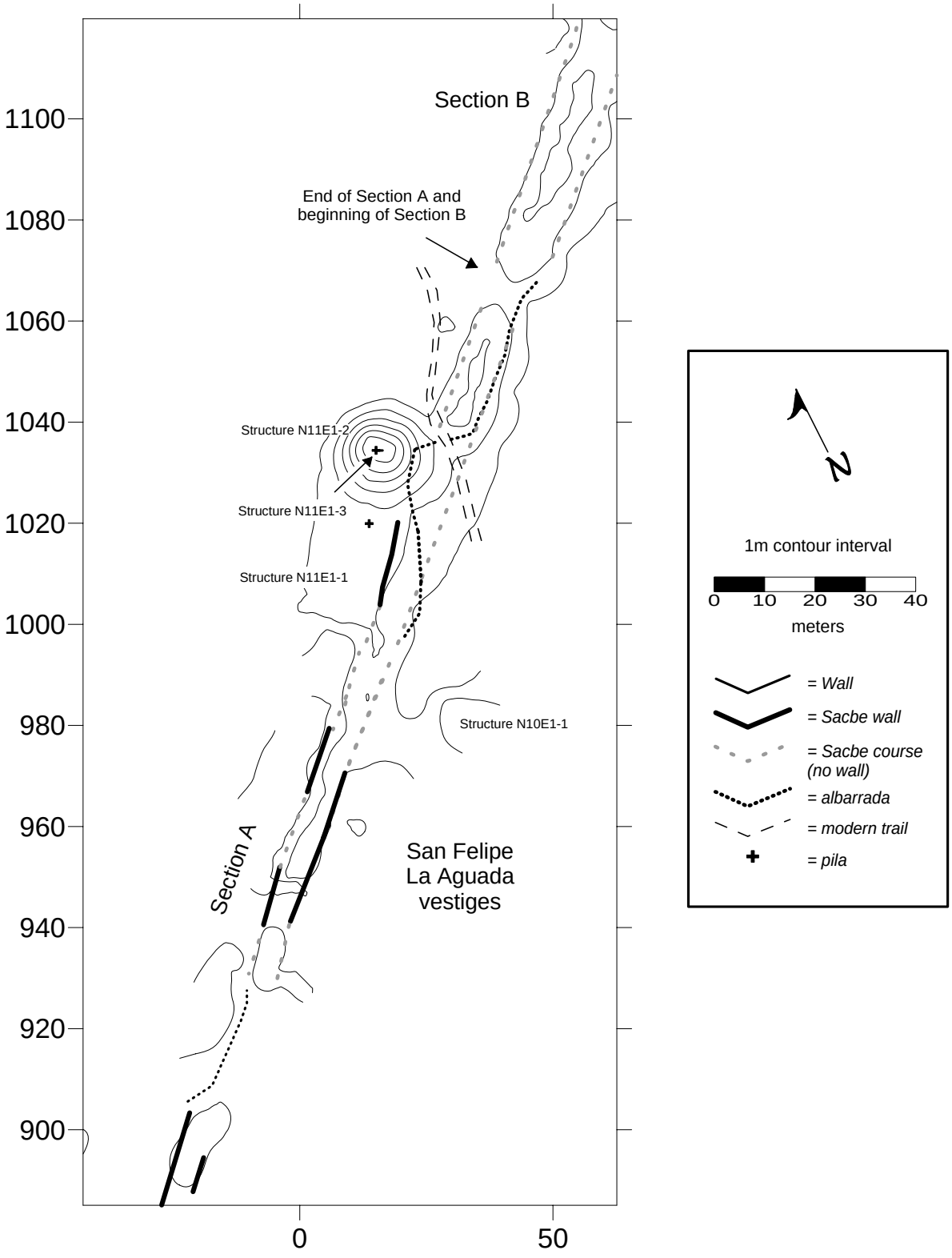

Figure 7. Plan Map of the Xa'aybeh Area of Sacbe 2

Figure 8. Xa’aybeh Front View

Figure 9. Xa'aybeh Rear View

Xa'aybeh complex is located on a low natural hill, since the ground level descends each direction from this point.

There are two possibilities to explain the convergence point of the two sections. The first one is that Section A ends when it reaches Structure N11E1-1 and Section B begins at the end of said platform. The second is, based upon the width of both sections, the point of convergence occurs about 30 m ahead of the east side of the pyramidal structure, Structure N11E1-2, just where a 5-m-long section is missing. According to our maps, it is at this point that the *sacbe* broadens, expanding from 7 to 10 m in width. This width is preserved until the terminus mound; for this reason, we are more inclined to sustain that is here where the change of sections occurs (Figure 10). This amplification of Section B, relative to Section A, may indicate that, in the following segment when the *sacbe* became taller, the builders of the causeway noticed that they would need a wider base in order to increase the height that in some areas exceeds 4 m. It should be noted that although one *albarrada* crosses over the *sacbe* course in the missing section close to the area where the village of San Felipe La Aguada once lay, there is a total absence of any stones at ground level. For this reason, we speculate that this 5-m-section was never built, and the lack of construction material must be explained by other causes. A perishable bridge or a vaulted passage (as the one found further ahead) may have existed to connect both sections of the causeway. However, there is not enough evidence to sustain these speculations. At this time, without any excavations, it is not possible to conclude which one of these are the point where both sections converge. However, we have a penchant for the convergence of Section A and B occurring 30 m northwest of Structure N11E1-2, where the *sacbe* was enlarged.

Sacbe 2: Section B

Section B starts, as has been said in the previous paragraph, about 30 m after the Xa'aybeh complex. From this point, its course is continuous until it arrives at the terminus mound. Its total length from this point is about 1,550 m, maintains a constant width of 10 m, and reaches more than 4 m in height in some segments. As was reported by Clapp and Wilson about 30 years ago (Wilson 1974), some sections are well preserved, with up to 4 courses of stone in height, showing the original level of the roadway. In these higher segments of Sacbe 2, Section B, courses are composed of rocks that grade in size from boulders to cobbles, although the side walls are made of cut stones; several of these are *in situ*. In lower sections of the causeway, where gravity and erosion have had less of an effect, its shape is almost complete, with the exception of the pavement that has been destroyed by weather and/ or human activities. Since long sections of the lateral walls are still standing, the core of the *sacbe* is still preserved in a nearly original shape.

From 280 m (from the thick, defensive wall of Group B's North Acropolis) until about 950 m is where the *sacbe* reaches its highest point (more than 4 m), because is the lowest area of the terrain crossed along its course; as has been said, its builders tried to maintain the same constant grade.

The section between the 400 and 800 m is one of the most interesting, in terms of human activity, not just because of its tremendous height (Figure 11). A large

Figure 10. Sacbe 2, Section A and B Junction

Figure 11. Sacbe 2, View of Section B

platform of about 50 m in length was found next to the northwestern side of *sacbe* course. Said platform has not yet been mapped due time constraints; also, our priority was recording the total length of the causeway, instead of having better coverage of the vicinity. However, a mapping station was positioned on its top in order to facilitate returning to map the platform in future seasons. A visual inspection of its summit revealed several platforms and foundations braces. The height of the platform is about 6 to 8 m. It appears that the platform is situated upon a natural hill, but dense vegetation made it difficult to accurately assess its characteristics. Based upon its dimensions, which dominate the surrounding area, it may be one of the structures that Clapp observed from the air in mid-1970s (Wilson 1974: 12-14). About 50 m ahead of this point, and practically attached to the *sacbe*, another platform was found, Structure N13E2-1. It is a rectangular platform of about 10 x 20 m, which still has its southwestern and northwestern side walls. The southeastern side of the platform seems to be semi-detached from the *sacbe*, although a small wall line makes it appear possible that one small corridor runs in the middle of both structures. However, this wall line could be only part of a construction technique, and in fact, the platform was semi-detached from the causeway. Whichever of the two possibilities is correct, it seems that this platform was part of the same construction project as the causeway and it may function as a checkpoint, ritual station or a provisioning place, although this can only be tested with future excavations. A series of foundation braces was placed upon Structure N13E2-1, but these seem to belong to a later period, based on their characteristics (without well-cut stones and without mortar). Structure N14E2-2 is a rectangular foundation brace, although it lacks its northeast side, while Structure N14E2-1 is a circular foundation brace. Structure N13E2-2 is also a foundation brace but its shape is unclear; however it has a somewhat rectangular appearance (Figure 12). With the evidence that we posses now, we cannot posit any date for these constructions. Due to their style, it seems that they belong to the Postclassic, although the platform upon which they lay, Structure N13E1-1, may date from the Late or Terminal Classic.

About 150 m ahead this point, from 650 to 700 m from the beginning of Sacbe 2, also in the northwestern side, another complex of foundation braces, which lies on a polygonal-shaped platform (Structure N15E2-3), was located (Figure 12). Both Structure N15E2-4 and Structure N15E2-5 are foundation braces; the first one has a rectangular shape and second has a circular shape. A *pila* or *metate* lay in front of said structures. Structure N15E2-2 was located directly on the surface, in front of the platform Structure N15E2-3, and, based upon its dimensions (1.5 x 1 m), seems to have been a small corral for birds or other little animals. In the vicinity, but upon the *sacbe* itself, what seems to be a looters' hole was located. It may have resulted from the extraction of material to build the structures upon Structure N15E2-3. Directly in the middle of the causeway, a small Postclassic shrine (Structure N15E2-1) was located; it also may have been constructed with material extracted from this same looters' hole. The shrine is not aligned with the *sacbe* course. For this reason, we speculate that the shrine is more likely to be temporally related to the foundation braces that lie upon Structure N15E2-3 than it is contemporary with the *sacbe*. The context formed by Structures N15E2-2, N15E2-4, N15E2-5 and Postclassic shrine seems to be

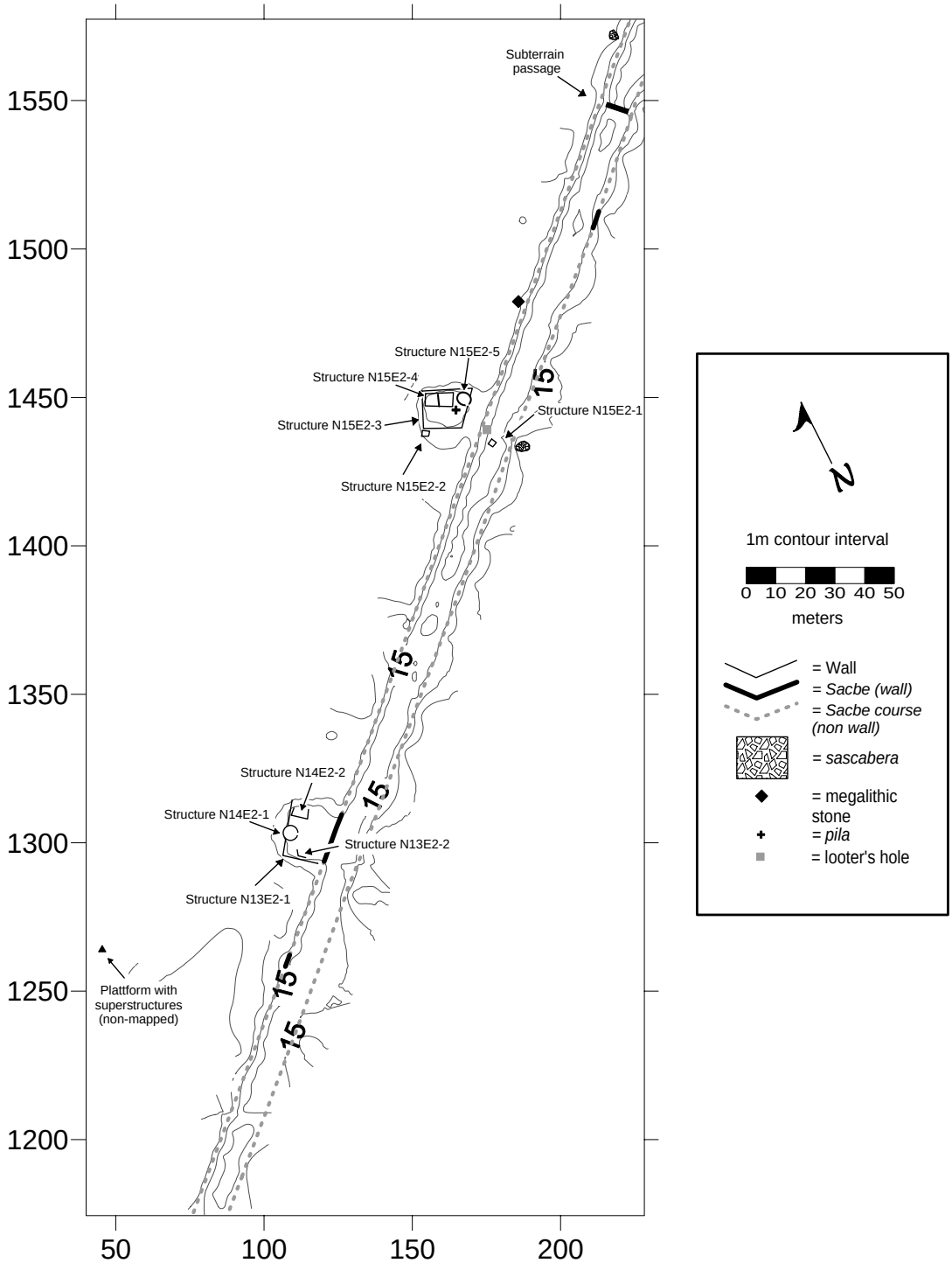

Figure 12. Sacbe 2, Mid-section Map

domestic, probably being constructed by a family group that established a residence there when the *sacbe* was abandoned or unused. The shrine may have been built by the re-occupants to conduct an ancestor-based ritual, probably during the Postclassic. On the other side of the *sacbe*, the southeast side, a large *sascabera* was found; its interior has a dry-laid wall that runs through its middle, creating a small space like a room, possibly to store goods or raise small animals. At present, since no excavation has been carried out, is difficult to say more about the function of this complex, but future seasons, that include test pits, may shed light upon our suppositions.

About 40 m ahead of this complex, on the northwestern side of the *sacbe*, a megalithic stone (of 2 x 0.90 m in size) was located. Its rectangular shape seems to a stela, although it could be just a large stone that was planned to be used in the *sacbe* side walls but, due to its dimensions, was not utilized and was simply abandoned right there on the base of the *sacbe*. Also, this megalithic feature may have been a distance marker and/ or a boundary stone that indicated to pedestrians an important place when they walked upon the causeway. Although the megalithic stone is broken and eroded, it is obvious that its dimensions are greater than other blocks employed in the construction of the *sacbe*. At almost 800 m from the beginning of the roadway, and 130 m ahead of the shrine in the middle of the causeway (Structure N15E2-1), one of the most interesting features of this long construction was located, a vaulted passage (Figures 13 and 14) that perpendicularly bisects the *sacbe*. The feature has been previously reported by Lloyd in 2002 (Lloyd 2002: 21-26). Said archeologist describes the subterranean passage and relates it, stylistically, with the Early Classic Oxkintok Puuc style (*idem*: 23). This is the point where the *sacbe* reaches its greatest height (4.40 m); it is also the area with the lowest ground level that the causeway crosses. The vaulted passage is about 1.8 m wide and 3 m tall from floor level to the underside of the vault (Gendrop 1997: 91), although its floor level lies covered by debris (Figure 15). Due to their height, the lateral side walls have collapsed on both the exterior and interior of the passage. For this reason, we speculate that if the passage had once had a plaster floor it may still be well preserved (Figure 15). The interior walls of the passage seem to have also been covered with plaster, since several patches of plaster remain *in situ*. The vault is a stepped vault without covering stones.

According to local members of our crew, the entrance of the passage was crowned by a wooden lintel about 30 years ago[1] and the passage still has "its polished floor". The area that comprises the settlement zone of Yo'okop was subject of traditional agricultural activities, including the slash and burn preparation in order to sow corn. Several crew local members also claim that there was a large fire that burned this area a few decades ago and probably for this reason the lintel has disappeared. This explanation is highly probable, since also we found, about 20 m ahead the passage, several large and burned trunks of *jabín*. In any case, it seems likely that the remains of the *sacbe* passage, whether a stone or wooden lintel, lies preserved below the collapse. An extensive excavation in this area would help us to investigate these stories, as well as the possibility that a sealed lot that could help us to date the construction of the cause way could be found. The existence of this passage may be related to the *sacbe*'s

[1] Several sustain that was a tree called in Maya *jabín* (Flores field notes 2008).

Figure 13. View of Subterranean Passage Entrance

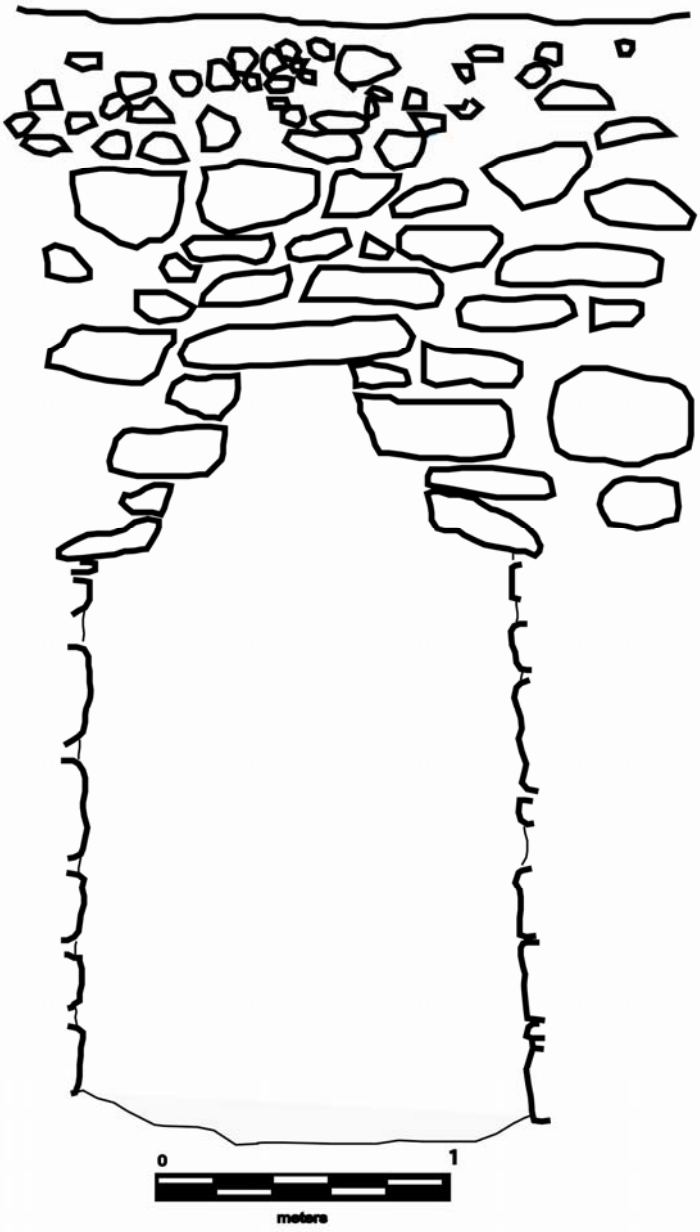

Figure 14. Sacbe 2, Section B, Vaulted Passage

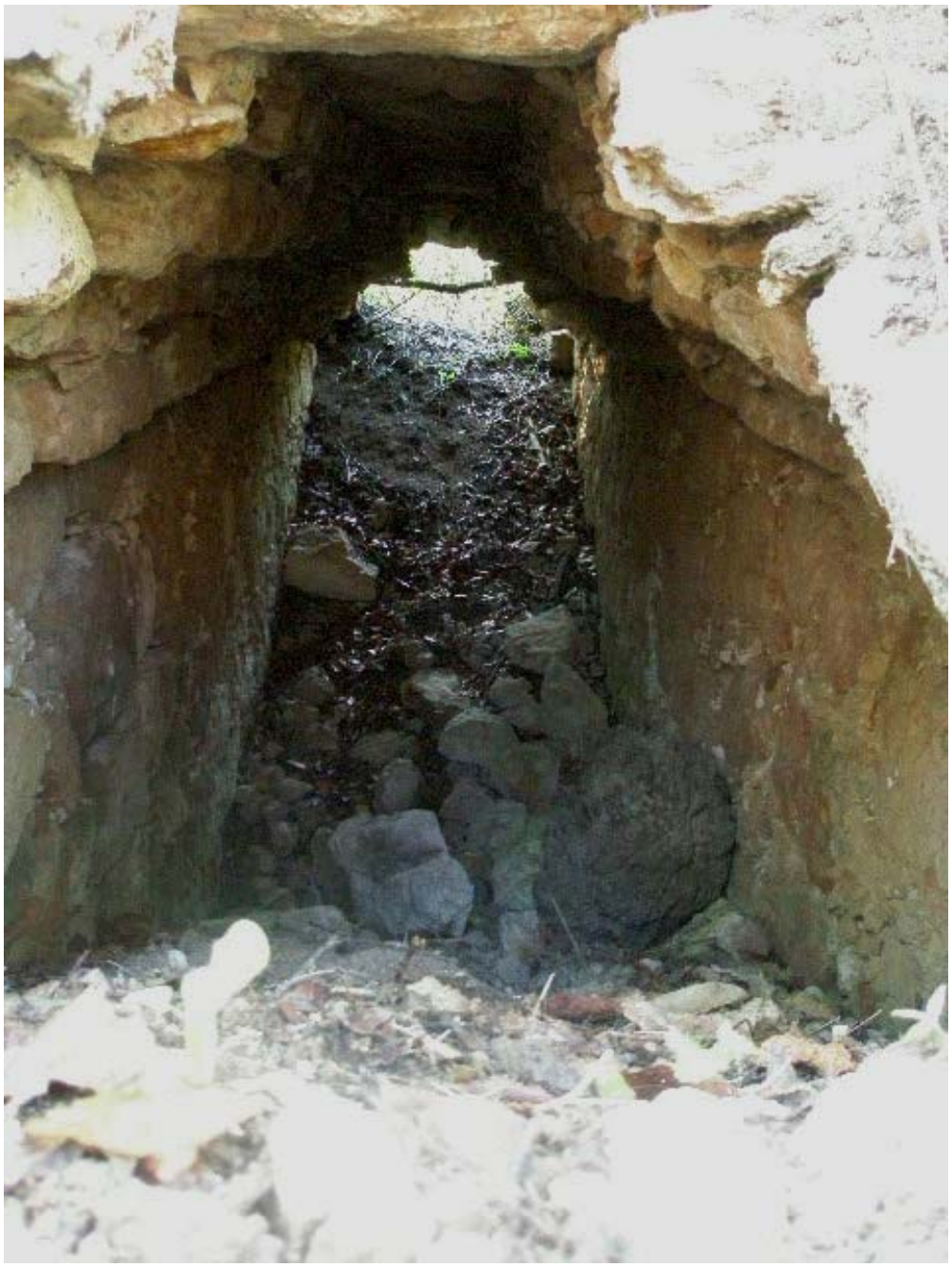

Figure 15. Vaulted Passage, Interior View

height that at this point is more than 4 m. It may have been necessary to build a passage to permit transit between both sides of the *sacbe*, since otherwise a pedestrian would have had to climb a 4-m-tall wall (Figure 16). In any case, the area could not 6have witnessed too much traffic, since the width of the passage only accommodates one or two persons at the same time. Another possible function is that the passage was made to allow the transit of a stream or a seasonal water feature, although by its shape (taller than wider) makes this seem less probable. The evidence points to the *sacbe* passage having been created for pedestrians.

After this segment, the causeway becomes lower (as the terrain rises) and maintains a height of 1.5 m on average until it reaches the terminus mound. After the vaulted passage, there is not another notable feature, although it should be mentioned that this portion is better preserved than the previous segments, with some sections still displaying completely preserved side walls (Figure 17). From the passage to the terminus mound, in a segment of roughly 1 km, a total of 16 *sascaberas* were located, mainly in the northwest side. These will be described below. The *sacbe* connects directly with the terminus mound, with no plaza in between, in a place that locally is known as Xnicteil.

Terminus Area (Xnicteil)

Xnicteil is how locals refer to the place where the terminus area of the Sacbe 2 is located, about 1.8 km to northwest of Group B's North Acropolis. The terminus area has been visited previously by Clapp and Wilson (1974), as well as by Lloyd (2002).

The *sacbe* connects directly with Structure N25E6-3, which is an 11-m-high pyramidal structure when viewed from its front (Figure 18). However, from its rear and northwestern side, where the terrain is lower, it reaches 14 m (Figure 19). In front of the structure, the bases of two walls were found, which are the corners of one of its stepped bodies, although there is no other architectural feature *in situ*. The stones of these walls are well-cut, with a square or rectangular shape that looks similar to the Late Puuc style. The *sacbe* entrance to this area is flanked by two low and square platforms of about 50 x 10 m in size: Structure N25E6-1 and Structure N25E6-2. These enclose the causeway until the pyramidal structure (Structure N25E6-3), creating a sort of plaza in front of Structure N25E6-3 (Figure 20). It seems probable that, in reality, both structures were a pre-existing plaza that was connected to the *sacbe* in later times. However, the collapse of the causeway impedes a clear appreciation, in stratigraphic terms, of which was built first. Excavations at the point of the intersection between the platforms and the causeway would indicate to us the construction periods of this terminus area. For the moment, we are considering the platforms to be two different structures but future excavations in the area would test our suppositions. Another dominant element is a large *sascabera*, possible the largest one associated with the causeway, located on the northwest side of terminus mound.

Previous archeological surveys in the area make claims about the relative isolation of the terminus mound (Lloyd 2002: 27; Wilson 1974: 12). A brief reconnaissance in the surrounding area to the northwest and southeast was carried out this season, confirming that the terminus mound is isolated from other structures, apart from the two platforms previously described. There is a series of platforms at about 1.5

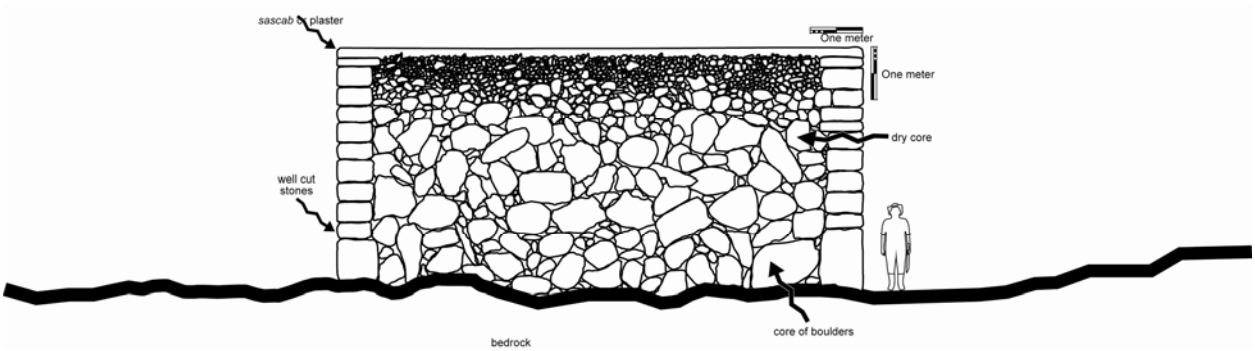

Figure 16. Hypothetical Cross-section of Reconstructed Sacbe 2

Figure 17. Sacbe Side Wall, Close to Terminus Mound

Figure 18. Xnicteil Terminus Mound, Front View

Figure 19. Xnicteil Mound, Northwest Side

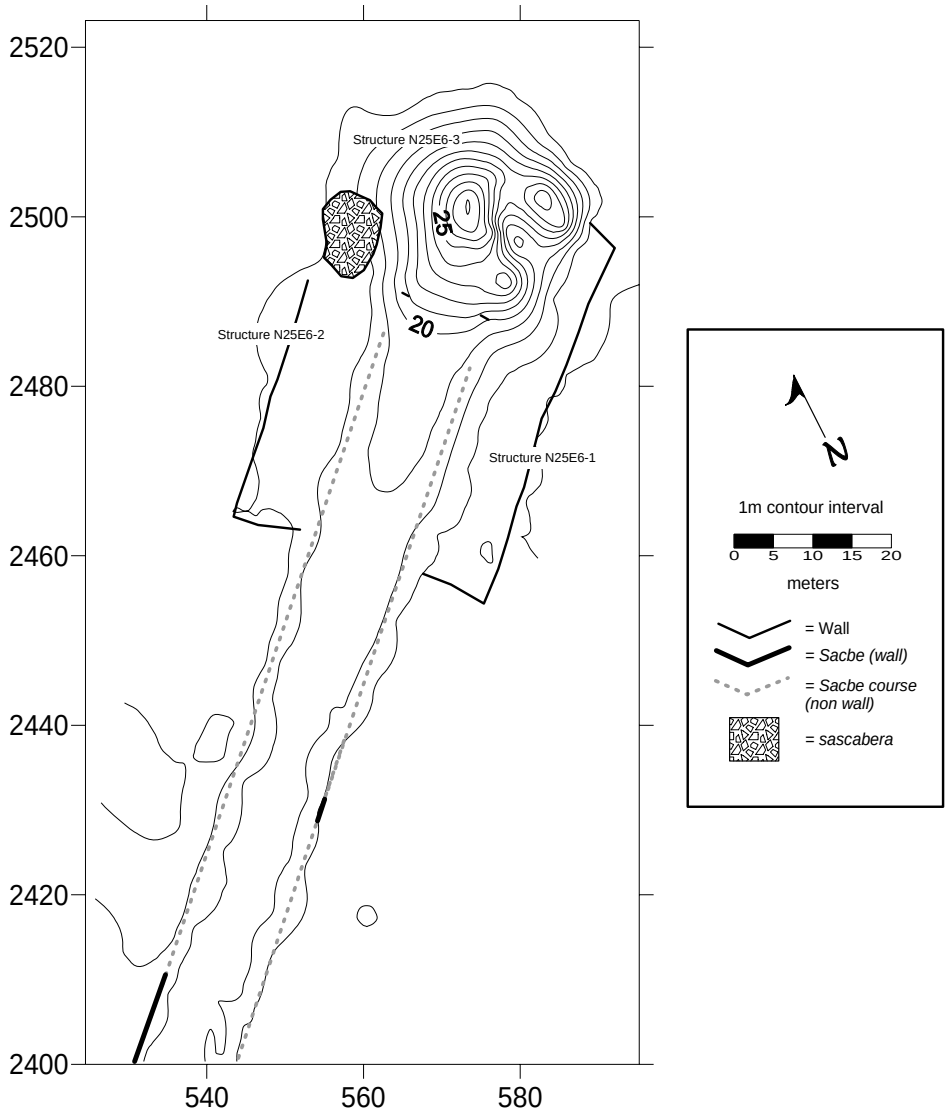

Figure 20. Sacbe 2, Xnicteil Terminus Area

km southeast from terminus mound, into the same forest designated as Xnicteil, but these are more related to a colonial well and possibly are part of another settlement (see “Rancho Xnicte” this volume). For this reason, we speculate that there is no direct relationship with Structure N25E6-3.

Sascaberas

Clapp (Wilson 1974) as well as Lloyd (2002) emphasize the existence of several *sascaberas* along *sacbe* course (Figure 21). Survey conducted this season reveals a total of 16 *sascaberas* that lie mainly from 650 m until the terminus mound, Structure N25E6-3. Also, the *sascaberas* are primarily located on the northwestern side of the causeway. Although it could be speculated that this pattern is caused by our sampling method, since we were more focused on northwest side, as has been explained in the beginning. For this reason, our coverage was better on this side. However, we reject this possibility since we made visual inspections along the entire southeastern side. An explanation for this pattern could be more related to a construction technique and/ or to a morphological characteristics of the surface that facilitated the extraction of material in the northwest side, although we don´t have any additional information about what this might be.

The dimensions of *sascaberas* have a wide variation, both size and depth, although it should be noted that all are located relatively close to the *sacbe*’s sides. Several *sascaberas* seem to have collapsed through time, since their roofs are an open cavity, and probably they only had a small access when they were in use. Inside some of the *sascaberas, albarrada* walls (dry laid walls) were located. These may have been constructed to delimit spaces, taking advantage of the cavity created when the material was extracted. The reason to create these spaces may are related to the storage of goods or small animals, although they also could have had a symbolic function. Several *sascaberas* seem to have been opencast mining; in other words, the material was extracted directly from the surface, as was the large *sascabera* that lies next to the side of Structure N25E6-3. However, others seem to have been subterranean and their roofs collapsed later. It is possible that opencast mining *sascaberas* were, in reality, quarries to extract rocks, and subterranean examles were the result of the exploitation of *sascab*, perhaps for technical reason or due to the need for *sascab* to maintain a certain degree of humidity.

The proximity of these quarries and *sascaberas*, in several cases perhaps exaggerated by collapse, may be related to a reduction in transportations costs. However, it seems that these *sascaberas* and quarries would not have been sufficient to supply all of the construction material to complete the construction of the causeway, which makes us suppose that there are other more distant sources. It may be that these quarries and *sascaberas* are more related to maintenance, rather than construction, labors, if we suppose that maintenance was carried out by smaller parties of workers instead of the large groups necessary to build such a causeway. A small party will try to get sources in close proximity in order to facilitate its labor, whereas a large group, being more numerous and well organized, will be more able to carry more material from outlying sources. During July of 2008, the road from Saban to Yo’okop was re-surfaced. These labors permitted us to observe how workers organize themselves in parties, with each group dedicated to a specific labor task. Several

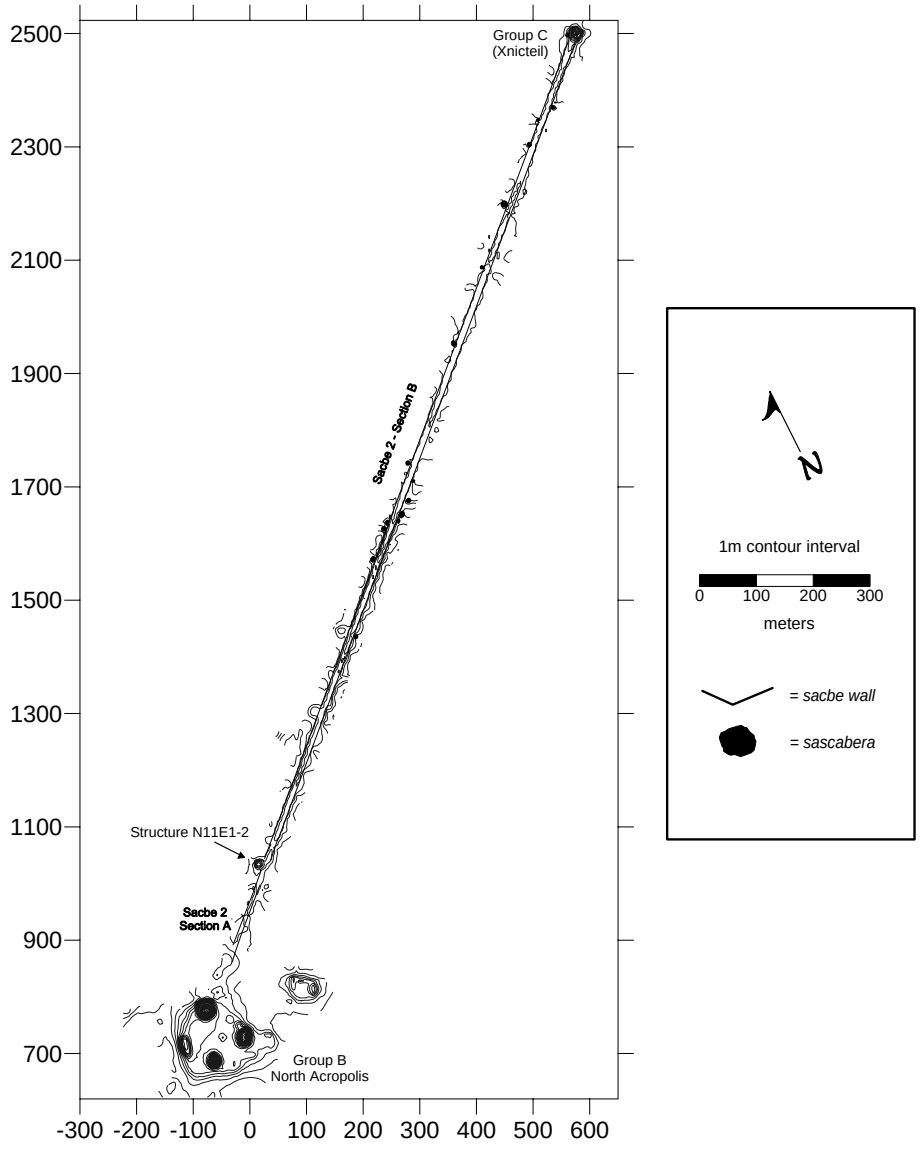

Figure 21. Yo'okop's Sacbe 2 *Sascaberas*

sascaberas were created next to this road, leaving a pattern quite similar to that observed next to the Sacbe 2. Based upon this analogy, we speculate that a similar organization went on to construct and maintain the causeway. As a small group, it was more expedient for them to utilize nearby sources instead outlying quarries. Based upon the relatively proximity of these quarries and *sascaberas*, we claim that they are the result of maintenance functions instead construction. The above-mentioned hypothesis is based upon this analogy, but future investigations will allow us to test our suppositions.

Interpretation

Wilson (1974: 12), as well as Lloyd (2002: 27), wondered about the function of Sacbe 2, since it only connects with an isolated structure, Structure N25E6-3, as well as the Xnicteil forest area. The amount of work to construct the causeway does not seem to have a functional justification, since it links Group B with an area relatively devoid of structures. It seems that the best interpretation for the purpose of the causeway appeals to a symbolic aspect instead a functional one. In a functional sense, a *sacbe*, being a straight line on geography, will be the closest way to connect two points in space. Furthermore, it maintains a constant grade to avoid pedestrians having to make an extra effort when they cross the rough surface of this part of the Yucatán. However, it seems that the creation and maintenance of the causeway would be more expensive than constructing a path in the forest, even more if we consider that this area was never very populated, based upon the archeological remains visible today. Considering the construction volume that comprises Sacbe 2, it is quite probable that the causeway is the largest building effort ever carried out within the CRAS Project's survey area located to date, even larger than the effort to construct the so-called "Castle" in Yo'okop's Group A (Structure S4W1-1), a pyramidal structure that surpasses 35 m in height. Considering that Sacbe 2 runs across a lower area for about 600 m, with 3 m tall on average, even surpassing 4 m in height in some segments (Figure 16), it seems that this causeway also employed the largest use of resources, both material and human, in our survey area. However, all this labor was only carried out to conduct pedestrians to a small pyramidal structure of 11 m in height, Structure N25E6-3, which, although of modest height, must have possessed a fundamental symbolic concern for the inhabitants of Yo'okop. Considering all the information that we have at present, we speculate that Sacbe 2 could be a *u ch'ibal be* [a road of lineage[2]], related to others smaller in size and of lesser importance as paths or tracks (Álvarez 1997: 456-460. It is possible that this road was designed to allow the transit of the main participants of ritual processions, perhaps during funerary rituals.

If there is a relation between road size and its function, in terms of transportation, we can suppose that Sacbe 2, with its 10 m width, was designed to allow the simultaneous transit of at least 6 rows of pedestrians. We assert that Sacbe 2 was created to permit the transit of multitudes, possible during ritual processions. This old idea about a ritual function of the *sacbeob* comes from Landa's time (Landa 1998: 77). Due to its relatively isolated location, as well as its topographic shape, it is highly probable that the Xnicteil mound (Structure N25E6-3) was an important temple, perhaps related to the linage in power, as a mortuary pyramid, a mausoleum. Several *sacbeob*

[2] Literal translation.

are associated with this kind of building, linking range structures with mortuary temples, as occurs with the *sacbe* that leads to Kinich Na (Nalda 2000). Possibly Sacbe 2 was constructed to conduct mortuary rituals of a important character for Yo'okop's lineage that established or inhabited Group B in an effort to link its power with an key ancestor buried into the Xnicteil mound. Or, it may be that an important member of the Group B's kin lies buried within the terminus mound.

At this point, we cannot go further into what may have been the function of the terminus mound (Structure N25E6-3) and Sacbe 2 in the past. We will have to wait until get more data, through excavations in the area, to determinate what was the importance of this terminus area that lies overgrown in the forest of Xnicteil, its isolated pyramidal structure, as well as the relevance of its interesting artificial causeway, and the importance of this possible *u chibal be*, this road of lineage.

Part 2: The *Ejido* of Saban

Chapter 4: Chuunpich

Alberto G. Flores Colin and Jorge Pablo Huerta Rodríguez

This site is located at 6.7 km south of the *pueblo* of Saban and 920 m to the south of Yo'pila. *Chuunpich* means "trunk of *pich.*" It received this name due a big trunk (*chuun*)[3] of a tree called *pich* in Maya [*Enterolobium cyclocarpum*] (Pennington and Sarukan 2005: 210), that was located in this place a long time ago. These great trees usually can be founded on the plazas of many towns in Yucatán, and their shade is greatly appreciated.

Archaeological remains founded in this area date from Prehispanic times until the Caste War period. A well and a series of *albarradas* (dry core stone walls), probably belong to the aforementioned period (Figure 22). Prehispanic features in this area consist of at least eight low platforms (about 2 m high), located 60 m to the northeast of the well (Figure 23). No diagnostic features that could indicate temporality were found. Larger platforms registered are located at 300 m to the southeast from the well, within a *milpa* field that facilitated their discovery (Figure 24). This platform measures roughly 30 x 20 m, and is 3 m tall. To the east of this construction, another two smaller platforms were found. Although the survey conducted at the site was quite rapid and is incomplete, since it was visited on the last day of the season, we believe that this settlement is part of the site of Yo'pila (see "The Prehistoric Settlement of Yo'pila" this volume), due the continuity of dispersed platforms in the intervening area. It is highly probable that the settlement in this portion of the Saban *Ejido* is extended and continuous, since that numerous low platforms were observed from La Trinchera through Yo'pila and continuing until Chuunpich (see "La Trinchera" this volume), which are located along a road that goes to the southeast from the road to Yo'okop, a 2.7-km-long stretch of continuous structures. Future surveys in the area will help us to discern if these are part of the same settlement or if these vestiges are occupations dating to different time periods that occupied the same area over many centuries.

[3] *Chuun*, foot of a tree, trunk [Ciudad Real 1995: 251; Martínez 2007: 137, 161).

Figure 22. Well at Chuumpich

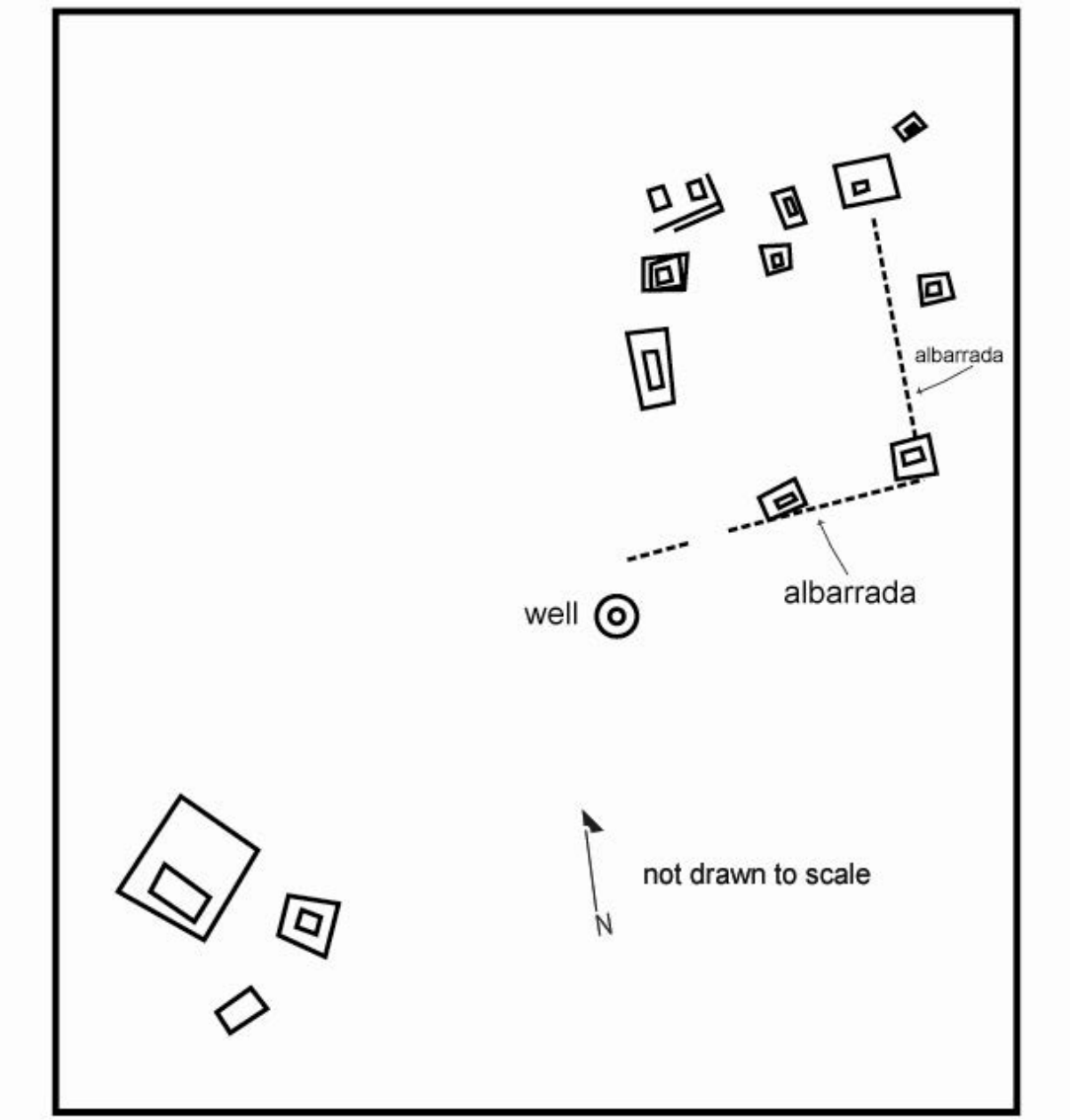

Figure 23. Plan Map of Chuunpich

Figure 24. Southeastern Platform at Chuunpich

Part 2: The *Ejido* of Saban

Chapter 5: Fortín de Yo'okop

Adam Kaeding

During the Caste War, a fort was established to protect the area surrounding Saban (Figure 25). It was named for the nearby site of Yo'okop. This fort is an impressive historic structure displaying a standard four-bastion design. Like all historic sites in the region, the central feature is a well. In fact, there are many similarities between this site and the other agricultural sites in the region. It is possible that the fort was constructed upon a core provided by a hacienda or rancho. It is also possible that the site was used for agriculture after the Caste War, thereby explaining these similarities. Furthermore, it is equally possible that the fort itself needed to be somewhat self-sufficient and, therefore, ran a dual purpose between defense and agricultural production.

Aside from the bastions mentioned above, the defensive features of Fortín de Yo'okop include a trench that accentuates the formidability of the outer walls. This trench follows the outline of the entire fort with the exception of the area immediately in front of the well, presumably the entrance. The central well contains a large square *noria*. The well itself seems to become wider towards the water level which may indicate a *cenote* or cavity below – this remains inconclusive. The *noria* is on a slightly raised area above a flattened surface of paving stones. To the south and wrapping around the east and west sides of the well is a large wall. This serves as a barricade and includes *albarradas* that extend east and west from its corners. It seems likely that this feature is a means of mitigating the lack of a defensive trench in front of the well. Directly south of this barricade wall and the well itself, and at a lower elevation, there is a *bebedero*. It seems likely that there was some means of channeling water from the *noria* to this *bebedero*, but none has yet been identified.

Beyond the southern boundary of the fort there lies a series of bays constructing into the natural elevation of the landscape, already augmented by the defensive trench. There is one very narrow bay on the eastern end facing west. Two larger, but still narrow, bays lie side by side on the eastern end of the southern line; these face to the north. Finally, there are two wider bays in that same southern line. These are not only wider but also contain very interesting hollow domed features with a small access hole. These seem to be ovens or kilns. Unfortunately, this line of features has suffered considerable collapse. Further investigation is warranted to identify, with more accuracy, the function of these features.

On the north side of the fort, in the northwest bastion, there is one subterranean room. This room is well plastered and accessible by a narrow stairway. Likely, this was a storage room for ammunition, or some other product that needed to be kept cool and dry. There are depressions both further south on the same bastion and on the other northern bastion to the east that may indicate other, unexcavated subterranean rooms.

While the well, *bebedero* and bay features indicate that this site served an agricultural function at some point, there is no evidence of a large corral system in the area. The lack of corrals suggests any of a number of conclusions. First, it is possible

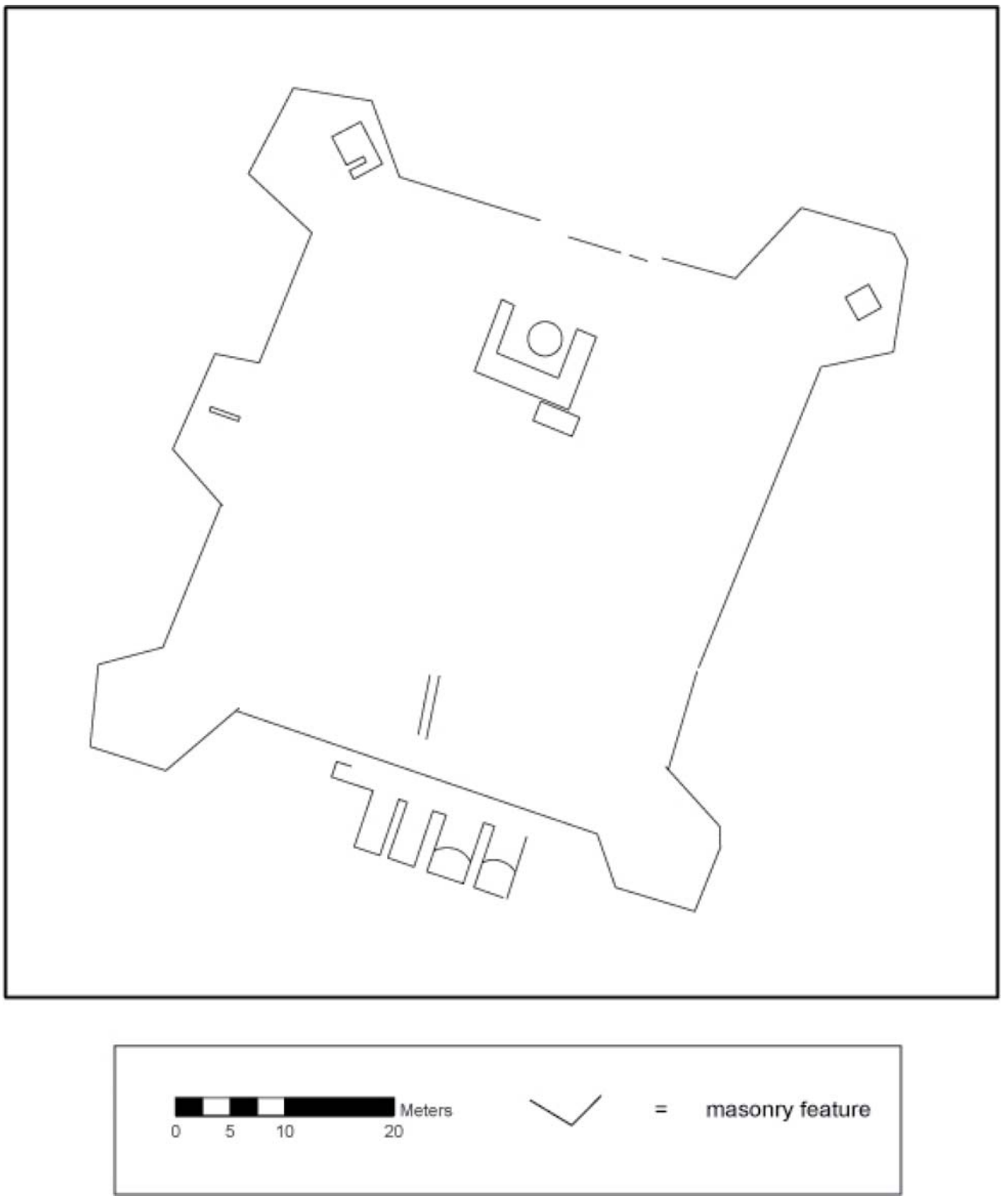

Figure 25. Fortín de Yo'okop

that the agricultural function of the site predates its defensive component. The building materials of the corral network, in this case, may have been reused in the construction of the fort. Alternatively, it is possible that livestock was not raised in the area until after the fort was abandoned. In that scenario, the boundaries of the fort, as it is currently constructed, would have served as the convenient limits of the corral. In fact, this is the way the area is used by a small-scale cattle rancher today. Finally, it is also possible that the agricultural function of this site was not directly related to the raising of livestock. Instead, the area surrounding the fort may have been an agriculturally productive zone for the raising of crops such as sugarcane. Perhaps the presence of the sunken bays is an indication in this direction, as we have not seen similar features at the *ranchos* more obviously dedicate to the raising of livestock.

Part 2: The *Ejido* of Saban

Chapter 6: Gruta de Alux

Johan Normark

Gruta de Alux or La Gruta is a cave site within an extensive settlement located over 2 km east of the church in Huay Max and 3.7 km from the church in Saban. As one approaches the site from Huay Max, there are at least two possible *trincheras* (defensive walls) dating to the Caste War. Our chosen center of the map (Figure 26), near the cave, lies 700 m west of the easternmost *trinchera*. There are several possible Terminal Classic structures with platforms roughly 100 to 300 m to the west of the cave. These were only located by GPS. Directly north of the mapped part of the site lies unmapped foundation braces only documented with GPS.

The cave itself has a 2.5-m-deep vertical entrance that turns into a steep slope for another 3 m. It leads down to an inner passage that lacks both water and artifacts.

There is a ballcourt-like structure, 70 m southwest of the cave. It consists of two parallel mounds, Structures S2W1-1 and S2W1-2. These are 30 m long and are up to 1 m high. Local informants claim it is a *trinchera* from the Caste War, but as a defensive structure it has a poorly chosen location and design. It is located at the lowest point at the site with no defensive features on two sides (all other known *trincheras* sits on hillocks). There is no *in situ* architecture such as a wall. The mounds mainly appear to be piles of unconsolidated rubble and their dates remain unknown. Similar architectural features have been located at Ramonal Quemado and Hopemul. If it is a ballcourt, its placement some distance away from the other possible Terminal Classic settlement and its vicinity to a cave is perhaps no coincidence considering the association between ballcourts and caves in mythology and both categories being seen as liminal spaces (Gillespie 1991; Tedlock 1996).

The most interesting pattern at this site are the 12 small round structures surrounding the cave (Figure 27). They are fairly uniform in size, 5 m in diameter. These round structures sit on higher ground than the “ballcourt”, apart from two structures located near the “ballcourt” (Strutures S1W1-2 and S1W1-3). The other round structures are located on a U-shaped hill that surrounds the cave entrance. Five of the round structures are connected and form an L-shaped pattern of rings, Structures N1W1-2, N1W1-3, N1W1-4, N1E1-1 and N1E1-2. Six of the other round structures come in pairs; N1W1-1 with S1W1-1, S1W1-4 with S1W1-5 and S1W1-2 with S1W1-3. Only Structure N1E1-3 is solitary, but the vegetation was thick around it so there might be another structure nearby. Some of the round structures have door jambs.

The absolute chronology is unknown for the site, but the relative chronology suggests that the two round structures near the “ballcourt” are later and built of stones taken from the parallel mounds. If the “ballcourt” was younger than the round structures it would most likely have consumed these two foundation braces.

Postclassic ceramics were located near the round structures and if they are contemporaneous with the structures we may have a diagnostic architectural feature for Postclassic domestic structures. If so, this is the first known Postclassic residential area in the Cochuah region. Circular foundation braces have been encountered and documented during earlier investigations in the Cochuah region.

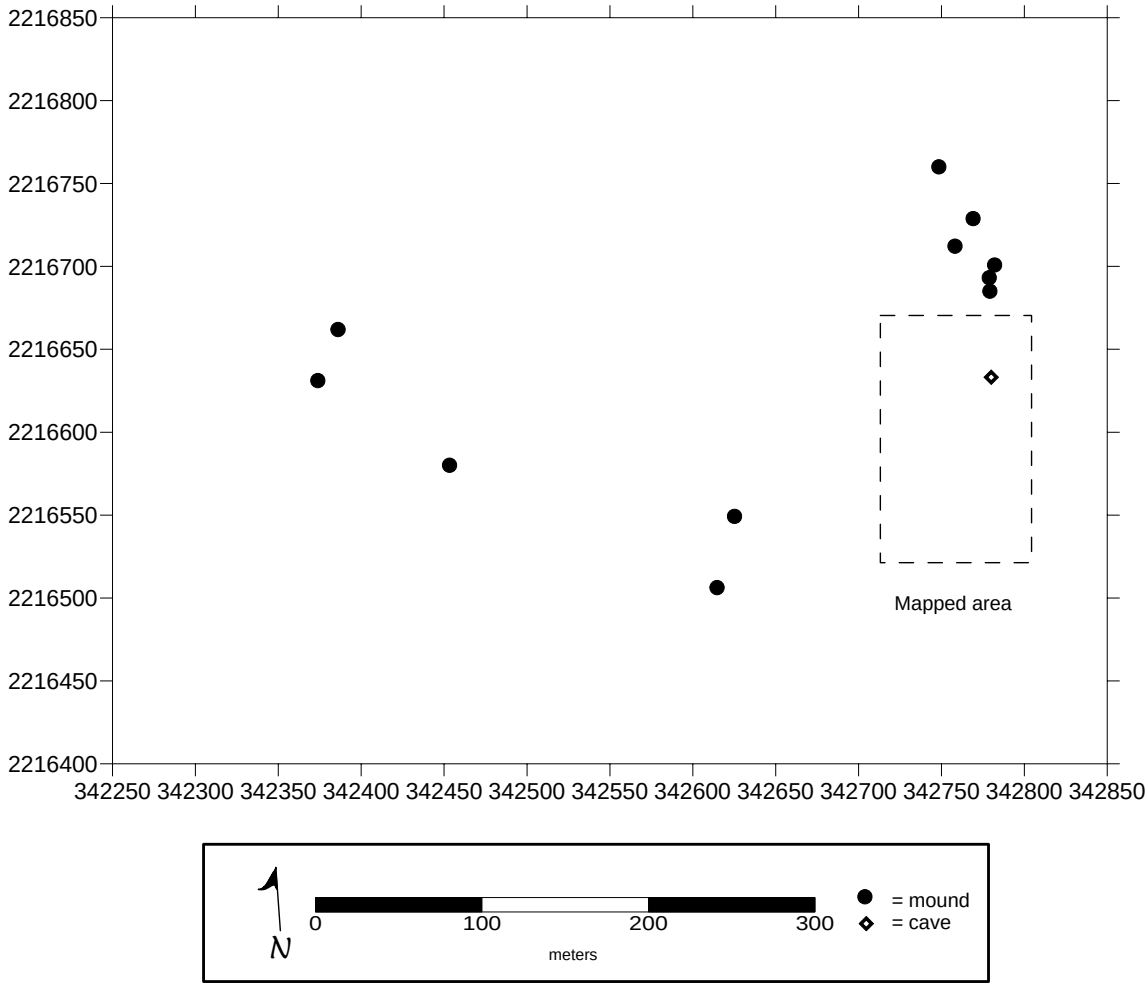

Figure 26. Greater Gruta de Alux

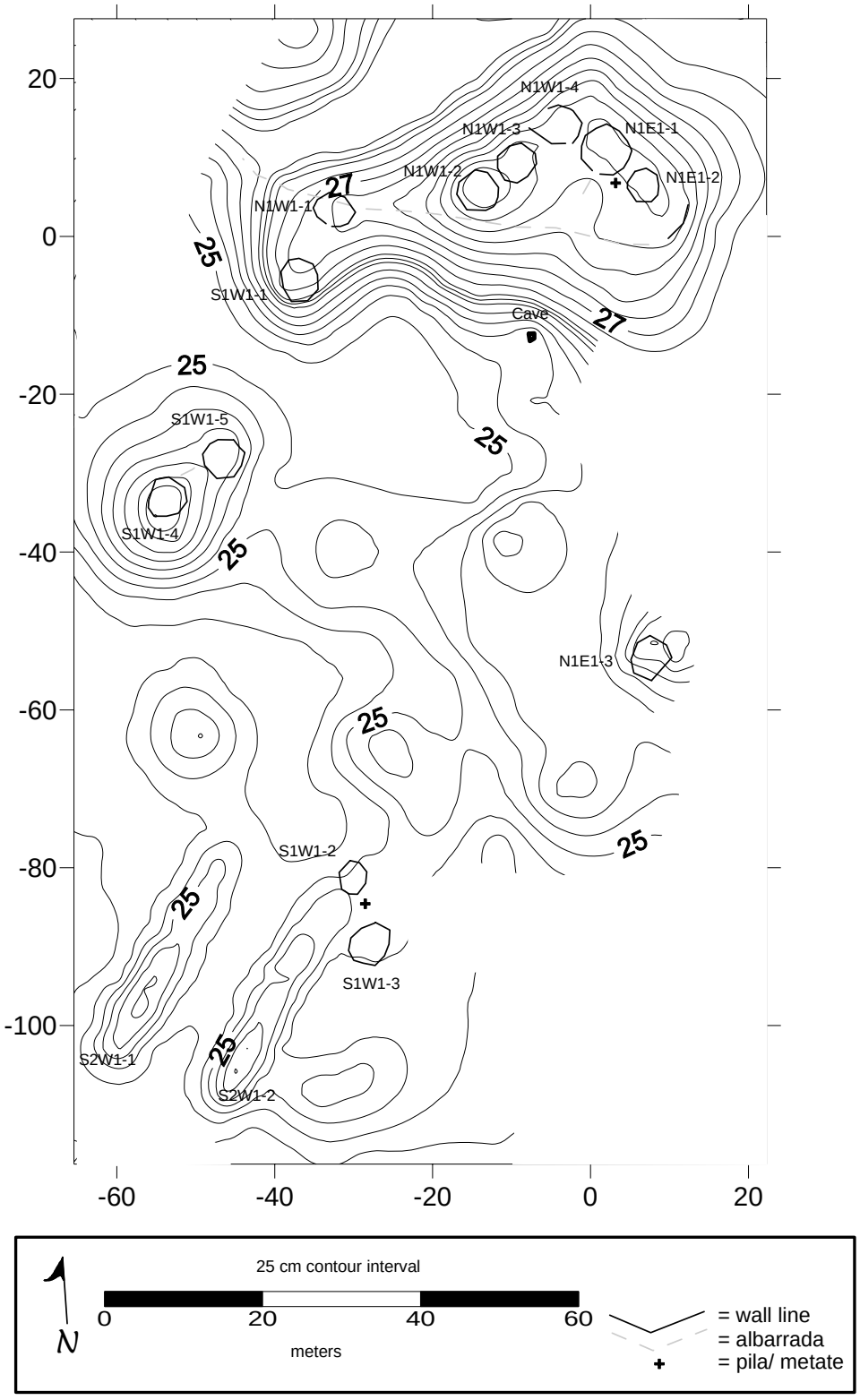

Figure 27. Gruta de Alux

These are often found together with rectangular buildings on platforms and they have been interpreted as kitchens. However, these round structures could potentially be from another time period in those cases where the rectangular buildings are of Terminal Classic date.

Part 2: The *Ejido* of Saban

Chapter 7: Hacienda Palomar

Adam Kaeding

This site (Figures 28 and 29) features the standard agricultural complex as well as a masonry house thereby establishing it as a *hacienda*. The central well is a standard circular well associated with a double *bebedero* feature similar to those seen at a number of other sites in the region. Interestingly, there is no evidence of *albarradas* in the area of the *bebedero* that would establish a central corral.

The house is located to the south of the well. It is an oval structure with a squared porch extending from the north edge. This northern extension is a constructed platform that leads back into the house. It is not clear whether the house itself sits on an artificial platform or is instead a modified natural raise.

The *albarradas* extend to the east and south. As far as is currently observable, these *albarradas* only establish a couple of clearly enclosed areas like corrals. The *albarrada* network itself, however, extends further in both directions. Likely, these *albarradas* establish boundaries for roads linking Palomar to other sites.

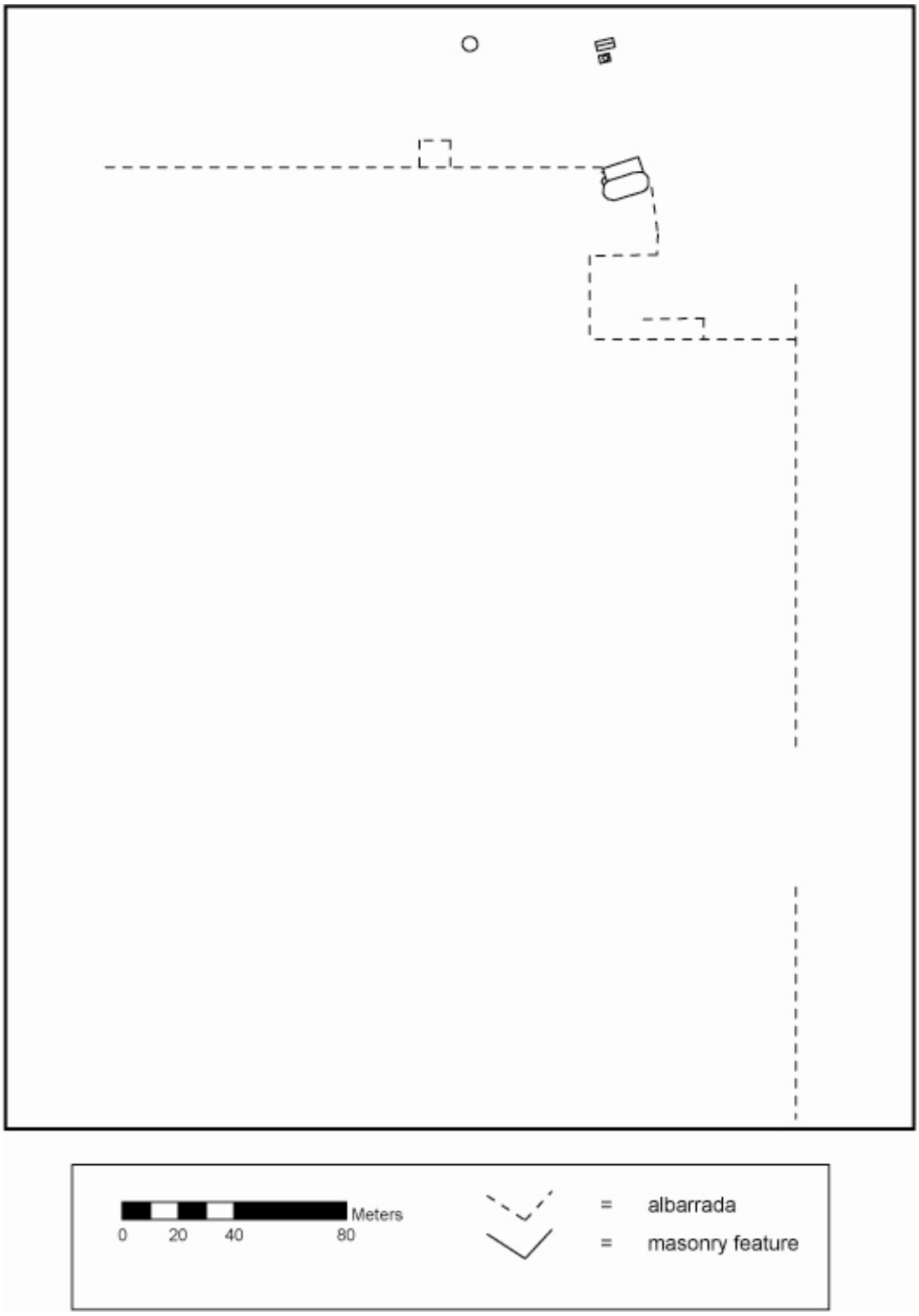

Figure 28. Hacienda Palomar

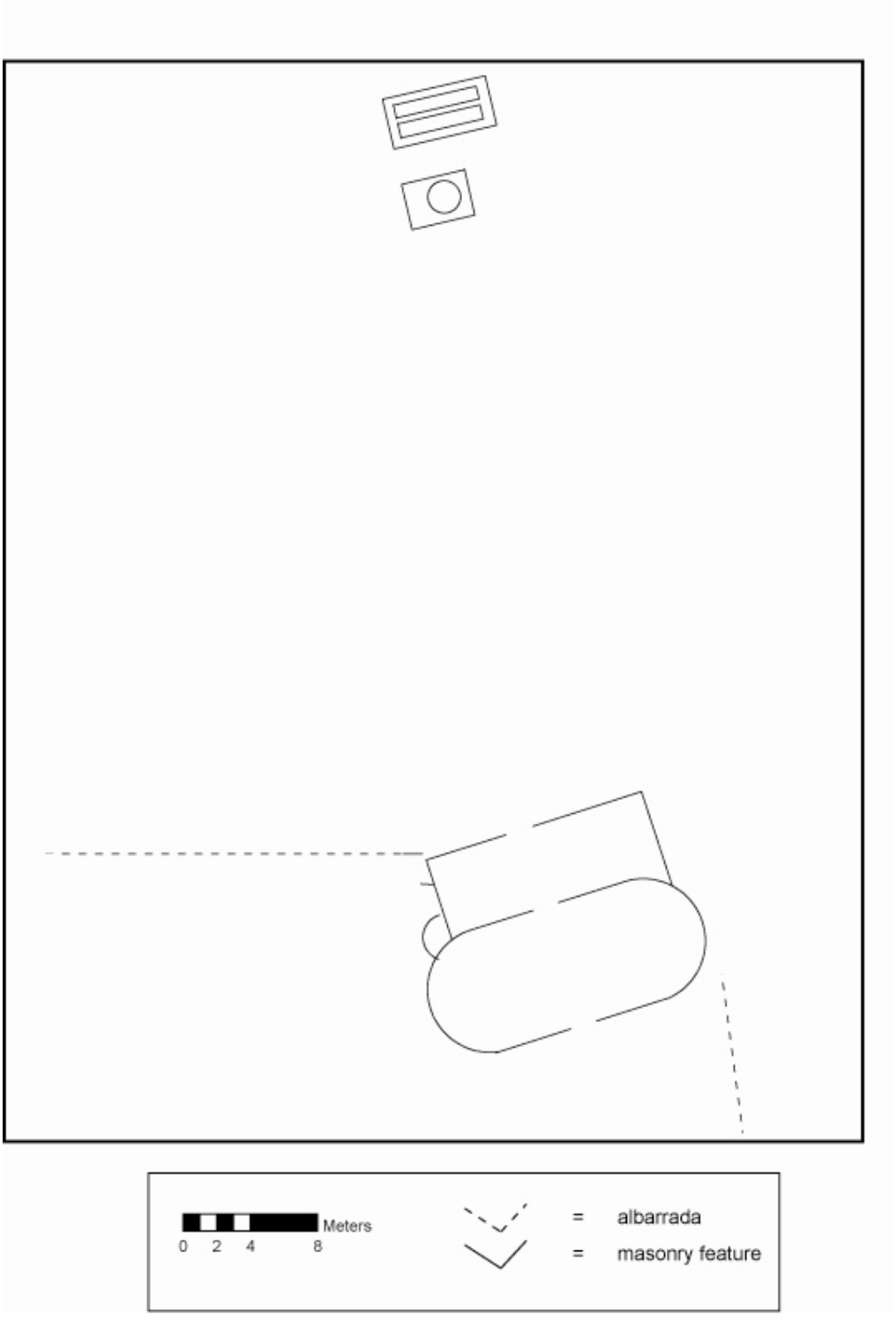

Figure 29. Hacienda Palomar House Area

Part 2: The *Ejido* of Saban

Chapter 8: Hacienda San Miguel

Adam Kaeding

San Miguel is a *hacienda* site characterized by a large central *noria* platform with an adjacent house connected to a central corral area (Figure 30). San Miguel is currently a fully operational cattle ranch, making it somewhat difficult to distinguish its historic components from those that are more modern. Nevertheless, it seems likely that the well-*noria* and house are of greater antiquity due to the nature of their construction.

The corral has three large *bebederos* that run in a line along its southern wall. These are fed by a channel that leads from the well. These features, specifically the channel, seem to have at least been modified in recent times. In fact, it seems likely that the stones from the original bebederos are now the same stones that line the walkway to the house. They maintain the same beveled shape that has characterized older *bebederos* in the region.

There is a single small square feature set to the south of the central complex. It is unclear what purpose this may have served, but it is interesting that it currently houses a standard olive jar, typical of the colonial period. Near this square feature, there is an open perishable shelter. It is possible that this structure stands on older foundations.

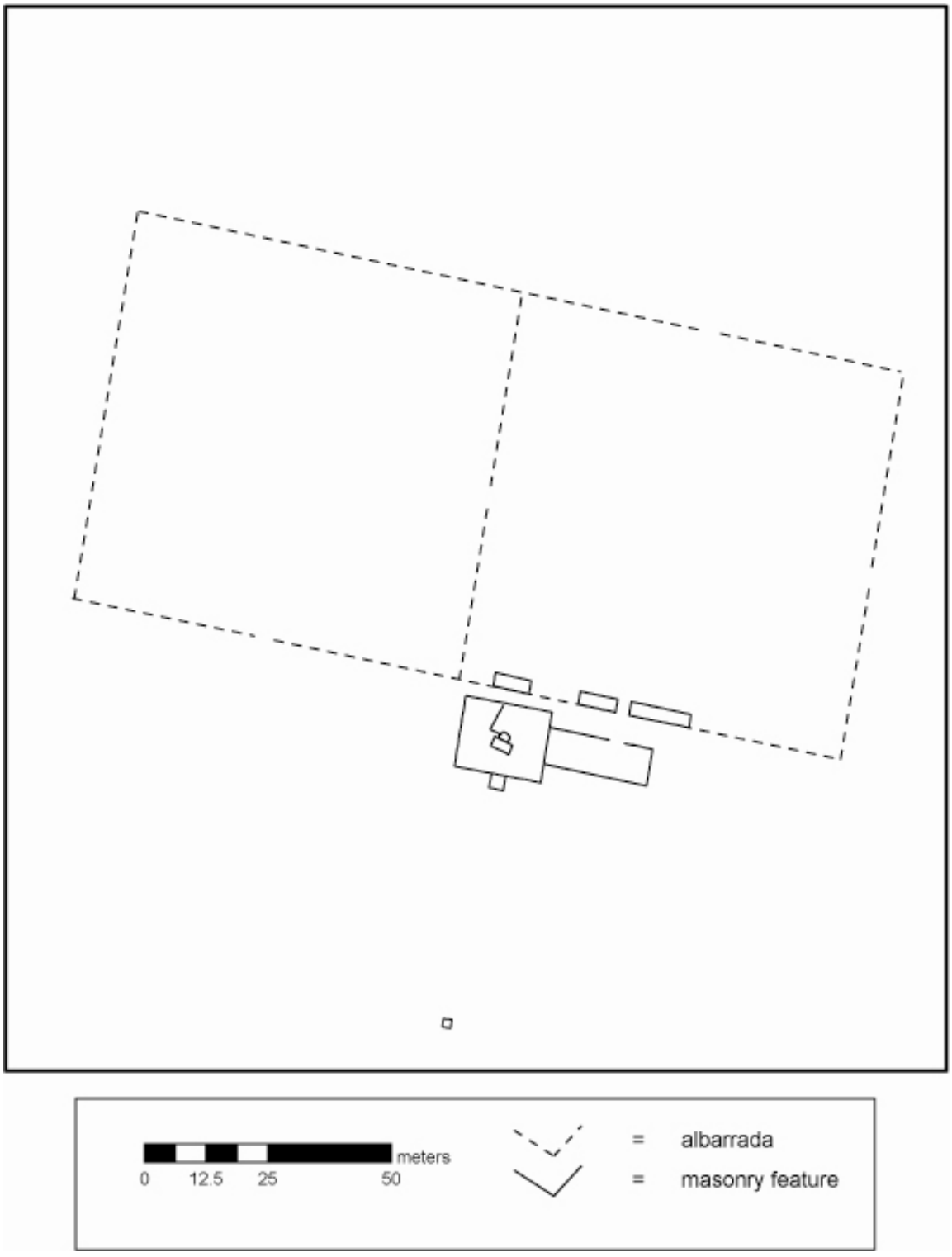

Figure 30. Hacienda San Miguel

Part 2: The *Ejido* of Saban

Chapter 9: Hacienda San Pedro

Adam Kaeding

This is an indisputable *hacienda* site. It is probably the largest site of this category in the region characterized by a very large masonry house, a large well-*noria* and *bebedero* complex, and a complex of *albarradas* (Figure 31). Unfortunately, this is also one of the most remote sites in the area; located as far from any access roads as any other site that we have visited in Saban. A secondary issue at San Pedro considers its current use. Probably because of its isolation, this site has become the location for a large-scale apiculture program. Directly in the center of the site, between the well and the house, there are stacks of probably at least 40 hives housing what has been reported to be Africanized bees. The site's remote location and the presence of these bees have made the mapping of this site particularly difficult to map. We were able to establish a base point and initiate a total station map, but were forced to switch over to a simpler sketch map and description.

The central *noria* platform is about a meter and half high and accessible by a stairway that leads toward the large central house. The central well is a large square cut hole. There is a canal set into the *noria* and leading off of the platform to the northwest. This canal is enclosed; plastered over by the surface of the platform. That canal leads to an aqueduct that is constructed at the level of the *noria* (1.5 m) and then runs another (noria length) where it reaches a large *bebedero*. The drain into the *bebedero* is located at 70 cm above the surface establishing a gradual slope.

Like several other agricultural sites in the region, this one clearly had a more recent occupation. There is an inscription in the *bebedero* plaster that reads "1960 Rancho San Pedro". While it is clear that the occupants of this site identified it as a rancho, it is important to note that using the categorization used in this study, the site falls clearly within the designation of a hacienda. The key feature in this designation, again, concerns the presence of a central residence. San Pedro has a large masonry residence whose walls still stand about 3 – 3.5 m tall. It is a large, long structure rounded at both ends. The central room is divided between a single room and what appears to be an open porch area. The doors of the house are elaborately decorated with what seem to be scalloped tops. The central porch is accessed by two stairways. There are pillars running the length of the porch on the side with the stairways.

There is at least one separate structure foundation near the main house. This foundation is currently the base for a perishable structure and probably always has been. There seem to be more four-post structures scattered around the central yard, bearing evidence of other, more ephemeral structures. Beyond this central yard, there is a network of *albarradas* that extends in every direction. These *albarradas* establish what seem to be corral areas as well as leading into roads that lead away from the site.

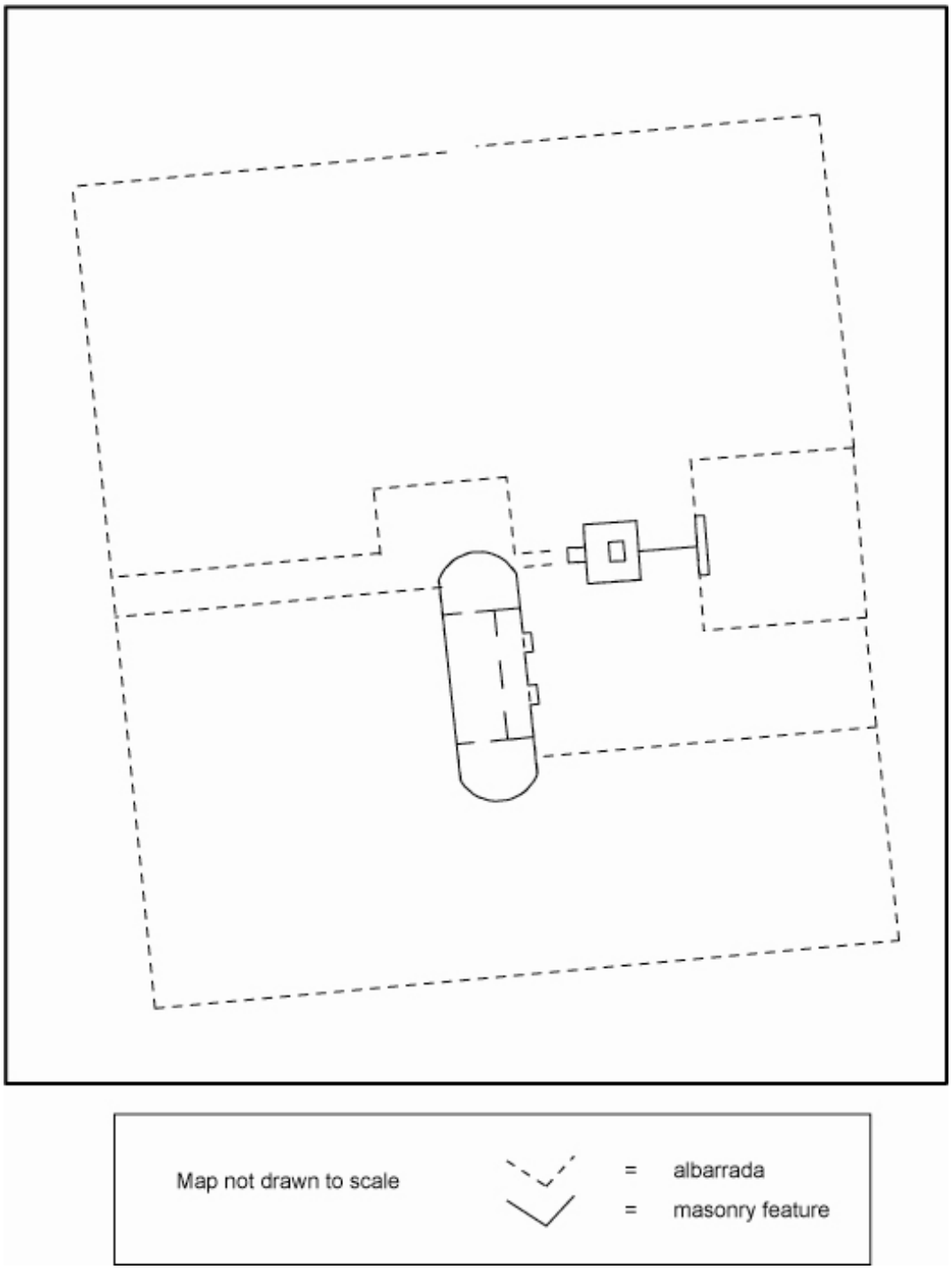

Figure 31. Hacienda San Pedro

Part 2: The *Ejido* of Saban

Chapter 10: Rancho El Palomar

Jorge Pablo Huerta Rodríguez

A partial survey was carried out in a location called Rancho El Palomar, where several Prehispanic structures were found (Figure 32).

Structure 1 is a pyramidal structure of about 7.50 X 12.00 m. It lies east of a Colonial well whose above-ground architecture has a current height of roughly 2.2 m. An *albarrada* (dry-laid wall) runs along its northern side, with two looters' holes located on its summit. It is unusual in that its sides are asymmetrical; the northern side is one m longer than the southern side (3.5 vs. 2.5 m.), while the eastern side is two m longer than western (5.0 vs. 3.0 m).

Structure 2 is located to the southeast of the well. It is a rectangular mound with a base that measures 17.20 x 23.80 m and is 1.80 m high. This building is composed of at least three stepped components (that are 3 m wide). In general, these are well preserved, with intact wall lines in some areas. On the northeast side of the third terrace of this structure, a sort of a stairway descends to the ground surface; this is composed of 5 steps measuring 6 x 4 m. Furthermore, upon the third of its terraces, two wall lines were located. These are the possible remains of a superstructure.

Structure 3 is located to the southwest of the Colonial well (right next to Structure 2). Structure 3 is a large, rectangular platform, whose dimensions are 35 x 19.5 m at its base with a height of 6 m. On its northern side, a single wall line was located. The well-leveled summit indicates that a superstructure may have been placed there.

Structure 4 is located to the south of the well. It is a rectangular platform of 12.6 X 11.5 m, with a height of about 3 m. The slope of the platform's sides is not regular, since the western edge is 4 m tall while eastern is 2.5 m tall. An *albarrada* is located to the 3.8 m east of this platform. The northern façade has been almost totally destroyed by a looters' hole.

To the southeast of Structure 4, another platform complex was located; this appears to lie upon a larger platform. To the east of this platform, a large *sascabera* (13 X 10.5 X 1.6 m) was located. It should be noted that to the south of this platform the ground surface is quite uneven. On the summit of Structure 4, two smaller platforms were located. However, it is possible more structures are present, because time constraints prohibited us from better defining the architectural remains. The eastern platform is 4 m tall and about 14 m long; it has been impacted by the construction of an *albarrada*. The western platform is only about 0.6 m tall and about 19 m long. The northern side of both platforms was well defined.

Conclusions

Unfortunately recent human activities have affected the majority of the platforms at the site. Structure 2 is potentially more significant than the other archeological

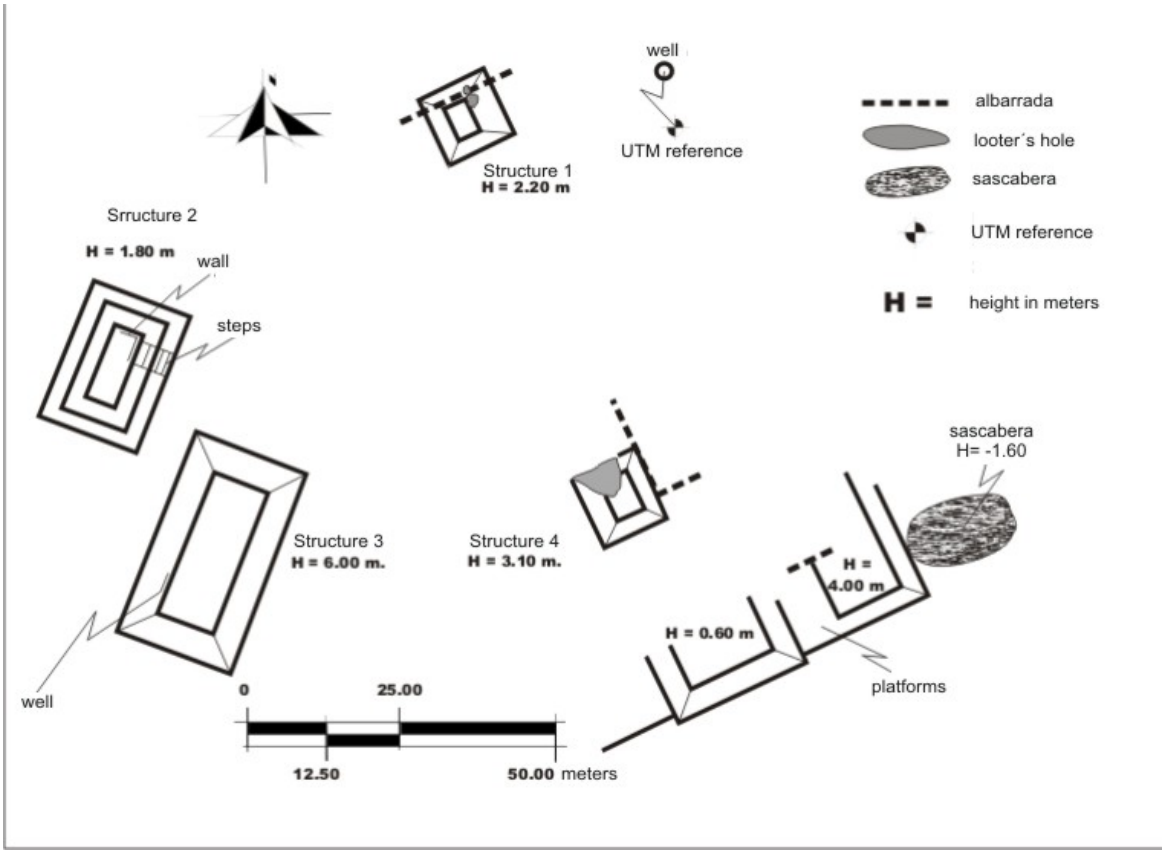

Figure 32. Rancho El Palomar

remains, in that it displays a different architectural style than the rest of the site. It is likely that the alignment recorded on Structure 2 represents the remains of a room or an altar, but this hypothesis will have to be tested in the future, with a topographical map and thorough excavations.

Part 2: The *Ejido* of Saban

Chapter 11: Rancho Pancho Villa

Adam Kaeding

There are two potential features at this standard *rancho* that may suggest central residence and thereby categorize it as a *hacienda* (Figure 33). Unfortunately, neither of these is features is very well preserved so neither is conclusively evidence of residence. At any rate, it is clearly a large *rancho* at the very least.

The central feature is a large circular *noria* platform with a square well cut into its center. There is a canal set into the *noria* platform that leads from the well northeast to what appears to have been the location for at least one *bebedero*. It seems like the stones of this *bebedero* have been removed and only the footprint of its construction remains. There is a stairway accessing the well on its southeastern side. There is currently a ramp accessing the same well on its northwestern side, but this seems to be a recent modification. The *noria* also has a unique double-sided *pila* on top of it.

The axis of this site runs basically southwest-northeast. An *albarrada* establishing this orientation passes just north of the *noria*. Following this *albarrada* to the northeast from the *noria*, there is a clearly defined oval platform. While this platform is well constructed and identifiable, it has very little construction material in association. As a result it seems likely that this foundation does not represent a masonry residence. Instead, it was likely a *trapiche* platform or possibly the foundation for a perishable structure. Further to the northeast along that same *albarrada* lie the remains of a more substantial masonry structure. From what remains, this appears to have been a square structure with high walls. Unfortunately, only one of the corners of this building remains so it is difficult to determine its exact layout.

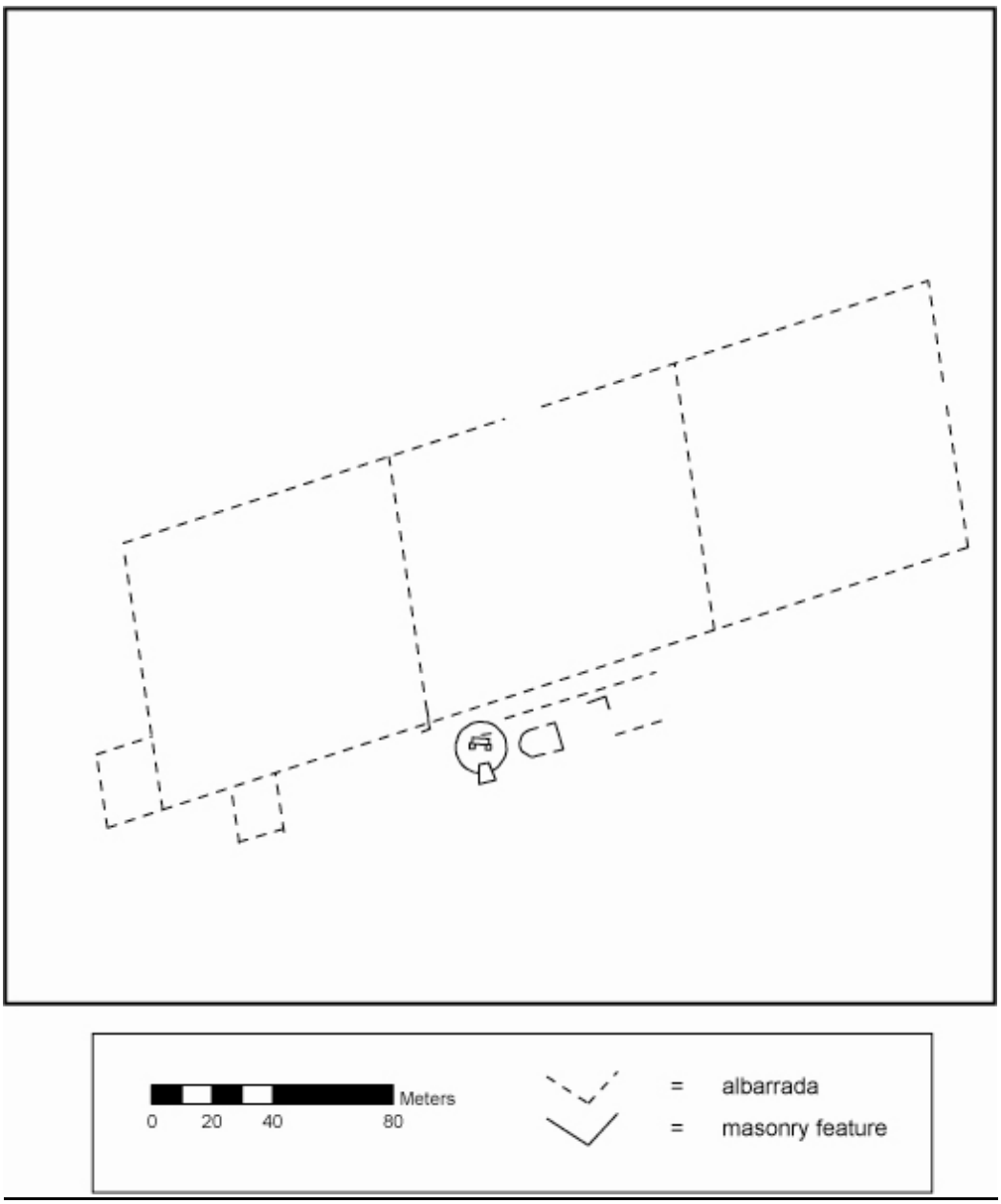

Figure 33. Rancho Pancho Villa

Part 2: The *Ejido* of Saban

Chapter 12: Rancho Rosales

Dave Johnstone

Rancho Rosales is located 4 km southwest of Saban in an area with very little topographical relief. As its name implies, there was a ranch operated at this locality, although it has been abandoned as a ranch for approximately 15 years. The corral is 40 m on a side, with three entrances to the north, east, and south. There is a watering trough along the west wall close to a well. Interestingly, this well was not dug from the present ground surface, but some 3 m below the present surface, through the floor of a *sascabera* (pit for extracting oxidized limestone). The height and thickness of the walls suggest that they were constructed during the Colonial period. There is no evidence of a Colonial period residence associated with the corral, so it is likely that the people who operated the *rancho* commuted daily from Saban.

Three Prehispanic structures were documented at this site (Figure 34). The largest is a 3-m-high pyramid. The southeast corner is still *in situ*, and shows large roughly hewn stone blocks. On the western face, the wall is made out of smaller roughly hewn stones, slightly battered. There is a large looters pit in the summit. The second largest structure is a 2-m-tall range structure. This building has been badly robbed for stone; presumably quarried in order to construct the corral. The last structure is a platform supporting a perishable residence. The remaining stones in the foundation brace are veneer stones, suggesting a Terminal Classic date for its construction. A small Postclassic shrine has been built on its summit, reutilizing many of the structural elements from the underlying residence (Figure 35). Some other small foundation braces were noted within 100 m of the principle mound, but were not sufficiently close, or concentrated, to warrant the effort needed to include them in the map.

After the first CRAS survey in the *ejido* of Sacalaca, Flores C. (2003:69) noted the close association between Prehispanic and Colonial settlement and suggested that the characteristics of the localities attracted both the ancient Maya and the Spanish to settle at the same place. Given the ruinous condition of the range structure at Rancho Rosales, I would like to offer a different hypothesis to explain the association. I suggest that the conditions attracting the two are not the same. This is in light of the basic differences in subsistence between ranching and farming. I think that one of the reasons that the Spanish reoccupied sites previously occupied by the Maya, is that those sites themselves were viewed by the Spanish as an important resource; one that could be exploited for their own purposes such as a ready source of cut stone suitable for use as raw material in Spanish building efforts.

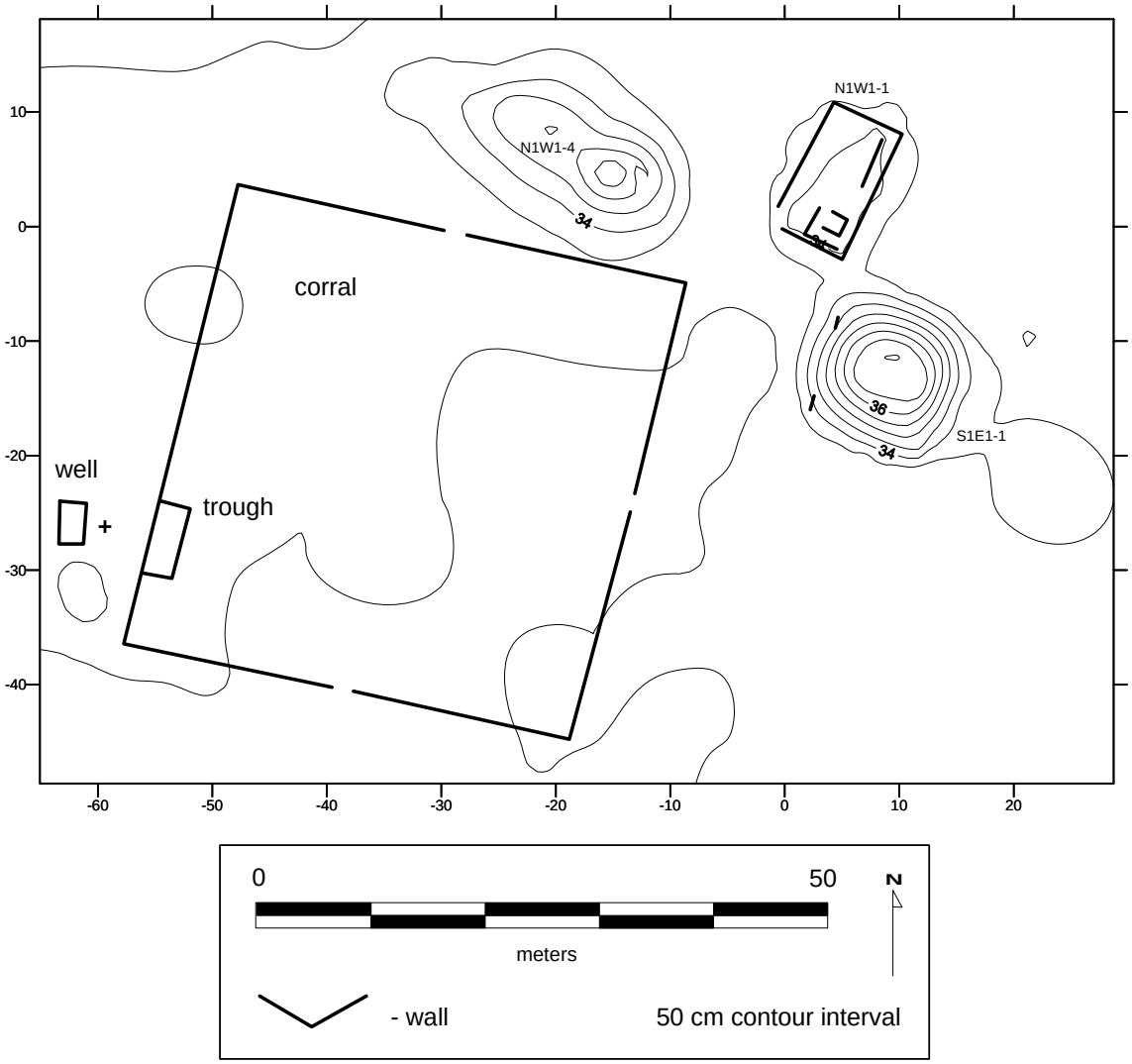

Figure 34. The Site of Rancho Rosales

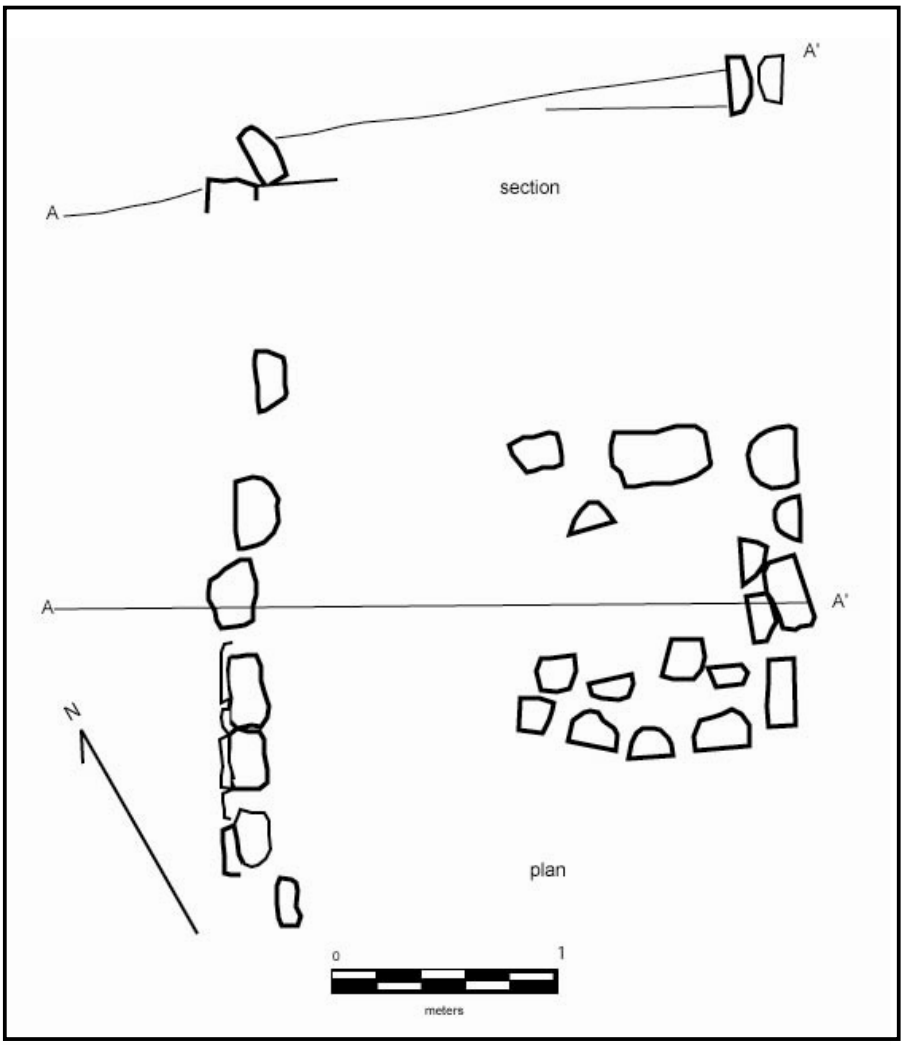

Figure 35. Rancho Rosales, Structure N1W1-3, Postclassic Shrine

Part 2: The *Ejido* of Saban

Chapter 13: Rancho Sahkabch'en

Adam Kaeding

This site is somewhat intermediate between a large *rancho* and a *hacienda*. There are two areas that seem to be potential house platforms which might suggest a central residence and, therefore, assign this site to the category of *hacienda* (Figure 36). On the other hand, the potential houses are both small and seem to have been constructed largely of perishable materials. In this sense, then, the structures are very different from the large masonry houses we see typically associated with haciendas in the region. Instead, they might be better interpreted as temporary houses, or the residence of foremen or caretakers rather than the landowners themselves. Sahkabch'en, in that case, would be better considered a *rancho*.

Regardless of its official categorization, the site is clearly an area of extensive agricultural production. At its center there is a well and *noria*. A boundary wall with a built in aqueduct lies to the south of the well and connects to a double-*bebedero* feature. This feature is unique to the region – it is one fairly deep *bebedero* running north-south. It has a high wall bordering its eastern edge. On the other side of the wall there is another *bebedero* that matches the first but seems to be a bit shallower. The large, separating wall is perforated with holes connecting the two *bebederos*. It seems that one of the troughs would have been filled and then the overflow from that one would feed the other. Extending from this central feature is a network of *albarradas* that isolates two small pens.

The two features that seem like raised structure platforms lie directly to the east of the well and to the north. They are approximately the same size and dimensions. The platform to the east is apsidal, almost circular. It is possible that this one is a *trapiche* platform. The foundation to the north is more elongated and apsidal. It is currently serving as the foundation for a perishable shelter. There is a *pila* just off to the southeast of the foundation and a small rectangular been to the northeast. It seems likely that, if there were a residence at this site, this northern foundation would indicate its location.

The corral network extends from the center in every direction. We were able to follow these corrals and get a better sense of the areas that they enclose. This includes at least two larger corrals to the west and one smaller example to the southeast. There are also at least two much smaller that are isolated architecturally and probably served as pens. One of these is located within a corral to the southwest of the well. The other is built into the corral wall to the southeast. The *albarrada* nearest the well ends in a sort of rounded feature. This, too, could represent a makeshift pen though it is open for any number of interpretations including a sort of entrenched fortification or a decorative feature on the approach to the house.

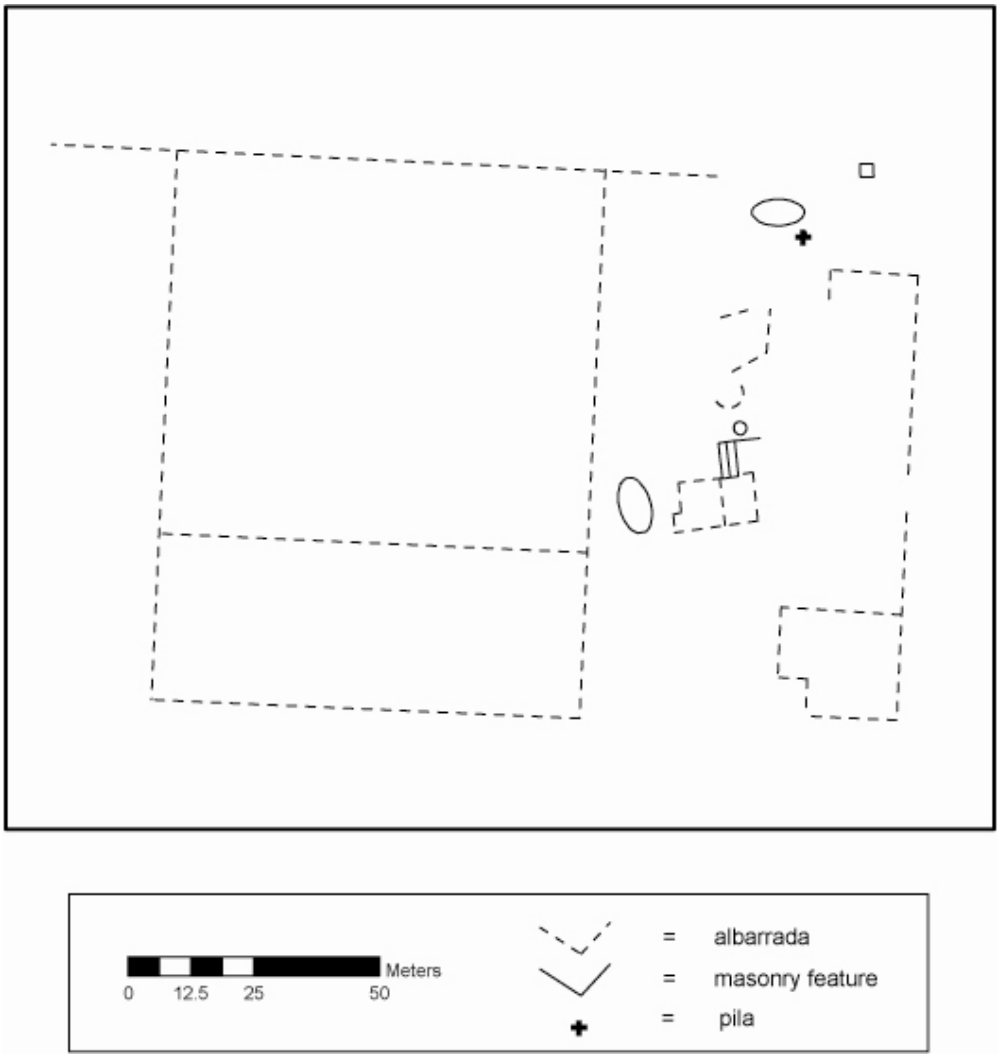

Figure 36. Rancho Sahkabch'en

Part 2: The *Ejido* of Saban

Chapter 14: Rancho San Francisco

Adam Kaeding

Even within a relatively small area, this site represents many of the archaeological and geological elements that we see in the region. It is an historic *rancho* with modern reoccupation (Figure 37). To the east of the central *rancho* features, there are Prehispanic features including at least one large mound and apparently several smaller house platforms. At least one *sascabera* lies to the northeast and there is either a larger *sascabera* or a cave to the southeast. The Prehispanic and geological features are discussed elsewhere in this report (see "San Francisco").

Like all *ranchos*, San Francisco is centered on a well and corral. It is a square well with an aqueduct leading to two *bebederos*. One is a small *bebedero* along the aqueduct and very near the well. The other is a larger and recently plastered example that sits on the other side of the *albarrada* that encloses a corral to the north. There is a separate and larger corral to the south of the well.

Many of the *ranchos* in the *ejido* of Saban bear evidence of having been reoccupied in the 1960s. Local informants suggest that it was this time period that Saban was officially designated an *ejido*. Settlers then came from nearby towns, perhaps most prominently from Tihosuco, to establish their *ranchos*. San Francisco is one example of this process. There is certainly evidence of a more recent occupation including the most obvious, an inscription on the re-plastered *noria* that reads "Rancho San Francisco" and "1965". The other evidence of recent occupation is a small square feature of stone and concrete with a rebar structure. This would have served as the base for a mechanized pump used to draw water from the well.

The remainder of the site seems to have older origins. As mentioned above, there are two square corrals flanking the central well. Further north, the regularity of these corrals is lost. For example, in what seems to be the furthest northern extent of the historic site, there is a much smaller *albarrada* corral area. In the same area, there is a *sascabera* ringed with *albarradas*. These *albarradas* were likely constructed in order to keep livestock from falling in the sascabera.

There are a number of mounds in the area, both to the north near the *sascabera* and also closer to the well. These are addressed elsewhere in this report. For the sake of describing the historic features, it is important to note only that there are many cylindrical and other cut stones in proximity to the well. These are clearly not in their original context. Likely, they were removed from the Prehispanic ruins either nearby or as far away as Yo'okop. It is fair to assume, therefore, that the materials used in the construction of Rancho San Francisco likely found their origins in the Prehispanic mounds.

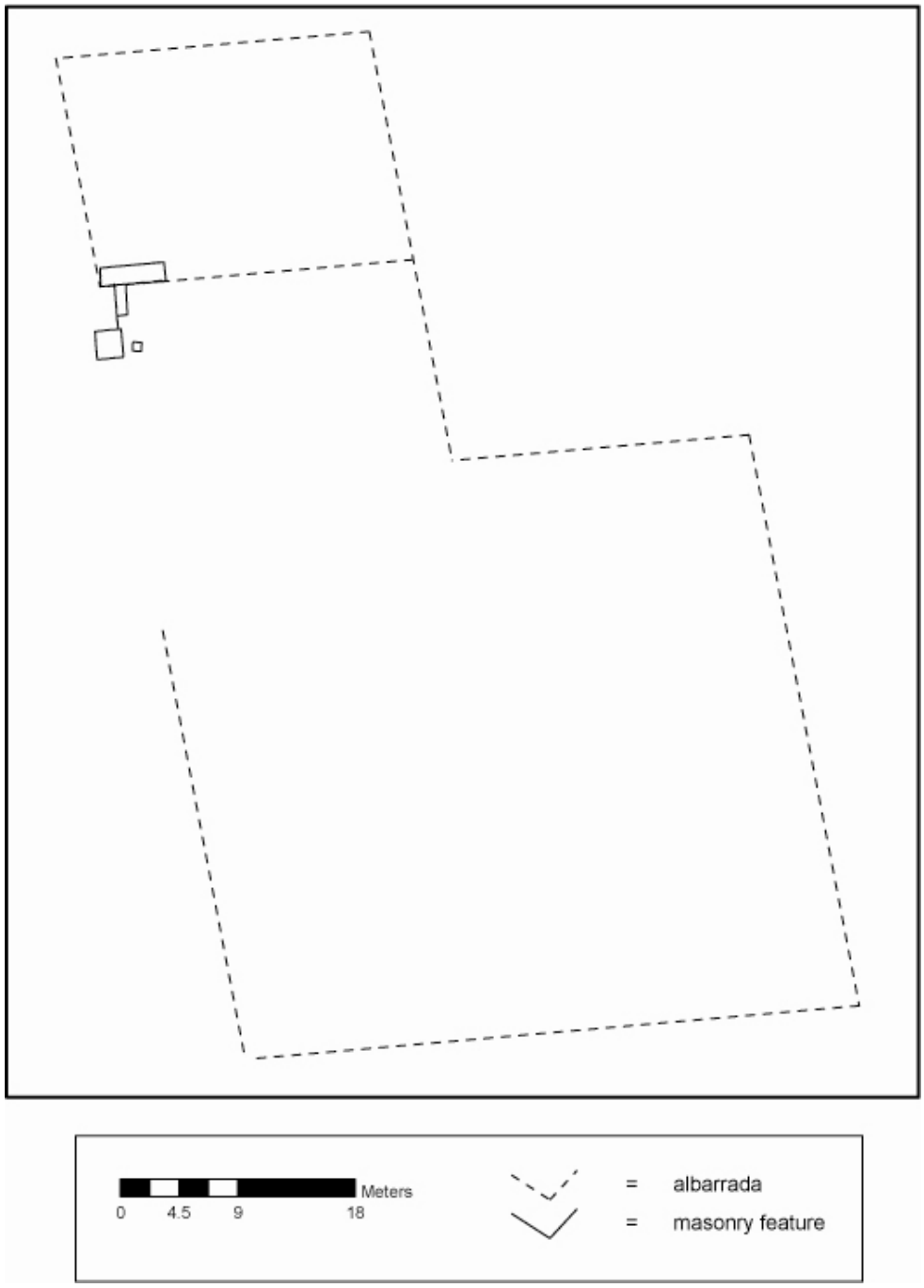

Figure 37. Rancho San Francisco

Part 2: The *Ejido* of Saban

Chapter 15: Rancho Santa Rita

Adam Kaeding

This is one of the *ranchos* that are currently operational. It is relatively small as there does not seem to be an extension beyond the central corral (Figure 38). At the center of this square, high-walled corral, there is a well and *bebedero* arrangement. There are also two foundations visible to the south of the central corral. One of these is large enough to nearly match the dimensions of houses we have seen elsewhere in the region. Both of them are on raised platforms. There is also a fairly large pyramidal mound just beyond the northwest corner of the central corral. This pyramid has been modified and currently houses an altar with a cross at its peak.

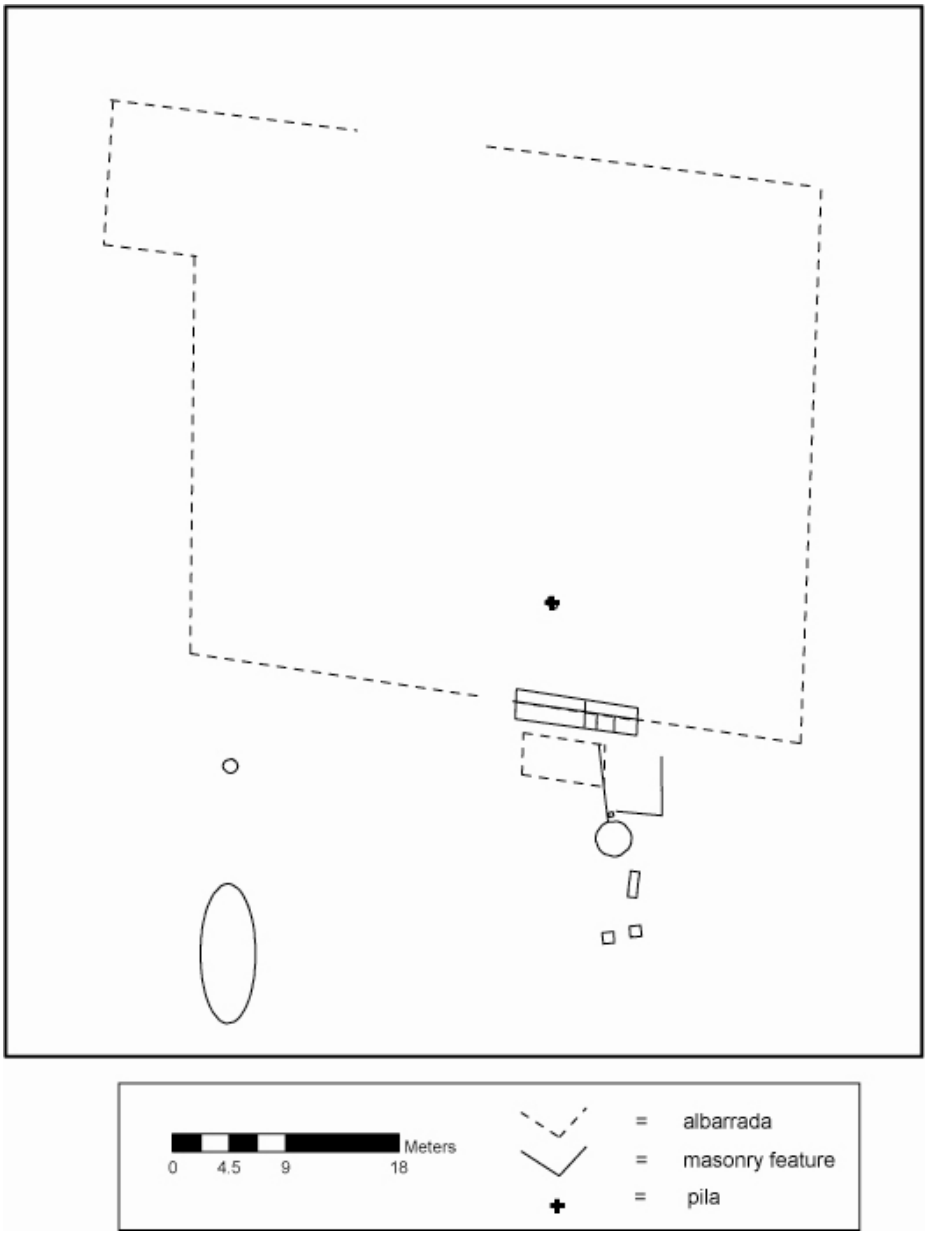

Figure 38. Rancho Santa Rita

Part 2: The *Ejido* of Saban

Chapter 16: Rancho Xnicte

Adam Kaeding

Like Sahkabch'en, this site bears evidence of a possible house foundation (Figure 39). It does not, however, hold any obvious remains of a masonry house. Therefore, it falls somewhere in-between the categorization of a *rancho* and a *hacienda*.

Its central feature is a large, square-cut well with thick walls. Like Rancho San Francisco, these wells have been re-plastered during a period of reuse. The plastered is inscribed reading "R. Xnicte Ha, 26 Mayo 1963". Again, our local guides inform us that these were the ranchos that were in use at the time of Saban's establishment as a separate *ejido*. At that point of transition, ranchers either established themselves fully in the newly formed Saban, or returned to Tihosuco where the majority of them had resided.

There are several networks of *albarradas* establishing corrals to the east and west of the well. To the east, the *albarradas* isolate at least three separate areas, one of which is a very narrow rectangular strip probably used for a purpose separate from that of the larger corrals. To the west, the *albarradas* were more difficult to identify, so we were unable to delimit a specific corral area. It is over here, however, that we find evidence for a possible house platform. There is a large and well constructed platform, rising about a half-meter above the surface. Along its western end and in the southwest corner, this platform is well preserved and maintains a straight line. The remainder of the platform, on the other hand, has suffered considerable collapse. Combined with the fact that the platform itself seems to recede into the natural elevation to the east, its exact dimensions are difficult to identify. One feature does seem to indicate its central access. There is a slight protrusion off the south side which may indicate a staircase. To the southeast of this protrusion there is a ring of stones that may establish a protective *arrieta* for trees grown in the front of the house.

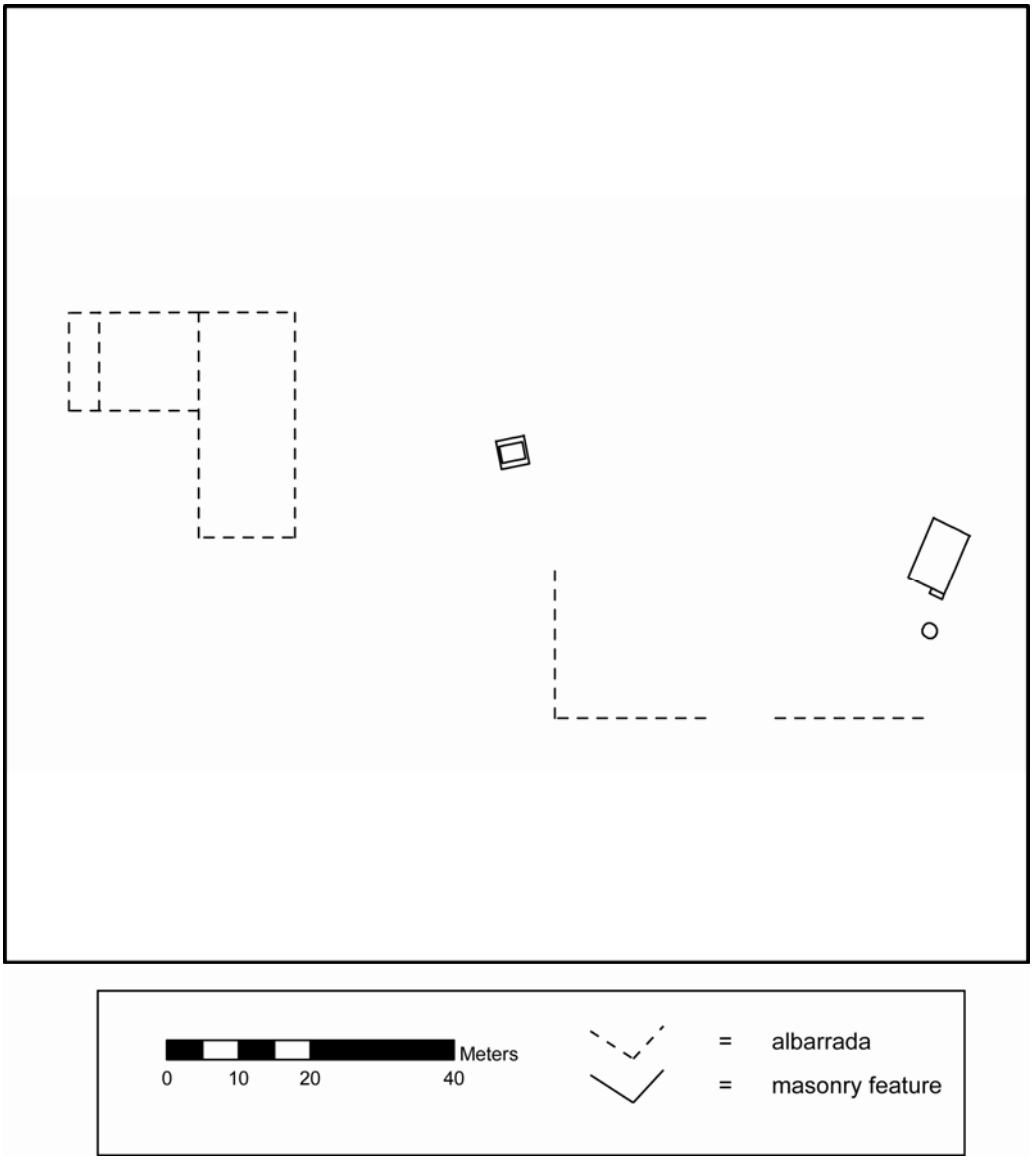

Figure 39. Rancho Xnicte

Part 2: The *Ejido* of Saban

Chapter 17: Rancho Yopila

Adam Kaeding

This is an historic *rancho* currently used by a contemporary cattle rancher. Interestingly, while there are both historic and modern elements to this *rancho*, they are generally distinguishable (Figure 40). This has not been so obviously the case in other ranchos currently in use. Essentially, the rancho is a well and central corral. There are two *bebederos*, one historic and one modern, both linked to the well by two separate aqueducts, again, one historic and one modern. There is also a large house foundation directly to the south of the well. Unfortunately, due to either salvage or the general nature of preservation, we were unable to locate the rear wall of this structure.

Because this rancho lies in an extensive *milpa* field cleared of any larger vegetation, we were able to locate the extents of the corral system. The southeast corner of this rancho arrives in an area notable for the presence of at least four relatively small (two to three meter high) Prehispanic mounds. The northeast corner was also interesting because it was roughly triangular. Because we have seen a similar manifestation at Sacalaca's Hacienda Ramonal, it seems possible that this triangular corral indicates a pattern of land distribution.

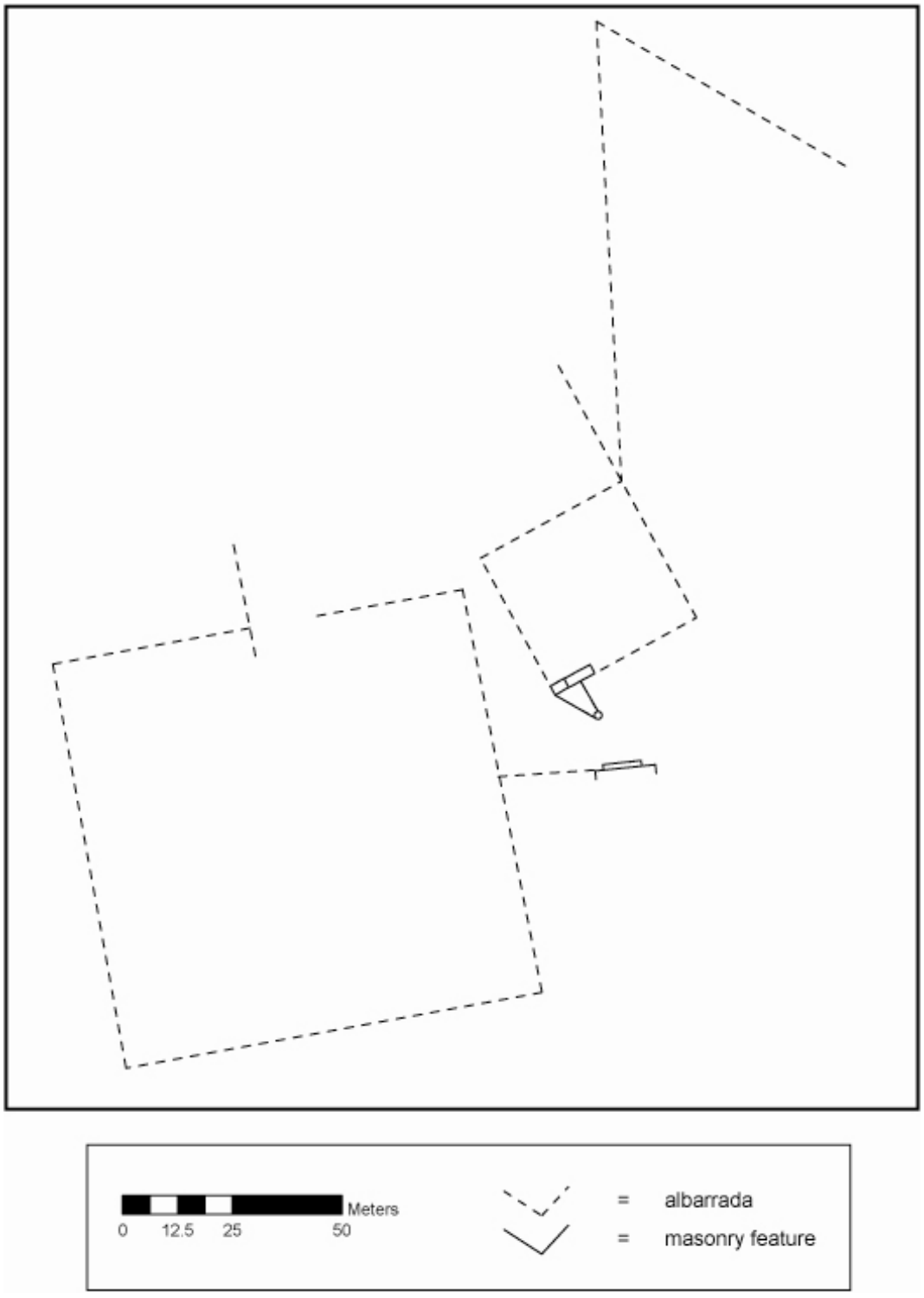

Figure 40. Rancho Yopila

Part 2: The *Ejido* of Saban

Chapter 18: Rancho Ysidro

Adam Kaeding

This *rancho* (Figure 41) lies on the route between Yo'okop and the large *hacienda* of San Pedro. It bears the standard signature of an historic *rancho* – a well and corral arrangements. In this case, the well is located between two relatively small corrals to its east and west. There are also two strange circular foundations to the north of the well. While one of these can be dismissed as an *arrieta*, the other is considerably larger. Its function is unknown. There is no evidence for residence in the area.

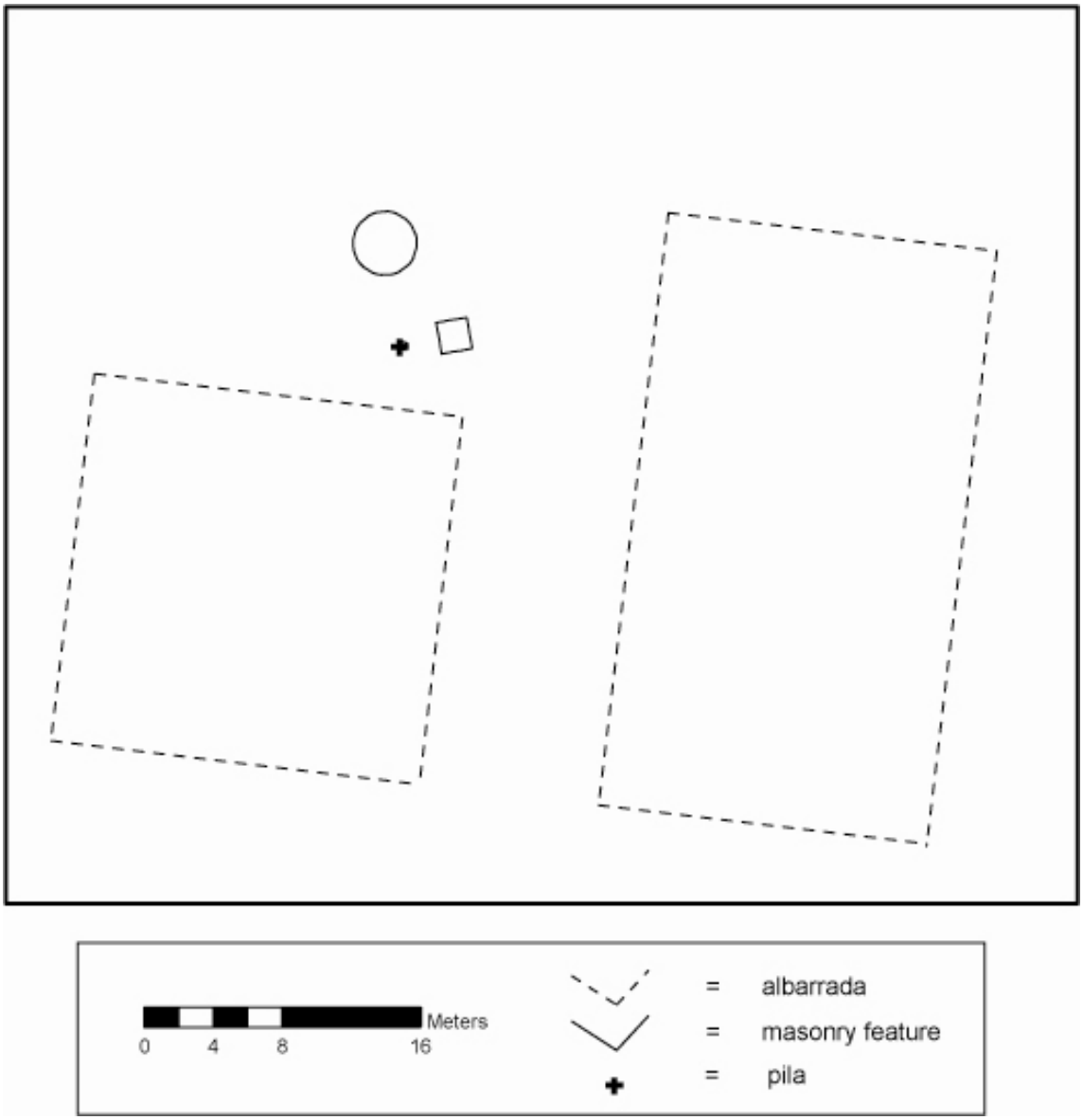

Figure 41. Rancho Ysidro

Part 2: The *Ejido* of Saban

Chapter 19: Sahkabch'en

Alberto G. Flores Colin and Justine M. Shaw

Sahkabch'en means, literally, "the well of the *sahkab* cave" or "the well next to the *sahkab* cave", from *sahkab* (*sascab*) white powder employed in construction and *ch'en* "well" (Barrera 2001: 708). Although we don't know yet if there is a relation between the name and some geomorphologic feature in the surrounding area, it seems probable that the well was constructed upon a natural depression, a cave or a *sascabera*, and for this reason the place took on this name.

This archaeological site is located 13.4 km in straight line to the southeast from the center of the *pueblo* of Saban, and 3.5 km from Yo'okop. Access to the settlement is through a path that leads to a *rancho* and colonial well. The area is only visited by farmers, apiculturists, and hunters. According to locals from Saban, the settlement was populated by "*repobladores*" that came from Yucatán in the 1930s and 1940s until late 1980s. Colonial vestiges at the location were registered by Kaeding (see "Rancho Sahkabch'en" this volume).

The largest Prehispanic structure present at this site is located 400 m northeast of the colonial well, although several lower platforms were observed in all directions between the two points. The site is covered by a thick secondary forest, on a higher elevation than its immediate surroundings. Due temporal constraints, because this site was registered during the last few days of the season and furthermore its remoteness from our point on entry, an extensive survey of the area could not be conducted.

At present, the site is composed of a large, 1.5-m-tall platform (Figure 42) (Structure N1W1-1), which covers an area of roughly 60 x 40 m that is the base for at least three other constructions. In terms of its dimensions, within our survey area, Structure N1W1-1 is most comparable to Structure S1W4-1, at the site of Yo'aktun in Sacalaca *ejido*. On the surface of the Sahkabch'en structure, directly to the south, lies a 3-m-tall platform (Structure S1W1-1), while to the northeast two foundation braces were found (Structure N1E1-1 and Structure N1E1-2). These were only partially mapped, due constrains reasons. Furthermore, in the northwest portion of the platform's surface a sort of alignment was found, which probably was part of a foundation of another structure, now destroyed. However, due to time restrictions, it was not possible to clear all the vegetation of the platform, in order to see if there is another foundation brace(s) or other similar constructions in the area.

Structure S1W1-1 is a 6-m-tall platform that was the base of a perishable structure (Figure 43) that, as has been said, lies on the south central surface of the previously described Structure N1W1-1. Structure S1W1-1 shows two looters' holes close to its summit. In one of these, the one in the north, two well preserved floor levels were observed. In the same northern side of this structure, several short alignments were found, possibly remnants of a stairway, but we only could only clearly discern one single step. For this reason, we think that this structure was faced to the north, the same direction where the largest surface area Structure N1W1-1 is located. This was probably the main activity area for this group of structures. Although, unfortunately, it was not possible to include other structures

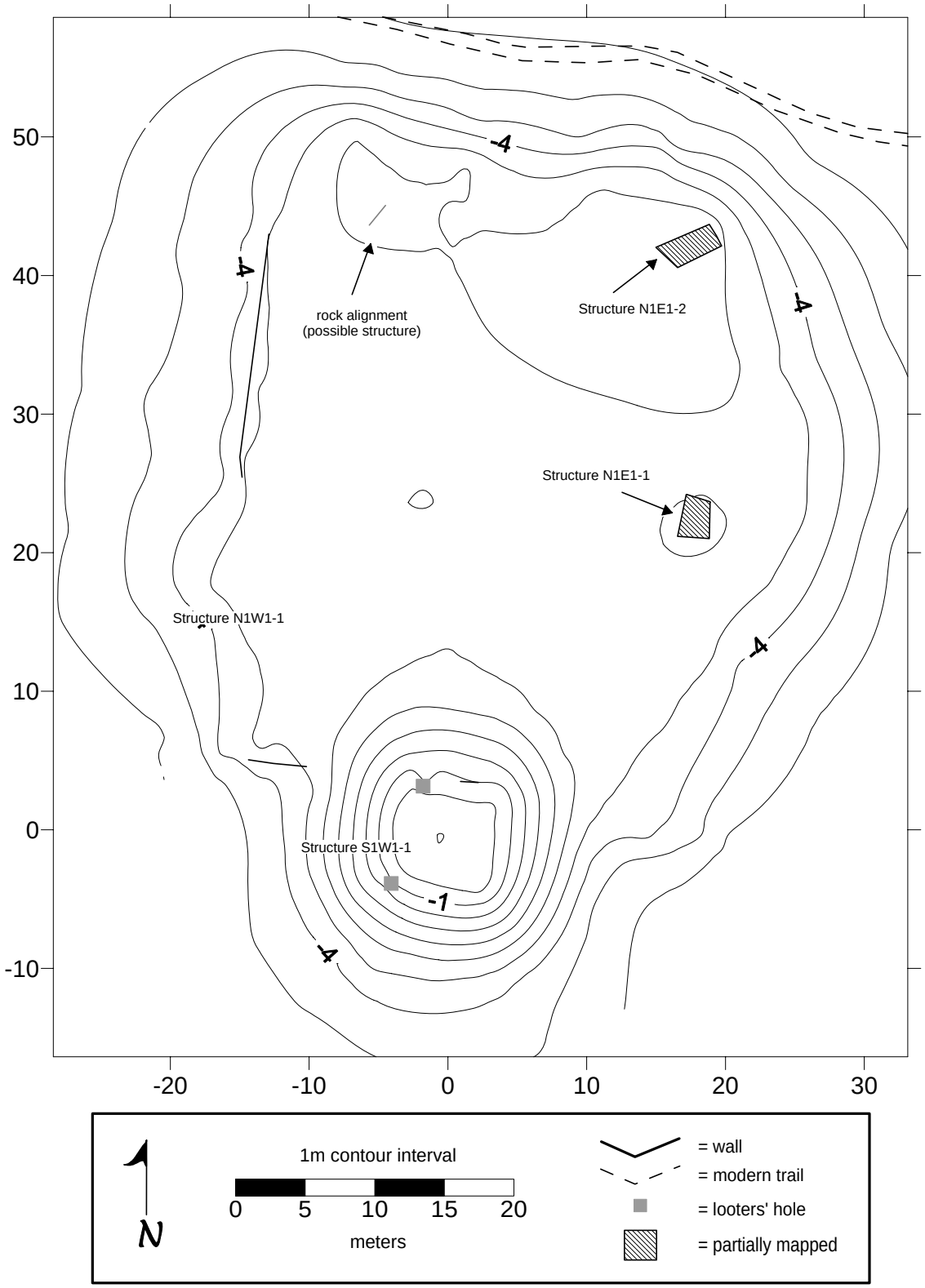

Figure 42. Sahkabch'en

Figure 43. Sahkabch'en's Structure S1W1-1

observed adjacent to the well area (roughly 300 m to the east) or conduct an extensive survey in the surrounding terrain, we believe that this settlement is more extensive. Since this year the Project was only focused upon registering and mapping more sites, chronological temporality for this site cannot be established, since we lack diagnostic materials. Future surveys and excavations can help us to confirm the presence or absence of more archeological remains, as well as obtain estimates the time period(s) to which these remains belong.

Part 2: The *Ejido* of Saban

Chapter 20: San Francisco

Justine M. Shaw and Pablo Huerta R.

The site of San Francisco is located approximately 3.5 km to the north of Yo'okop, in the *ejido* of Saban. Containing historic (see "Rancho San Francisco" this volume) and Classic Maya architecture (Figure 44), it was documented for the first time in 2008.

The most significant features at San Francisco began to the east of the well. Possibly of Prehispanic origin, based upon its consistency of the pattern of architecture to the east of the water source, it is undoubtedly associated with the site's historic occupation.

The Prehispanic architecture at the site has been severely impacted by its use as a mine for the numerous *albarradas* and other historic features distributed across its surface. The remaining architecture includes two 3.5-m-tall mounds, Structures N1E1-2 and N1E1-3. Both have large looters'/ mining holes, with material likely being used for the *albarradas* that directly abut their faces. These appear to have formed the northern edge of an elevated plaza. The eastern side of the plaza is formed by Structure S1E1-2, a range structure that presently is capped by the remains of two Postclassic shrines, as well as a portion of an altar. The two shrines sit atop the rear, elevated portion of the range structure that was probably originally a rectangular foundation brace.

Additional fragmentary architecture includes four small mounds that seem to sit in the middle of the original plaza. The southern side of the plaza is defined by an elevated platform that could not be recorded in 2008 due to time constraints. A similar platform, in very poor condition, lies between the well and the mapped portion of the site. Although it defined the western portion of the group, it could not be mapped this season due to time constraints at the conclusion of the field season.

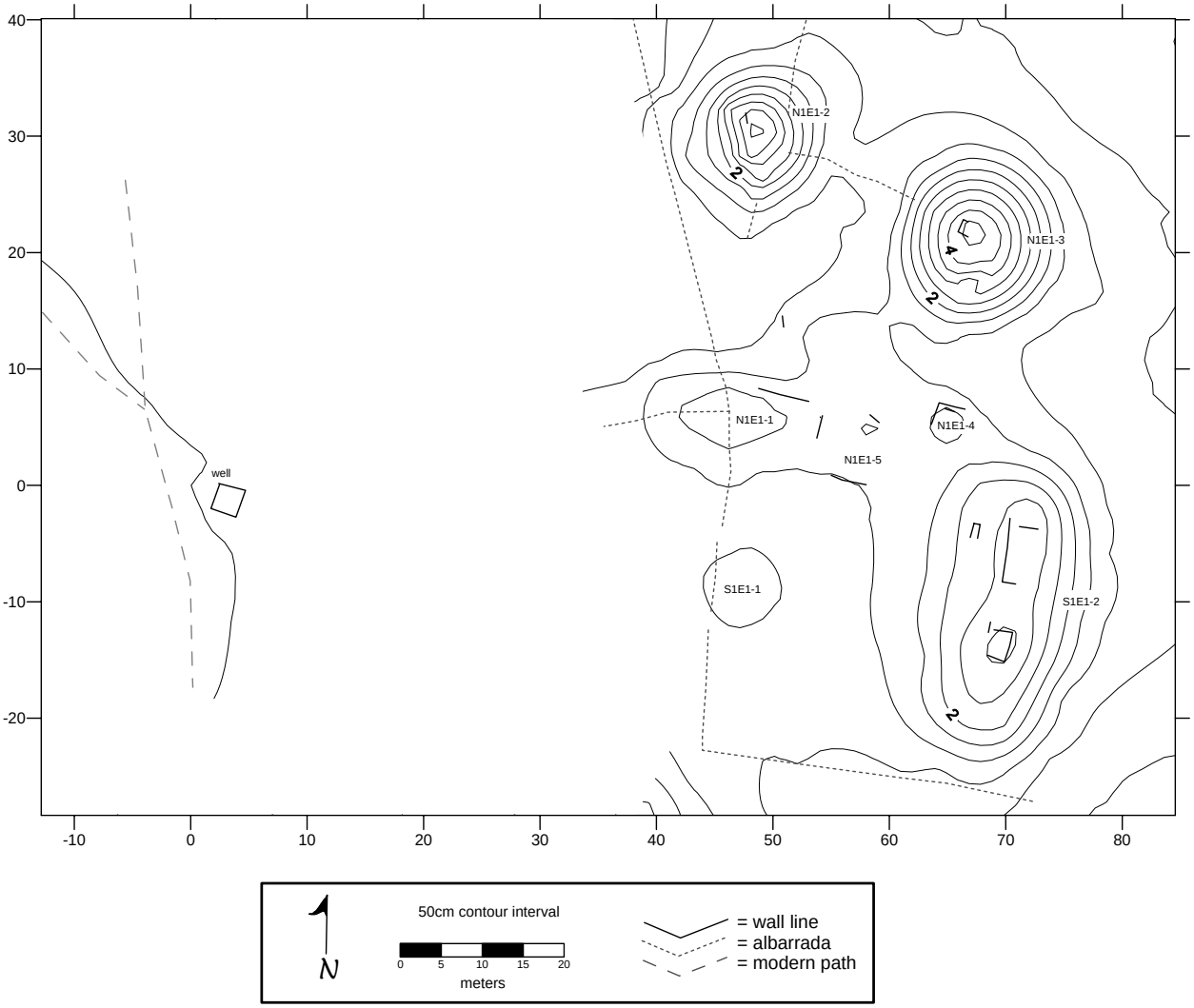

Figure 44. The Prehistoric Portion of San Francisco

Part 2: The *Ejido* of Saban

Chapter 21: San Manuel

Johan Normark

San Manuel is located in a *rancho* and a *milpa* with an undulating terrain consisting of small hillocks with flat terrain in-between (Figure 45). There are three wells within this settlement, but they all appear to be recent (the southernmost well is outside the map). One of the wells is located in a *sascabera*.

Most house mounds are located on the hillocks, although two of the round foundation braces are located in the low areas in-between the hillocks. There are six round structures mapped at the site. Structure N1W1-6 could potentially be a corn crib of more recent date. Structure N1W1-5 has a doorway. Structures S1E1-1 and S1E1-2 come in pair, similar to some of the round structures at Gruta de Alux. Structure S1W1-1 is the only round structure on a rectangular platform.

There is a slight difference in distribution of architectural features at the site. The western structures at the site have rectangular foundation braces and sits on platforms. There are six rectangular platforms with four rectangular foundation braces. Excavation is needed to determine whether this distribution between rectangular and circular structures reflects different phases of settlement or different divisions within a contemporary settlement.

Postclassic Chen Mul *incensario* sherds were located, but not collected, on Structure S1W1-2. There are also Late Formative sherds at the site. The site extends to the north and south, and there are observed but unmapped mounds in this area. The intermittent areas may have been garden areas.

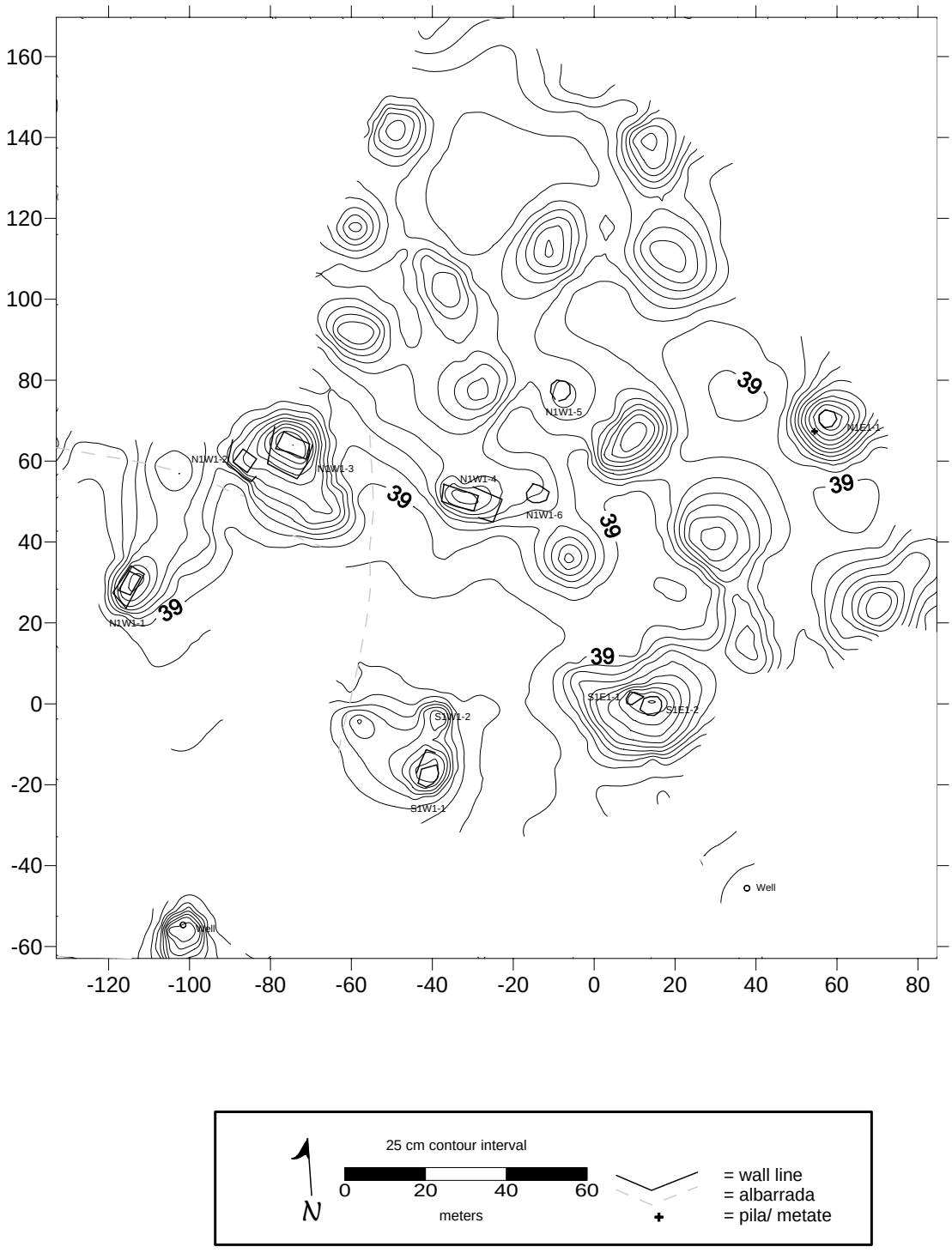

Figure 45. San Manuel

Part 2: The *Ejido* of Saban

Chapter 22: La Trinchera

Alberto G. Flores Colin and Jorge Pablo Huerta Rodríguez

The site of La Trinchera (the trench) is located 5 km from the *pueblo* of Saban, adjacent to the road that leads to Yo'okop and Dzoyolá. Its name comes from the remains of Caste War military fortifications at the site. The location is well known to farmers, who relate that a lot of "Winchester" cartridges have been found everywhere when they make their *milpas* (corn fields). The prehispanic site is composed of two low platforms of roughly 2 m in height. Due to time constraints the site could not be mapped, but an unscaled sketch map of the visited area was made (Figure 46). The largest of these structures is an approximately 20 x 15 m size platform. An *albarrada*, which probably dates to the Caste War period, runs atop both structures. To the southwest of the largest platform is a dry core wall, a sort of a fortification, which displays a polygonal shape, is located. From this point on, the road that goes to Yo'okop, which presumably follows the same course since the Caste War, is quite visible. To the northwest of these platforms lies a well that we suppose belongs to the same period (Figure 47). Probably the Prehispanic settlement was larger than we see today, but human activity has affected its preservation. Its location, adjacent to the road from Saban to Yo'okop, makes this site a really good "quarry" to extract construction material; furthermore, it is likely that many of the Prehispanic features were re-used to build Caste War fortifications.

This military installation could be one of a series of fortifications established by General Bravo during the campaign against the Maya rebels (Luis Alberto Martos, personal communication 2008). On a military map that dates to this period, a position called "El Pozo o Puesto B"[4] is marked at the same location where the vestiges of the fortifications are located (*idem*), which makes us speculate about that La Trinchera and "El Pozo" are the same military position. With regards to the chronology of the Preshispanic remains, we did not locate any diagnostic material to indicate to us to which period(s) the site belongs. Due its relative proximity to Yo'pila (1.4 km to the southwest), it is assumed that this site was probably part of the same settlement. Furthermore, several structures were observed between both sites (see "The Prehistoric Settlement of Yo'pila" this volume). Since we lack more information, for the moment this site has been classified as a different site than Yo'pila, although future research may reveal that these sites are part of a same, continuous and extended, settlement.

[4] "The well or position B"

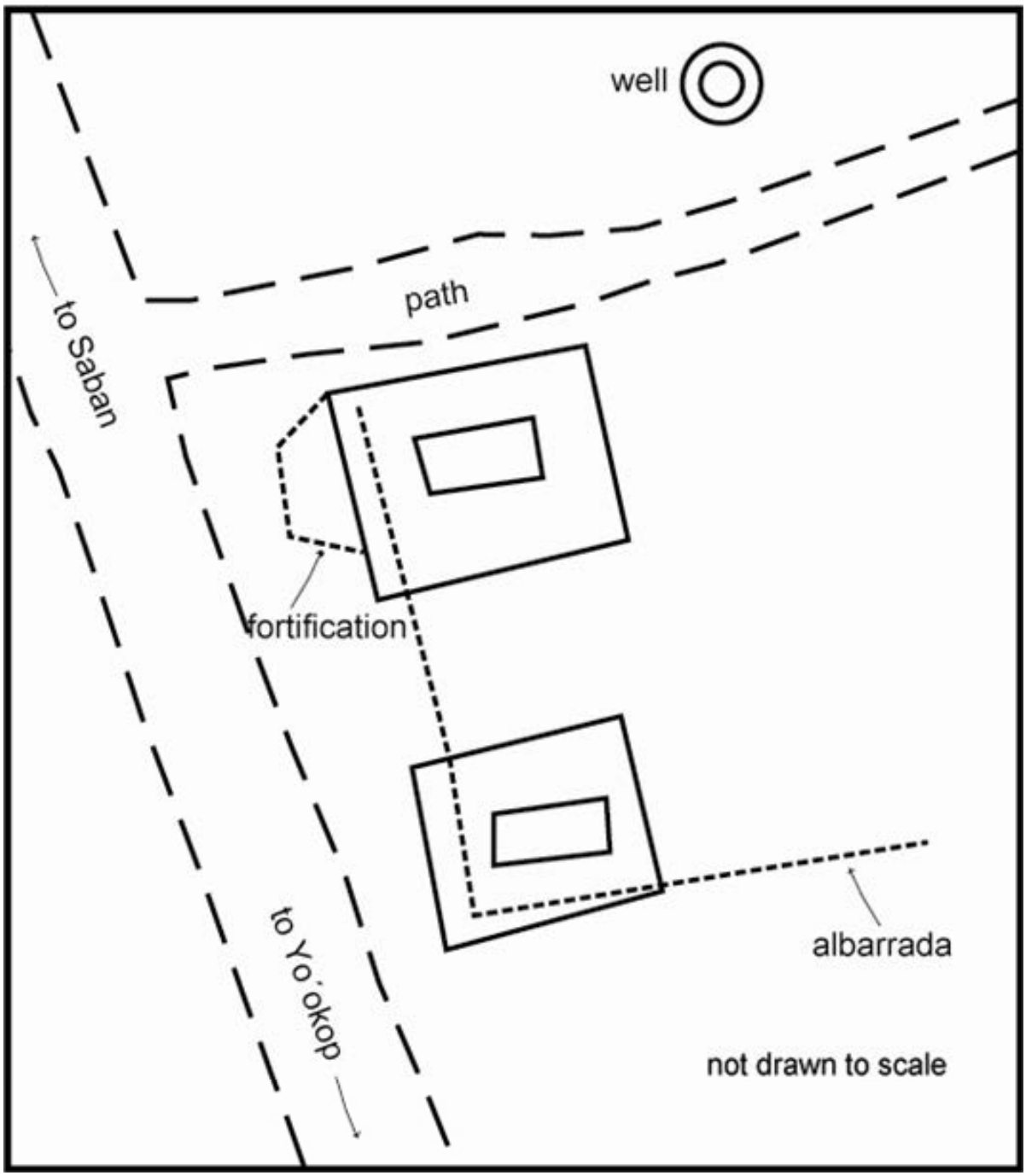

Figure 46. Sketch Map of La Trinchera

Figure 47. Well at La Trinchera

Part 2: The *Ejido* of Saban

Chapter 23: The Prehistoric Settlement of Yo'pila

Dave Johnstone and Alberto G. Flores Colin

Yo'pila is a secondary site located 7 km south southeast of Saban, approximately halfway between Yo'okop and Sisal. Topographically, the site is located in a shallow basin with low limestone ridges to the north, east and south. Today, the site is covered by a mixture of secondary forest, *milpa*, arboriculture, silviculture and ranchlands. Owing to time constraints, only two discontinuous segments of the site were mapped (Figures 48 and 49). Pedestrian survey showed that settlement continues for a distance of 300 m northeast of the main plaza. No natural water sources were noted, although there is a well on the ranch portion of the site (see "Rancho Yopila" this report).

The formal architecture is located around the perimeter of a rectangular plaza, open to the east. To the north of the plaza is Structure S1E2-1, a 7-m-tall pyramid. A small Postclassic shrine is located on its summit, reached by stairs on the south side. The western side of the plaza is held by a 5-m-tall palace. Both the palace and the pyramid have multiple looters' holes in their flanks. One of these in the palace exposes a floor about 1.5 m below the summit. It is not clear if this floor relates to the wall lines present on the surface. The southern margin of the plaza is occupied by a low 1.5-m-tall range structure. No intact architectural elements were visible on this structure, and so its function is unknown.

Seventy m west of the palace is located a large platform that supports a vaulted residence and two foundation braces for ancillary structures. This is the largest and highest of the residential platforms mapped to date at Yo'pila. Other platforms and residences are more modest, with perishable walls demarcated by foundation braces. Most of the identifiable ceramics visible on the surface corresponded to types from the Terminal Classic period. These suggest that Yo'pila has a minimum of two periods of occupation.

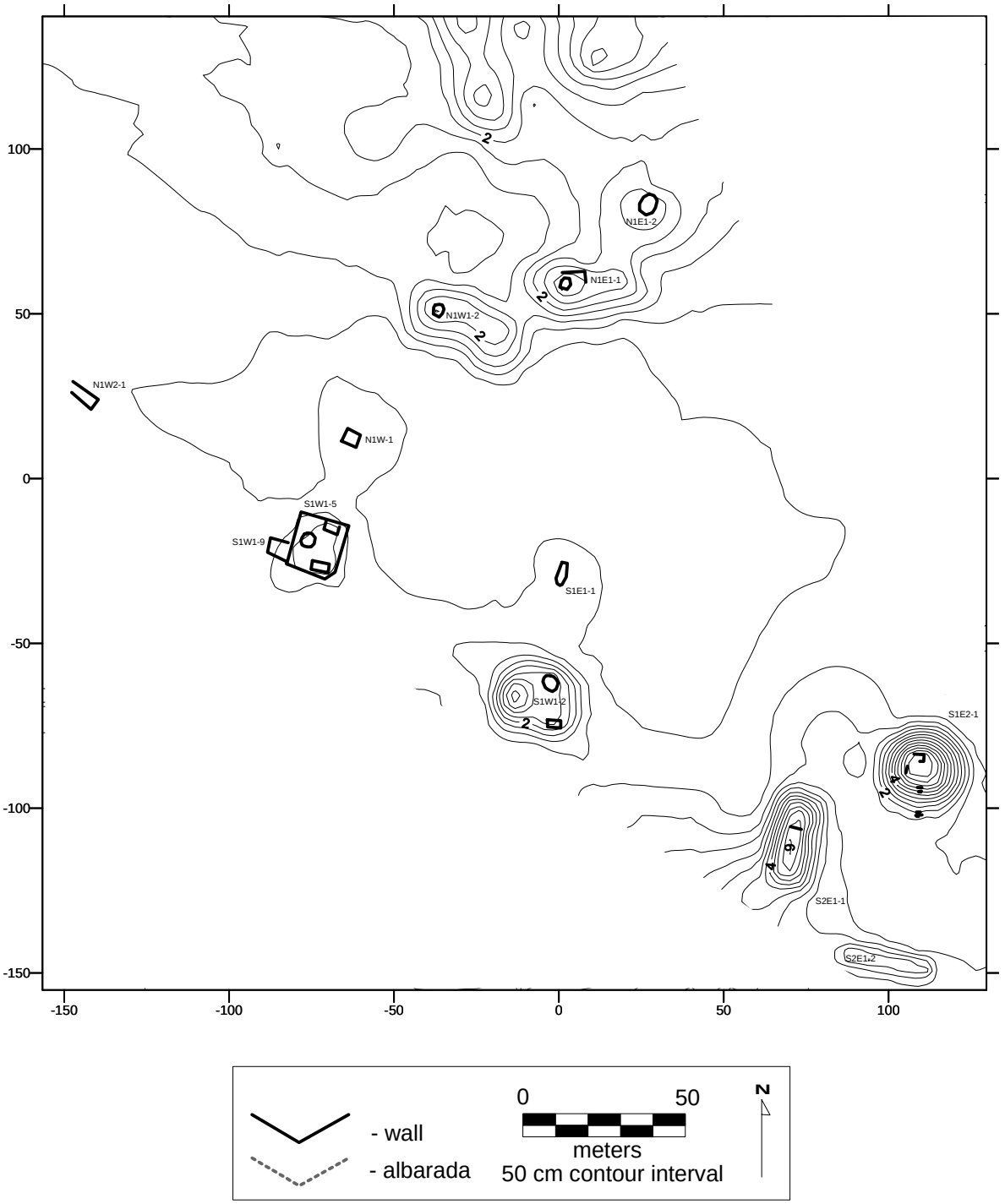

Figure 48. Yo'pila

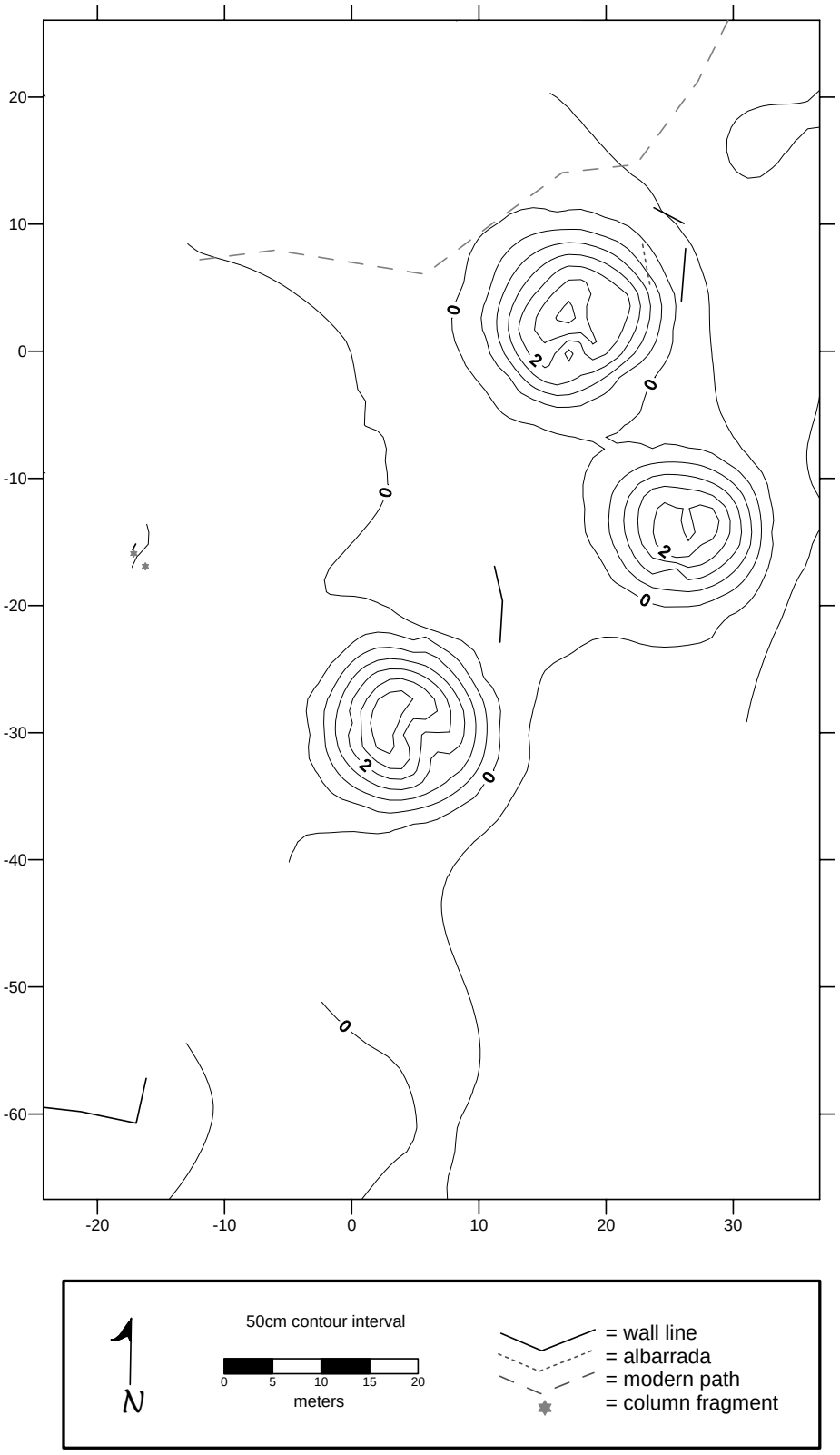

Figure 49. Northwestern Segment of the Site of Yo'pila

Part 3: The *Ejido* of Sacalaca

Chapter 24: Hacienda Xbaquil

Adam Kaeding

The site of Xbaquil within the *ejido* of Sacalaca (not to be confused with the Xbaquil within the boundaries of Ichmul) has been introduced elsewhere in this report with reference to its Prehispanic elements. This is also the site of one of the most substantial historical components in the *ejido*. In fact, the historical architecture of Xbaquil is among the largest in the CRAS region and qualifies as one of the few undeniable *haciendas* (Figure 50). The distinction between the *haciendas* and the more common *ranchos* relies on the presence of a large residential structure which is an indication of the *casa mayor* of the absentee landowner, or of the house in which the *hacienda* foreman would have resided. Potentially, a *casa mayor* could serve both purposes. At any rate, the central feature within the boundaries of the central corral of Xbaquil is a large well and *noria* connected by aquaducts to a *bebedero* to the north. Just further northeast of this is an area raised two terraces above the ground surface and, at the top of the higher terrace, there is the foundation of a rather large apsidal house. Currently, there is nothing more than the foundation, meaning that this hacienda does not display the same scale of residential architecture as has been seen at other haciendas in the region. Nevertheless, the central location of this foundation and the architectural infrastructure around it suggest that this subtle structure played the role of the casa mayor. Meanwhile, it is also entirely likely that the top tier platform represents the foundation of the house itself. In this case, then, the somewhat insubstantial apsidal foundation is only representative of the more recent structure which reused the stones of the original.

Incidentally, the two raised tiers in this central area seem to be largely natural features. Still, the natural raise was undeniably modified by *albarradas* that run their boundaries and staircases that surmount the inclines (Figures 51 and 52). The staircase that approaches from the ground surface to the first tier is an interesting feature: it has two small rounded tunnels running through it under the second and fourth stairs. While such a feature would certainly suggested a drainage function in some settings, that does not seem to be the case here. First, there seems to be little change in elevation on either side of the stairwell, suggesting that even if pooling was a concern, these drains would not have addressed it. Secondly, the two tunnels are completely different sizes, each taking up the space available to them. This, too, suggests that these features may have been more decorative than purely practical. On the other hand, at least on the southern wall of the first tier, there is a system for drainage that will allow water to runoff into the *bebedero*. It is not unlikely that there are similar systems linking the second tier to the first and something in place to address this issue east of the staircase, but, at this time, only the system leading directly to the *bebedero* has been observed.

As mentioned above, one central feature of Xbaquil is its well and *noria*. There is also a second well located to the north, upon the second tier and parallel to the *casa*

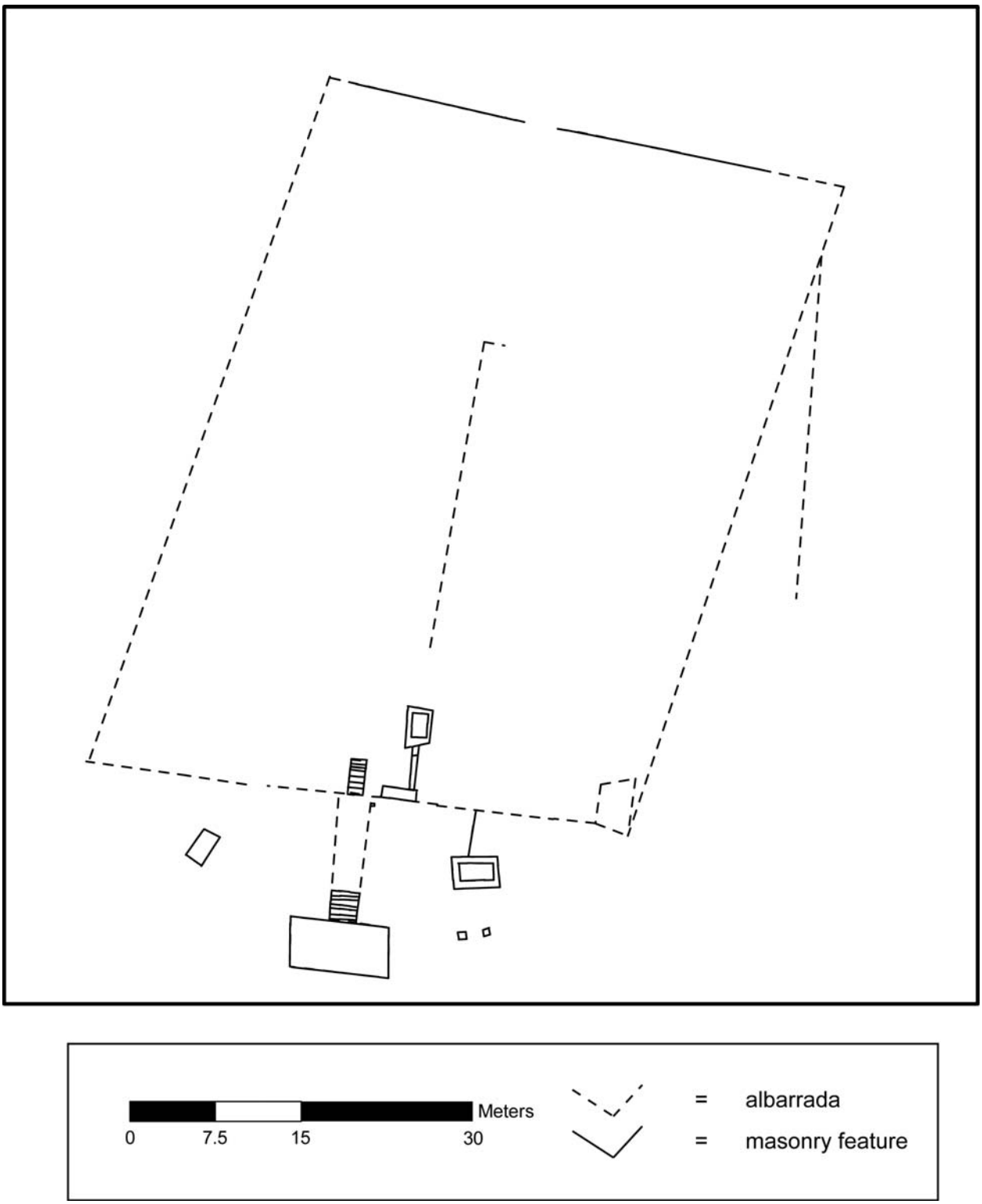

Figure 50. Plan Map of Central Hacienda Xbaquil

Figure 51. Hacienda Xbaquil Center including Well, Stairs and Tiered Platform

Figure 52. Xbaquil Stairs, Aqueduct, and *Bebedero*

mayor. This well is not attached to any other features. However, it is very clear that both this well and the large central well access the same large *cenote*.

The *albarrada* system that defines the central area of the site extends particularly to the east. These *albarradas* that define relatively small spaces including spaces that seem to be at higher elevations. It seems possible that this separate area may be isolated specifically as a living space for the resident labor force of the hacienda, which would be characterized by perishable and generally invisible house foundations. The one larger housing platform could represent a residence for the labor foreman.

Part 3: The *Ejido* of Sacalaca

Chapter 25: The Historic Settlement of Parcela Escolar

Adam Kaeding

Parcela Escolar was the focus of much of this season's research in the Sacalaca *ejido*. This segment presents the historic components of that particular site. The historic signature of Parcela Escolar is generally consistent with that which would be expected for a *rancho* (Figure 53). There is a central well located in what seems to be a natural depression. The well no longer has a protective barrier and is, instead, an exposed hole in the center of the depression. This area could be an ancient quarry as it includes some relatively sheer cuts, but the gradual slope on its other sides suggests that it is likely natural. Whether initially natural or not, the depression has been modified in the sense that *albarradas* now ring the feature. It is likely that these *albarradas* are intended to keep livestock from entering the depression and therefore protecting the well itself.

This site seems to have been fairly heavily looted, not surprising considering its proximity to not only Sacalaca itself but also the abundant supply of building material that would have been available among the Prehispanic mounds of Parcela Escolar. As a result, there are no longer many stones in association with the *noria* or the aquaduct. Still, the footprints of these features remain and it is clear that they would have attached to a *bebedero* that would have been just outside of the western wall of the *albarrada* bordering the depression. Interestingly, the *albarrada* complex extending from the wall has two passage areas that are clearly marked by a 1.5-m space in between two stones that measure much larger than the other stones that constitute the *albarrada*. These passages give access directly to the location where the *bebedero* is reported to have sat. The *bebedero*, however, has also been removed and is now on display in the *ejido's* new museum.

About 18 m to the northeast of the well, there is a small raised area with an apsidal-circular foundation. While potentially representing a residence, there are reasons that support and oppose this suggestion. For example, there is a circular feature, two m in diameter, directly to the west of the foundation. This might be a food storage area serving the residence represented by the foundation. Similarly, there is a *pila* not far from the southern side of the foundation which would e expected in a residential situation. However, there are alternate interpretations. For example, the *pila* has a hole in the bottom which indicates that a better interpretation for this artifact might be that it served as the basin that connected the aquaduct to the *noria*. We have seen similar features elsewhere in the region – water drawn up from the well (Figure 54) would be emptied into the basin which would then feed into the aquaduct at a rate that would avoid overflow (Figure 55).

The foundation itself has no breaks in it. This may be meaningless and indicate nothing more than the extent of the looting in the area. On the other hand, it may indicate that there was in fact no break in the foundation. If this were the case, then an alternate suggestion would be that this feature represents a *trapiche*. The circular

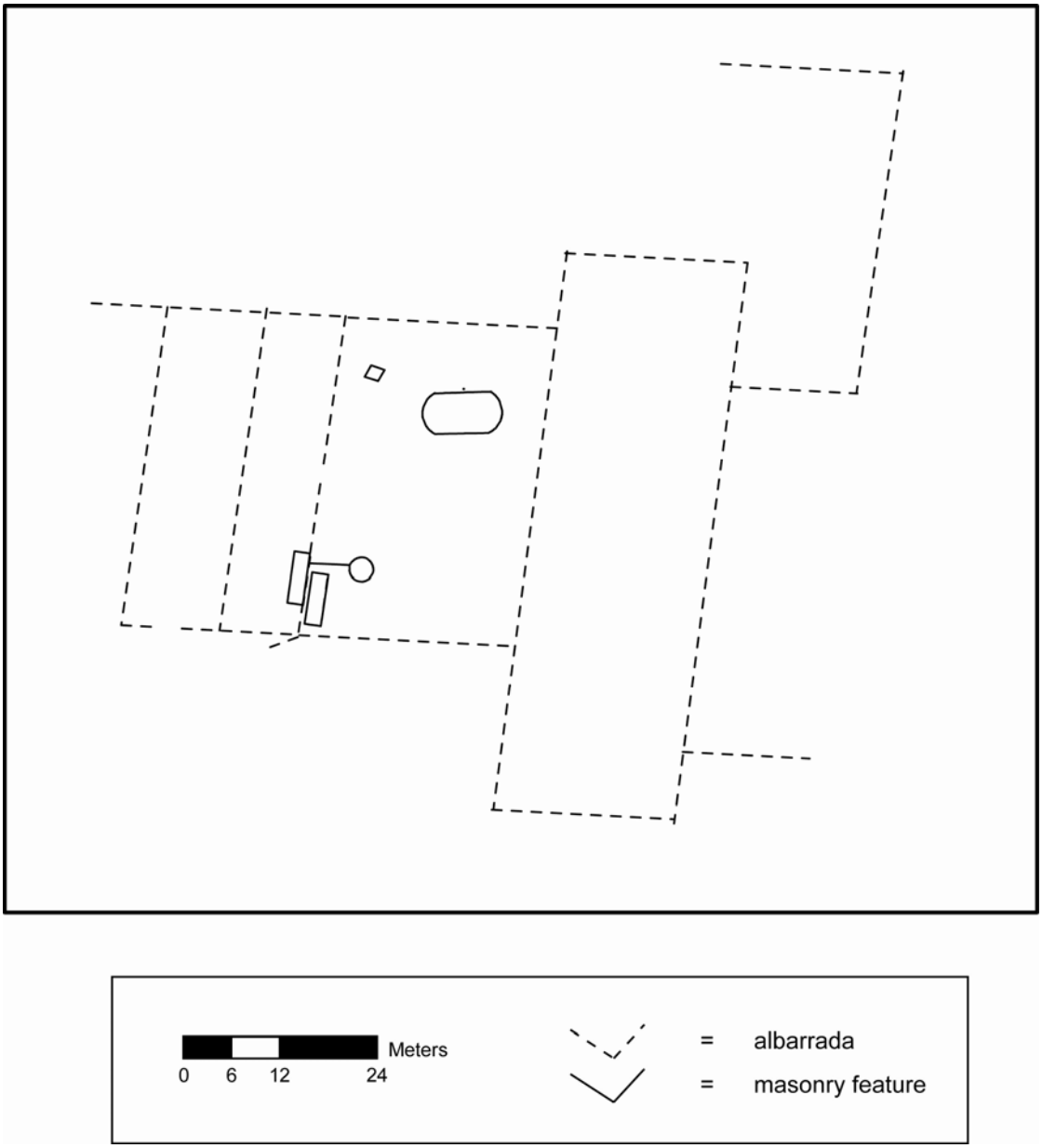

Figure 53. Rancho Parcela Escolar Plan

Figure 54. Parcela Escolar Well Area

Figure 55. Parcela Escolar Aqueduct Basin

feature nearby could still have served as a storage for food, but rather than serving the house, this food would have awaited being ground . Considering the proximity of this rancho to Sacalaca itself, it seems highly unlikely that the landowner would have retained a residence at the site.

Part 3: The *Ejido* of Sacalaca

Chapter 26: The Prehistoric Settlement of Sacalaca

Dave Johnstone

The secondary site of Sacalaca was initially mapped (Shaw 2003a) during the 2003 CRAS field season. At that time, we were largely restricted to public areas, or to *solares* (house lots) containing large Prehispanic constructions. The resulting map was discontinuous, with mapped areas separated by large sections of unmapped space. As a consequence, the site map documented very few residential structures, and we did not have a very good appreciation for the areal extent of the site. Our goal this season were to remedy these problems by further mapping within the area of modern settlement, as well as expanding the mapped area around Sacalaca's northern group, seeking the northern limits to the site.

In conjunction with efforts to document historic settlement within Sacalaca (see various chapters by Kaeding in this volume), a larger portion of the site center was mapped than in previous seasons. In addition to the documentation of colonial and later features, a number of Precolumbian architectural features were also recorded. These included a platform east of the major southern mound (Structure S10E2-2), as well as four foundation braces west of the '*torre*' (the site's principle mound). The general paucity of Prehispanic residences recorded within the area bounded by modern settlement is probably a function of the reuse of stones from these features in more recent construction rather than an overall absence. Two of the foundation braces that we recorded were crossed by colonial property walls and largely buried by later soil build up within the property walls. This patterning was also noted in the site of Ichmul (Flores and Normark 2005), where the ancient site was also covered by modern settlement.

Beyond the limits of modern settlement, the prehistoric structures have not been impacted by recent activities, and are therefore more frequent. Taking advantage of a recently cleared *milpa* (seasonal agricultural field), we mapped an area of approximately 2.5 ha. Within this area, we recorded 30 new structures, including 7 platforms, 3 vaulted buildings and 20 foundation braces (Figure 56). As a result of this effort, our ideas about Sacalaca's North Group have changed. Whereas previously our map of this group showed a set of mounds isolated from the rest of Sacalaca, it is clear after this season's mapping that these mounds are located within an area of relatively dense residential settlement. The group itself consists of an artificially raised platform supporting pyramidal mounds on its southern and western sides. Smaller mounds on the north and west probably represent the remains of elite vaulted houses. While sharing the same platform as the pyramids, and forming a formal plaza, Sacalaca's North Group does not appear to be restricted space, as it is neither bounded, nor does it possess a formal entrance such as a stairway. Surrounding the North Group is an area containing smaller, mostly perishable residences. These are almost exclusively located on raised bedrock outcrops. The low areas between these outcrops contain deeper soils that today support *milpas*. It is quite likely that these low areas were also used as fields in antiquity, and that an effort was made to reserve this

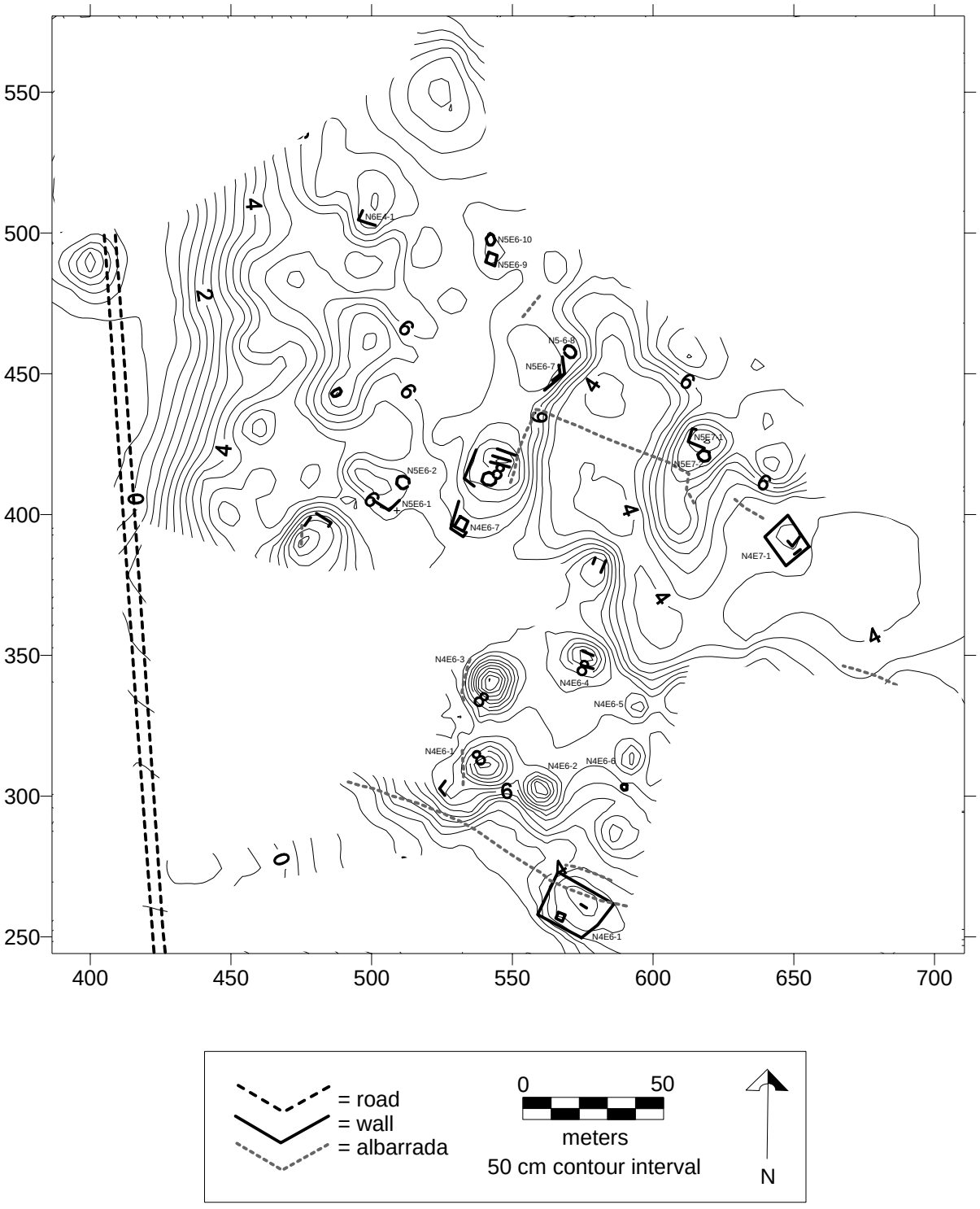

Figure 56. Sacalaca's Northern Margin

space for that use. One exception to this is Structure N4E7-1 (Figure 57). Besides being located in the center of a low area, this structure is different from the majority of other structures mapped in Sacalaca. Its platform is constructed of large monolithic blocks. Elsewhere in the CRAS region, this type of construction is associated with the Late Formative period. One other such megalithic platform was recorded in Sacalaca this season (see "Hierarchical and Spatial Relationship Between the Sites of Sacalaca and Parcela Escolar" this volume).

One hundred and fifty m north of the North Group, the structural density declines precipitously. As there is no change in the nature of the topography that might otherwise explain this decline, I am attributing the structural drop off to signify the northern edge of Sacalaca. For a further 100 m beyond this point, there are no additional structures. If this halt in structures represents the northern edge of the site, and the North Group is continuous with the rest of Sacalaca, then Sacalaca's north-south extent runs for some 1.5 km. It remains to be seen where and how far from the main palace the remaining borders of this secondary site lie.

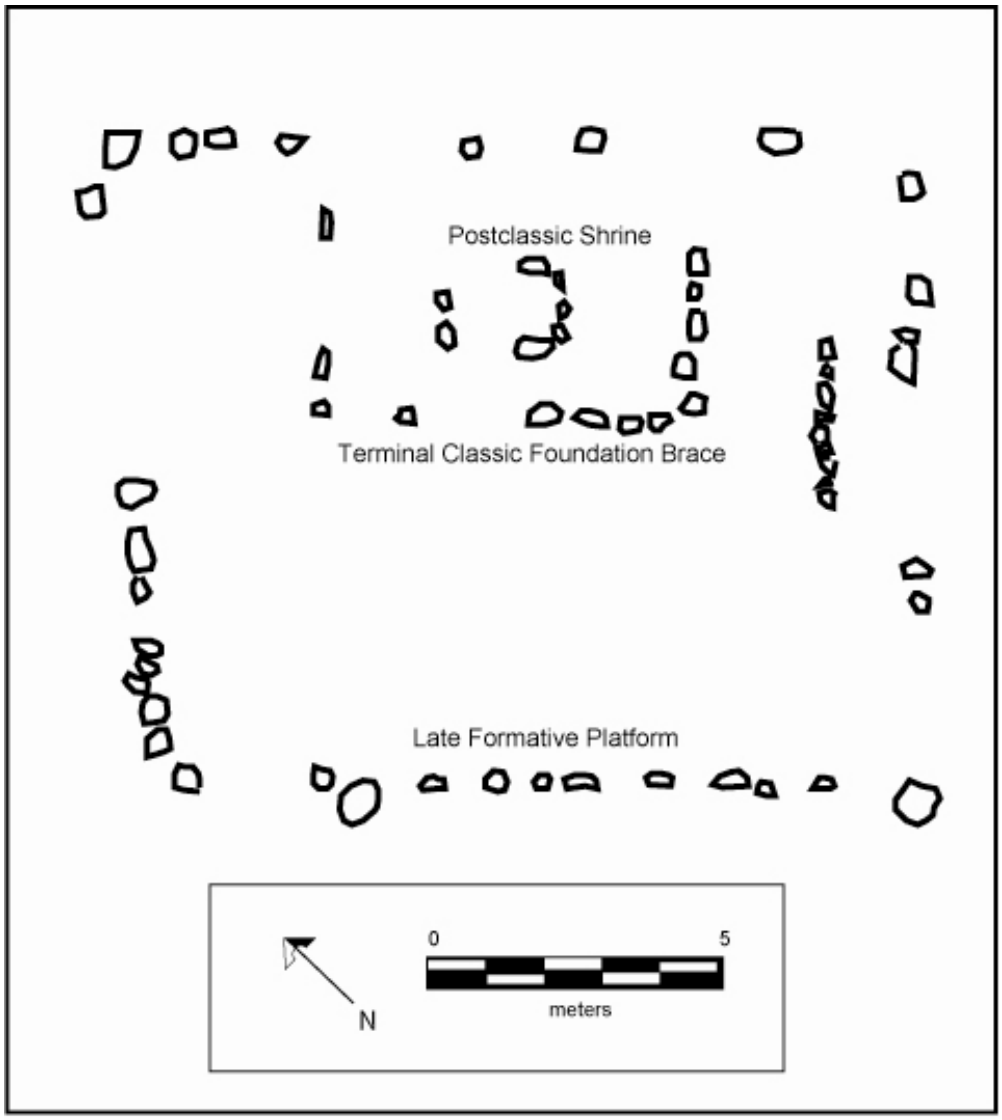

Figure 57. Sacalaca's Structure N4E7-1

Part 3: The *Ejido* of Sacalaca

Chapter 27: Hierarchical and Spatial Relationship Between the Sites of Sacalaca and Parcela Escolar

Tatiana Young

The 2008 field season was a continuation with new insights into the two previously studied sites of preceding seasons: Sacalaca and Parcela Escolar. Previous research proposed affiliation or some degree of dependence of Parcela Escolar to Sacalaca based upon territorial extent, the layout and makeup of the sites. The site of Parcela Escolar is adjacent to the periphery of Sacalaca, and positioned about 1 km to the northeast of the site's epicenter. It was difficult to define precise boundaries between the sites of Parcela Escolar and Sacalaca, if indeed such boundaries ever existed, because of the spread of modern settlement and dense vegetation. Additionally, only the largest structures of the site of Sacalaca were mapped, not allowing for the location of the boundaries of the site (Young 2005:116-124). The major goals of the survey during the 2008 season were to clarify if the sites of Sacalaca and Parcela Escolar were a single aggregate, or two distinct sites, as well as to determine hierarchical and spatial relationships between these sites. An additional aim was set to delineate the boundaries between these sites.

To check the earlier proposed hypothesis of continuous settlement, an approximately 1-km-long transect was cleared between Sacalaca and Parcela Escolar. The transect was 4 m wide with about 10 m visibility on each side, which made 24 m east-west visibility. A total station was used in order to create a map between the studied sites. The transect is presented in two parts: the southern part (Figure 58) and the northern part (Figure 59). Additionally, the site of Parcela Escolar was mapped using the total station (Figure 60) so that is internal arrangement could be compared to that of Sacalaca.

The Southern Part of the Transect

The transect began at a group of the structures representing the northern edge of the site of Sacalaca. This group of structures is located on a natural rise, which slopes down due to a natural depression. This group consists of six structures. A rectangular shaped platform, Structure N1E3-1, is located in the northern part of the group. About 10 m eastward, Structure N1E3-2 is situated. In the northern direction from both of these structures an approximately 50-m-long *albarrada* is located. The aforementioned structures were likely robbed of their stone for construction of this *albarrada*. In the eastern side of the group, two structures are located, Structures N1E4-1 and S1E4-1. Structure N1E4-1 is a square shaped platform. A rectangular platform, Structure S1E3-2 is positioned at the southern side of the group.

Approximately 120 m north of this group a platform and *sacbe* were found. The rectangular platform consists of megalithic stones, suggesting construction during the Formative Period (see "The Prehistoric Settlement of Sacalaca" this volume). An approximately 70-m-long *sacbe* runs from Sacalaca northward in the direction of

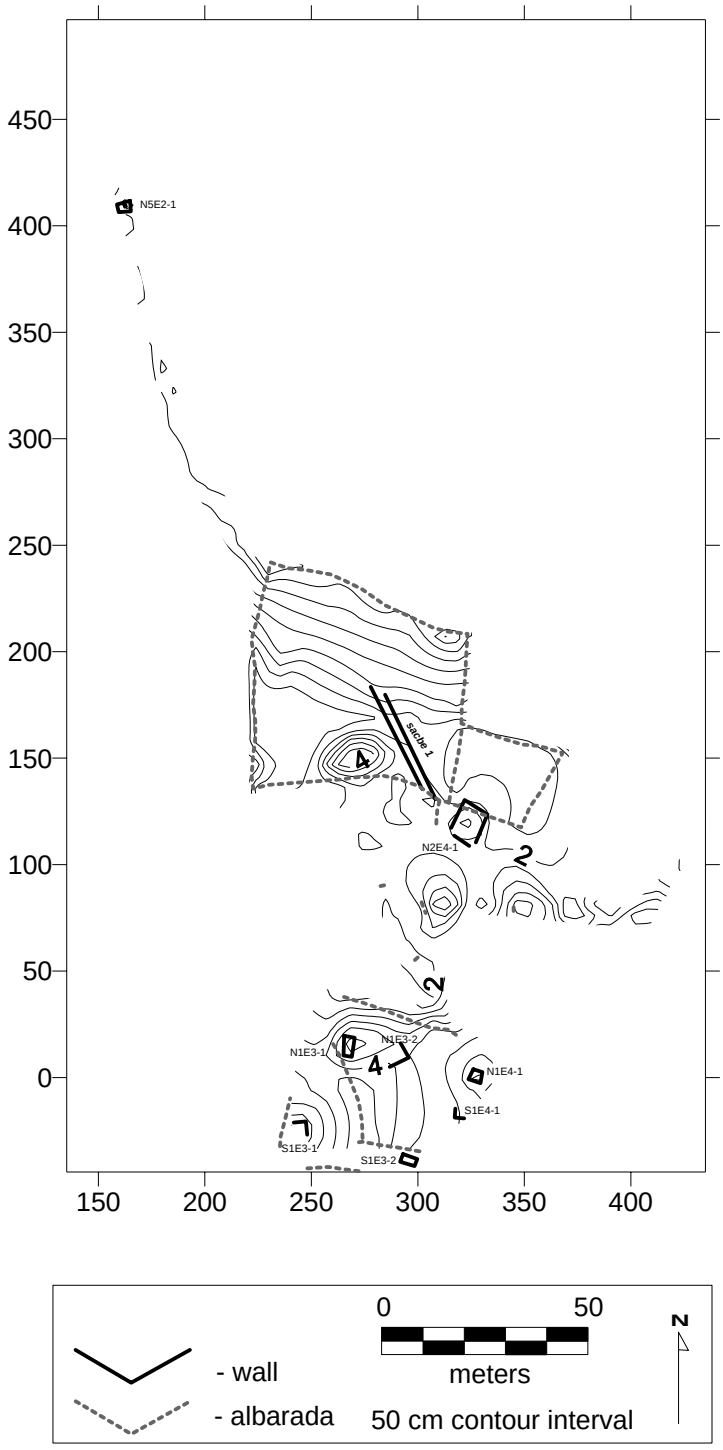

Figure 58. Southern Portion of the Parcela Escolar *Brecha*

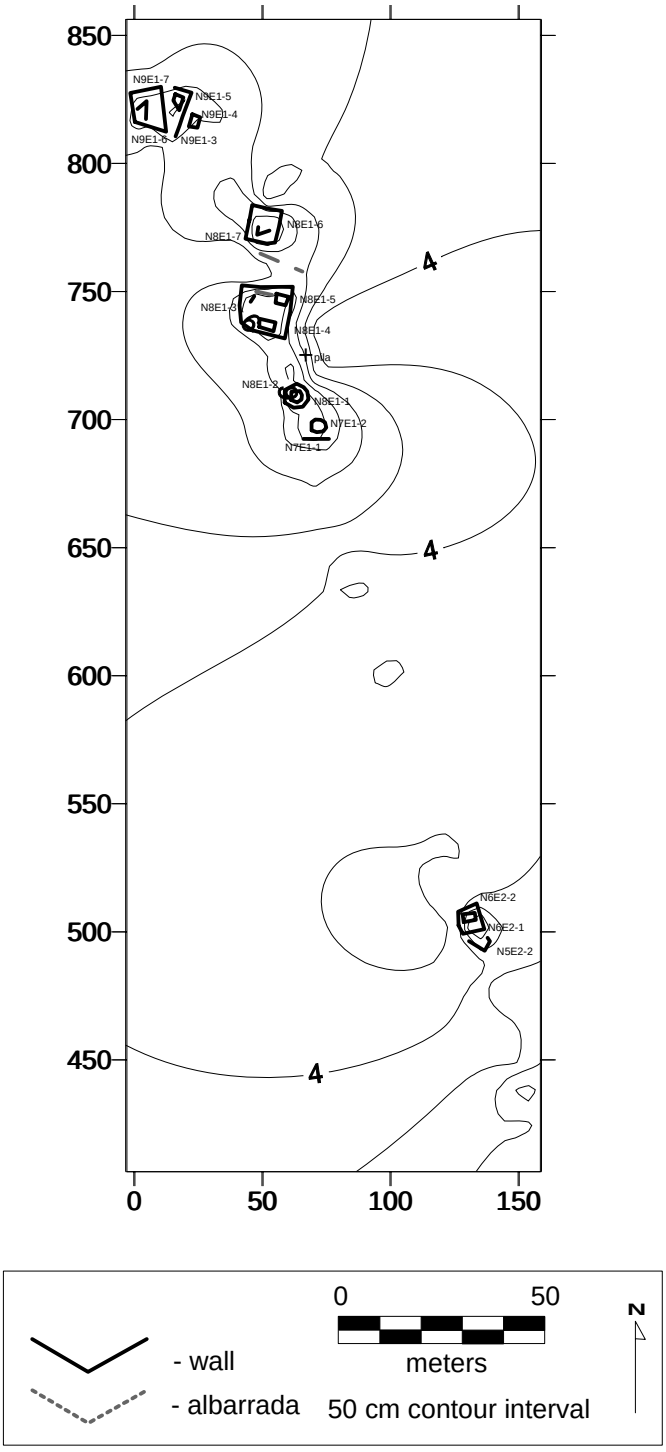

Figure 59. Northern Portion of the Parcela Escolar *Brecha*

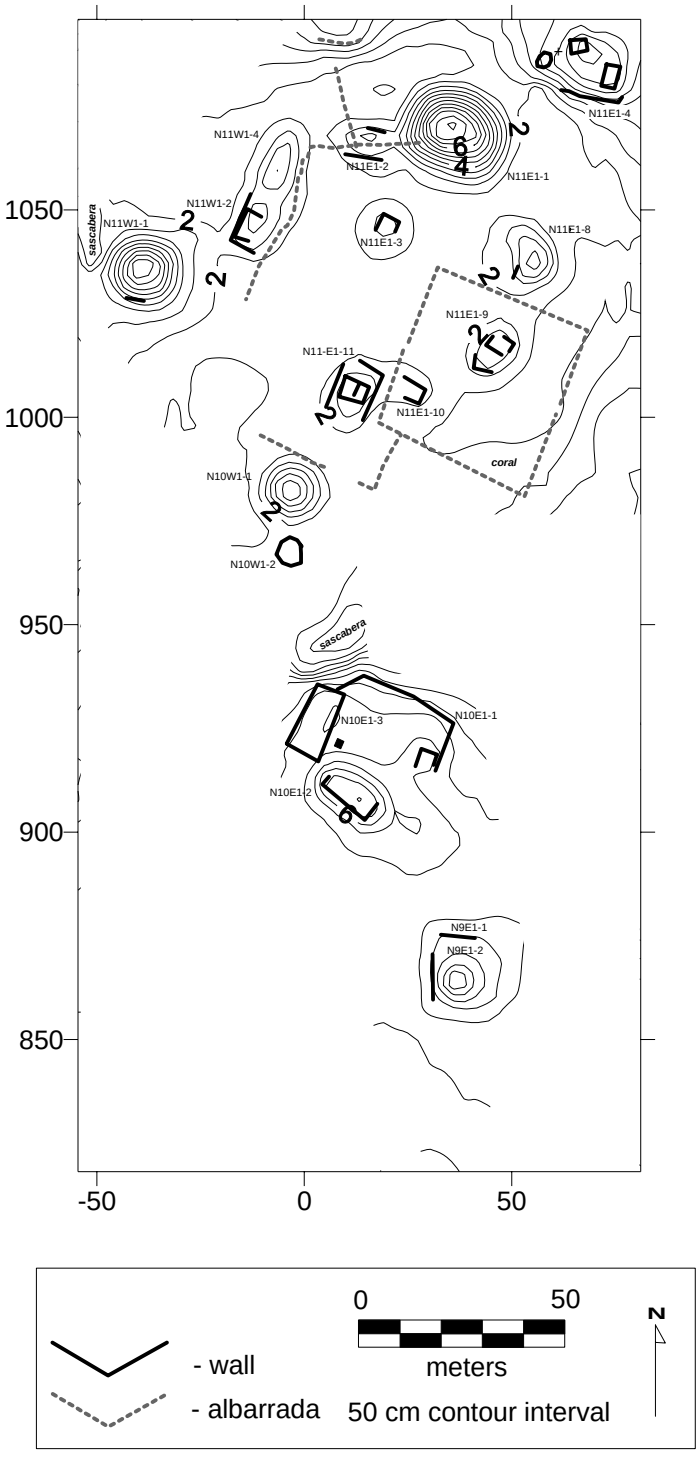

Figure 60. The Site of Parcela Escolar

Parcela Escolar. In places, boulders are positioned vertically on the west side marking the boundary of the *sacbe* and bedrock. The *sacbe* is incomplete, and it appears to be unfinished or was robbed of stones for later construction.

No structures were discovered for about 200 m northward towards the site of Parcela Escolar, until reaching what is now referred to as Structure N5E2-1. This structure consists of a square-shaped platform and a superstructure.

It is suggested that drop off in density may represent the northern edge of Sacalaca site. The natural depression can serve the role of topographic/natural boundary between the sites.

The Northern Part of the Transect

The next three structures are located (Figure 59) about 90 m northwards from Structure N5E2-1 on a low bedrock outcrop. Structure N6E2-1 is a rectangular platform with a superstructure, N6E2-2. For the next 200 m, the transect runs through a *milpa* without presence of any structures. This "empty" area, possibly left for agricultural purposes, may be proposed as a boundary zone, where a *milpa* serves the role of boundary.

At this point, the transect reaches the southern edge of Parcela Escolar. After rising 1.5 m off of the *milpa*, the local topography becomes more uneven, and there is a marked increase in structural density. At the south edge of Parcela Escolar, a platform, Structure N7E1-1, supports Structure N7E1-2, a semi-oval-shaped superstructure. Structures N8E1-1 and N8E1-2 - positioned 10 m northwards - are near concentric circles. Near the concentric circled structures a *pila* was found. *Pila*s are usually associated with residential function of structures.

A square shaped platform - Structure N8E1-3 - with two superstructures (N8E1-4 and N8E1-5) is located about 20 m away from the previous structure. The next platform, Structure N8E1-6, with superstructure N8E1-7 is positioned about 17 m away. On the last part of this transect, a group consisting of five structures were discovered – Structures N9E1-3 through N9E1-7 - located approximately 30 m from Structures N8E1-6 and N8E1-7. The fronts of these structures were faced to the cardinal north.

Parcela Escolar

The transect reaches the previously mapped portion of Parcela Escolar at Structure N9E1-1, which corresponds with Structure 18 on the earlier map (Young 2005:119). Three pyramidal mounds, five rectangular buildings, a platform and thirteen auxiliary structures characterize the site. The height of the major mounds ranged from 4.3 to 6.6 m tall (Young 2005:116-124). The transect reveals that Parcela Escolar is at least three times larger than was previously suggested. Reaching Parcela Escolar by only one direction opened at least five new platforms - fourteen structures in total.

There is a 200-m gap with no structures between the newly discovered structures of Parcela Escolar and a group of structures on the transect: Structures N5E2-1, N6E2-1 and N6E2-2. The 200 m is covered by *milpas*, which appears to have always been there based on the composition of the soil. This dark-colored soil displays organic deposits, which would generally reflect an area that had been cultivated. Black or brown humid soil is one of the common soil types in northeastern Yucatan (Kepecs and Boucher 1996:72). Named *chich luum* by local inhabitants (Kepecs and Boucher

1996:72), this kind of fertile organic soil - also called mollisoils - is a main soil type in the Maya Lowlands (Fedick and Ford 1990:20). Additionally, due to further clearing of the site, some visible local depressions containing deep soil pockets were discovered. These depressions were located in proximity to the structures at the site.

Conclusion

The topography of the area has a vast influence on the settlement pattern. The nature of the geographic setting in the studied vicinity is comprised of high and low areas, where elevation is raised approximately 2 - 4 m. Raised areas, such as bedrock or artificial platforms or combinations of both, were used by ancient inhabitants as residential or public spaces. Building houses and temples on an elevated surface had advantages in this climate since higher altitudes presented more wind and would lessen the severity of heat. Low areas or depressions were used as *milpas*, for the reason that depressions had pockets of soil, and during a wet season rain would bring more soil down from raised areas. Houses were not built in low areas. Depressions are also moist and more suitable for farming, especially in the climate where water sources were limited to the rain season and reliance upon *cenotes*. *Rejolladas* as well were used for agricultural purposes, because they trapped soil and rain, providing with well-drained fertile plots, they are still in use today by farmers as *milpas* (Kepecs and Boucher 1996:70-77). *Rejolladas* were suitable for cultivating crops such as cacao and cotton (Kepecs and Boucher 1996:69-77). These fertile plots were in “close spatial associations with residences” (Fedick and Ford 1990:26).

There is a large depression between the sites of Sacalaca and Parcela Escolar where *milpas* are located. Within the transect, the density of houses (settlement) drops between the site of Sacalaca and the site of Parcela Escolar. When looking from a topographical perspective at the settings of Parcela Escolar and Sacalaca, the absence of houses is logically anticipated. The composition and quality of the soil, especially at the last 200 m before the newly discovered structures of Parcela Escolar, points out that the *milpas* were there for a long duration – possibly since ancient times. This raises the question of where does one site begin and the other end. Does a drop in density correspond to boundaries between sites? Drop offs in densities and natural depressions coincide with the edges of Sacalaca; therefore, one can speculate that *milpas* and depressions delineate the boundaries between sites.

Can spatial distribution of sites be quantified through architecture? Levi’s research of three archaeological sites in northeastern Belize suggests a commonality in distribution of recurring architectural arrangements. She classifies architectural arrangements into four group classes: isolates, paired platform groups, basal platform groups, and large composite groups (Levi 2003:85-86). Basal platforms occur within 500 m from a monumental precinct. If we propose that Structures N11W1-1, N11E-1 and N10W1-1 represent a monumental precinct of Parcela Escolar, then the presence of basal platforms will occur within a 500 m radius (Figures 2 and 3). A monumental precinct is characterized by absence of dominant residential forms for 750 m (Levi 2003:88-89). A single structure platform – isolates - seems to correlate to Structure N5E2-1; Structures N5E2-2 and N6E2-1 correspond to a paired platform group (Figure 2). Both isolates and paired platform groups occur within a range of 750 m to 1.25 km from the monumental precinct (Levi 2003:88-89).

Is this distance enough to propose that Parcela Escolar and Sacalaca were two different sites? One can reasonably propose that Parcela Escolar was a different (independent) site. Territorial extent can be an attribute of a site's autonomy (Garza and Kurjack 1980; Velázquez et al. 1988). The territorial extent of Parcela Escolar appears much larger than previously proposed. The fronts of structures in Parcela Escolar faced the opposite cardinal direction when compared to the structures of the site of Sacalaca. Additionally, the presence of *milpas* that correspond with areas of low structural density can delineate the boundaries between two sites. Occurrence of density drop could indicate that the *milpa's* zone was deliberately left open

Despite the fact that the occupation span of Parcela Escolar and Sacalaca is contemporaneous - in other words, both of them had earlier deposits of ceramics from the Late Formative Period and experienced a peak during the Terminal Classic Period - Parcela Escolar still can be an independent site. This pattern of occupation seems to be characteristic of the majority of the sites investigated in the Cochuah region (Shaw 2003a:39-50; Young 2005:123).

One of the other arguments for Parcela Escolar's autonomy can be the discovery of an unfinished *sacbe*. Was it planned to be an intrasite causeway, connecting groups within the site? Or was the *sacbe* built to connect two sites – Parcela Escolar and Sacalaca? What purpose would it have served the higher ranking site of Sacalaca of investing its time and labor in the construction of a sacbe to the lower ranking site of Parcela Escolar? The simplest reason for building a road between sites is transportation. In this terrain it was necessary to provide roads in order to move people and goods, for exchange, communication, as well as control; thereby, economical, social and political means of *sacbeob* were intervened (Shaw 2008:106-9). It can be proposed that some kin groups were responsible for building different parts of this *sacbe.* Shaw suggested that working together united workers and instituted collective identity and may have been used as a tool for integrating and managing the populace (*ibid*:110-11).

One of the attractions of Sacalaca to the Parcela Escolar site perhaps was fertile pockets of soil where crops, such as cacao, could be cultivated. According to research done by Houck, cacao was cultivated in the site of Ek Balam; moreover, Gomez-Pompa discovered "cacao growing in three sinkholes near Valladolid" (Houck 2006:74). Parcela Escolar could have been serving the purpose of a lucrative, subsistence-related site. Some outlying sites could have had different production specialization, by which they had paid tribute to higher ranking sites and needed to be controlled via *sacbe* (Shaw:106-10). Houck states that "[f]armers, not unlike the *campesinos* of today, lived in small communities near their fields and worked to support their families and meet tribute obligations imposed by the state" (Houck Jr. 2006:75). A *sacbe* could have been a means of having control over "dispersed farmers in the surrounding vicinity" (*ibid*:106). Since only the area adjacent to the *sacbe* was mapped, data is too preliminary to conclude on the nature of this *sacbe*.

The transect was just a cross-section of a greater area. A new transect with a new trajectory could potentially yield even further results. Making an additional transect parallel 200 m from the 2008 transect could provide a greater understanding about the extent of the settlements. Additionally, excavations of structures discovered at the beginning of the transect as well as ones in the middle and newly discovered structures

at the Parcela Escolar site would provide timelines to help determine any interrelationship between studied settlements. It would be insightful to excavate non-traditionally shaped concentric circular structures to gain more knowledge about this type of architecture. Excavation as well as clearing and mapping the area around the *sacbe* would provide more details about its function and date of its construction.

Part 3: The *Ejido* of Sacalaca

Chapter 28: Rancho Guadalupe

Adam Kaeding

Rancho Guadalupe (Figure 61) consists of two separate historic components alongside a Prehispanic mound. The southwestern part of the site contains the features that are generally associated with a rancho. In this case, it is a large well dug into a square, walled platform. The well is accessed by a staircase cut into its northeast corner. Extending from this side to the east there is an area of restricted corral space and a long *bebedero*. This *bebedero* is fed by a canal leading down from the well (Figure 62).

The second component of the site is a stand-alone chapel about 260 m to the northeast of the well. This is unique within the region and, therefore, puts this site in the category of a Private Ranch – an agricultural site whose resident workers are entirely self-sufficient and likely operated under a system of communal land-ownership. The chapel is an apsidal structure; open on its eastern, squared side (Figure 63). Though there is a pair of symmetrical doors on the northern and southern walls of the chapel, the lack of a large amount of collapse debris indicates that the open side was always open. Likewise, it seems that the structure never included a roof. As the structure runs to the west it raises two steps to the rear platform. This area has a second smaller platform in the center – likely representing the original location of the altar. To the south of the altar there is a stone pillar and wall extending to the exterior wall of the chapel. While this feature is largely collapsed, it seems likely that there was a compliment on the north and potentially an arch connecting the two over the altar. This would have served to restrict access to the very rear, curved part of the chapel.

Along both the north and south walls of the chapel, running between the western door jambs and the area of the potential arch, there is a preserved painted decoration. The decoration shows an alternating pattern of bisected circles with either half painted white or red. These circles were then connected by a crosshatch pattern.

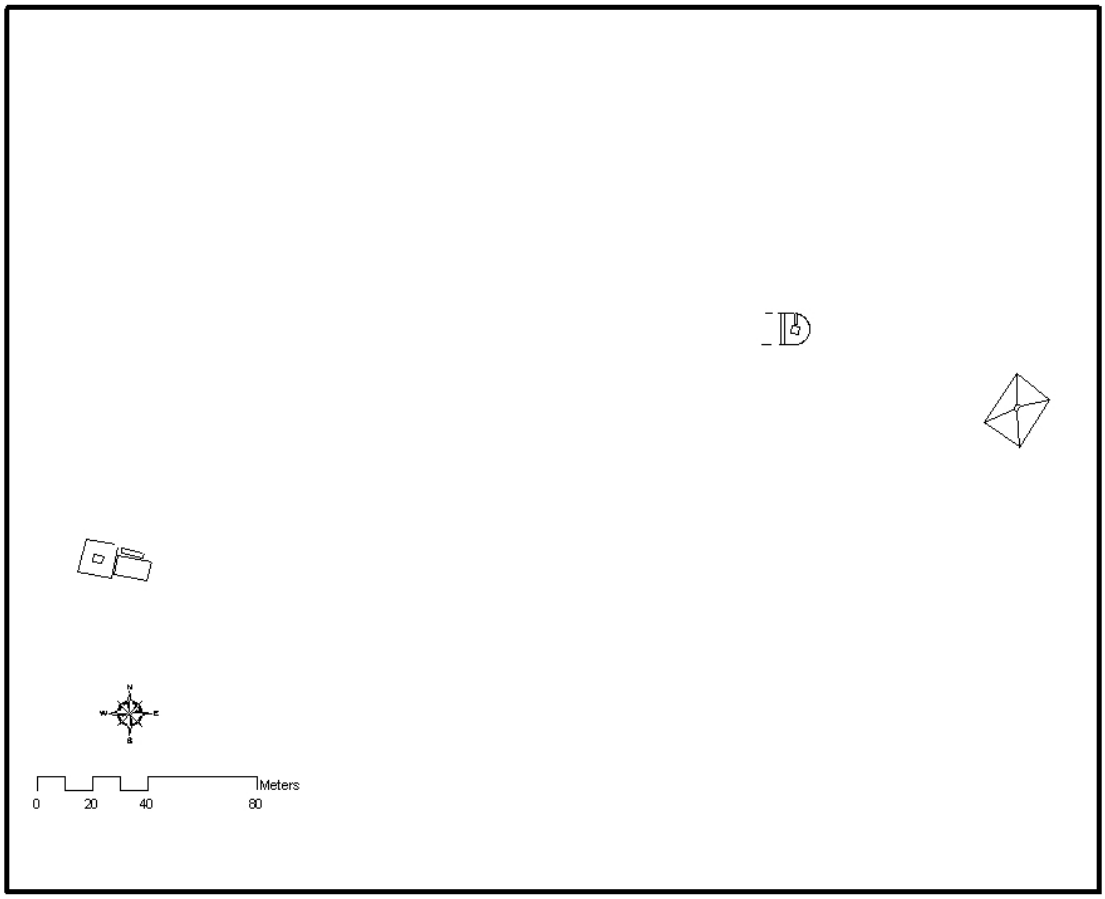

Figure 61. Plan Map of Rancho Guadalupe

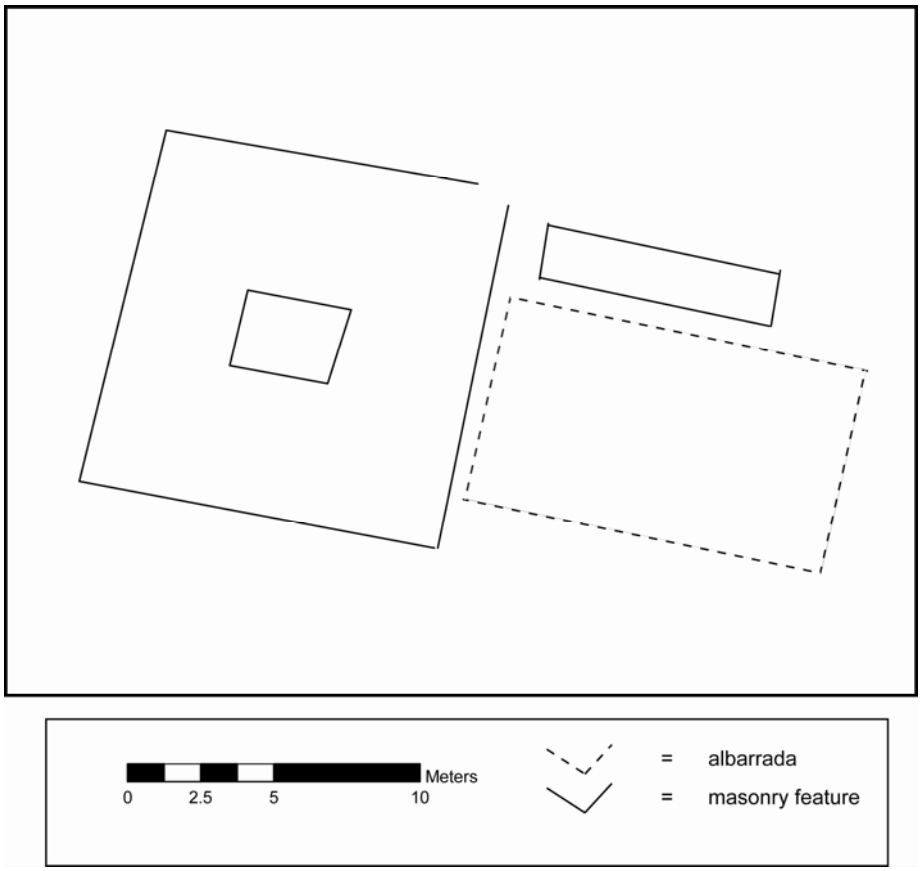

Figure 62. Rancho Guadalupe Well Features

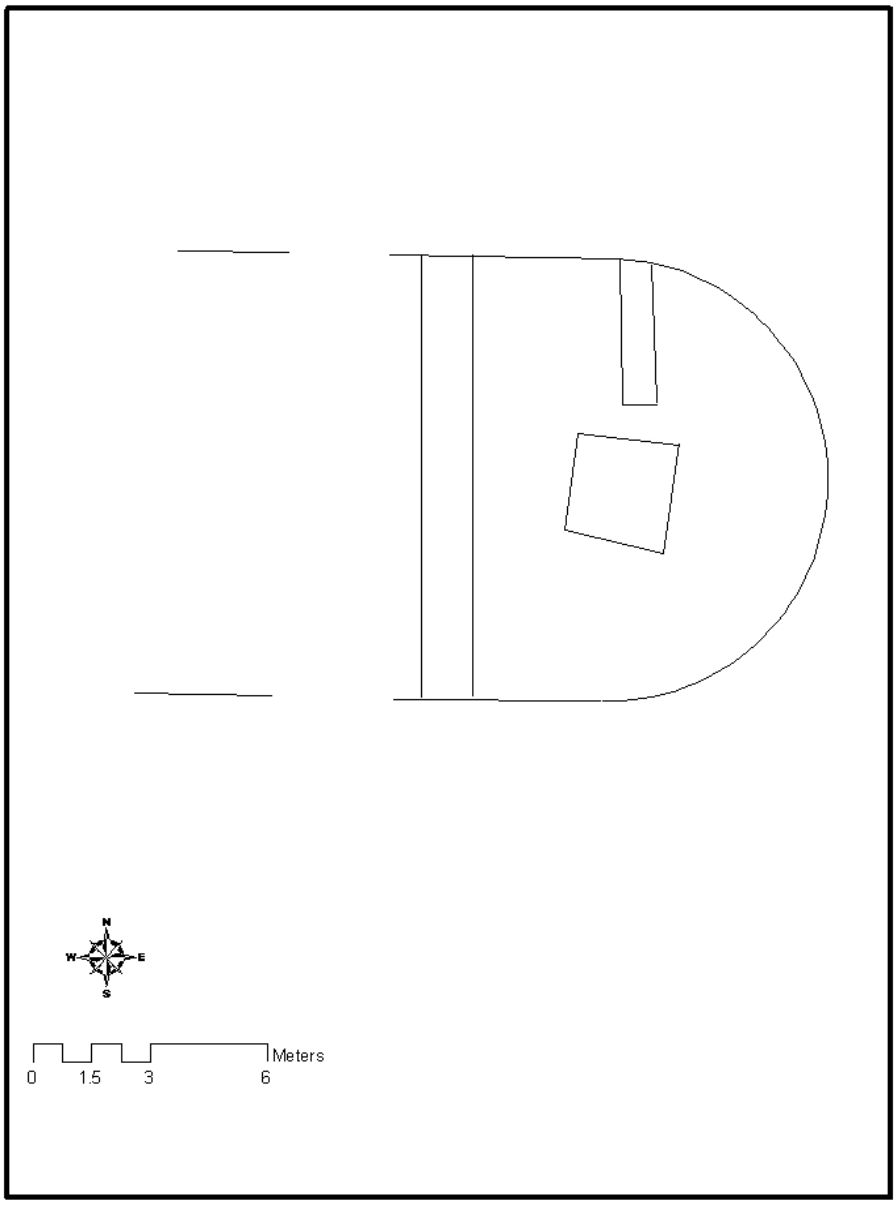

Figure 63. Rancho Guadalupe Chapel

Part 3: The *Ejido* of Sacalaca

Chapter 29: Rancho San Diego

Adam Kaeding

This is another large corral complex centered around a water management feature (Figure 64). This site is rare to the region in the sense that the real central feature is not the well-*bebedero* compound exactly, but the *bebedero* itself (Figure 65). The *bebedero* extends to the west from a section of the north-south wall that defines the axis of the site. The enclosed corral areas extend to the east of this axis on its northern half and to the west of the axis on its southern half. The well, interestingly, is set just to the south of the entire complex (Figure 66). While there is no existing connection between the well and the corral complex, the southern half of the corral axis has a central groove. It seems likely, then, that this part of the corral served as an aquaduct feeding the *bebedero*.

The separation between the *bebedero* and the well seemed to be a possible indication that there might have been a residence further to the south. A preliminary investigation did reveal an extra section of a poorly preserved *albarrada* as well as a fragment of what would have been a large *metate*. While these could have indicated residence, no foundations were encountered there or elsewhere in the area.

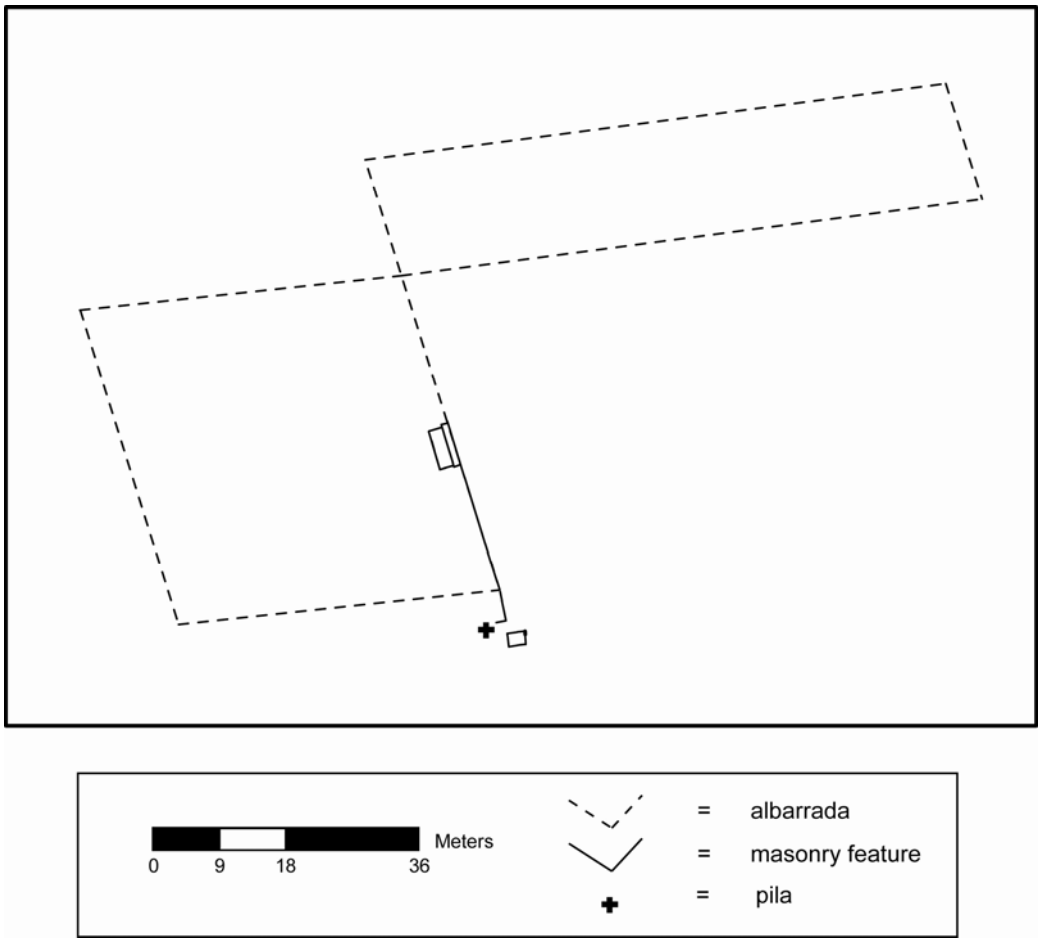

Figure 64. Plan Map of Rancho San Diego

Figure 65. Rancho San Diego *Bebedero*

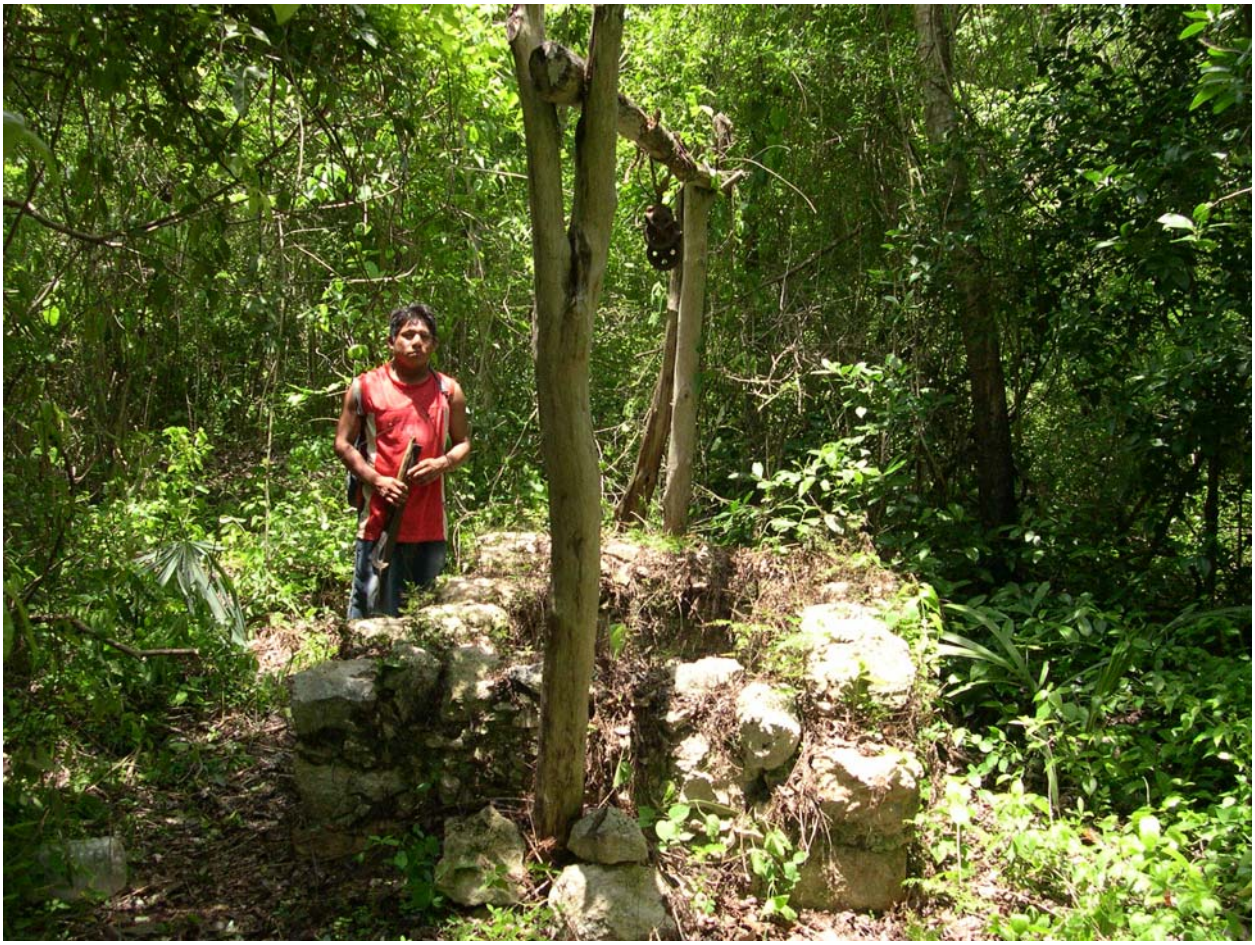

Figure 66. Rancho San Diego Well

Part 3: The *Ejido* of Sacalaca

Chapter 30: Rancho San Juan

Adam Kaeding

The site of San Juan contains both Prehispanic and historic period components. The historic elements conform with what is generally considered the standard *rancho* complex (Figure 67). These include the features associated with the raising of livestock, in this case three corrals of varying sizes, a well (Figure 68), *bebedero* and eating trough, but missing any evidence of a central residential structure.

The currently-recognized features of the San Juan Rancho are spread over an area of roughly 800 sq m. Prehispanic features continue to the north. This complex is just over 5 km to the northwest of Sacalaca.

As mentioned above, the features of this site conform with that expected of an agricultural *rancho*. The corrals themselves are the most variable feature. There are two smaller and probably more recent corrals (approximately 20 to 23 sq m) and one considerably larger (548 sq m). While the smaller corrals seem to be less substantial features and, therefore, may be more recent, some of the stones used in their construction are well-cut square stones that were likely salvaged from the nearby Prehispanic structures. The large corral, on the other hand, is a much more substantial construction with the walls reaching about a meter in height in some places.

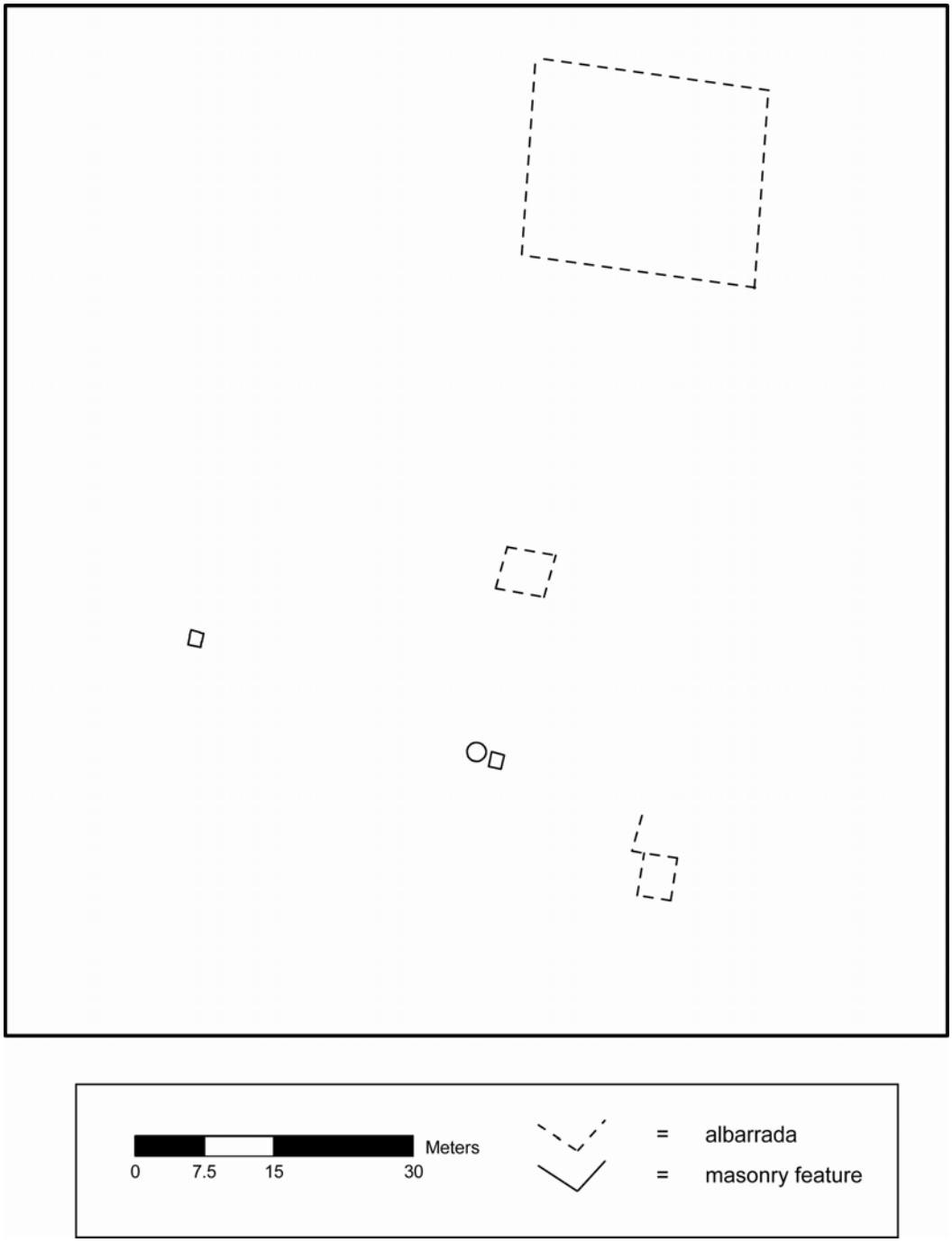

Figure 67. Plan Map of Rancho San Juan

Figure 68. Rancho San Juan Well

Part 3: The *Ejido* of Sacalaca

Chapter 31: Rancho San Pablo

Adam Kaeding

This site is defined by its architectural features dedicated to agriculture (Figure 69). Some of this architecture seems to be considerably more recent than the rest, and it is obvious that this rancho has been in use in modern times. Nevertheless, it seems likely that the basic foundations of the rancho are older. Fundamentally, there is a single corral with a well and *bebedero* combination at the center of the southern wall which is at a slightly higher elevation. This central feature has been recently re-plastered. As a result, one feature that seems to have served as an aquaduct is no longer functional, leading further credence to the suggestion that there are at least two occupations of the rancho represented by the current architecture. The original aqueduct is rare to the region in the way that it forks before reaching the *bebedero*. Most aqueducts lead directly from the well or *noria* to the *bebedero*, but in this case it splits into two separate branches about halfway between the two features (Figure 70). There are two small, square lines of stone that extend from the well-aqueduct feature. One extends west from the western branch of the aqueduct, the other extends east from the central aqueduct line. Their function is unknown, but because they are such insubstantial features, it seems likely that they may have penned in garden areas.

The *bebedero* sits on the northern side of this wall, within the boundaries of the central corral. *Albarradas* continue to the west and seemingly to the east, but we were unable to determine whether these established separate corrals. Likewise, there are two *albarrada* segments south of the wall whose function has not been determined.

Another set of features lies to the south of the well. These seem to largely represent the more modern occupation. The largest feature is a square foundation to the southeast of the well. There are four post holes cut into its corners (Figure 71). These postholes extend into bedrock. They are rare to the region because they are square. Two more of these square postholes are found further to the west, but with no identifiable alignment.

There is one square partitioned *pila* feature (Figure 72) in this southern area as well. It is fairly large and seems as though it might have functioned as a separate *bebedero*. It is quite shallow, however, suggesting that perhaps it served a different purpose. It is possible that this *pila* feature is plastered with concrete or, perhaps, constructed of the more modern material. Considering that it has no parallel features in the region, it seems likely that this is strictly a modern feature.

Finally, near the platform, there is a partially excavated hole. This is best categorized as a *haltun* as it only extends about a half meter into the ground. It is interesting to note, however, that its dimensions are nearly identical to those of the well. Perhaps this *haltun* presents an abandoned effort to establish a separate well – though this too seems curious considering the proximity to the original and still functional well.

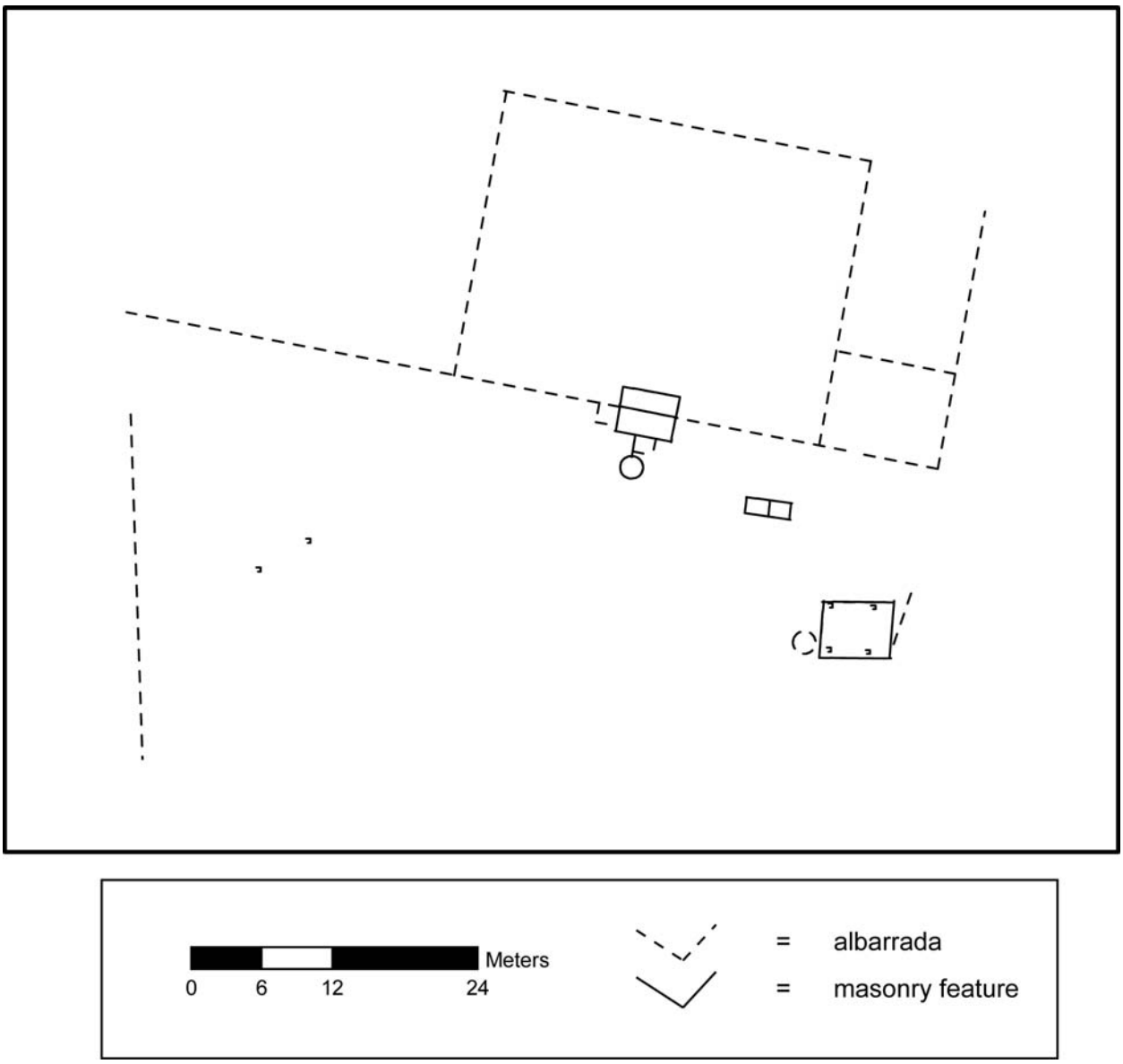

Figure 69. Plan Map of Rancho San Pablo

Figure 70. Rancho San Pablo Central Well Area

Figure 71. Rancho San Pablo Square Posthole

Figure 72. Rancho San Pablo Partitioned *Pila*

Part 3: The *Ejido* of Sacalaca

Chapter 32: Rancho Yodzonot

Adam Kaeding

There are two *cenotes* that are associated with Sacalaca proper. In the interest of promoting ecotourism in the region, both of these have received improvements over the last few years. The large, open, tourist-accessible *cenote* closest to the center now boasts a restaurant and parking area. The other is farther away and is enclosed; it is now approached by a recently constructed *sascab* pathway.

This second *cenote* is the site of a historic period *rancho* (Figure 73). Local informants did not know of any particular name to refer to this site. As a result, it has been designated simply Rancho Yodzonot. The well and *noria* is built over the access to the *cenote* (Figures 74 and 75). It seems likely that the location of the well was selected because of a preexisting hole accessing the *cenote*. This access has been significantly altered, however, as it is now squared in a way that reflects wells elsewhere in the region.

Directly to the south of the well is a *bebedero* built into an *albarrada* that partially encloses the well area. There is no convincing evidence of an aquaduct connecting the well and bebedero. Many of the sites in the region have been heavily salvaged. This is no exception. The path that has been laid between the center and the *cenote* features square cut stones as its borders. These stones have certainly been reused from their original context as features of the historic site. Further to the east lie two more large corrals.

There are two raised areas both to the north and south of the well itself. While these seem like probable locations for residence, there was no evidence of any further architecture in either area. Likewise, to the west of the well there is an area that may contain related features. Unfortunately, this area now houses a number of beehives making it difficult to continue investigation in that direction.

This site is the one closest to Sacalaca along an old road that reportedly connects the sites of Saban, Sacalaca, Petolillo, Dzonotchel, Xbaquil, Guadalupe, and possibly continuing onto Senor, and Felipe Carillo Puerto. This road is no longer in use, but in some places its borders can be noted by low *albarradas*.

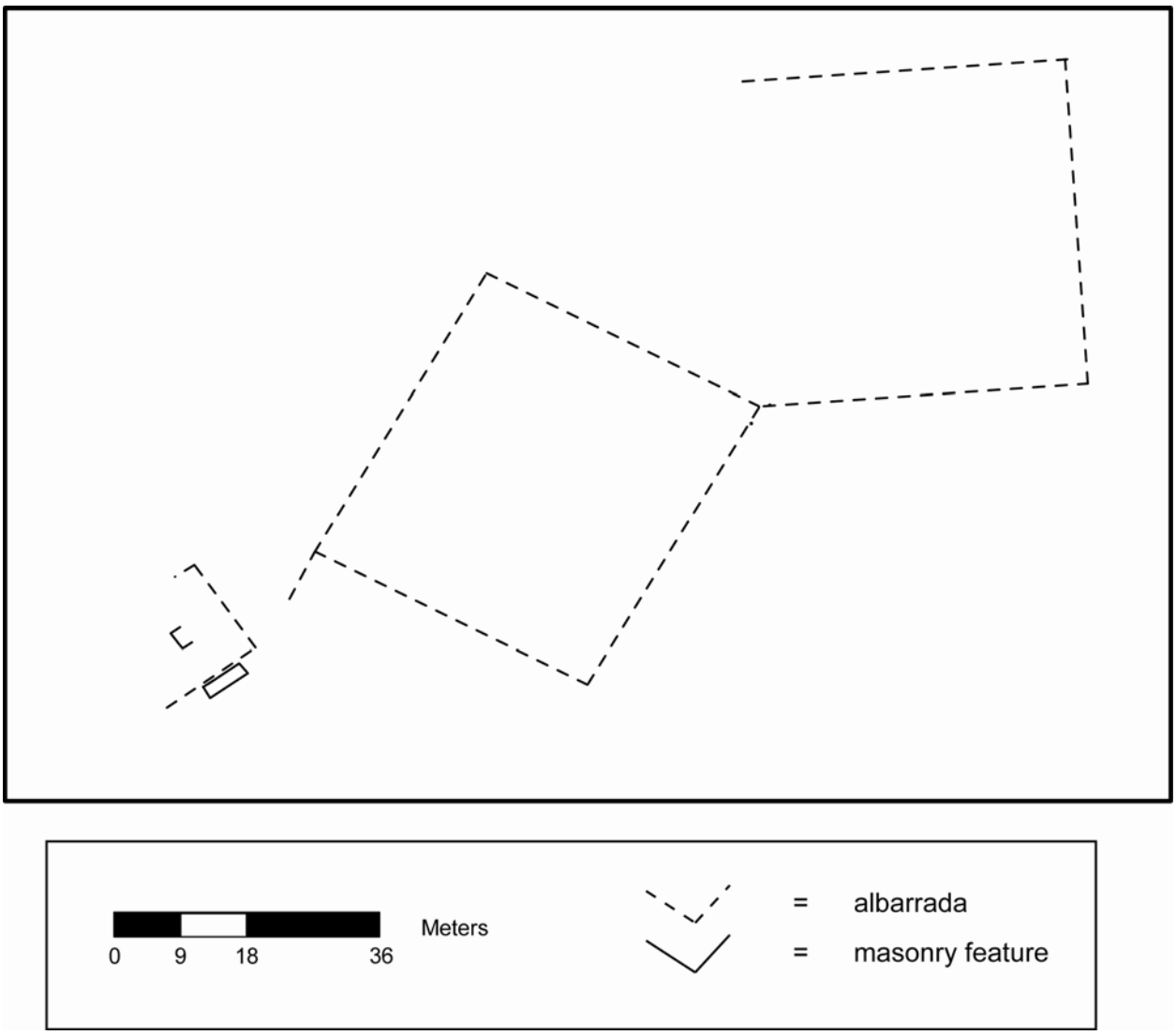

Figure 73. Plan Map of Rancho Yodzonot

Figure 74. Rancho Yodzonot Well

Figure 75. Rancho Yodzonot Well Accessing *Cenote* Cavity

Part 3: The *Ejido* of Sacalaca

Chapter 33: Reconnaissance in the *Ejido* of Sacalaca

Jorge Pablo Huerta Rodríguez

This year, a survey was conducted in the Sacalaca *ejido* with the aim of extending the knowledge of the Cochuah Region. It included the location of new sites, as well as more thoroughly registering previously known Prehispanic and historic settlements.

Methods

The location of possible new sites involved some aerial photo interpretation, but mainly was carried out with the help of local informants familiar with the area, as well as data obtained in previous seasons. Once a possible new site is identified, the procedure was to conduct a physical visit in order to detect archeological remains on the surface, and in the cases that the sites were verified, a proper registration was carried out, including a GPS coordinates, sketch map (compass and tape), and digital photographs. Generally, our local informants brought us to the main structures (in terms of size), but from this point a series of long *brechas* (cuts in vegetation) were radiated in order to get a better coverage of the surrounding zone.

Rancho La Esperanza

This site is located to northeast of the *pueblo* of Sacalaca. Although locally the site is well-known as a *rancho*, the only remains that are still present are a well and small corral. These are mainly covered with *zacate* grass (*Panicum máximum*), used mainly in cattle raising. In the area of the modern *rancho*, there are at least five Prehispanic structures, one Colonial well, one corral, and four *pilas* (*metates*) (Figure 76).

Structure 1

Structure 1 (Figures 76 and 77) is composed of a large platform of about 25 x 11 m in area along its east-west axis, which is located in the central portion of the settlement. Upon this platform, two pyramidal mounds were constructed. On the northern side, the height of the platform is around 2.70 m; it has been affected by a looters' hole, which partially reveals the core of the structure. The southwestern mound is about 4 m tall (Figure 78), and almost all of the structure has also been affected by looting (Figure 79).

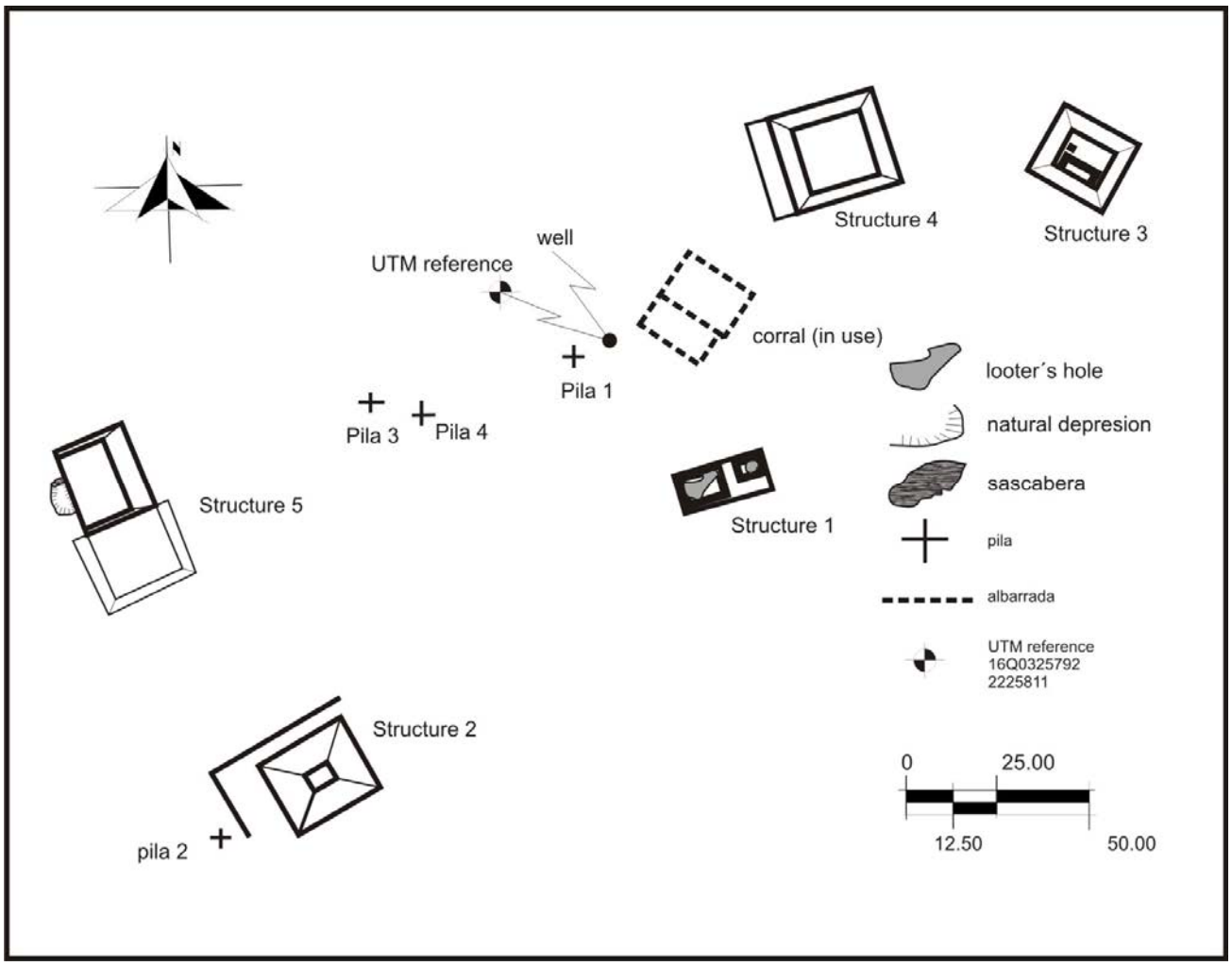

Figure 76. Rancho La Esperanza Plan Map

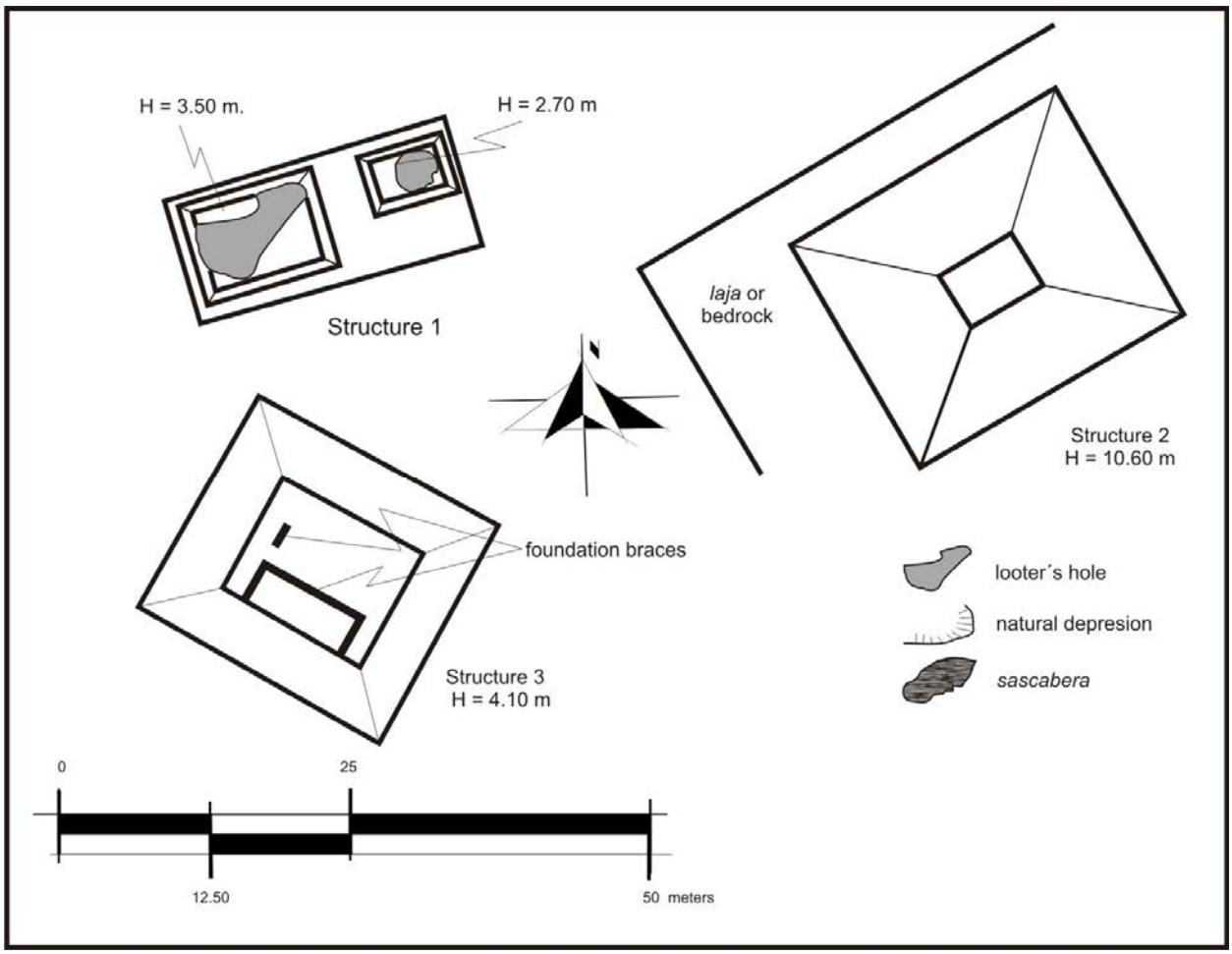

Figure 77. Rancho La Esperanza, Structures 1, 2 and 3

Figure 78. Rancho La Esperanza, Structure 1, Northwest Corner

Figure 79. Rancho La Esperanza, Structure 1, Looters' Hole

Structure 2

Structure 2 (Figures 76, 77, and 80), the largest mound at the settlement (about 11 m), is located in the southwest portion of the site. It is a pyramidal mound that is constructed directly upon bedrock, and is aligned in a northeast-southwest axis. The pyramid is about 28 x 22 x 7 m at its base.

Structure 3

Structure 3 is a pyramidal mound (Figure 81), which is located in the northeastern part of the settlement. Oriented to the southeast, it is not aligned with the others buildings at the site. Its dimensions are about 33 x 22 x 4 m, and it still shows the remains of wall fragments on its summit, possibly for a perishable structure (Figure 82), as well as another wall line in the middle area, at roughly 4 m from the base, but without a clear shape.

Structure 4

Structure 4 is a platform that (Figures 76, 83, and 84) is located in the northeastern portion of the site, which is aligned on a northeast-southeast axis. Its base is about 30 x 28 x 4 m. Semi-detached from Structure 4, a 6 x 29 m platform was located.

Structure 5

Structure 5 is located in the western part of the site (Figures 76 and 83) along a northwest-southwest axis. It is about 4.6 m tall, and appears to be situated on a natural hill that has been quarried as a *sascabera* accessible on its western side.

Conclusions

A large quantity of ceramic material was observed during our survey at Rancho La Esperanza, mainly in the vicinity of Structure 3 and Structure 4. However, sherds were too eroded to be indentified, since they have been exposed to continuous burning due traditional slash-and-burn farming. Four *pilas* where located in the vicinity of the Colonial remains (Figures 76, 85, and 86).

The well (Figures 76 and 87) was probably constructed during Prehispanic times, but perhaps was only carved into the bedrock. We speculate that during the Colonial period it was re-used and its mouth was covered with stones and a rim added on the surface. Its seems that the well has been re-used various times, including during the last century when the area was repopulated after the Caste War, when new inhabitants discovered, cleaned, and re-use several Colonial settlements.

Between Structure 1 and Struture 2 it was observed that the ground surface was leveled, possible making a sort of plaza, but no buildings were located to west or east. Structure 1, Structure 2, and Structure 3 seem to be aligned in other directions. For this reason, we speculate that the buildings belong to a different periods. Structure 2, as has been mentioned, is built directly upon bedrock. However, it can be speculated that it was covered with a stucco floor in the past, although is possible this bulding was constructed in later times.

Figure 80. Rancho La Esperanza, Structure 2, Summit

Figure 81. Rancho La Esperanza, Structure 3, Southern View

Figure 82. Rancho La Esperanza, Structure 3, Foundation Brace (southeast and western views)

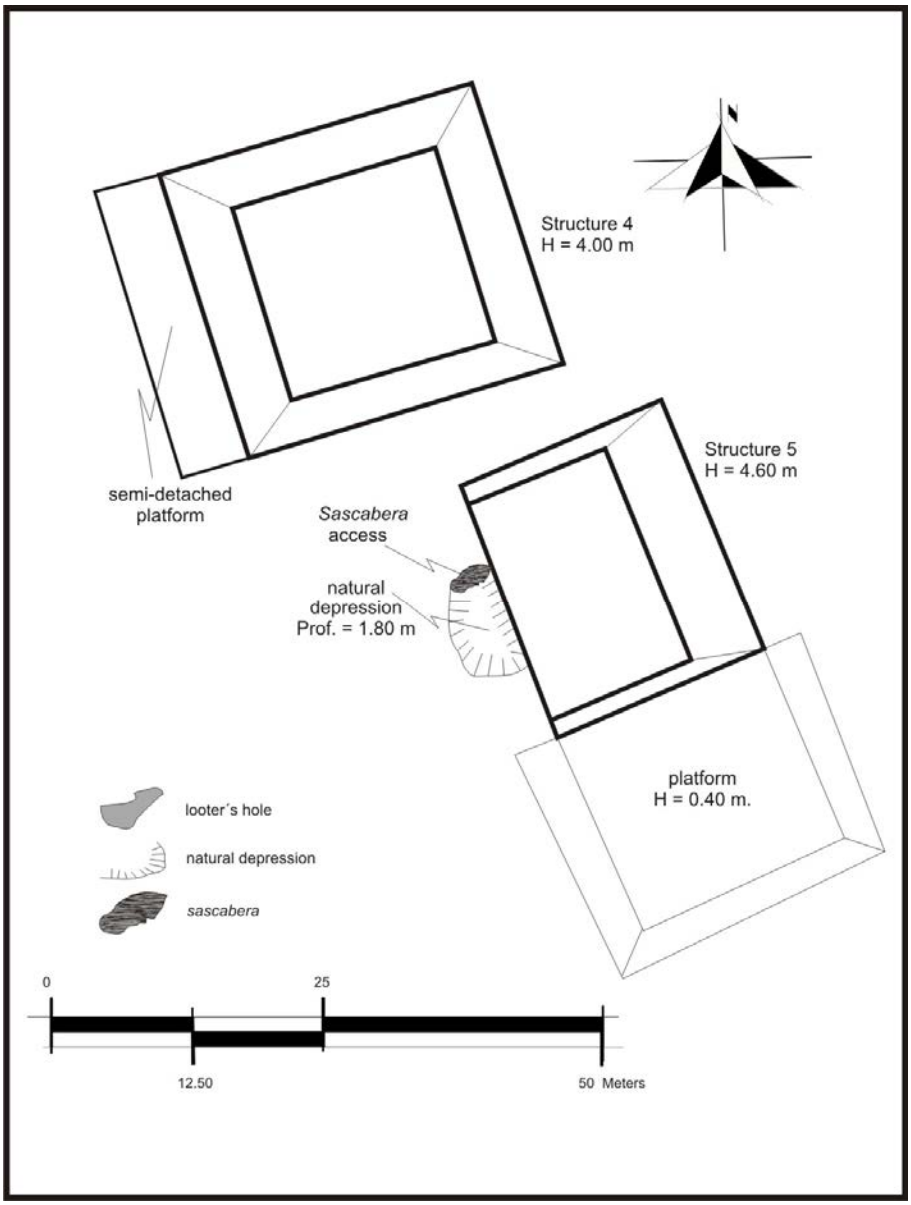

Figure 83. Rancho La Esperanza, Structures 4 and 5, Plan Map

Figure 84. Rancho La Esperanza, Structure 4, Northern Façade

Figure 85. Rancho La Esperanza, Pila 1

Figure 86. Rancho La Esperanza, Pilas 2, 3, and 4

Figure 87. Rancho La Esperanza, Colonial Well

Rancho Santa Elena

Rancho Santa Elena is located north of the *pueblo* of Sacalaca. According to locals, the area has been populated for the last 30 years by a small family settlement. Modern structures have affected the Prehispanic structures. Archaeological remains that compose the site include three Structures, a possible Colonial well, and four *sascaberas* (Figure 88).

Structure 1

This mound is located next to an unused elementary school and close to a family house that is currently inhabitated. It is the southernmost of the three Prehispanic buildings (Figure 88). The mound is aligned along a souteast-northwest axis (Figure 89). The structure has a pyramidal shape of about 16.8 X 14.2 x 3.40 m, and on its summit has been affected by a looters' hole. An *albarrada* runs along its eastern side (Figure 90). This mound is in a state of poor preservation, since it has been affected by modern occupation and its daily activities.

Structure 2

Structure 2 (Figure 88) is located on the northern edge of the Prehispanic settlement. It is a pyramidal mound of 10.40 x 8.30 x 3.40 m. This buiding is in very poor shape, in that nearly its entire summit has been removed by looters (Figure 91). Therefore, its original shape is unclear except for its northeast corner (Figure 92).

Structure 3

Structure 3 (Figure 88) is located to the east of the Prehispanic settlement. It forms the base of two stepped bodies measuring 23 x 10 x 3 m; the mound is aligned on a southeast-northwest axis, and on its southern side it displays what seems to be a ramp. A lot of cut stones were located on its summit that probably come from the façade of the structure (Figure 93). These cut stones (Figures 94 and 95) are approximately 43 x 10 x 20 cm, and have a carved line along their course, which was probably a decorative feature of the façade.

On the southeastern corner of the first body of the structure, which is well preserved, one can see that large boulders were used to construct the corners. The corner has been finished with cut blocks (Figure 96).

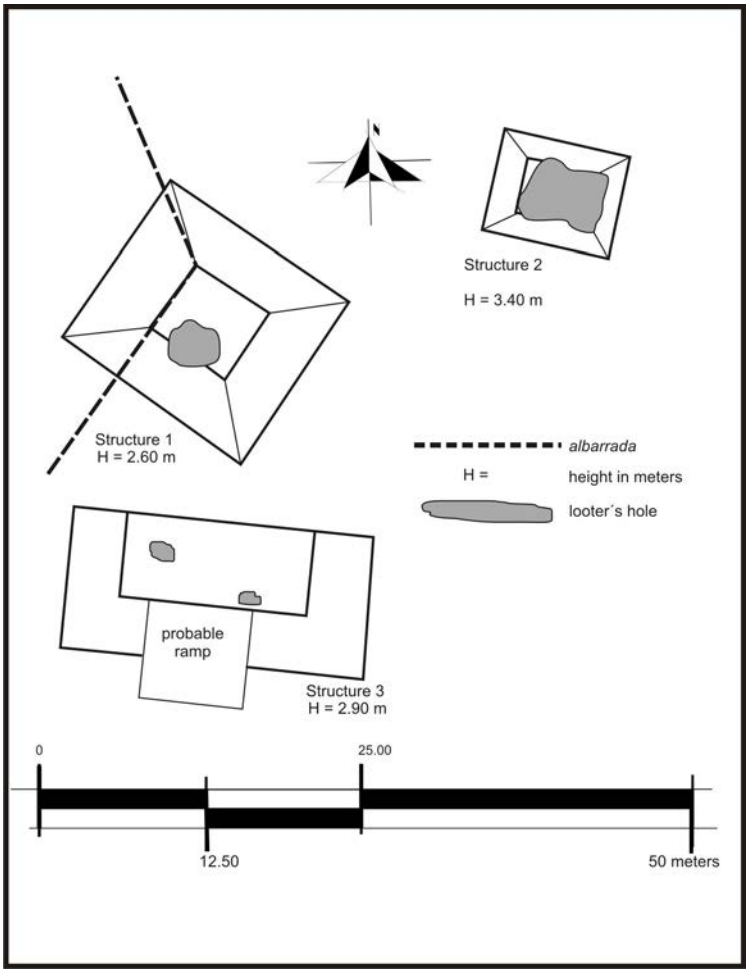

Figure 88. Rancho Santa Elena Plan Map

Figure 89. Rancho Santa Elena, Structure 1
(Note modern elementary school to the left)

Figure 90. Rancho Santa Elena, Structure 1, Northwest Corner

Figure 91. Rancho Santa Elena, Structure 2, Looters' Hole

Figure 92. Rancho Santa Elena, Structure 2, Northwest Corner

Figure 93. Rancho Santa Elena, Structure 3, Façade Elements

Figure 94. Rancho Santa Elena, Structure 3, Carved Stones

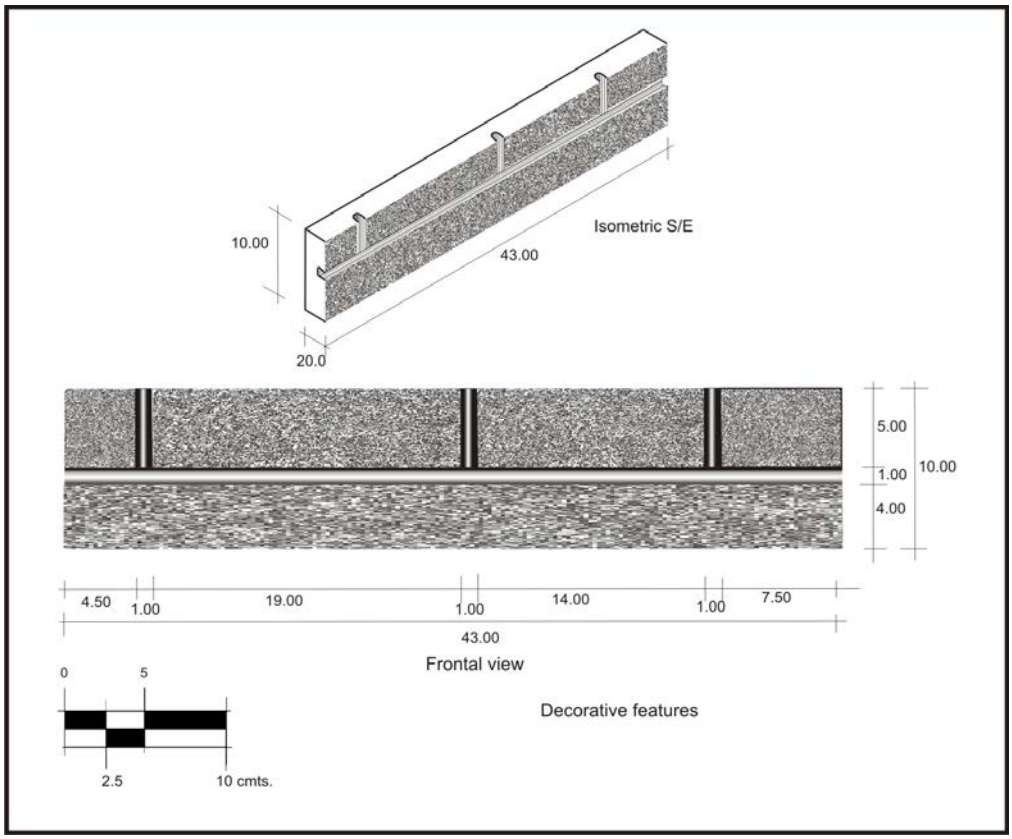

Figure 95. Rancho Santa Elena, Decorative Elements

Figure 96. Rancho Santa Elena, Structure 3, Southwest Corner Detail

Conclusions

As has been mentioned earlier in this chapter, the preservation of the structures at Rancho Santa Elena is quite poor, and it continues to be affected by human actions that have continued until the present. There does not appear to be any clear patterning with respect to the Prehispanic structures. However, it is interesting that the aligment of Structure 3 contrasts with that of the other two structures. Structure 3 is composed of two steeped components that still show remnants of decorative features that probably belonged to the façade; it appears that this building belongs to a later pediod that other two structures.

It seems that the mouth of the well of the *rancho* belongs to a later period (Figure 97), probably Colonial, but it may have been originally constructed during Prehispanic times. It has been re-used since this time until the present. Currently we lack the evidence needed to test this hypothesis.

Rancho San Isidro

Rancho San Isidro is located to the southeast of the *pueblo* of Sacalaca. Although our local informants have told us that there are Prehispanic structures in the area, our reconnisence only revealed a possible Colonial occupation. Remains that have been located at present include a well, water trough, a wall section, and a series of *albarradas* (dry core walls) (Figure 98). This settlement is currently occupied by people carrying out agriculture and raising cattle.

The well (Figure 99), as has been speculated, may date to Prehispanic times, but its mouth belongs to the Colonial period. An *albarrada* delimitates the area that was occupied once by the old *rancho* (roughly 19,803 sq m). To northwest of this point, the remains of a water trough and wall fragments were located. On the day of our visit, the water trough was empty; it was possible to observe several sections of plaster in the interior (Figure 100). The water trough was fitted in a wall (about 1 m tall), which has two orifices that probably conducted the water to the water trough (Figure 101).

Mid-way between Sacalaca and Rancho San Isidro, an aligment of stones and two faced blocks were located, which probably represent a platform wall. The area where the remains are located is currently a *milpa* and there is a lot of bedrock exposed on the surface. Due to this bedrock and the relatively clear nature of the vegetation, it was also possible to identify a corner of the platform (Figure 102); this wall line has a northeast-southeast aligment. A large, cut stone block was also identified on the surface of the platform, (Figure 103).

A second carved rock was located next to to the rock aligment (Figure 104), at about 30 cm east of the possible wall line (Figure 102); it was not well preserved. On the front side of this rock, a possible carved design that resembles a number six was found (Figure 105).

Figure 97. Rancho Santa Elena Well

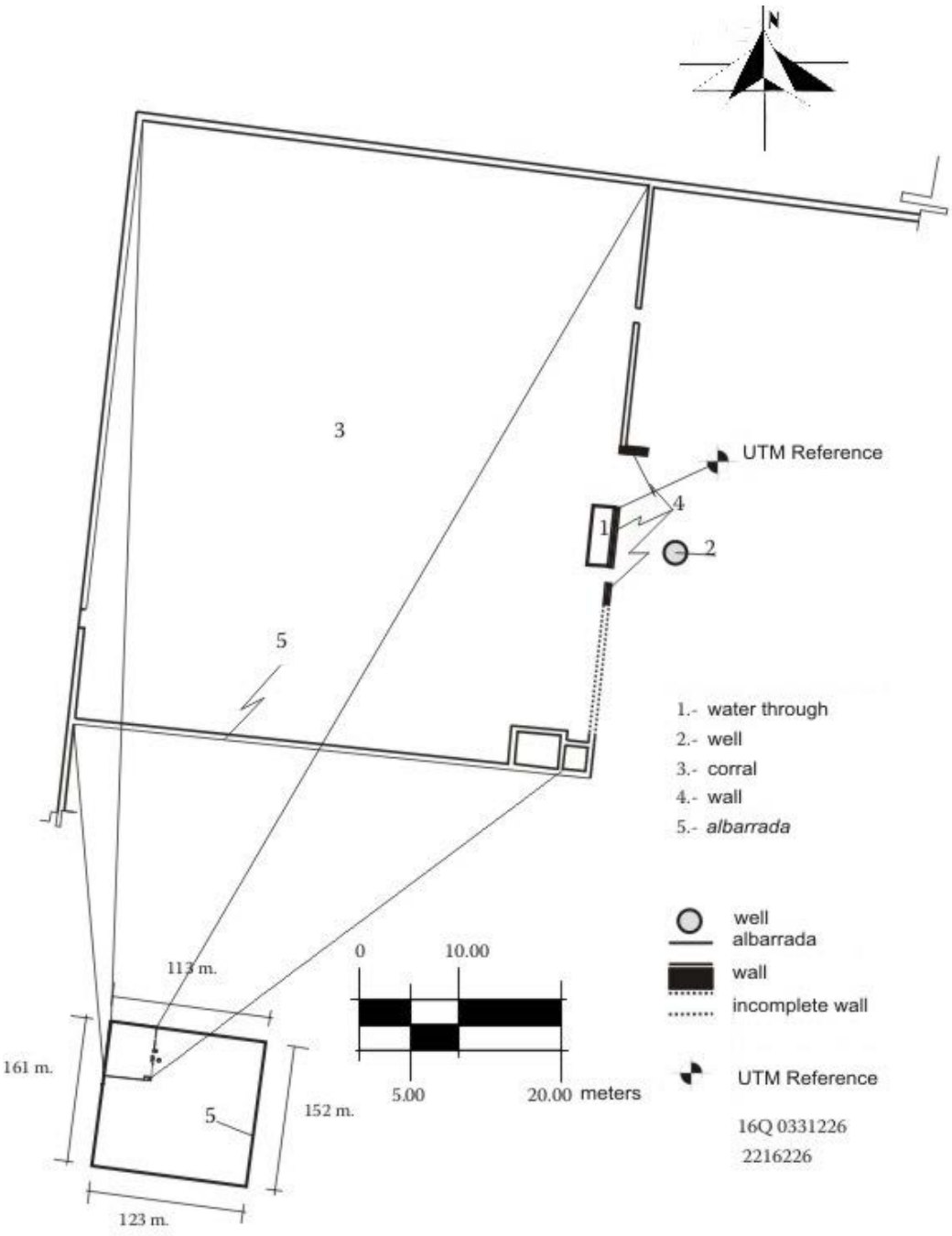

Figure 98. Rancho San Isidro Plan Map

Figure 99. Rancho San Isidro Well

Figure 100. Rancho San Isidro, Interior of Water Trough

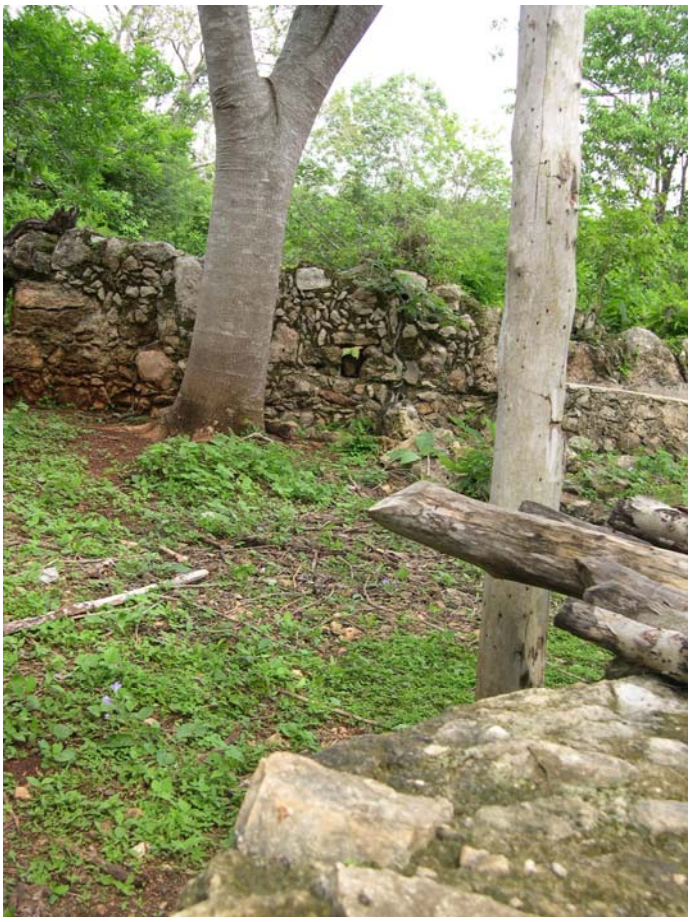

Figure 101. Rancho San Isidro Well, Platform, and Drain

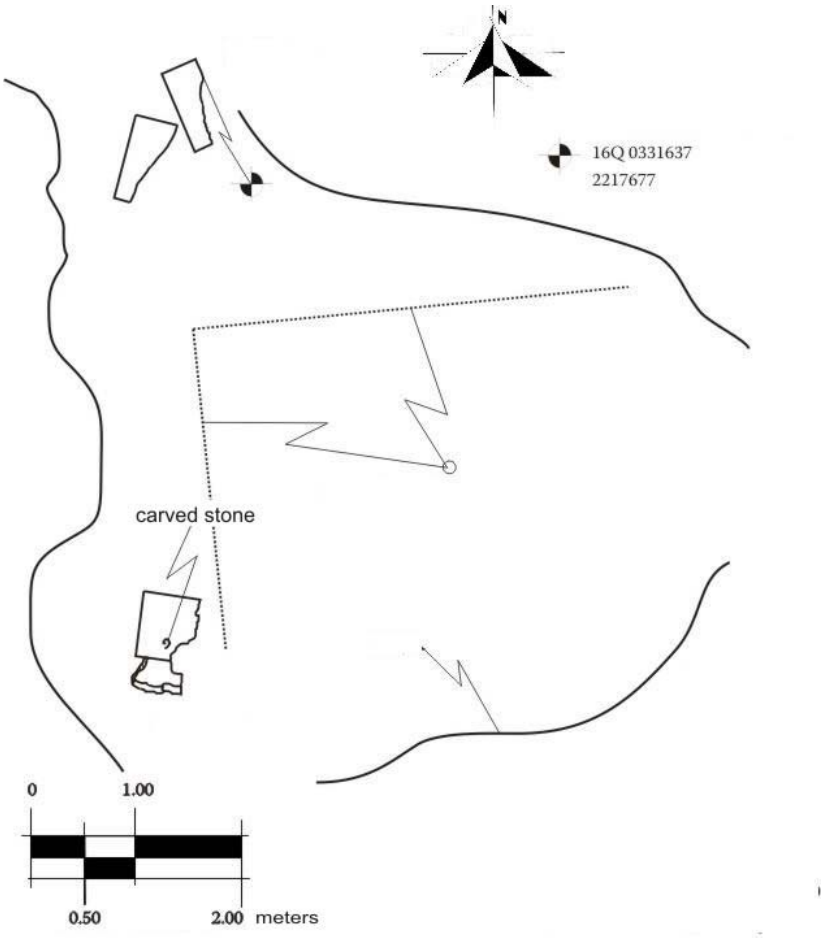

Figure 102. Road to San Isidro, Petroglyphs

Figure 103. Carved Rock “A” on the Road to San Isidro

Figure 104. Carved Rock “B” on the Road to San Isidro

Figure 105. Carved Rock “B” Detail

Conclusions

Although a survey of the vicinity of the *rancho* area was conducted, we could not locate any Prehispanic remains. However, it should be noted that the *rancho*, including the *albarrada*, the mouth of the well, and water trough. As has been mentioned, the *rancho* area has been inhabitated for many years and, for this reason, it seems probable that Prehispanic remains were destroyed by more recent settlers.

With respect to the carved rocks located mid-way between Sacalaca and the *rancho*, as well as the possible wall line of a platform, it seems possible that all these features were part of a Prehispanic settlement. The carved drawing, which resembles a six, seems that was carved in recent times.

Rancho Santa Cruz

The site is located to northeast of the *pueblo* of Sacalaca; it was previously reported by the CRAS Project. This season, two new architectural groups were located, both in association with caves.

The first group, located to northeast of the cave of Santa Cruz, is composed of two structures (Figure 106). The cave was previously described by the Project (Shaw et al. 2004). Structure A is a pyramidal mound of about 8 x 8 x 5 m. Structure B. located to northeast of Structure A, is also a pyramidal mound, measuring about 15 x 15 x 7 m. A cave entrance was located in the northeastern corner of this structure; according to locals this is another entrance to the Santa Cruz cave (Figure 107).

Due to technical and INAH permit reasons it was impossible to access the opening in order to verify if it is another entrance to the Santa Cruz cave, it seems very probable due its proximity. On the other hand, it highly possible that the area comprising this complex forms a sort of plaza, since maintains a homogenous level with the exception of the cave. This space is enclosed on north and south by another two structures.

As has been mentioned another structure that is a possible cave entrance was located on the way to Santa Cruz (Figure 108). This structure is a rectangular platform of about 20 x 15 x 3 m. On the summit of this platform, an L-shaped aligment was located. This probably constitutes a foundation brace. In addition, three carved rocks and a column, which were probably part of the façade were located (Figure 109). At around 5 m to the south, a large opening was observed that presumably is the entrance of a cave, *rejollada*, or rock shelter.

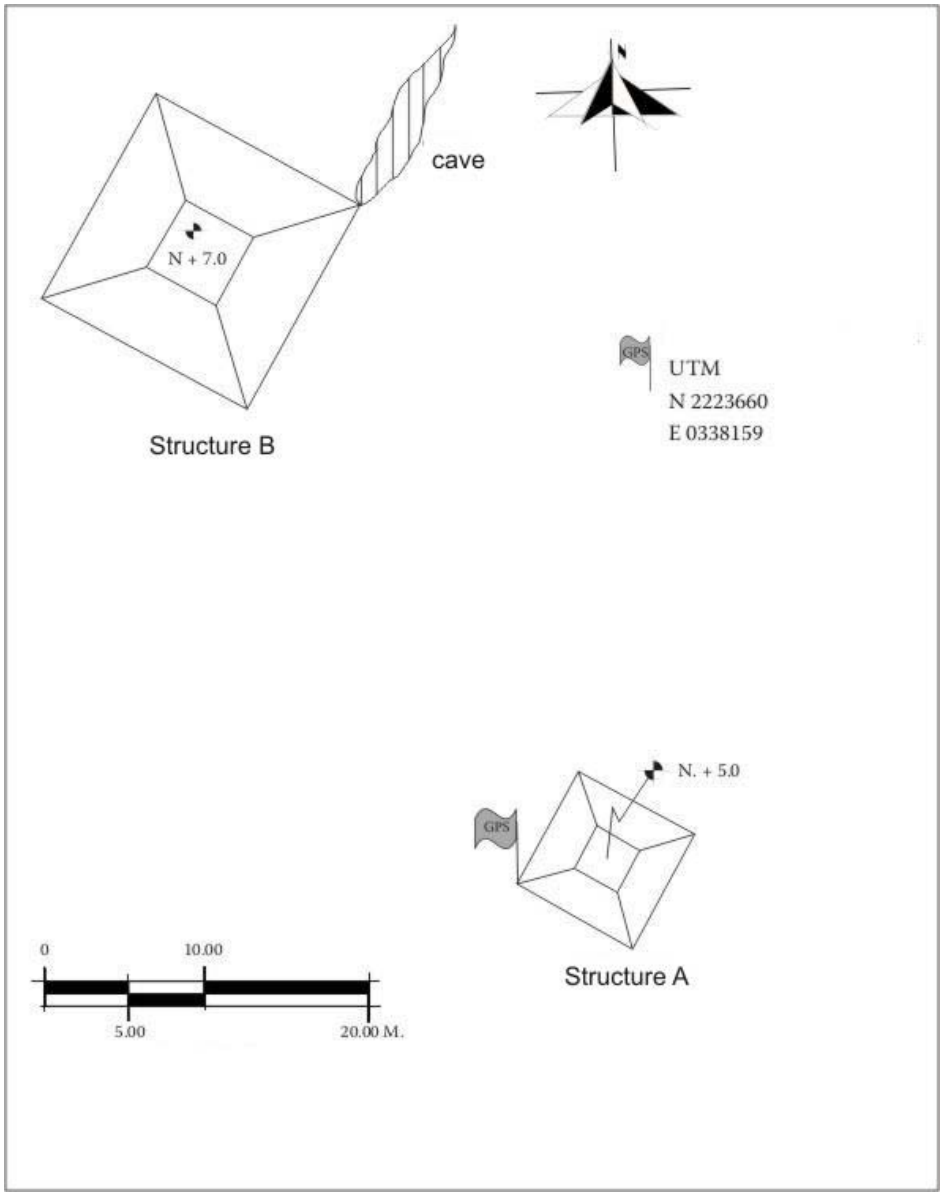

Figure 106. Northeastern Group of the Santa Cruz Cave Site

Figure 107. Probable Northeast Access to the Santa Cruz Cave

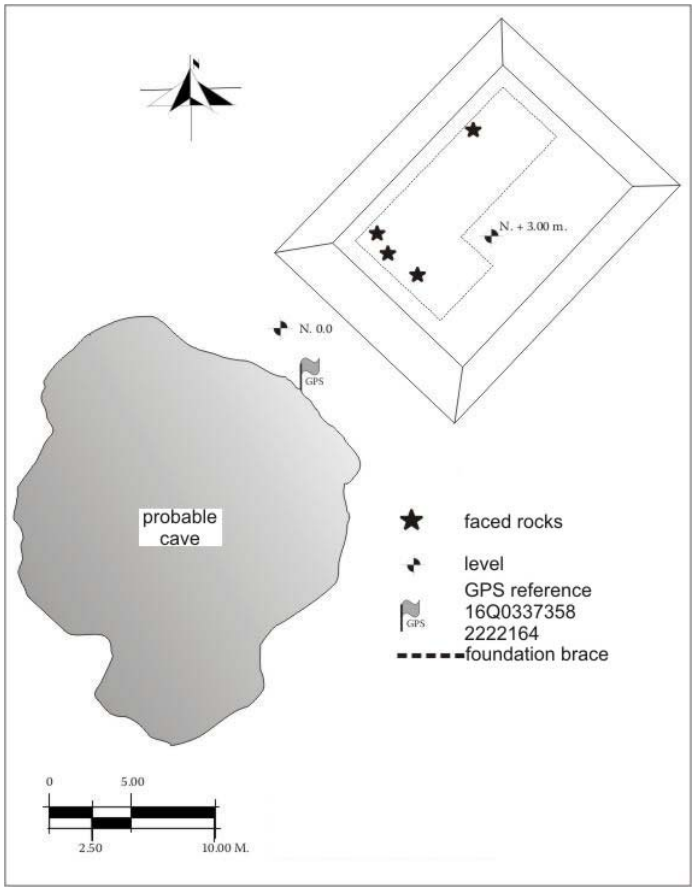

Figure 108. Probable Cave and Structure on the Road to Santa Cruz

Figure 109. Faced Blocks on the Road to Santa Cruz Cave

Rancho San Diego

Rancho San Diego is located to southeast of the *pueblo* of Sacalaca. Local informants brought us to a Colonial well and two Prehispanic structures (Figure 110).

Structure 1 is the southernmost feature. It is a square platform of about 12.5 x 12.5 x 1.2 m. On the summit of this platform, a rock alignment that resembles a Postclassic altar was found; its condition prohibits us from a conclusive identification. On the western side of this structure, along its centerline, a sort of ramp or stairway (of about 2 m in width) was located. Its shape remains indeterminate due to the condition of surface remains. At the bottom of the feature, a small platform (of about 3 x 2 m) was found that probably was a bench or a large step.

Structure 2 is located on the western side of the surveyed zone. It is a rectangular platform of about 15 x 11 x 2 m. Both structures are aligned along a southwest – northwest axis.

Features including the possible ramp, the altar, and the small platform suggest to us that the structure was relatively more important than Structure 1. It may have had a religious function, but it should be remembered the Postclasic altar is part of a later re-occupation. Between the well and the Prehispanic complex, a *pila* (*metate*) fragment was located. However, since it lies in a secondary context, we cannot say more about the feature (Figure 111).

Rancho San Pablo

This *rancho* is located to the southeast of the *pueblo* of Sacalaca, in an area where apicultural, agricultural, and cattle raising activities are carried out. The site is composed of a possible Colonial well and *rancho* (mainly corrals), and three pyramidal mounds (Figure 112).

Structure N1E1-1 is located to the north of this group of structures. It measures about 22 x 20 x 3.5 m. On its summit, a carved rock aligment was located. It is probably the remains of an altar, although its poor preservation makes this identification inconclusive.

Structure S1E1-2, a 20 x 24 x 3 m mound, is located at the center of the complex. On the top of the mound, an aligment associated with a looterss hole was located (Figures 113 and 114). The existence of modern cultural materials indicates that the possible alignment may have been created during the looting.

Structure S1E1-1 is located in the southern portion of the complex. It is 17 x 18 x 2.3 m. It seems probable that the pattern created by these three structures is a small acropolis, based upon the elevation observed during the survey.

To the northeast (approximately 450 m) from the well, a 10 x 12 m natural entrance enters an approximately 6 m cave composed of a series of chambers (Figures 115 and 116). According with our informants, there are chambers that were not visited, including one with a pond. The cave is currently only visited by Ah-MEN, Maya ritual specialists, who go there to carry out rituals. An appropriate registration could be conducted with specialized equipment. It is likely that, with more time to investigate, a Prehispanic occupation could be located.

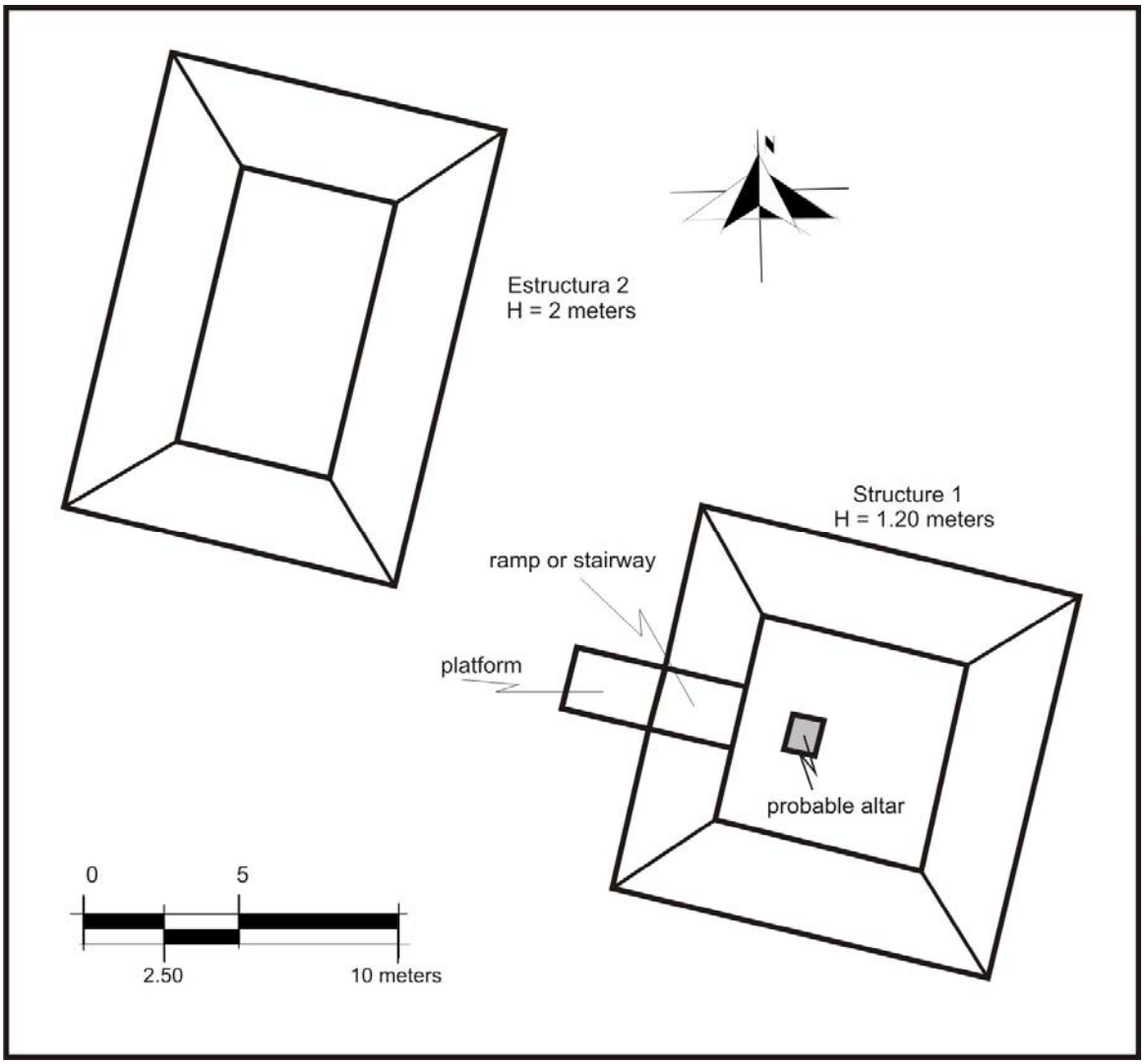

Figure 110. Rancho San Diego Plan Map

Figure 111. *Metate* Fragment, Rancho San Diego

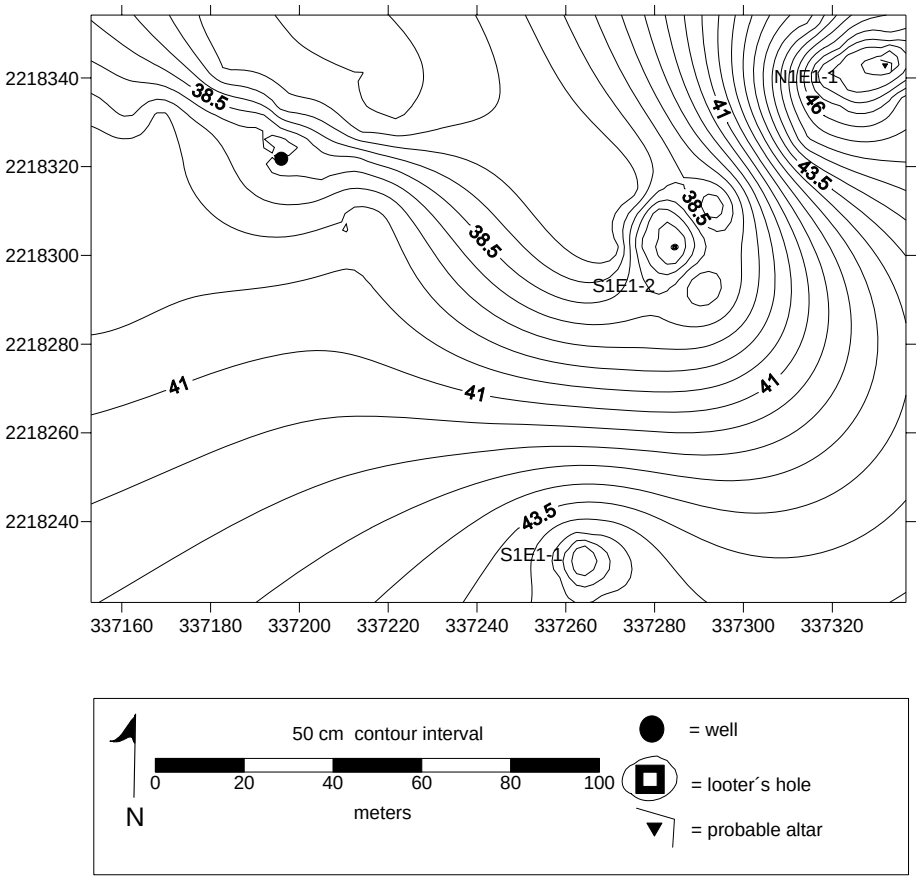

Figure 112. Rancho San Pablo Plan Map

Figure 113. Rancho San Pablo, Structure S1E1-2

Figure 114. Rancho San Pablo, Structure S1E1-2, Looters' Hole

Figure 115. Rancho San Pablo Cave Entrance

Figure 116. Rancho San Pablo, Entrance to the Nearest Cave

Aktum

This site is located to the east of the *pueblo* of Sacalaca in an area devoted to agriculture and cattle.

Aktum is composed of a pyramidal mound of 14 x 22 x 6 m (Figures 117 and 118). On its southern façade, a sort of stairway (about 6.5 m wide) was located. The base of its southern side indicates that the building is situated upon a platform. However, there is also a natural bedrock outcrop that indicates to us that part of the platform is natural. As has been said, this area is highly impacted by a cattle ranch. On the western side of its summit, there is an aligment, which is probably the foundation brace of a perishable building.

At approximately 100 m to the northwest of this structure, a natural hill with small foundation braces and a small platform, as well as a pair of pilas (*metates*), was located. However, due to time constraints, the area was not mapped.

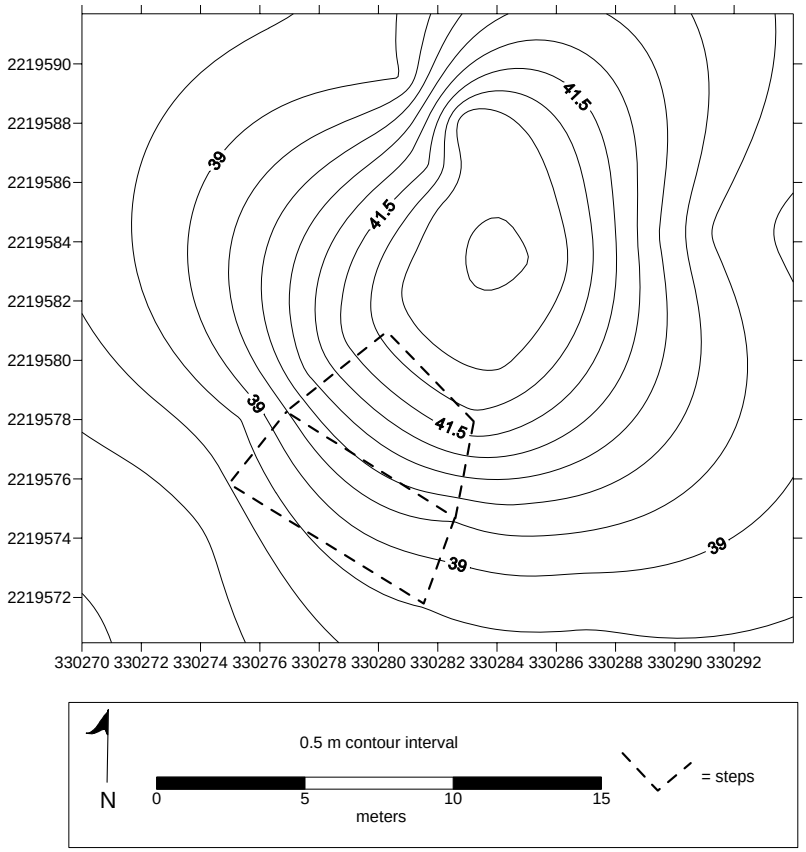

Figure 117. Aktum Plan Map

Figure 118. Pyramidal Mound at Aktum

Part 4: The *Ejido* of San Felipe

Chapter 34: Hopemul

Justine M. Shaw and Alberto G. Flores Colin

Hopemul was first visited and mapped this 2008 season. As at other sites in the *ejido*, the entire site was not recorded due to time constraints. Instead, only the portion of the site with the largest and most organized constructions were cleared and mapped with the total station (Figure 119).

Situated approximately 2 km to the south of the *pueblo* of San Felipe, the site is accessed by a little-used branch of a narrow dirt path. For this reason, it has received less modern damage than sites that may be more readily used for building material. While few wall lines are intact in the main architectural cluster, this appears to be due to the quality of the original construction, as well as damage from what appear to be tree throws on the larger three mounds.

Structure N1W1-1, the closest to the modern path, is located at the northwestern end of the group. The pyramidal structure spans a drop in the natural elevation. If it contains more than one construction phase, a smaller original building may have been situated to take advantage of the rise, with a later enlargement necessitated the unusual arrangement involving spilling down the slope. Three small mounds line the northern edge of the recorded zone. Each is upon a platform, although only Structure N1E1-2's substructure has any discernable wall lines.

The second and third largest mounds at the site, Structures N1W1-4 and N1E1-1 are parallel range structures. Based upon their arrangement and form, they appear to be a small ballcourt. This hypothesis is supported by the presence of a round stone in the southern end of the middle of what would be the playing field; with one to two other such stones could have served as ballgame markers. Like Structure N1W1-1, the lack of wall lines on the two is largely due to the construction style or quality. These three largest mounds are composed of uncut boulders roughly 30 cm in diameter. No smaller cobbles (*chich*) is present on the structures and only three cut stones comprising a wall are visible on the southeast face of Structure N1W1-4. Structures S1E1-1 and N1W1-3 are aligned with the center of the playing field, possibly serving as endzones or goals of some sort. The entire ballcourt arrangement is a miniature version of that recorded at Ramonal Quemado, elsewhere in the San Felipe *ejido* (see "Ramonal Quemado" this volume).

Approximately 50 m to the southwest of the ballcourt is an extensive platform with several foundation braces that could not be mapped due to time constraints. Additional reconnaissance to the east revealed a zone with few cultural features for approximately 100 m. Then, roughly 120 m to the east local crew members located a *chultun* associated with a series of platforms surrounding a depression.

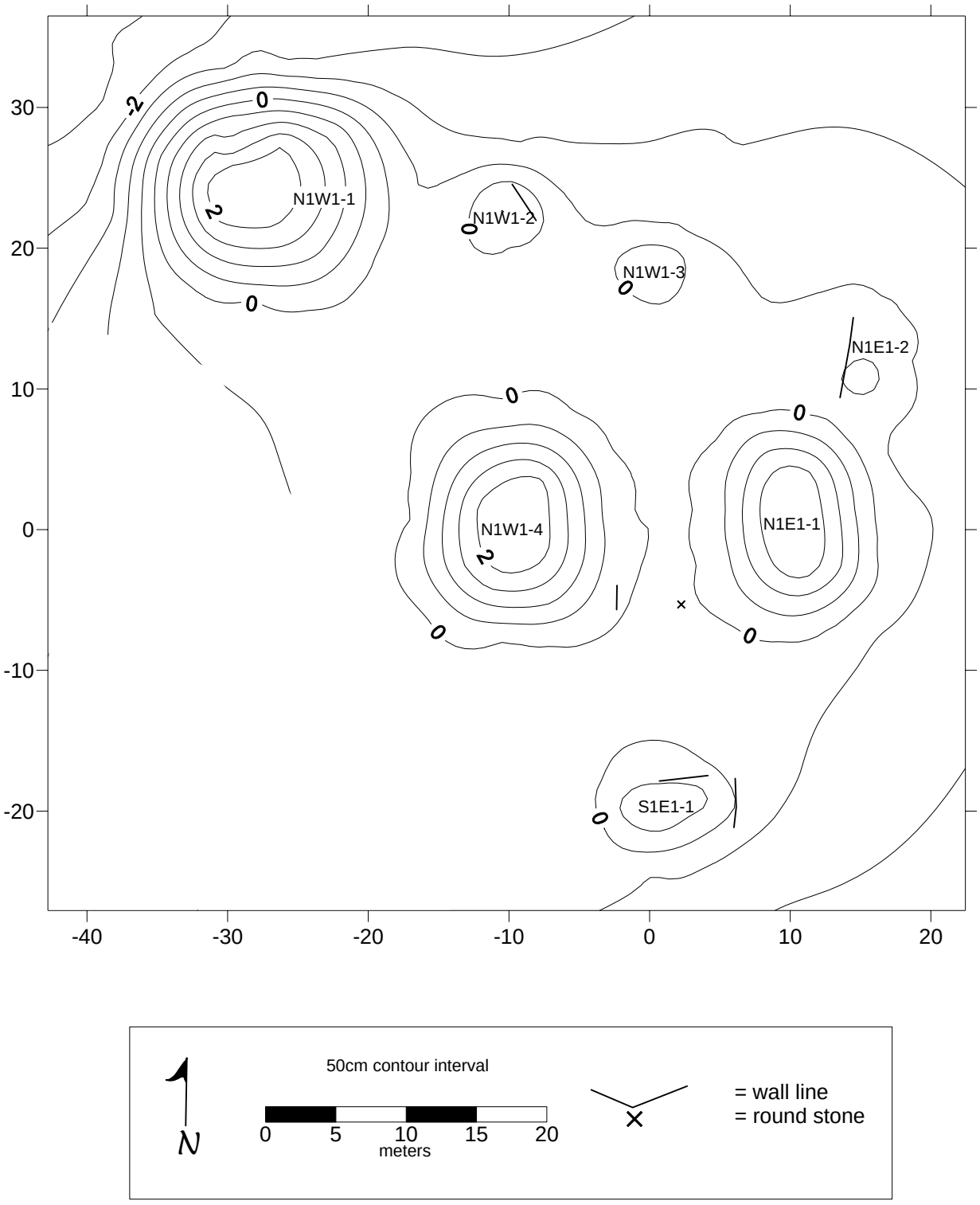

Figure 119. Hopemul

Part 4: The *Ejido* of San Felipe

Chapter 35: Ramonal Quemado

Justine M. Shaw and Alberto G. Flores Colin

The site of Ramonal Quemado is located 2 km east-northeast of the *pueblo* of San Felipe, on a spur of the path that leads further west to Sisal. It was first visited and mapped by CRAS project members during this 2008 field season. Like Sisal and San Felipe, it is an acropolis-based site. However, unlike these other two sites, it does not appear to have a significant surrounding residential occupation (Figure 120).

The largest building at the site, Structure N1W1-2, is a 7-m-tall range structure that appears to have originally faced to the south, towards the core of the site. It, like all constructions at the site larger than a foundation brace, has very few intact wall lines. There are no nearby modern or historic settlements, only one short *albarrada* is present, and none of the structures appear to have been looted or mined for building material. As at Hopemul, the architecture is presently composed of piles of uncut 30-to-50-cm-size boulders that lack cobbles (*chich*), soil, or other fill material. Structure N1W1-2 has a few intact cut stones forming the northwestern corner of its summit structure, as well as a Postclassic shrine on the center. The remainder of the main portion of the acropolis includes Structure N1W1-1, a range structure, as well as two flanking lumps of collapse. The eastern and western sides appear to have once had foundation braces that retain short sections of intact wall. The interior of the plaza includes Postclassic altars and portions of two foundation braces that appear to postdate the primary occupation.

The symmetry of the arrangement continues off the acropolis, with Structures N1W1-3 and S1W1-1 immediately off the southwestern and southeastern corners of the acropolis. Additionally, Structures S1W1-1 and S1E1-1 extend from these to form another small plaza to the south of the acropolis. When looked at another way, they may actually be said to be atop a portion of the acropolis, as a raised and leveled surface extends well beyond them. To the rear (east) of Structure S1E1-1 is an extensive depression, which appears to have been created through the mining of rock for building material. The zone is quite extensive and irregular and form, so only a small portion of it was recorded in 2008 due to time constraints.

The most distinctive set of constructions at Ramonal Quemado form an unusual ballcourt complex. As is typical of Mesoamerican ballcourts (Scarborough 1991), the court is composed of two long, parallel buildings, in this case Structures S1W1-5 and S1W1-6. At approximately 30 m long and 2-to-2.5 m tall, they are larger than the typical Maya ballcourt (Scarborough 1991). Unfortunately, due to the nature of the site's architecture, no playing surfaces or walls of any kind are visible. The feature that is particularly unusual about the court are two sets of twin mounds to the north and south of the court, perfectly aligned to form end zones or goals of sorts. On the northern end are Structures S1W1-3 and S1W1-4, the larger of the two "goals." The two mounds sit atop a shared platform with their additional meter in height forming a central cleft. To the south, Structures S1W1-8 and S1W1-9 mimic this arrangement at a

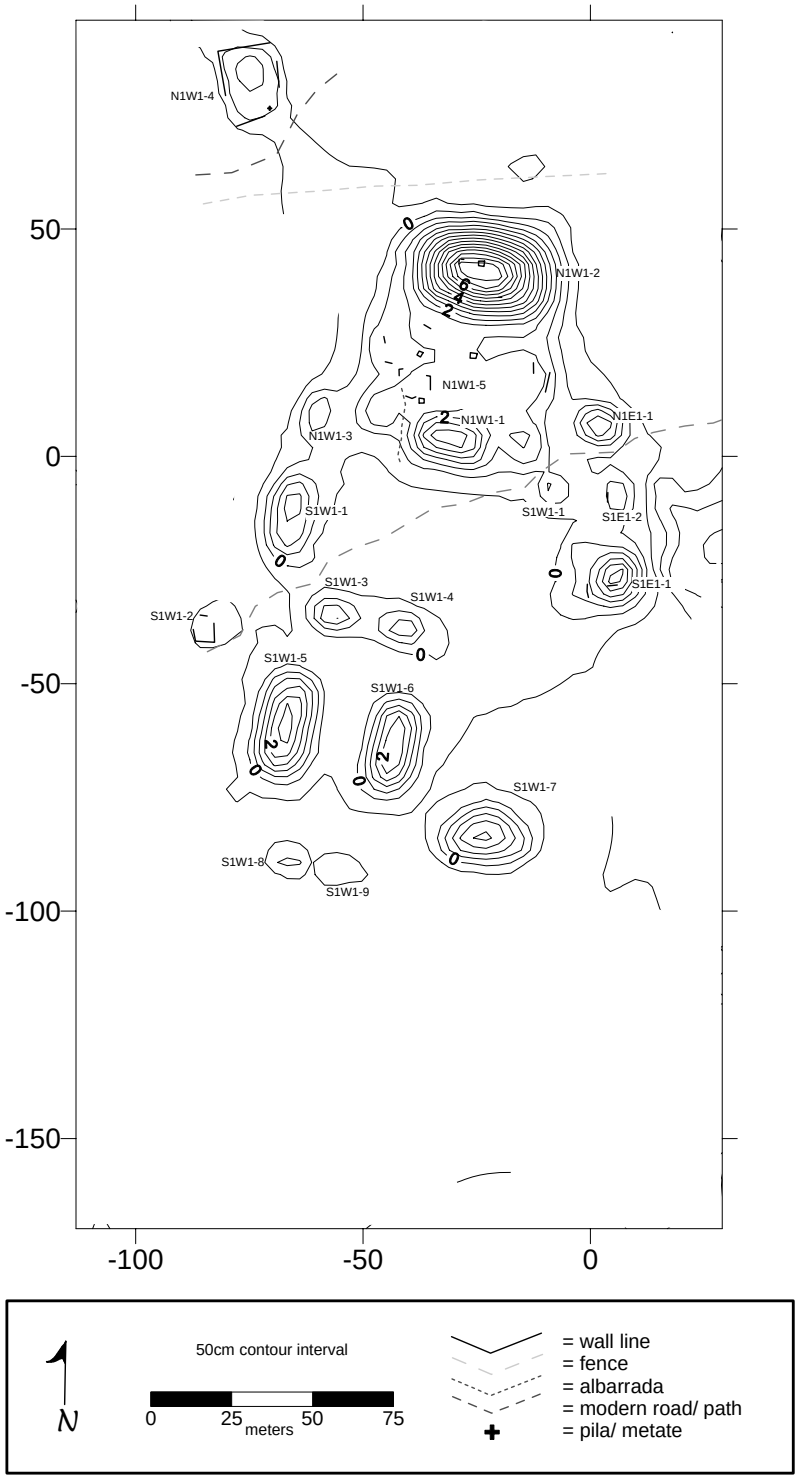

Figure 120. Ramonal Quemado

reduced scale. The entire area from “goal” to “goal” may have formed a 50-m-long playing field.

Structure S1W1-7 is the only significant mound to break the symmetry of Ramonal Quemado. It shares the same construction style as the other mounds, making it unlikely that it was constructed significantly earlier or later than the remainder of the site, however. While it is quite near the ballcourt, its 2.5-m height and small summit do not make it a good candidate for a viewing platform.

As at other sites, reconnaissance was conducted in the area surrounding the monumental core in order to attempt to obtain a general estimate of the size and form of the site. At Ramonal Quemado, a modern path to the southwest and northeast provided a ready-made *brecha*. Walking to the northeast for several hundred meters, no structures were seen. To the southwest, one foundation brace (Structure S1W1-2) was immediately located. However, no other constructions were apparent for several hundred meters. This southwestern path provides access to the main path leading both to Sisal and the *pueblo* and thus was walked on a daily basis during the mapping and clearing process. An additional mound, approximately 2 m in height, was seen adjacent to the path approximately half a km from the site, but it seemed to be isolated from any other features of a similar size. Vegetation was particularly dense to the south of the ballcourt, so two 2-m-wide *brechas* were cut from Structures S1W1-7 and S1W1-8. The *brechas* intersected at a point about 75 m south of the site core, forming a triangle. Although the same terrain continued, a mix of bedrock outcrops and relatively shallow soil pockets, absolutely no cultural features were seen in this zone. Immediately north of Structure N1W1-2 was a zone, composed of the same natural features, that was much clearer due to the presence of an enormous leaf-cutter ant colony and a fenced area where cattle had been kept in the recent past. This too was free of cultural features, as was the portion of the cleared area that wrapped to the east of the acropolis. The anticipated supporting settlement zone only began to be detected to the extreme northwest, its start being recorded in the platform of Structure N1W1-4. Four other similar platforms were located in a dense arrangement to the immediate north and northwest of the recorded area. Unlike the site core, platform and superstructure walls were preserved in a more typical fashion in this residential portion of the site.

Thus, Ramonal Quemado is an unusual site in several respects. Although substantial in scale, its architecture is, for lack of a better word, shoddy in that it lacks cut stone and the cobbles and gravel that are typically used to comprise solid surfaces. While providing archaeologists with the ability to rapidly record the site, as mere topographical forms, the construction style supplies few clues about the finer points of form, function, or even orientation. As one stumbles up, down, and around the piles of loose stone, it seems incredible that the uncut stones could have been arranged in a manner that would make the structures useable. One hypothesis for this construction style, seen here, at Hopemul, and to a lesser degree in certain structures at other sites in this portion of the study area, is that the substantial gaps between the boulders were filled by a much more fine-grained material that has since washed away. Typically, monumental Maya architecture would have been covered in a lime plaster. However, producing lime plaster requires the burning of a tremendous amount of wood and its use is generally minimized, used as a “frosting” over a form composed of stone as much as

possible. It seems unlikely that the builders of Ramonal Quemado would have preferred to plug large gaps with pure plaster, rather than toss in the cobbles and chips left by mining the boulders as fill. A more sensible alternative in this zone of relatively deep soils for the region would have been to use dirt to cover the rock. No additional soil was visible within the rubble piles, however; they are merely dry core fill of the sort that generally composes the base of major construction events, to be capped by cobbles, gravel, and then plaster in usual Maya constructions. Other explanations include that the site is somehow unfinished. Yet, it seems rather unlikely that all the major structures would be stalled at the same point in construction. Finally, as stated originally, it may just be plain shoddy construction, perhaps rapidly constructed for a short use life, only needing to hold together for a special purpose, such as a meeting of factions to play a ball game or the ceremonies to install a new ruler at a site.

Part 4: The *Ejido* of San Felipe

Chapter 36: San Felipe

Justine M. Shaw and Alberto G. Flores Colin

Although a portion of San Felipe's settlement zone extends through the modern *pueblo* of San Felipe, the core of the site is situated approximately 350 meters to the northeast of the town's main square (Figures 121 and 122). When the *ejido* of San Felipe was first studied by CRAS project members in 2005, the northern portion of the site of San Felipe was mapped using a tape and compass. A 2 x 2 m test pit was also excavated to the southwest of Structure N4E5-2 (Lloyd 2005a, 2005b). The unit revealed three floor surfaces and a possible foundation brace, with ceramics dating to the Late Formative, Early Classic, Terminal Classic, and Postclassic. In 2008, the site was more thoroughly cleared and recorded using a total station, revealing additional structures and features, including a *sacbe* leading to a residential group approximately 300 m to the south.

The monumental core of the site of San Felipe is situated atop a natural rise that has been further augmented in order to increase its elevation and level the terrain into an acropolis. Nine mounds ring the edge of the acropolis, with foundation braces and other smaller structures interspersed. The original plan of the group appears to have included an open internal plaza, although two open-fronted, C-shaped structures (Structures N4E4-3 and N4E5-6) violated the plaza. Each boasts double rear and side walls, with a single line of stones in front, each facing towards the same spot to form their own interior plaza. Based upon the stratigraphy of 2005's Operation 1, as well as the date of such structures elsewhere in the region, this intrusion probably took place in the latter portion of the Terminal Classic. Based upon the style of what appear to be the earlier, if not original, structures on the acropolis, it seems to have had a non-residential emphasis compared to the remainder of the site. The absence of *pilas/ mutates* (with the exception of the open-fronted Structure N4E5-6) and the presence of three plain, round altars are consistent with this interpretation.

Although relatively few wall lines were intact on the elevated structures of the acropolis, the architecture differed from that of many sites in the study area in that large rectangular stones were common at San Felipe. Based upon their dimensions, they may have functioned as door jambs. However, a pair towards the base of Structure N3E5-1 is positioned to have instead functioned as the end of balustrades. Two more were found at the base of other structures. Structures N4E4-1 and N4E3-1 had these same stones on their summits, although they each also had Postclassic shrines including other borrowed architectural elements, indicating that the "door jambs" may have been brought from a lower location. At the same time, identical stones were seen in unmapped portions of the southern residential group, as *in situ* jambs.

A distinctly residential zone was recorded just off the southwestern edge of the acropolis. Here, foundation braces of various styles and ages mix with *metates*, just above a slope down to a zone with deeper *chac luum* soil. Structure N3E4-6, built atop a terrace that extends the elevated zone, appears to be either a L- or C-shaped building with its open face looking eastward towards the start of the *sacbe*. While the southern

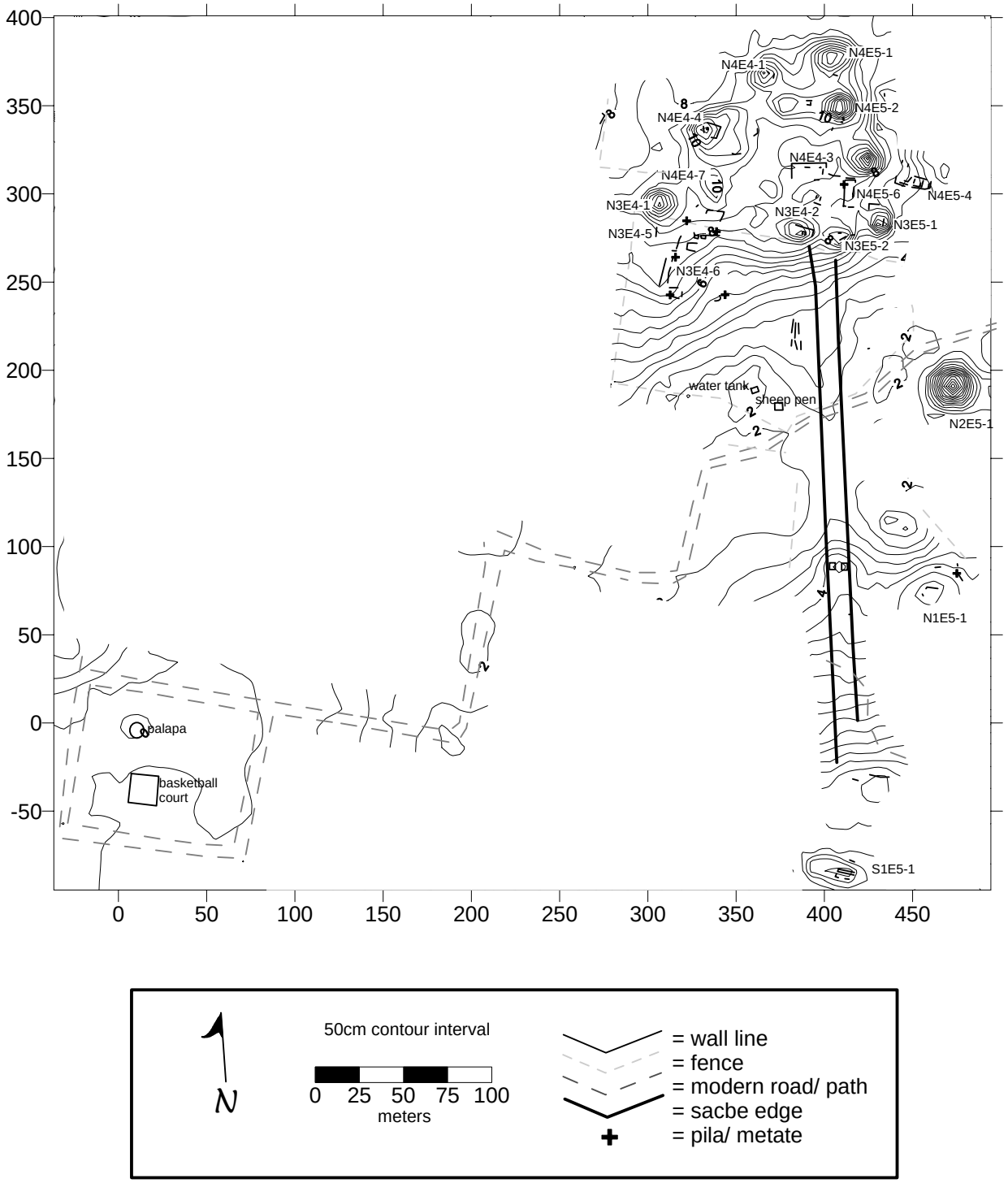

Figure 121. The *Pueblo* and Site of San Felipe

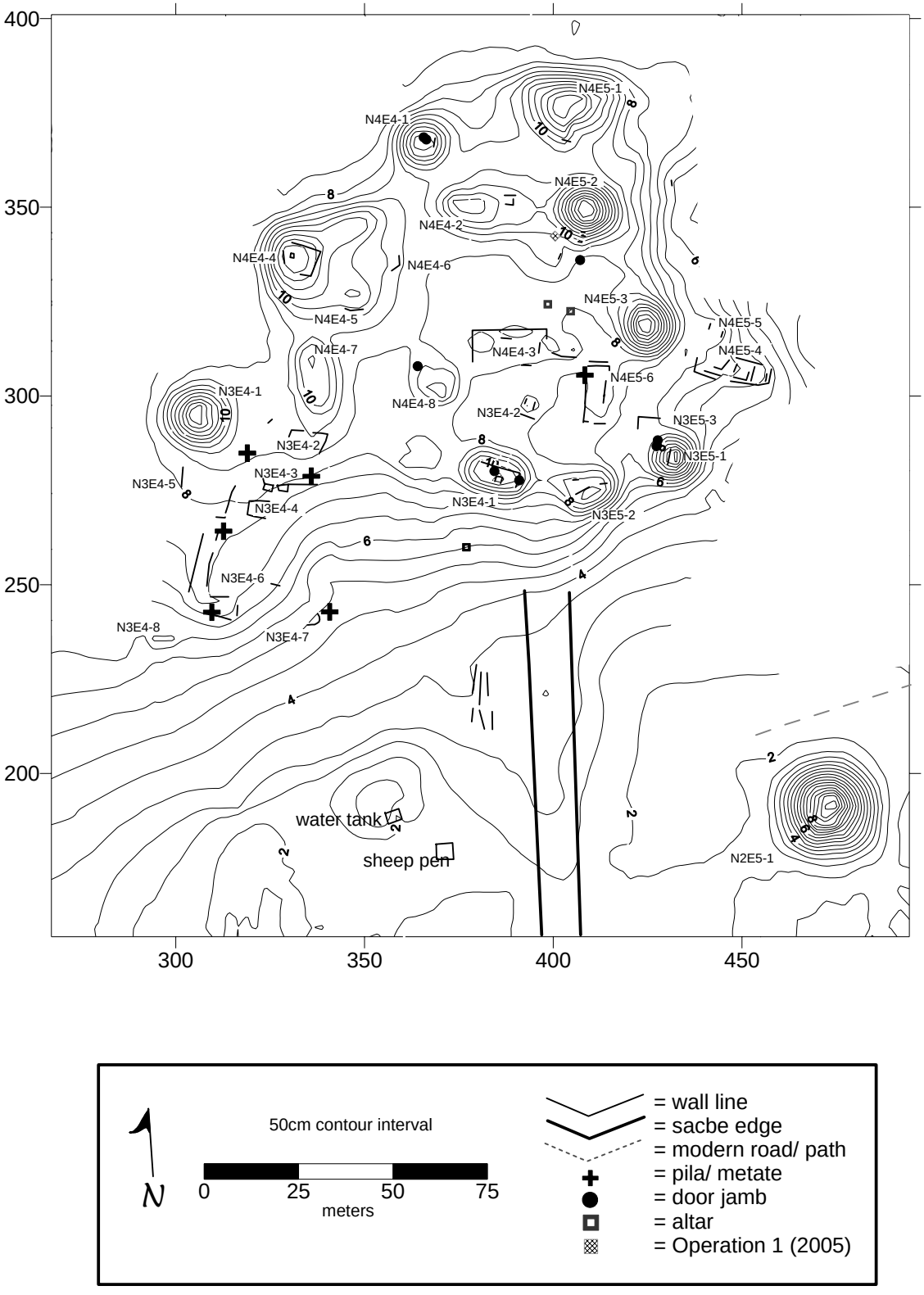

Figure 122. The Site of San Felipe

wing and rear of the structure of quite distinct, the probably northern wing, which lies directly upon the ground surface instead of a terrace, is muddled in a mix of collapse and other architectural elements. To the south of Structure N3E4-6 is an elevation composed of the large, uncut stones that typify Late Formative platforms; they have been removed from their original context by later activity leaving only the implication of a building that has been named Structure N3E4-8. At the base of the slope, to the south of the acropolis and west of the *sacbe*, is a depression that may have been modified to hold water in the past, serving as an *aguada*. Local crew members report that it holds water today following substantial rainfall. For this reason, a concrete water tank has been constructed here, in order to supply the goats that currently occupy the field between the site core and modern path with water.

The *sacbe* heading directly south from the main site core was not located until 2008, as damage from daily cattle crossing along the modern path had obscured its outline and the goats that had prepared the clear visible this season were not present in 2005. However, once cleared, it was an obvious roadway, clearly different from the surrounding *chac luum* (Figure 123) and with well-defined, cut-stone edges for portions of its course. Near the acropolis, it widened, using a ramp, rather than a stair, to reach the higher terrain of the group. A construction pen, or later reinforcement feature, was visible along its eastern edge, while its western edge was modified by a later construction that extended beyond where the original western edge of the *sacbe* was visible. Lines of parallel stone walls to the west of the *sacbe* approximately 25 m south of its origin do not appear to be associated with the roadway; their age and function are unknown. About 125 m before the roadway reaches the residential group at its southern end, just as the terrain again starts to rise above the deep *chac luum* soil zone, two unusual features were visible on the *sacbe*. They appear to be integral to the original construction, rather than being later additions, such as the Postclassic altars that grace many causeways. Unfortunately, they have been large disassembled in order to create a rock pile of relatively recent origin immediately between them. What remains looks to be the base of two square features. There does not appear to be enough “extra” rock present in the vicinity for the two features to have reached more than half a meter in height. It is entirely possible that more stone may have been removed, as numerous structures at the site have been mined for building material. Based upon their context, it is postulated that the twin boxes may have served as a gateway of sorts, potentially augmented by perishable material.

Structure N5E2-1 is the only monumental construction that is present in the immediate vicinity outside the main acropolis group. Situated in the deep soil zone, it is unique in the area’s settlement, which otherwise is almost exclusively situated upon the higher bedrock shelves that look down upon the deeper *chac luum* deposits. Since modern paths and roads tend to run along the zone where more soil is present, Structure N5E2-1 has been subjected to some of the most severe looting at the site. Local crew members report that in recent decades it was mined in order to provide construction material for nearby cattle facilities. Significant swaths of the pyramid’s core are absent and no wall lines are visible on its surface. Within these cuts, deep plaster deposits are visible (Figure 124), hinting that it may have once had a stucco façade.

Figure 123. San Felipe's *Sacbe*

Figure 124. San Felipe’s Structure N5E2-1

The southern terminus of San Felipe's *sacbe* contains relatively smaller constructions that appear to be primarily residential in function. As the *sacbe* reached the group, about 50 m before any mounds were visible, a portion of a wall line was seen. This appears to be the edge of a platform or terrace, defining the edge of the group. In 2008, the northernmost and largest of the buildings in the area, Structure S1E5-1, was recorded. Due to time constraints, the rest of the group was not cleared or recorded. However, brief reconnaissance revealed a line of low platforms with foundation braces facing westward to the southeastern edge of the group. These have been connected with what seems to be a later series of low walls in order to close off this edge of the group. If they served as privacy barriers, fortifications, or a means to contain children or animals, they would have had to have been augmented by perishable materials. Other low mounds could be seen just to the north and northeast of the mapped structure.

The actual extent of the site of San Felipe is unknown. In addition to the southern residential cluster, reconnaissance along a cattle path atop this same outcrop to the east revealed continuous, dense settlement for at least another half kilometer before the vegetation became too dense to continue. Additionally, as noted, platforms and mounds extend through the *pueblo* itself, with modern roads cutting directly through multiple platforms, revealing plaster floors and construction fill. Several two-to-three meter mounds are visible in *milpas* along the road immediately to the east of the *pueblo*, as the local road that exits the main Dziuche-Tihosuco road curves to enter the town. In the southeastern corner of the modern square is a well. Like other examples observed elsewhere in the *ejido*, it may be a historic construction ring atop a Prehispanic well. The modern plaza itself is a depression that itself have been a water catchment area in the past.

Part 4: The *Ejido* of San Felipe

Chapter 37: San Lorenzo

Justine M. Shaw, Jorge Pablo Huerta Rodríguez, and Alberto G. Flores Colin

The site of San Lorenzo is located 1.2 km to the southwest of the *pueblo* of San Felipe, on part of the grazing land of the *rancho* of San Lorenzo. Although the portion of the site that was mapped was covered with dense, thorny vegetation, much of the rest of the site was in high grass, revealing continuous residential settlement consisting of platforms and foundation braces. The portion of the site that was mapped includes a well-organized small acropolis with four principal mounds and several smaller structures (Figure 125).

The largest mound on Structure S1E1-6, the acropolis, is Structure N1E1-1, which is approximately six m higher than the natural ground surface or four m taller than the acropolis' raised plaza surface. It has an additional platform on its front, southern, side, as well as a terrace to its southwest, extending this original flat surface. The structure's summit retains two walls of a rectangular superstructure, as well as a Postclassic altar atop a small platform. To its southeast, along the edge of the acropolis, is a 15-m platform that still includes a front wall of its superstructure. A low platform that once held some sort of superstructure (Structure N1E1-3) sits to the southwest of Structure N1E1-1.

The tallest range structure on the acropolis is Structure S1W1-7. In spite of the removal of architectural elements for a Postclassic altar on its highest point, the rectangular foundation brace retains some intact wall lines, including portions of five steps leading to the plaza. Structure S1E1-1 is a lower platform that includes portions of its western retaining wall, composed of massive roughly shaped stones (approximately 70 cm long), as well as two to three phases of patio refurbishings on its southern and southwestern edges. The stones in the intact portion of its northern edge are significantly smaller and more well-shaped than those seen elsewhere on the platform, although they were not diagnostic of any particular time period. The bulk of the platform and any superstructure retained no wall lines, having been built of the same irregular boulders that characterize the construction at Ramonal Quemado and Hopemul. Structure S1E1-4 shares this style.

Although Structure S1E1-2 is small in size, it retains more architectural details that any other building at the site, including most of four steps on its stairway, balustrades flanking either side, many of the wall lines on the upper portion of the platform, what may be retaining walls or further steps, and then a summit structure.

The final constructions at the site are the other tall pyramidal mound, Structure S1E1-3, four m tall at its rear face, and the low platform Structure S1E1-5. The latter contains what appears to be a bench, facing southward directly towards its larger companion. The steep-sloped pyramid contains little usable summit space, sufficient only for a small rectangular construction capped by a later Postclassic altar.

To the west of the acropolis, a 40-m-long, irregular platform was recorded. Taking advantage of natural bedrock outcrops, the platform is defined by a combination of bedrock and megalithic cut stones. It contains an inset entrance that faces east

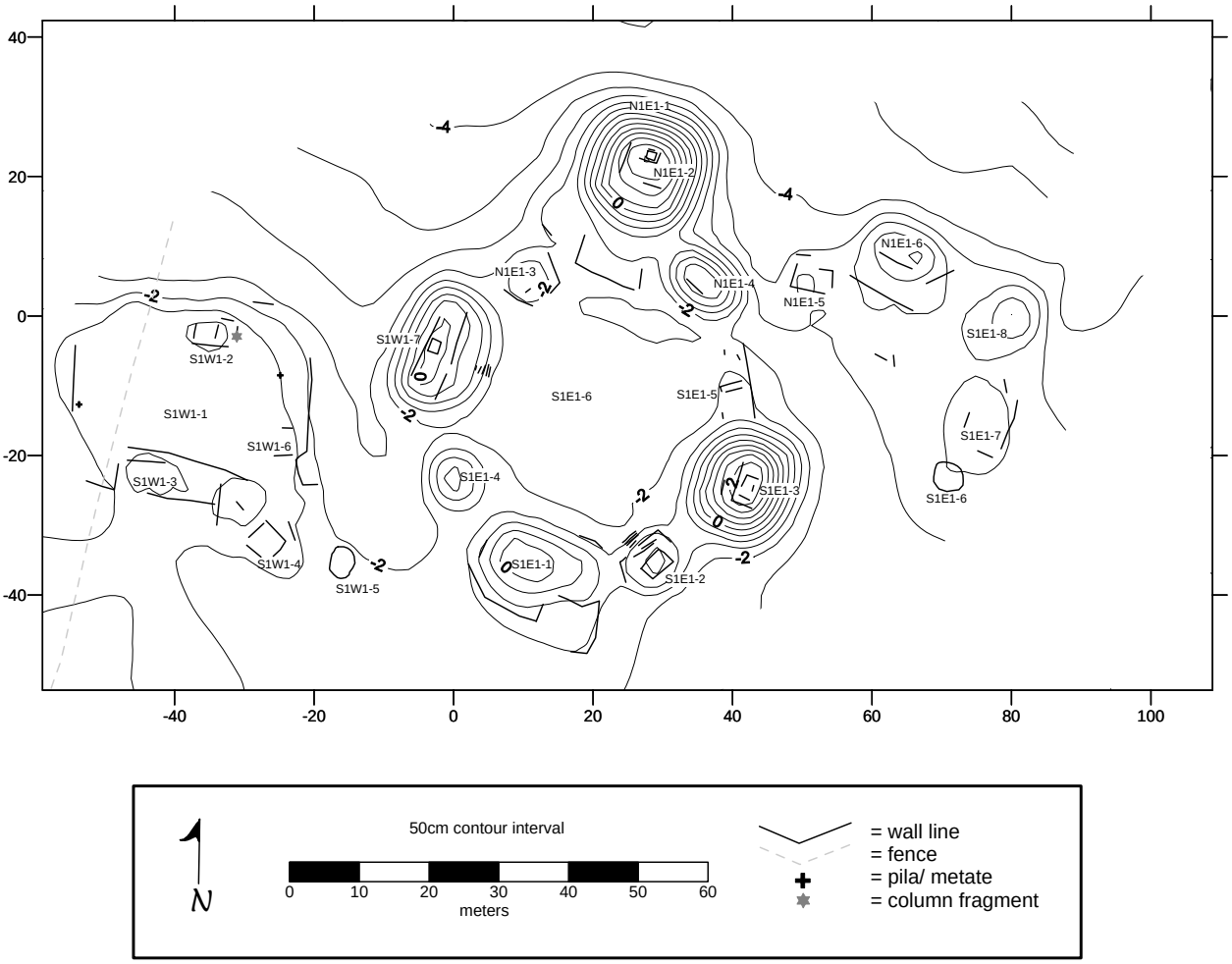

Figure 125. San Lorenzo

towards the acropolis. Its southern edge contains at least two distinct structures sharing a low platform, as well as Structure S1W1-4, which appears to be a later addition to the main platform, based upon the smaller stones defining the extension. The northern edge of the platform contains another long platform; only the eastern half of this, defined as Structure S1W1-2, retains intact wall lines. These appear to date to the Terminal Classic. Although its components have likely been robbed to contribute to the Postclassic altars at San Lorenzo, the few that remain are Puuc-style. Beyond the southeastern edge of the platform, Structure S1W1-5 was recorded. Although round foundation brace was not directly associated with any other architecture, elsewhere in the survey area such features appear to be extremely late in date, possibly representing a Postclassic domestic occupation.

Further small, probably domestic architecture was mapped to the east of the acropolis. In addition to another round foundation brace, Structure S1E1-6, two 1-1.5-m high platforms containing simple foundation braces were encountered. The lower Structure N1E1-5 closed the space between these and the acropolis. The entire arrangement was built atop a raised platform, currently visible as *chich* cobbles. This pavement abruptly ends at a line between the southwestern corner of Structure S1E-7 and Structure S1E1-3. The round foundation brace sits outside the pavement.

The architecture to the west and east of the acropolis is quite typical of that seen elsewhere on the *rancho*, where informal reconnaissance revealed continuous settlement for at least half a kilometer to the north and west. Local crew members report that similar features continue to the border of the *ejido*, where the sites of San Salvador and Rancho Benito Juarez were recorded, but not mapped, in the *ejido* of Tabasco. It seems quite probable that Hopemul and even San Felipe may be further continuations of the extensive settlement zone.

Part 4: The *Ejido* of San Felipe

Chapter 38: Sisal

Justine M. Shaw and Alberto G. Flores Colin

Situated approximately 4 km to the west of the site of San Felipe, Sisal was originally mapped using a tape and compass in 2005. Additionally, a 2 x 2 m test pit was excavated in the plaza immediately northeast of the site's largest mound, Structure S1W1-1 (Shaw 2005a, 2005b). The unit revealed that while occupation in the vicinity began in the Middle Formative, there is no evidence of construction until the Early Classic when five plaza flooring episodes took place. The final plaza surfacing took place in the Terminal Classic with a limited number of sherds testifying to activity during the Postclassic.

Like many sites in the southern portion of the survey area, the core of Sisal is situated atop an acropolis ringed by numerous constructions with its largest mound at the southern end of the site (Figures 126 and 127). The 11-m-tall Structure S1W1-1 sits atop a platform with two long, megalithic (Early Classic) steps leading to the north-northeast. Portions of the building material were reutilized during the Postclassic in order to construct several shrines atop the platform, at the base of the larger edifice. Large trees have disrupted some of the shrines, leaving only two that could be clearly mapped. Structure N1W1-7 also dates to the Postclassic, being built of select Terminal Classic stones culled from other constructions. Unlike at San Felipe, the plaza of the acropolis at Sisal is violated by constructions that do not appear to be extremely late in date. However, based on the open plaza that seems to be generally preferred in the region, it is unlikely that Structures N1E1-1 and N1E1-3 were integral to the original site plan.

The western and eastern sides of the acropolis are lined by range structures that average 2 m in height. Few original wall lines are visible on any of them, however, due to a significant amount of Postclassic activity on the acropolis. A short line of intact platform wall is visible in the collapse on the eastern edge of Structure N1W1-2. Structure N1E1-12 is a small C-shaped construction with thick side and rear walls and a single, low front wall line; it has been partly dismantled for the Postclassic shrine that now caps its rear, eastern wall. Additionally, intact wall lines between it and Structure N1E1-11; the short distance between these walls indicates they may be what remains of a bench. All five of the primary range structures have Postclassic altars or shrines composed of what were probably the finest and most visible cut stones, leaving few *in situ* wall lines. A possible plain, rounded altar stone was located atop Structure N1W1-3 in what appears to be a secondary context. Additional Postclassic altars and shrines dot the interior of the acropolis enclosure. Here, column fragments from an unknown source have also been included. The northern end of the acropolis contains the second highest constructions, a mix of pyramidal and range structures.

Structure N2E1-3 is an unusual northern arm of the acropolis. While acropoli generally take the form of rounded-off squares, this extension may have been built in order to take advantage of the natural terrain of the location. In fact, Structure N2W2-5 even serves as a portion of the acropolis, using terracing to take advantage of the

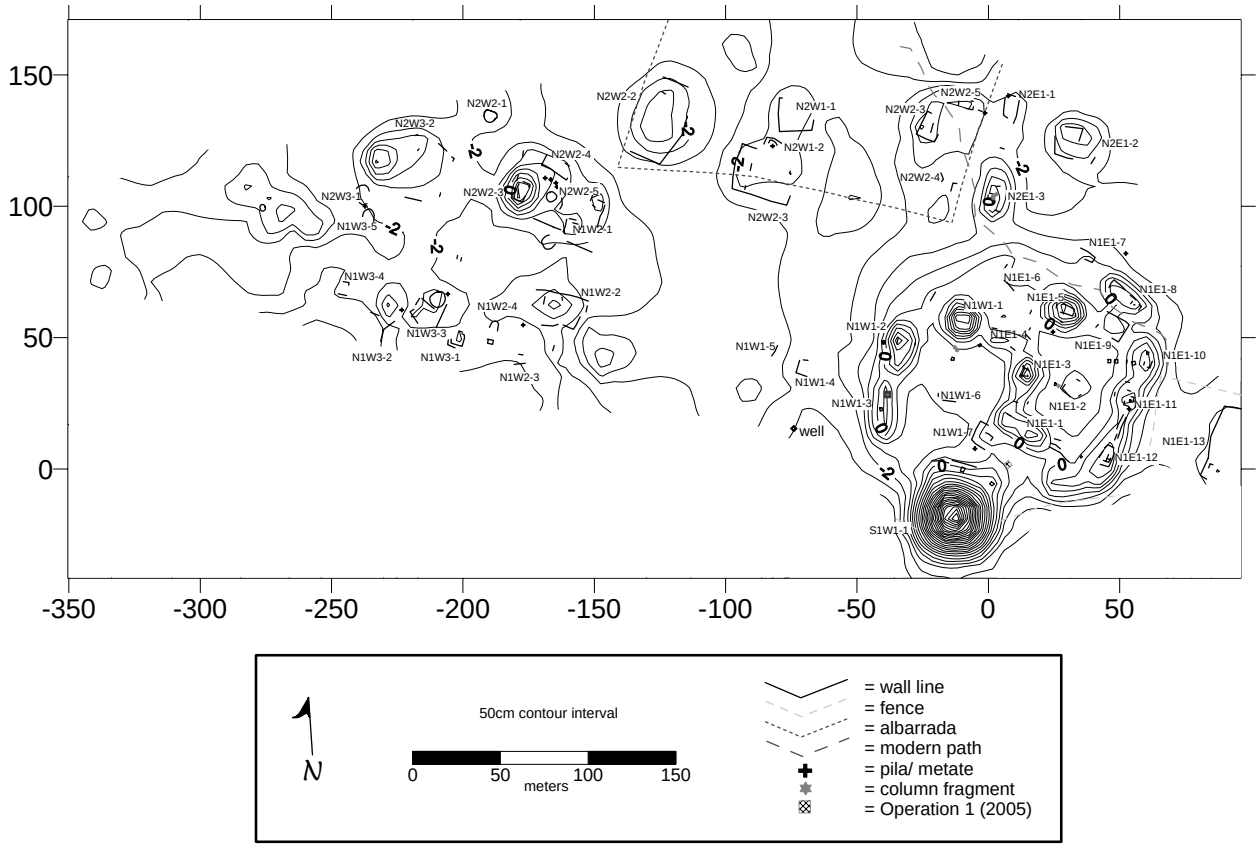

Figure 126. Sisal

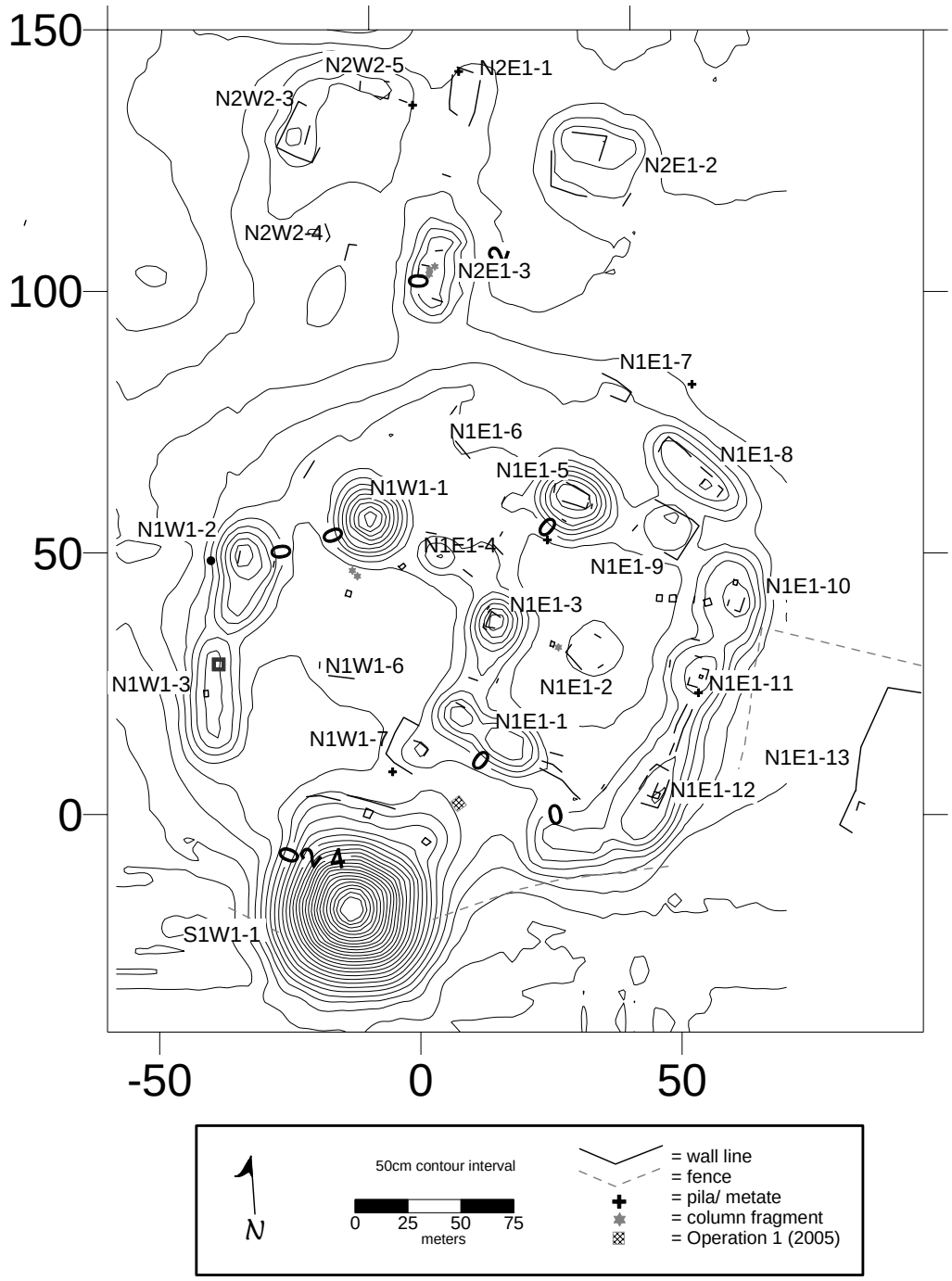

Figure 127. Sisal's Site Core

natural topography. However, Structures N2W2-5 and N2W2-3 may be late in date, as the latter is an open-fronted, L-shaped construction and seems to be primarily concerned with creating its own small plaza, rather than facing the main acropolis like the rest of the buildings. The remainder of the structures recorded are clearly off the acropolis, although two (Structures N2W2-3 and N2W3-2) did require a significant investment in the construction of their platforms.

The site's most obvious water source is a well located approximately 50 m to the northwest of Structure S1W1-1. The well lacks any historic modifications, such as a circular wall or features to aid in the removal of water. Instead, the southwestern edge of the well is lined by deep grooves in the natural limestone (Figure 128). The grooves appear to be the result of the prolonged use of ropes to pull containers of water from the well. At present the well is dry. This may indicate that the well was in use during a wetter time, that any lining that helped it to contain water has disappeared, or that the large tree roots that now perforate its depths have assisted in its failure. All other such wells visited by, or reported to, project members still contain water. About 150 m to the southeast of the mapped zone in the middle of a modern path is an intact *chultun* that still has its round stone lid in place (Figure 129). Local crew members report that they have found other examples of these features in their *milpas* throughout the *ejido*.

It was fortunate that a *milpa* was cleared and planted in 2008 to the immediate west of Sisal's acropolis, allowing the map to be easily extended to reveal a portion of the settlement zone. While a thickly vegetated zone between the *milpa* and the site is still not accurately recorded, the window provided by the *milpa* shows dense settlement that is clustered around depressions created by mining rock for construction. These may have been small *aguadas* used by household groups or merely *rejolladas* for growing specialized crops. The far western edge of the field, while composed of the same natural terrain, does not contain any structures, appearing to indicate a distinct site boundary. The *milpa* zone appears to be domestic in nature, lacking pyramidal structures or Postclassic shrines and altars. In addition to its two largest constructions, which are basic rectangular foundation braces elevated atop 2.5-m platforms, there are three basic construction styles present for most of the buildings. The first are low platforms with rectangular foundation braces. Some of the platforms are extensive enough to contain multiple buildings, while others are only slightly larger that superstructures that they support. Another set of structures are too small to have been dwellings. They may be the remains of field houses used during earlier incarnations of the *milpa*, providing simple shelter before bicycles permitted farmers to easily return home at night or storing corn following the harvest. A third set are round foundation braces. At least one of these, atop the Structure N1W3-3 platform, is late in date, overlying and borrowing elements from earlier constructions. The *milpa* and cleared acropolis extension also revealed a large portion of an *albarrada* enclosure. The presence of this historic *rancho* near the well indicates that it may have only recently dried up; no other water sources are reported nearby.

In an effort to determine whether any other monumental features, such as a *sacbe*, were associated with the acropolis, reconnaissance was conducted to the north,

Figure 128. Grooves in Limestone on Sisal's Well

Figure 129. *In Situ Chultun* Lid at Sisal

east, and south of the mapped zone. Another large *milpa* had been cleared directly south of the field that was recorded. It contained a similar arrangement of structures, including two larger, elevated structures; several low, extensive platforms with multiple foundation braces; and a dense distribution of small platforms and foundation braces without platforms. Immediately to the south of Structure S1W1-1 is a zone consisting of deep *chac luum*. It did not appear to contain any cultural features. To the north-northeast of the acropolis, small residential constructions were visible. An extensive area to the east of the acropolis is currently covered in grass, having been used for cattle grazing in the very recent past. The types of natural and cultural features that it contains are consistent with those recorded in the western *milpa*, although no end to the settlement zone was observed.

Part 5: The *Ejido* of Tabasco

Chapter 39: Candelaria

Justine M. Shaw, Jorge Pablo Huerta Rodríguez, and Johan Normark

Although it maintains a somewhat northeast-southwest orientation, the site of Candelaria is less clearly organized than many other recorded during the 2008 field season (Figure 130). Located near a *rancho* along a dirt road 3 km to the east of the *pueblo* of Tabasco, the site is bisected by the modern road, with additional unrecorded mounds being visible to the east, through the *rancho.*

The southern portion of the mapped area contains the largest building, Structure S1W1-1 (Figure 131), sits at the front of an elevated terrace that tapers to the natural ground surface at its rear. The front of the terrace is elevated approximately 50 cm above the terrain to its front, or northeast; this area has not been modified, consisting of bedrock outcrops and deeper soil pockets. Structure S1W1-1 had one principal vaulted room at its summit, with traces of two smaller flanking rooms still present, including an intact, exposed plaster floor on the eastern example. It is apparent that some of the damage to the structure has taken place relatively recently, while other impacts appear to have taken place some time ago. Column fragments litter the front terrace and surrounding area and two X-shaped, Puuc-style mosaic elements (Figure 132) were located on the front face of the structure. The original location of at least one of the mosaic stones was seen, adjacent to a partly intact, Puuc-style wall line that was buried by a later construction phase, as well as collapse. Additional proof of a later building episode was seen in the northwestern summit area, where a looters' hole revealed another intact face of this same façade, containing only smoothly cut stones. Based upon their orientation and the distance between the two lines of stone, they may have once formed two terraces of a Puuc-style range structure.

The western portion of the rear of the structure includes a terrace lobe that is still partly defined by a wall line. It appears to have supported some sort of superstructure in the past. Further to the southwest is a two-roomed, open-fronted structure facing southward. It possesses double wall lines at its rear and sides, as well as in its middle dividing wall. Structure S2W2-1 is built upon a protrusion of a terrace that takes advantage of the higher natural elevation to the south of Structure S1W1-1. At least two additional low mounds were visible to the southwest that could not be recorded due to time constraints.

The modern road cutting through the site has damaged a number of features, including the southern edges of Structures N1W1-1 and S1E1-2. An unrecorded mound to the south of the road, to the southwest of Structure S1E1-2 was not mapped due to time constraints and fact that it appears to have been nearly demolished.

The majority of the Structure N1W1-1 platform remains, defined by a megalithic cut stones along its platform edges. Its western, rear side is dominated by a large rectangular foundation brace and segments of other small features remain elsewhere on the platform.

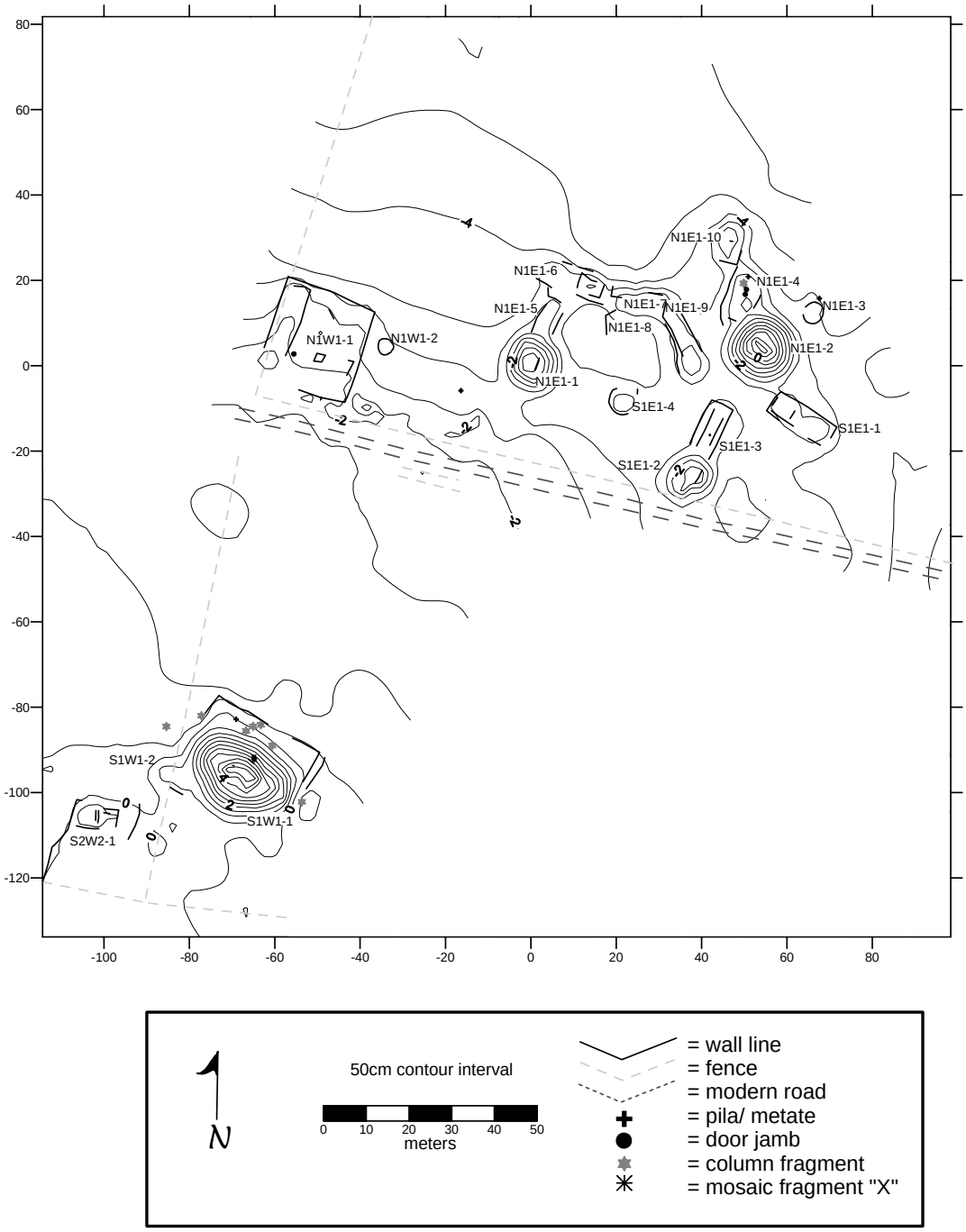

Figure 130. Candelaria

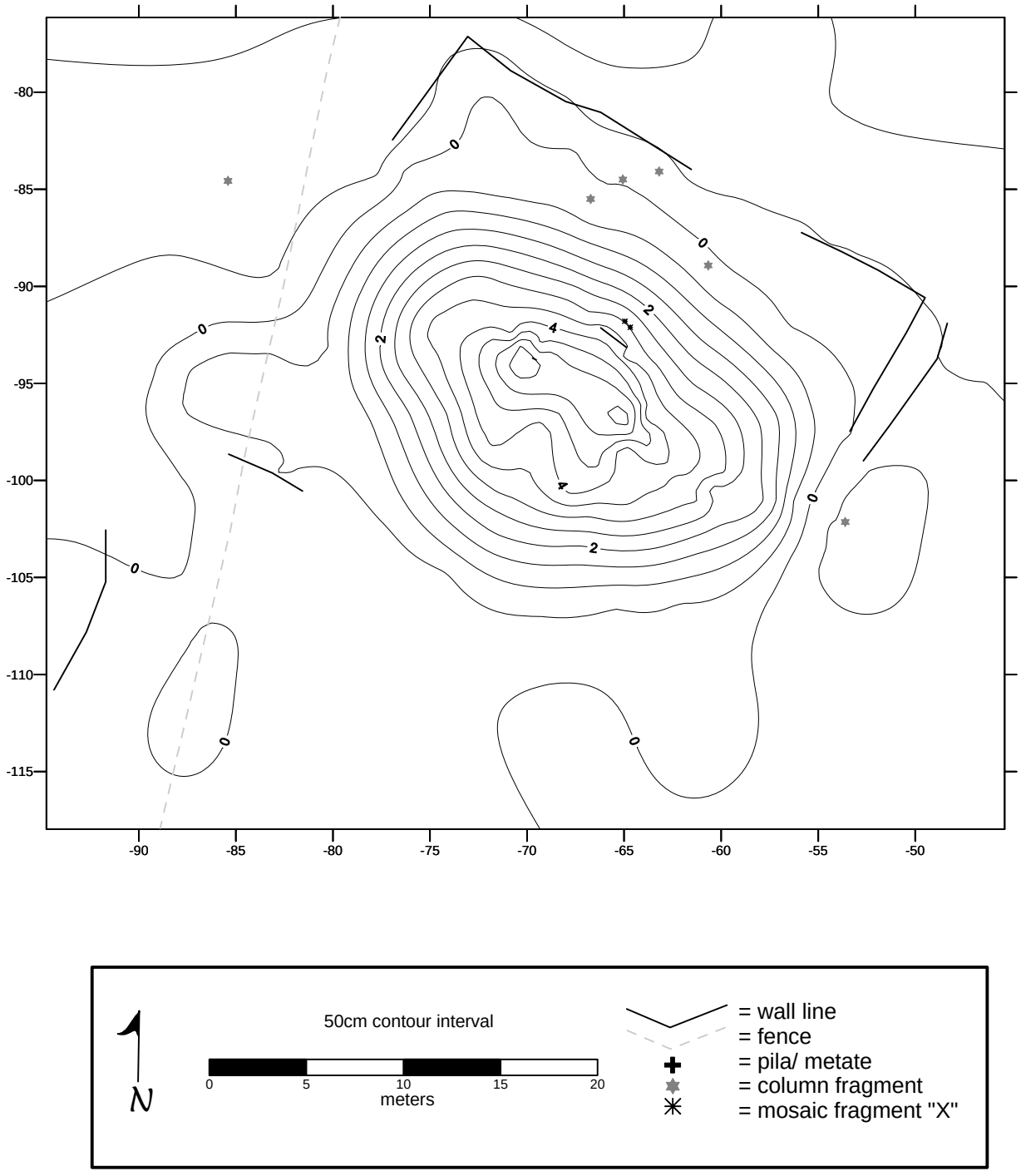

Figure 131. Candelaria, Structure S1W1-1

Figure 132. Mosaic Architectural Elements from Structure S1W1-1, Candelaria

Immediately to the east of the platform is one of the round foundation braces that have been found in limited numbers at many sites in the CRAS study area. Structure N1W1-2 and the other documented round foundation brace at Candelaria, Structure N1E1-3 cannot be stratigraphically related to other constructions without excavation. However, it is possible that they were built in one of the latest occupation phases at the site, as appears to be the case elsewhere. Another round building, Structure S1E1-4, differs in construction style in that it is actually a round platform approximately 50 cm taller than the plaza that it violates.

The main plaza in the northern portion of Candelaria is formed by the second tallest pyramidal mound, Structure N1E1-1, as well as a series of lower platforms and the damaged Structure S1E1-2. Its southern edge was probably closed by the other mound bulldozed by road construction. Structure N1E1-1 is 2.5 m tall with a relatively small summit defined only by one intact wall line. It is connected to the Structure N1E1-5 platform. This abuts Structure N1E1-6, which extends well to the west of the "corner" of the plaza area. Structure N1E1-7 connects directly to the eastern edge of Structure N1E1-6. The former, in turn, is linked to Structure N1E1-9 at a 45 degree angle. There is a small, level opening before Structure S1E1-3, the platform connected to the bulldozed Structure S1E1-2. The arrangement of the structures around this plaza area, including the "missing" southern end, is quite similar to that seen elsewhere atop the small acropoli at other sites. Here, no such acropolis was raised, however.

The final architectural cluster recorded at Candelaria is linked to the 4-m-tall Structure N1E1-2. This pyramid, like Structure N1E1-1, is composed of loosely piled uncut boulders. As has been discussed for Ramonal Quemado and Hopemul, this style of architecture currently lacks *chich* cobbles or other obvious fill that would have created usable surfaces. In the case of Structure N1E1-2, the effect is a large, unstable pile of rubble. An extension of its northern edge, Structure N1E1-4 does contain more intact wall lines, including a collection of nicely shaped Terminal Classic stones that have been gathered together as part of a Postclassic shrine structure. Structure N1E1-10's walls nearly abut the Structure N1E1-4 substructure, with an intact platform corner still being visible on the former.

Low platforms continue to the east of Structure N1E1-2, with only Structure S1E1-1 having been recorded. This two-roomed foundation brace may be an open fronted structure; only portions of its walls remain intact, but its significantly lower front (northeastern) edge seems to lack a front wall in its superstructure. Although not always visible as good wall lines, the other walls of the foundation brace are represented by higher rubble piles. A Puuc-style Terminal Classic foundation brace on a low platform was visible directly east of Structure N1E1-2, just at the edge of the mapped portion of the site.

Part 5: The *Ejido* of Tabasco

Chapter 40: Rancho Benito Juarez

Johan Normark

This site, which has most of its mounds in the *ejido* of Tabasco, is extensive and may be part of a greater settlement that extends to the east and into the *ejido* of San Felipe. It is located in between two wells, the eastern one lies in the *ejido* of San Felipe and it may be Colonial and even Prehispanic. The site is dominated by a 6-to-7-m-high pyramidal structure (Figure 133). The pyramid has a small attached platform on its northwest corner. To the north of the pyramid is a plaza group similar to the ones at Tabasquito and nearby San Lorenzo. The plaza has 9 buildings that almost encircle a plaza. There is a large opening in the southwest corner of the plaza. The northern building of this plaza group is the largest one and it has a well preserved wall facing the plaza. There are at least 35 structures and numerous *sascaberas* at the site.

There is no major gap in the distribution of mounds between Rancho Benito Juarez, San Lorenzo, San Fernando and San Felipe (Figure 134). San Fernando is dominated by a large L-shaped platform in the southwest corner of a cleared *milpa*. Smaller house mounds are located nearby and they are plotted on the map.

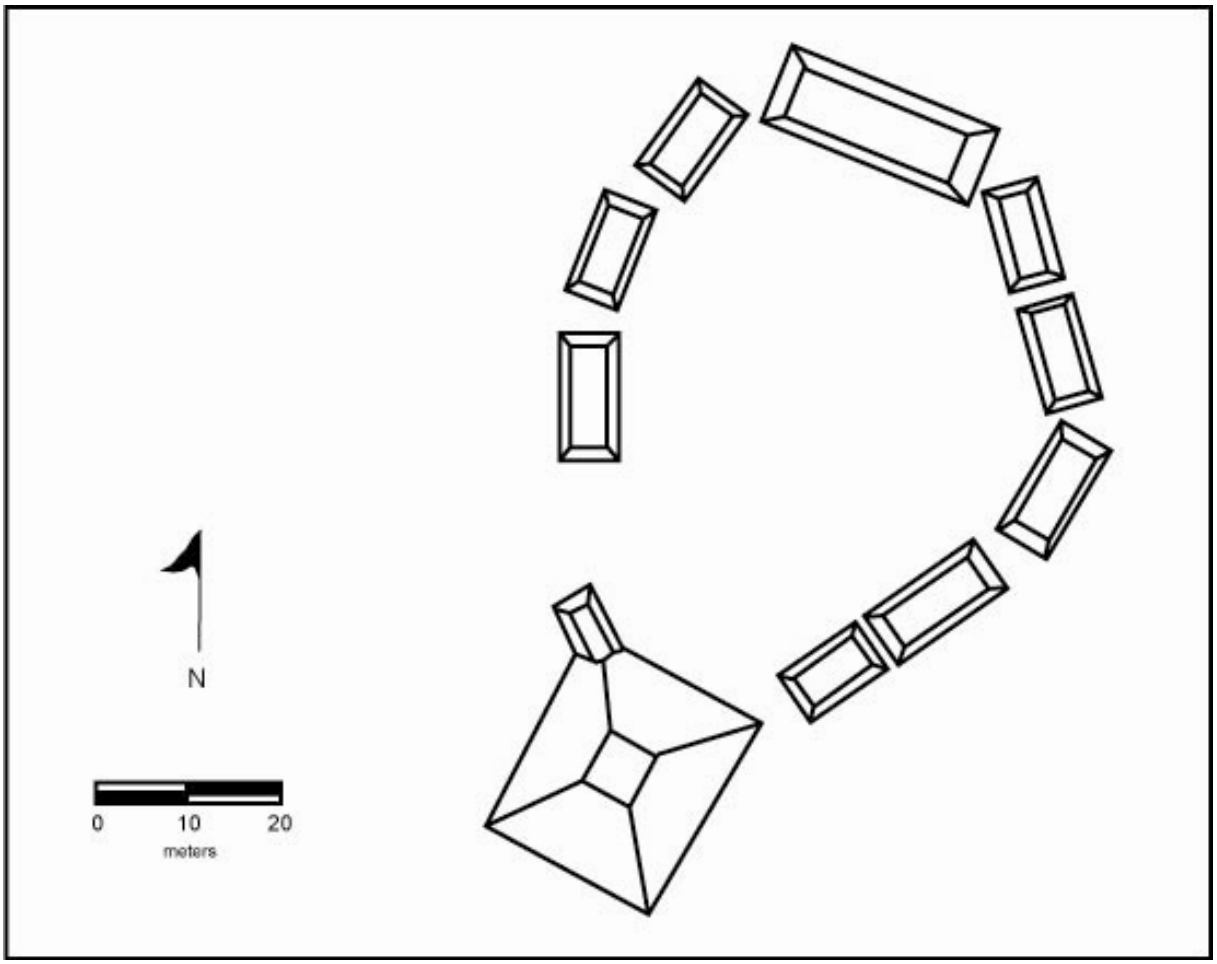

Figure 133. Benito Juarez

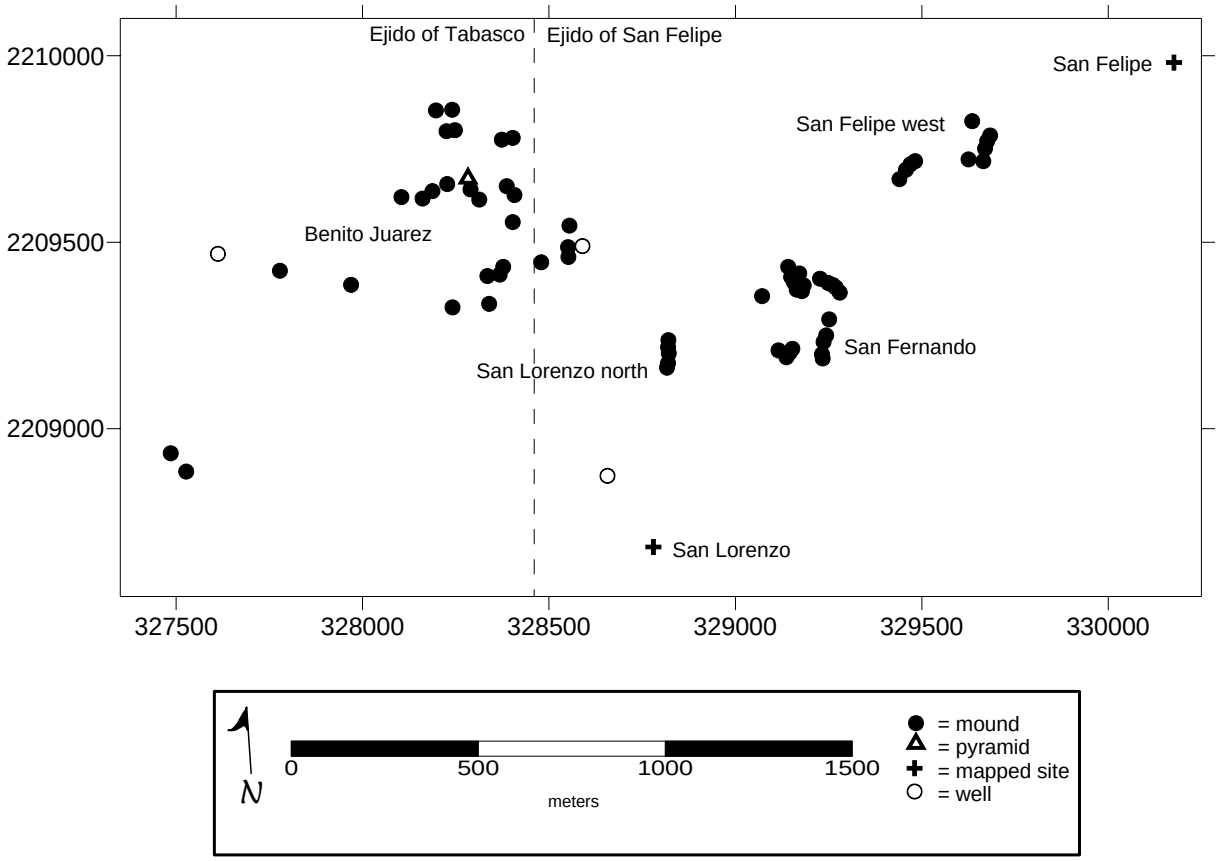

Figure 134. Settlement Between Benito Juarez, San Lorenzo and San Felipe

Part 5: The *Ejido* of Tabasco

Chapter 41: Rancho San Francisco and Rancho Chankunai

Jorge Pablo Huerta Rodríguez

With the aim of extending our sample of the Cochuah Region during 2008, the survey coverage of the Project was expanded to include the *ejido* of Tabasco, which is located to the southeast of *ejido* of Saban, close to the Tihosuco-Dziuche road that bisects our study area. As a result of this survey, several Prehispanic and Colonial sites were recorded and included on our regional map.

Methods

The process of locating new sites included the interpretation of aerial photographs and local informants familiar with the area who could lead us to the ancient settlements. Once a new site was located, all sites were registered with GPS coordinates, sketch maps, photographs, and/or, when possible, with a total station. In general, our local informants brought us to the principal structures (in terms of size) but, from this point, a series of long *brechas* (cuts through the vegetation) were radiated in order to get a better coverage of the surrounding terrain.

Rancho San Francisco

Rancho San Francisco is located about 2 km to northeast of the *pueblo* of Tabasco; it is accessed along a dirt path. The *rancho* is currently occupied, being dedicated to the raising of cattle and corn. The only colonial remains are a single well that is about 26 m deep.

Approximately 120 m south of the well, two structures upon a large platform were located (Figure 135). The large platform that is the base of the two superstructures is aligned on an east-west axis and measures about 66 X 55 m in area and 0.7 m in height. Its shape is highly irregular, and it appears to have at least 10 side walls. As has been mentioned, two platforms are located upon the platform. The western one is around 26 x 20 m in area, and about 9.5 m tall, while the eastern structure measures 15 x 11 m at its base, about 8.5 m tall, and is aligned along a north-south axis. In front of the eastern structure, a small platform of about 6 X 4 X 1 m was located; it is aligned in an east-west direction. To the northeast of the western structure, next to the base of the large platform, a *sascabera* was located. We are unsure of its antiquity, since the owner of the rancho, Sr. Alejandro Mezeta, informed us that he extracted *sascab* from the location a few decades ago. However, he was probably re-exploiting a Prehispanic *sascabera*. Approximately 60 m the east of this platform, another platform was located but not recorded due to time constraints.

Although only thorough excavations can provide us with adequate data concerning the site's construction techniques and an approximate period(s) of occupation, we can speculate that the construction of the platform was carried out in order to get a good level surface on which to place residential structures. Based upon its orientation, it seems that they were positioned to create a small plaza where human activities were conducted. A small platform next to one of the structures could be used

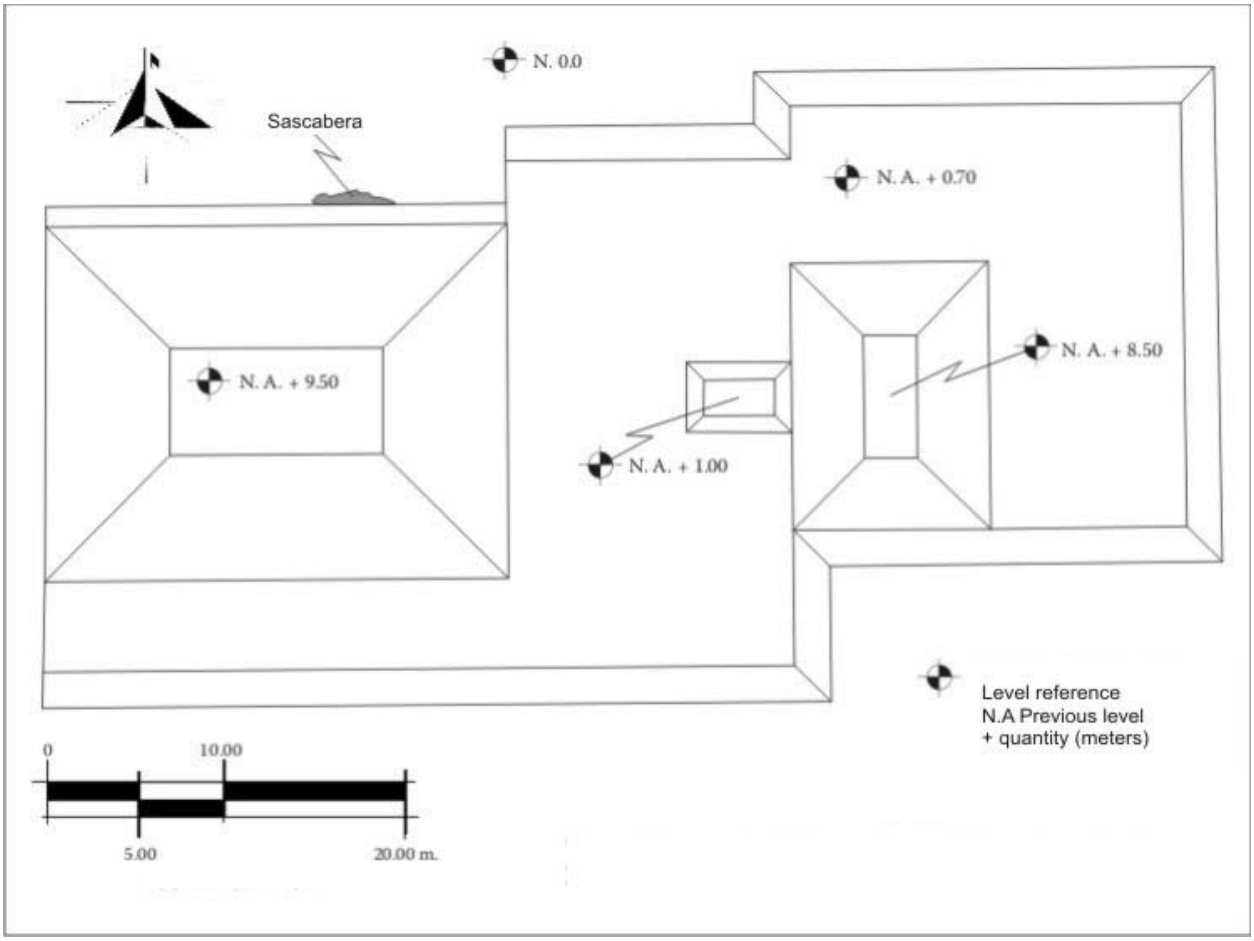

Figure 135. Rancho San Francisco

to date the complex, if it all of the structures date to the same period. However, it is possible that the various components were not occupied at the same time. With respect to the *sascabera*, all evidence points to it being a modern feature, instead of a Prehispanic one since its creation has affected the platform. However, the well seems to date to colonial times, also it is possible that its origin is relatively recent.

Rancho Chankunai

This *rancho*, located to the north of *pueblo* of Tabasco, and is currently dedicated to raising cattle and corn. The archaeological remains that compose the site include a colonial well, a *pila* stone (*metate*), and two Prehispanic mounds (Figure 136). The mouth of the well is round; it is situated atop a platform (Figure 137). A water trough is still preserved on its eastern and southern sides. It regains some pigment. A drain that connects the two features (Figure 138). A *pila* (*metate*) was located 2.5 m from the well (Figure 139).

Two Prehispanic structures were located to the west of the well. The southern structure is a pyramidal mound that is situated upon the highest point in the surrounding terrain. The mound is about 17 X 17 x 9 m and has two large looters' holes on its summit. The northern structure is a platform measuring 8 x 8 x 3 m; although it is not well-preserved, sections of its walls and corners are still visible.

Conclusions

It is evident that the mouth of the well and its excavated depths belong to different periods, based upon their surface details. The mouth of the well displays a relatively coarse finish, in comparison to the deeper portion of the well, which has a square shape and shows color on its exteriors walls. Also, it is evident that a domestic group was established there during a later period, based upon the *pila* that appears to be a re-used jamb door or lintel. With respect to the structures, the difference in their elevation may be due to a natural difference in the ground level, a settling of the northern substructure, or the fact that the northern structure may never have been leveled. Excavations would be necessary to evaluate these hypotheses.

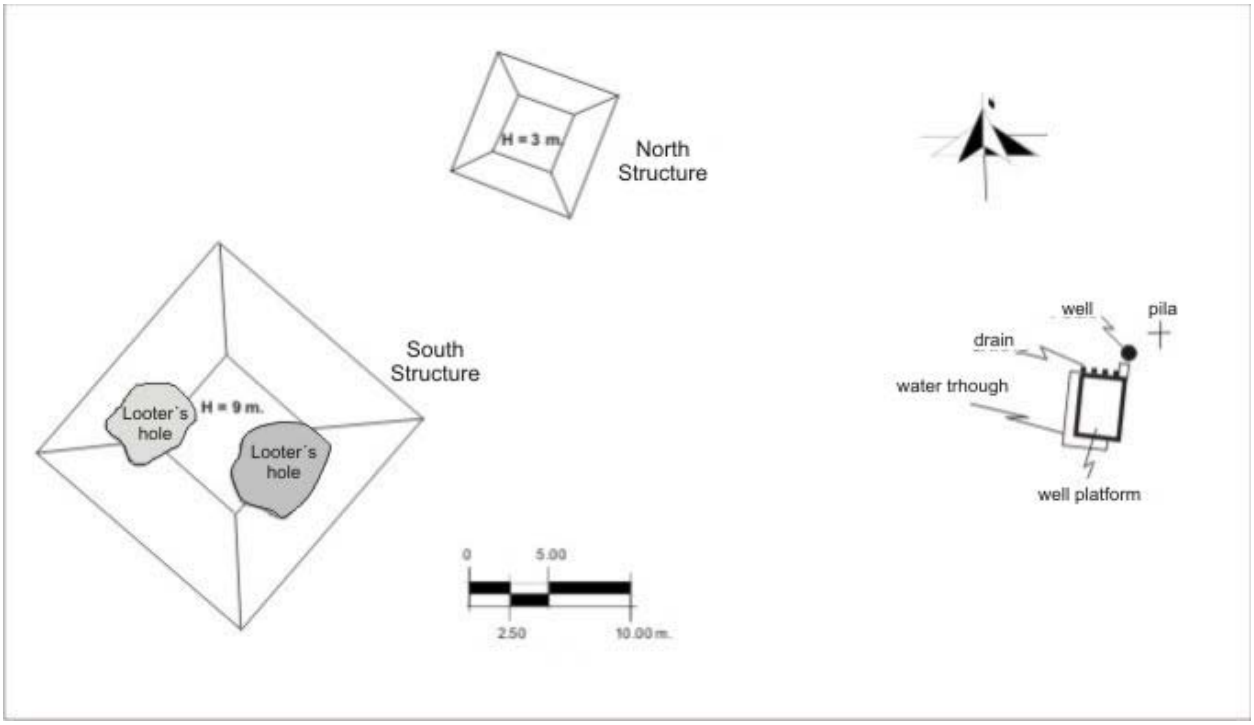

Figure 136. Rancho Chankunai

Figure 137. Well and Platform Well at Rancho Chankunai

Figure 138. Drain on Platform Well, Rancho Chankunai

Figure 139. *Pila* Next to Well, Rancho Chankunai

Part 5: The *Ejido* of Tabasco

Chapter 42: Tabasquito

Justine M. Shaw and Jorge Pablo Huerta Rodríguez

The site of Tabasquito, located 1.2 km to the southwest of the *pueblo* of Tabasco, was visited and recorded by CRAS project members for the first time in 2008 (Figures 140 and 141). It is similar to the sites of Rancho Benito Juarez, San Felipe, San Lorenzo, and Sisal in that its largest architecture is arranged atop a small acropolis with additional residential architecture being located around the acropolis. Much like Yo'okop's Group A, the considerably smaller site of Tabasquito is positioned to take maximal advantage of the natural terrain. Directly to the northwest of the acropolis, an extensive slope begins, so that, even with the current thick tree cover, it is possible to see for many kilometers across an enormous basin-shaped expanse that continues to the north. In addition to providing an attractive view, and potentially defensible location, the site would have been ideally positioned to control the deeper soils and less prohibitive distance to the water table afforded by this lower-lying land.

The tallest structure on the acropolis (3.5 m above its plaza surface) is Structure S1E1-2, a pyramidal construction resting on the southern edge of the acropolis, which has been extended to the northwest by Structure S1W1-2, a low rectangular foundation brace capped by a Postclassic altar. The eastern edge of Structure S1E1-2 is somewhat elongated by a platform facing east. The pyramid's orientation was probably roughly northward, towards the interior of the plaza. However, it has been impacted by several looters' holes, leaving little intact architecture on its summit. The cut stones visible in the portions of two walls lines that are still present appear to define the edges of what had been the summit; the stones were not temporally diagnostic.

Structure S1W1-1, a range structure defining the western edge of the Tabasquito acropolis, is actually more massive than Structure S1E1-2. Additionally, it retains significantly more intact architecture, including a rectangular foundation brace, portions of the wall defining the top of the substructure, and three long steps facing east, towards the center of the acropolis plaza. Its rear, shared with the acropolis edge, is actually 4.5 m above the natural ground surface, which begins to slope sharply downward here. Structure S1W1-3 is just off the range structure's northeastern edge. This smaller foundation brace still includes intact superstructure and substructure wall lines.

Directly north of Structure S1E1-2, on the northern edge of the plaza is another more diminutive pyramid, Structure N1E1-1. Its original architecture has been obscured, with elements being recycled in a Postclassic summit altar. In addition to culling out the best cut stone, this altar and two others on the acropolis include some of the largest elements, in the form of door jambs. The third fairly intact Postclassic altar, on the adjacent Structure S1E1-5, has similarly confused what remained of earlier construction episodes. Structure S1E1-4 anchors the eastern edge of the acropolis, otherwise defined by indistinct or fairly small constructions that supported perishable superstructures. No constructions were located within the central plaza surface of the

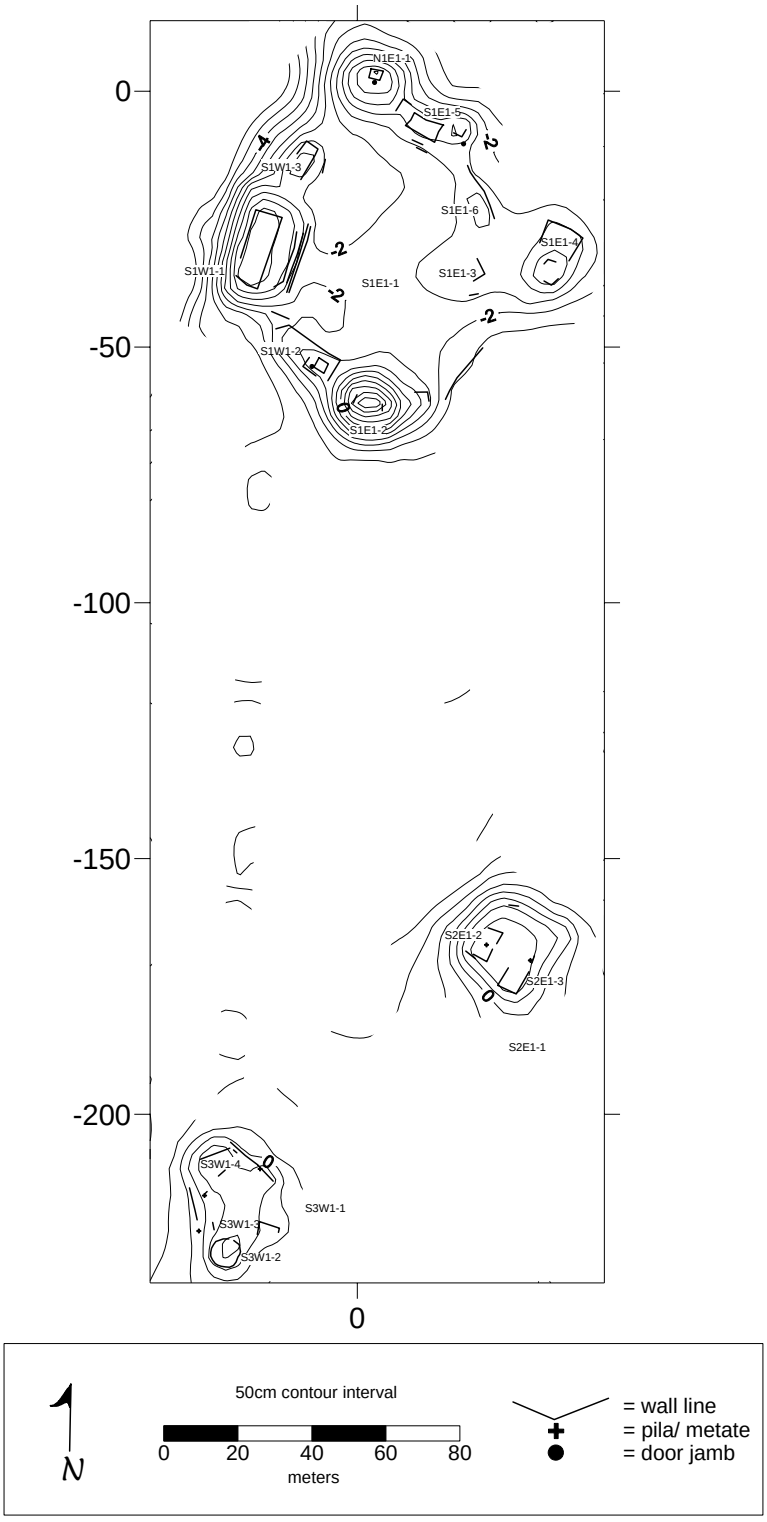

Figure 140. Tabasquito

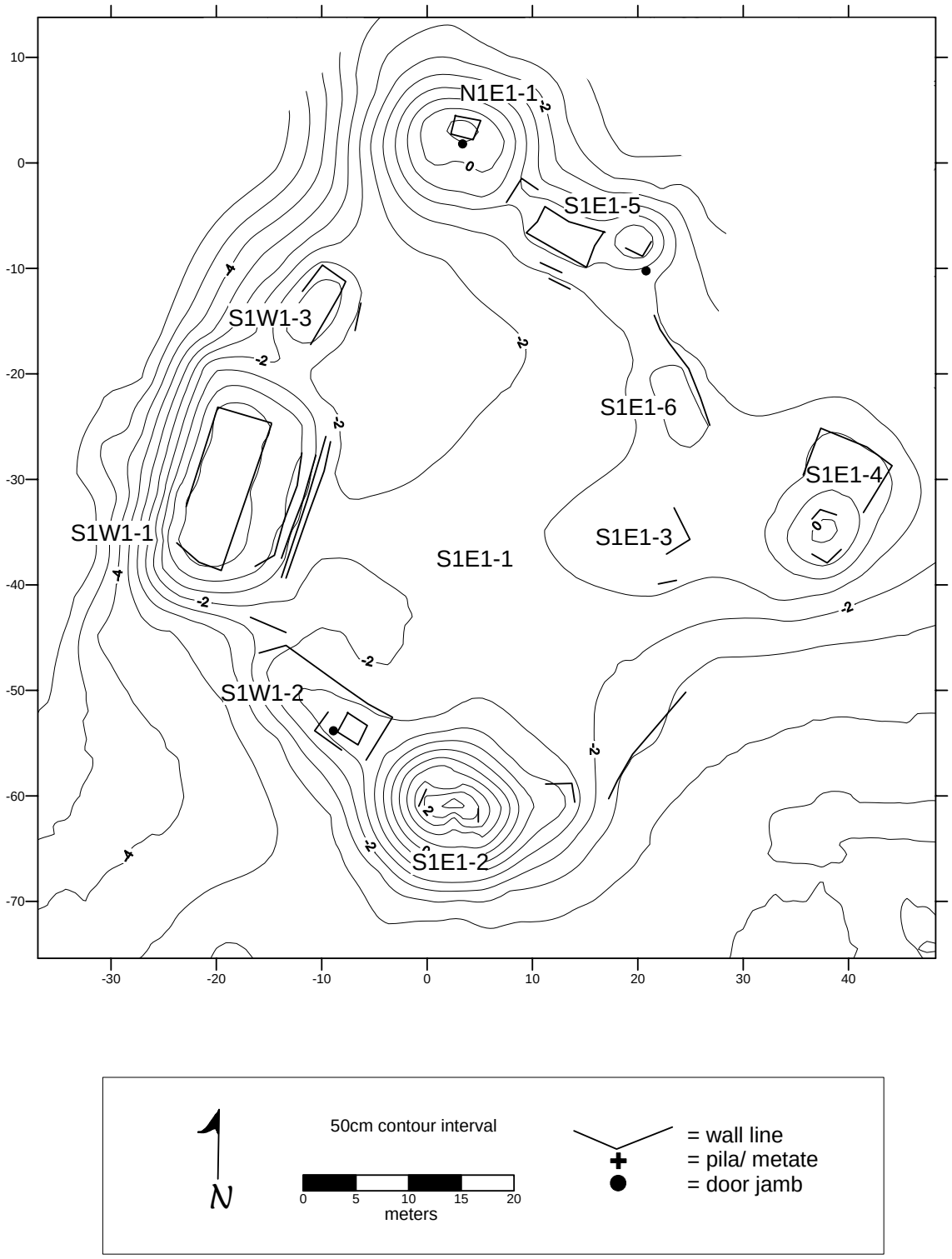

Figure 141. Tabasquito's Site Core

acropolis, although it was recorded with cross-*brechas* and searched without further vegetation clearance, so it is possible that one or more elements present at the same elevation as the ground surface may have been overlooked.

In order to obtain some idea about the density and variety of architecture around the acropolis, a triangular system of three *brechas* was cut to connect the acropolis with two residential platforms located 75-125 m south of the acropolis. Although the *brechas* were slightly more than 2 m wide, no cultural features were detected. Instead, an uneven ground surface including bedrock outcrops and deeper soil pockets comprised the intervening territory. The eastern *brecha* included a *sascabera* about 25 m south of the acropolis.

Structure S2E1-1 is the northeastern of the two platforms, with at least two rectangular foundation braces on its top and portions of its platform wall intact. It is roughly square in shape, with a slightly larger lobe to the south that takes advantage of higher bedrock in this area. Structure S3W1-1 is a more irregular platform, probably constructed by linking and leveling pre-existing natural outcrops with some effort being made to create a roughly rectangular shape. Two to three foundation braces originally graced the surface of the platform, with a round foundation brace being constructed at a later date based upon its position over what appears to be the remains of a foundation brace lacking intact wall sections; the round feature was likely built using immediately available architectural remains. The late date for the round structure is consistent with round foundation braces at other sites in the survey area.

When CRAS members visited Tabasquito, there were no modern paths in use to reach the site. Instead, a winding track was created through dense vegetation, in its second or third year of regrowth after clearing. Running from a deeper soil zone to the east-southeast to the somewhat higher, more bedrock-laden zone comprising the site, no cultural features were visible along this trail. Based upon the patterning seen elsewhere in the survey area, if more structures are present nearby, they might be located along approximately the same contour as the acropolis itself, to the south-southwest or north-northeast, rather than in the deeper soil or markedly sloping zones.

Part 6: Summary and Analyses

Chapter 43: Caves, Water Sources and Climate Change in the Cochuah Region

Johan Normark

This chapter aims to show that palaeoclimatic models need to take into account settlement changes that have occurred for reasons other than the climate. Such changes were, for example, caused by politics and religious doctrines introduced by the Spaniards. These changes affected the way water resources were conserved and utilized. This is a situation that remains today. Despite long lasting and devastating droughts during Prehispanic times (Gill 2000; Gill and Keating 2002; Gill et al. 2007; Haug et al. 2003; Hodell et al. 2001; Hodell et al. 1995; Hodell et al. 2007), people dealt with these water shortages in ways that the Colonial power made impossible to continue. However, some of these recent explanations for the "Maya collapse" emphasize ecological and climate related causes or catastrophes and the "collapse" has been seen as a warning example of how fragile both environment and society are. Other recent perspectives have made similar general analyzes in different parts of the world, sometimes referring to the Maya area as an illustrative example (Chew 2007; Fagan 2004, 2008).

Thus, climate has once again become an explanation for sociopolitical changes in the past, often with an underlying catastrophism (Demarest 2001; Webster 2002). In light of the contemporary climate debate in society, partially popularized by former US vice-president Al Gore and his documentary "An Inconvenient Truth" (Gore and Guggenheim 2006) it is important to show that from a historical/ archaeological context this catastrophism is highly problematic, particularly for the Cochuah region. We face grand problems today but once we project contemporary ecological factors and problems backward in time, other factors that may have affected settlements and our analyses of these patterns tend to be ignored. Not all palaeoclimatologists agree with the message of "An Inconvenient Truth": that we are facing a disaster today. Some see the emergence of the industrialization and increasing global warming as positive, stopping an otherwise inevitable ice age (Franzén 2001).

Although there is evidence that drier periods have occurred, the palaeoclimatic models on a "Maya collapse" have substantial flaws and some of them are the lack of sociopolitical and religious perspectives of past societies (Normark 2006). Since the effects of climate changes on society in the Maya area largely are based on modern and Colonial analogies, it must be noted that the Spaniards had a serious impact on the water conservation and settlement strategies in the Maya area.

This season the CRAS project surveyed what was a border area during the Colonial period (1544-1821), the early Mexican independence (1821-1847) and the Caste War and its aftermath (1847-1901). From the indigenous perspective, this border appears to have been fluid, but less so for the Spaniards or at least for their political system that was tied to the agricultural and sociopolitical strategies they brought over from Europe. As will be argued, this situation was partly affected by the Chicxulub fracture zone, created from an asteroid impact 65 million years ago (Campos-Enríquez et al. 2004; Connors et al. 1996; Corrigan 1998; Lefticariu 2004; Morgan and Warner 1997; Pope et al. 1993; Sharpton et al. 1993). I argue that karstic features within the Chicxulub fracture zone were important attractors in the Prehispanic settlement expansions during droughts and there is compelling evidence

that these locations were not settled during the Colonial droughts. All the karstic features within the fracture zone were not formed by the effects from this impact, but at least the deeper features, such as *cenotes* (sinkholes with water) may have their origin in the morphology caused by the impact. There are also karstic features outside the fracture zone but they are less frequent within the research area.

Settlement near karstic features, apart from *cenotes*, is without exception Prehispanic and not Colonial. The result of this year's survey shows the importance of the fracture zone for the Spanish politics and its transparent nature for the indigenous population (in both Prehispanic and Colonial times). This has implications for the palaeoclimatic models since they partly work from how climate affect people today rather than taking into account past sociopolitical and economic changes that have created the contemporary situation.

Results from Earlier Investigations (2000-2005)

Earlier investigations by the CRAS project have detected a fluctuating settlement pattern in the Cochuah region (Shaw in preparation). Larger sites with a large or a more or less permanent water source (Ichmul, Sacalaca, and Yo'okop) have a far more continuous settlement through time compared to smaller sites without permanent water sources. These smaller sites were largely settled during drier periods, not during wetter periods. A substantial proportion of these small sites have karstic features.

The chronology of the use of karstic features in the Cochuah region below has been established from earlier test pit excavations, dating ceramics through typology, survey and mapping. Some cave sites located this year are also included but these have only been surveyed. The dates are accompanied with dates of proposed droughts listed by Bracamonte (1994), Farriss (1984), García-Acosta et al. (2003), Gill (2000) and Mendoza et al. (2007).

- 600-300 B.C. The *rejollada* (a sinkhole not reaching the water table) at Chakal Ja'as had substantial activity during this period but there is no documented activity at the surface site (Shaw 2005c). Dry periods occurred around 480 B.C. and between 370 and 265 B.C. (Gill et al. 2007).
- 300 B.C.- A.D. 250. Other sites with karstic features in the region were settled at this time. Punta Laguna had low water levels at the end of this period (Hodell et al. 2007). Two peaks of droughts are noted in Chichancanab between A.D. 120 and 190 (Gill et al. 2007).
- 250-750. The settlement at smaller cave sites and the larger site of Sacalaca were scarce with a possible exception for Xmakabha near Ichmul (Johnstone 2006). Ichmul and Yo'okop had substantial settlement. There is a documented drought at Punta Laguna (535-550) (Hodell et al. 2007). Otherwise, this was a period devoid of known droughts.
- 750-1100. This was the period of substantial settlement expansion/dispersion to caves. All sites with settlements at caves were occupied. A series of droughts have been proposed for 760, 810-818, 860-862 and 910-915 (Haug et al. 2003). At Chichancanab there is evidence of droughts in two phases, 770-870 and 920-1100 (Hodell et al. 2005).
- 1100-1544. Some caves were used for rituals and perhaps for pilgrimages. The evidence for settlement near caves is scarce with the possible exception of Gruta de Alux and Huay Max, both cave sites visited this year. Gill (2000)

proposes several dry periods for the Postclassic; 1110-1160, 1240, 1330-1360, and 1450-1500.

- 1544-1847. The Colonial settlement at Sacalaca was located fairly near a *cenote*. The possible *cenote*(*s*) at Ichmul may have been covered by later architecture (Flores and Normark 2005). However, there is no known settlement around the "peripheral" caves during the Colonial period and the early independence. This could reflect the influence of the Church or the early *congregación* policy. However, the caves themselves appear to have been used. Droughts are known from these dates: 1535-1541, 1551-1552, 1564, 1571, 1575-1576, 1648, 1650-1653, 1661, 1725-1727, 1765-1774, 1800-1805, 1807, 1809-1810, 1813, 1817, 1822-1823, 1834-1835, 1837 and 1842.
- 1847-1901. The San Pedro Sacalaca and Santa Cruz caves may have been used during the Caste War (Normark 2003; Shaw 2004). Caves became important to the Cruzob religion that emerged in 1850 (Reed 1964). Droughts occurred in 1854, 1881-1882, 1887, 1889 and 1896 (Mendoza et al. 2007).
- 1901-2008. The main way to date modern cave use is through graffiti. Carvings and paintings with alphabetic writing exist but they are difficult to differentiate from similar texts from the Caste War or the Colonial period. This concerns, for example, Chakal Ja'as, Huay Max and Yo'aktun. Droughts occurred 1903-1906 according to Gill (2000) and 1923-1924, 1928-1929, 1935-1936, 1962-1963, 1971-1972 and 1986-1987 according to Mendoza and others (2007:163).

The above dates of droughts show somewhat different frequencies of severe droughts. Hodell and others (2007:235) have detected a frequency of 50 years between severe Prehispanic droughts. Haug and others (2003) propose a frequency of 40 to 47 years. These proposed frequencies have been used by Gill (2000), and more recently by Gill and others (2007), to propose a collapse in four sequences with fifty year intervals (760, 810, 860 and 910). Gill suggests these sequences are related to volcanic eruptions above a certain magnitude that affect climate patterns (Gill and Keating 2002).

However, Mendoza and others (2007:166), based on historical written documentation, suggest a somewhat longer periodicity of roughly 60-64 years between severe droughts, and notes that there were some time periods during historical times that had no severe droughts (1577-1647, 1662-1724, 1728-1764, 1774-1799 and 1855-1880). Most frequent droughts occurred between 1800 and 1850, just before the outbreak of the Caste War and its initial phase. However, if one look at the table in Mendoza et al. (2007:155) one can see that there are 10 recorded droughts during the earlier 240 years (1535-1774) and 15 droughts during the later 96 years (1800-1896). This suggests a sampling problem since earlier records are fewer than later ones. Either the written records describing droughts are less preserved, or earlier people made fewer notes, or the parameters for droughts have changed among officials through the centuries, or it reflects a real trend of increasing droughts (perhaps related to the emergence of industrialization and its initial effect on global warming). However, the table also shows that droughts are much more common than every 40 to 64 years. Mendoza and others also show that most modern and historical droughts only lasted one year but some could extend for up to ten years. This means that people for sure had both knowledge of and strategies to cope with this very frequent problem.

Of course, as Gill (2000) argues, if the drought was severe enough no knowledge and strategy would be sufficient. There is clearly a decrease in archaeological remains during the later part of the Terminal Classic, even in the Cochuah region. But there are too many flaws and assumptions in the palaeoclimatic models for us to attribute the drying trends seen in nearby Lake Chichancanab as the sole causes for this decrease. Our parameters of what constitutes a drought may be different from the ones used by past Colonial officials and farmers. Further, how can we know what amount of rain that actually fell or did not fell in a particular local area from sediment cores? Here Hodell and others (2007) have a more nuanced approach than Gill (2000) and Gill et al. (2007).

Method

During the 2008 field season, I investigated the distribution of Prehispanic and Colonial settlement in relation to karstic features on both sides of the fracture zone/ early Colonial border (Figure 142). The survey was done by hand-held GPS (Garmin Colorado 300), documentation producing maps drawn from tape and compass measurements and mapping with a total station on one occasion (Gruta de Alux). Documentation of the caves themselves was restricted to visits and observation on the surface rather than detailed mapping of internal features. The locations of caves in relation to settlement on a regional scale suit this project better than locating individual artifacts. Information of the internal features of the caves was given by local guides who had entered the caves on earlier occasions.

The survey studied the spatial distribution of Prehispanic and later settlement near water associated features. I particularly focused on the relation between water sources, karstic features with or without water and settlement. If the water-related features were crucial for sustaining settlements they would show increased importance during droughts in all periods. This is not the case for the Colonial period. Whereas the large Prehispanic site of Ichmul became crucial for the Spanish control (as it may have *cenotes*, today covered by later architecture), the even larger site of Yo'okop was never re-used as a settlement in Colonial times despite its large *aguada*. These sites and other sites indicate a change in the use of water sources that has to do with the Colonial regime. From what is currently known, there is no major difference in Prehispanic settlement distribution within the Cochuah region. More important is therefore the fact that there are no known larger Colonial settlements south of the fracture zone.

Caves in the *Ejido* of Saban

Most of the *ejido* of Saban lies south of the Chicxulub fracture zone but since it is also by far the largest *ejido* of the region it still contains many caves, particularly in the northern part of the *ejido*.

Aktun Abuelos, Aktun Sak Chikin and Chumkatzin

Chumkatzin lies roughly 8.5 km south of the church in Saban. The settlement of Chumkatzin is widely scattered over an area extending 1 km between two caves: the larger Aktun Abuelos and the small "ventilation hole" Aktun Sak Chikin (Figure 143). Aktun Abuelos has a steep entrance slope that extends roughly 4 m down. At this point it changes to a vertical angle and drops 3 m down. Rope is needed to enter this cave which, according to locals, has ceramics and remains of torches at the end of a 50-70 m long passage. There are also petroglyphs. At least one represents a fish according to the informants. The cave contains no water pool.

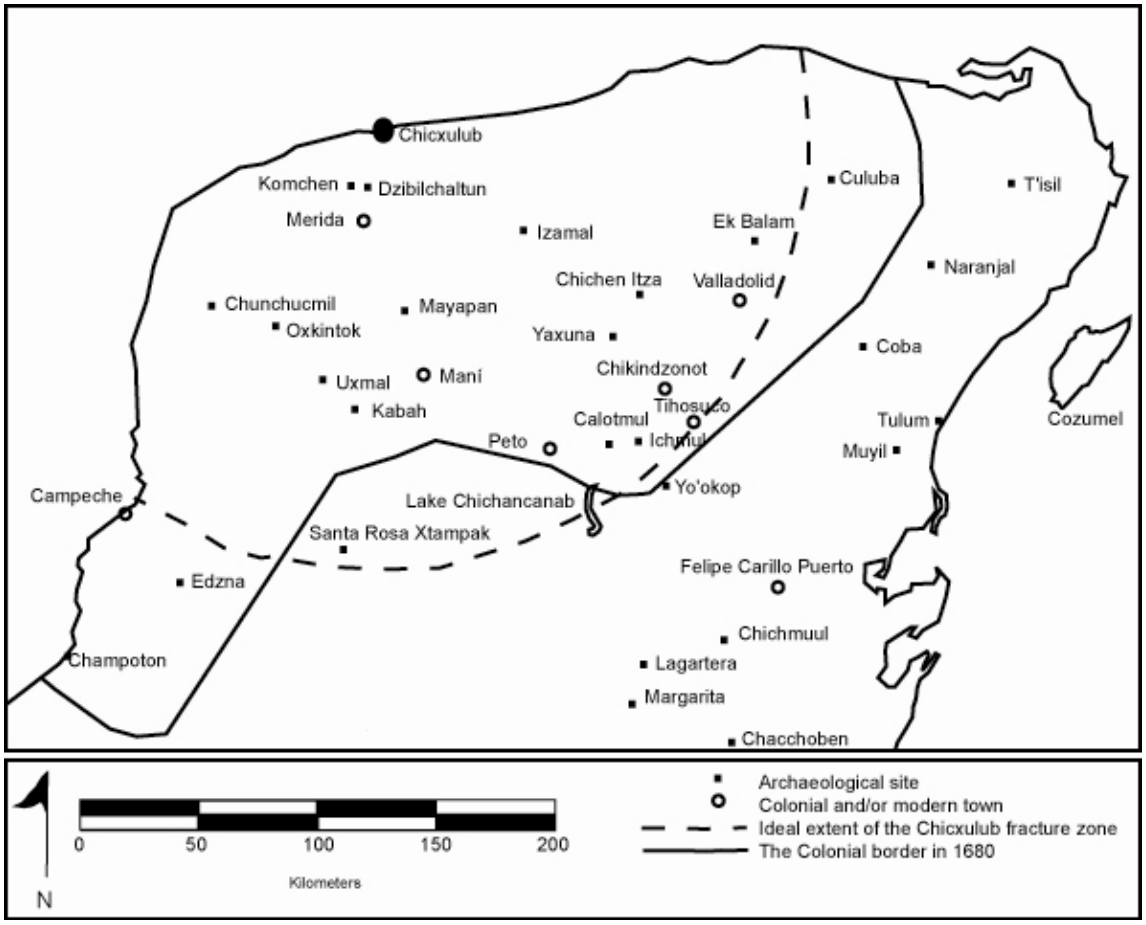

Figure 142. Colonial Border and the Chicxulub Fracture Zone

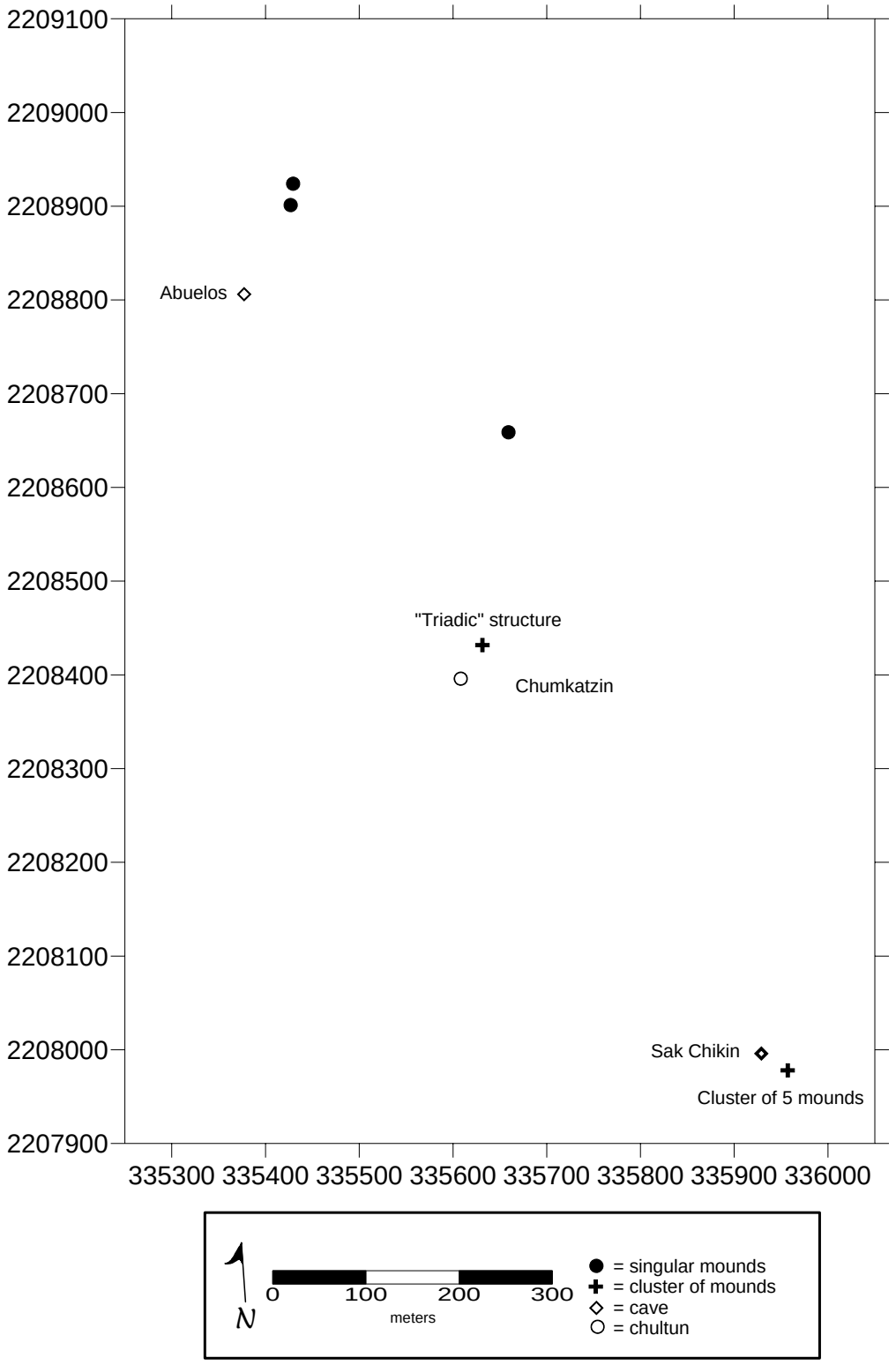

Figure 143. Chumkatzin

On the ground surface, 100 m northeast of the cave entrance, there are 2 round structures. One of them has a foundation brace that sits on a low round platform, roughly 5 m in diameter. Twenty m from this structure is the other round foundation brace.

A round foundation brace sits on a round platform 320 m southeast of Aktun Abuelos. Another 220 m further south is a platform built on a natural rise. The platform/hill is roughly 15 x 15 m large and 2 m high. There are 2 round structures on the south side, in each corner of the platform. North of these is a round/ apsidal structure that sits in the middle of the northern side of the platform. These three structures form a small "triadic" formation. There is a *chultun* (subterranean chamber for storing water) 40 m southwest of these structures.

More than 500 m southeast of the "triadic" platform is a small "ventilation hole" (Aktun Sak Chikin), not more than 0.3 m in diameter. Air is clearly coming out of the hole and it is located in a small depression. There is probably a greater cavity further down into the bedrock generating the flow of air. Thirty m southwest and on top of a 7 m high slope is a cluster of 5 small rectangular mounds. The largest mound is only 5 m long and 0.5 m high. The mounds have no foundation braces like the round structures further to the north within Chumkatzin.

Aktun Santa Rosa

Aktun Santa Rosa lies roughly 10.8 km south of the church in Saban and 3 km southwest of Yo'okop. It is a fairly large cave with a large chamber that has substantial amounts of old and fresh guano and possible artifacts may lie buried in it. No traces of human activity are known, apart from a thread leading down to a pool of water at the end of a roughly 15 m long winding passage which begins in a corner of the larger chamber. The water is clear, contains fish and has an estimated depth of 1 m.

No mounds were observed near the cave and the nearest known mound is 1.5 km north of the cave. Together with Aktun Abuelos and possibly Aktun San Salvador, this is one of the few larger caves in the southern portion of the Cochuah region. These lie outside the main early Colonial settlement zone.

Aktun Kuluub

This cave lies roughly 5.7 km west of the church in Saban. Kuluub has a vertical entrance which is at least 3 m deep and rope is needed to enter. The existence of water inside the cave is unknown to the local informants. There are no known associated mounds, but the undergrowth was thick around the cave and visibility was low. A *chultun* (called *xuchcab* by one local informant) is located on the side of a dirt road 370 m southwest of the cave.

Aktun Burro

Aktun Burro lies roughly 2.5 km west of the church in Saban. It is named after an event when a donkey fell into the cavity. This small cave has a narrow and short passage and shows no evidence of human activity and water. There are no known mounds nearby. A small *haltun/sarteneja* (shallow water filled cavity) was observed 100 m from the cave.

Aktun Huay Max

This cave lies roughly 3.3 km east of the church in Saban. The cave shows traces of substantial contemporary use. A concrete platform with a deteriorated *palapa* sits a few m from the entrance of the cave. The roof of the cave entrance has two holes, located only a few m from each others (Figure 144). The cave can be entered from both holes. Right next to one of the holes are the remains of candle grease, probably used for a ritual. The two holes are located in the roof of an extended overhang that is partially upheld by a natural stone pillar/speleotheme. This pillar has wines growing close to it. Abutting the stone pillar to the north are the traces of a terrace/ stairs, possibly in three levels, leading down to the narrow entrance to the darker parts of the cave. The upper step has a cornerstone at its southwest corner. The interior of the cave itself has a long horizontal passage heading in a west-northwest direction from the vertical entrance area. The passage is full of contemporary graffiti. According to local informants, there are shrines at the end of the deeper part of the passage but ropes are needed to reach this part of the cave.

On the surface, 70 m southeast of the entrance, is a platform measuring 10 x 10 x 0.7 m. It has been completely center trenched by modern machinery. An overgrown road cuts through the mound and the local informants say that the road was used for transporting machines that constructed the main road between Dziuche and Tihosuco. Four hundred m southeast of the main entrance is another cave entrance that is too small to enter. If this is connected to the larger system is questionable, particularly since the large cave passage heads to the west. However, the local informants claim that these passages are connected.

Gruta de Alux

See “Gruta de Alux” this volume.

Caves in the *Ejido*s of Tabasco, San Felipe and Sacalaca

The caves in these three *ejido*s are described together since the *ejido*s revealed few caves this season but for two different reasons. Tabasco and San Felipe partially lie south of the fracture zone and hence had few caves due to the geological conditions. Sacalaca lies within the fracture zone. The *ejido* of Sacalaca has been investigated during earlier seasons and has numerous caves. Only one “new” cave was recorded this season, San Pablo, which also was the largest one located in 2008.

Aktun San Salvador

The site lies roughly 7.6 km southeast of the plaza in Tabasco. There is a cave at San Salvador. This information was given to us after the site had been visited. According to the informants the cave has ceramics and other artifacts. We found some possible ventilation holes while surveying the site. The cave will be located in the future.

Aktun Santa Elena

Santa Elena lies roughly 3.3 km west of the plaza in Tabasco. This karstic feature is a small “ventilation hole”, reminiscent of Aktun Sak Chikin in Saban. The hole is 0.3 m in diameter and located in a small depression. The area is surrounded by 2 small nearby structures. Two other small structures are located 70 and 120 m away (Figure 145).

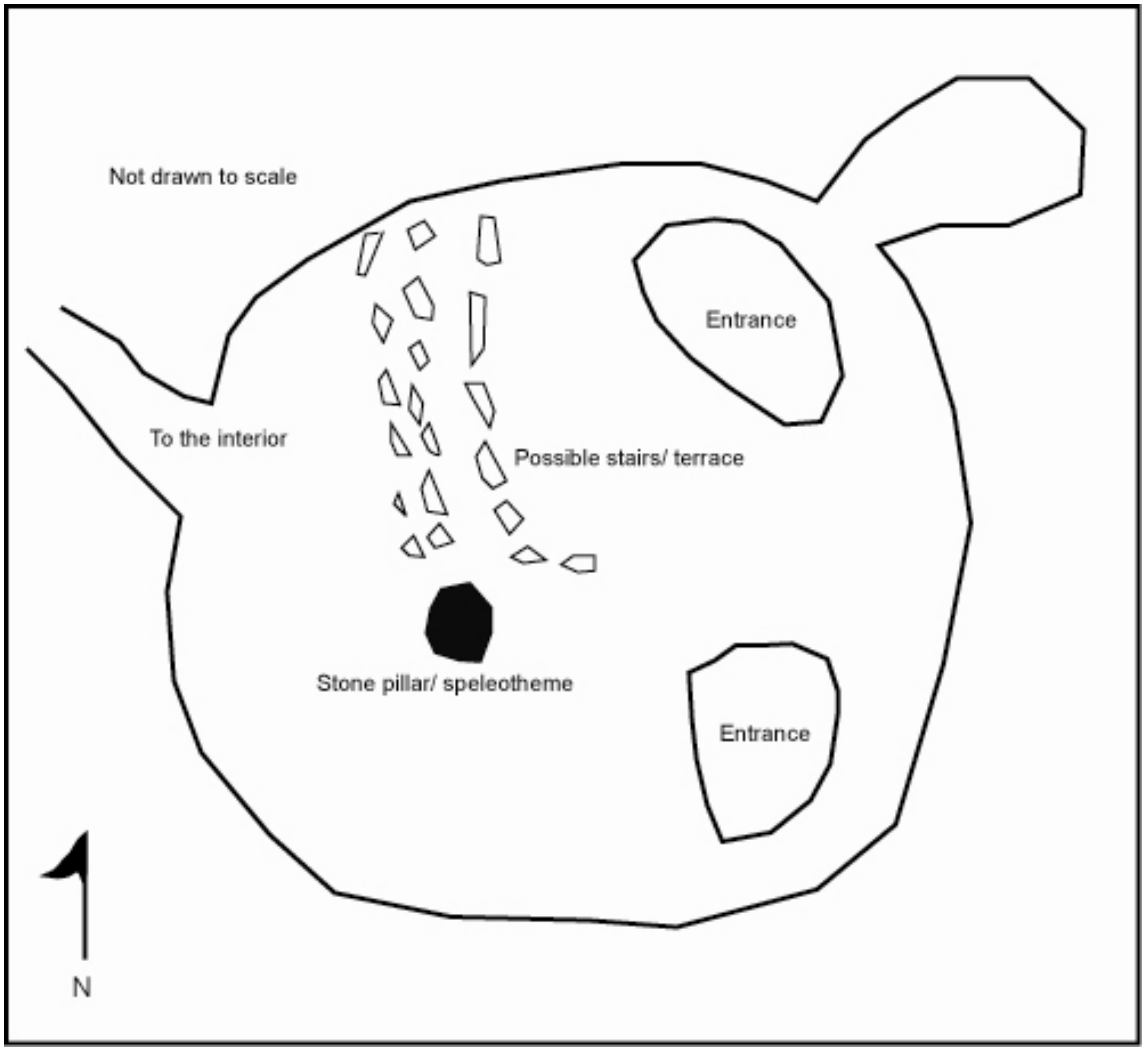

Figure 144. Entrance Area of Aktun Huay Max

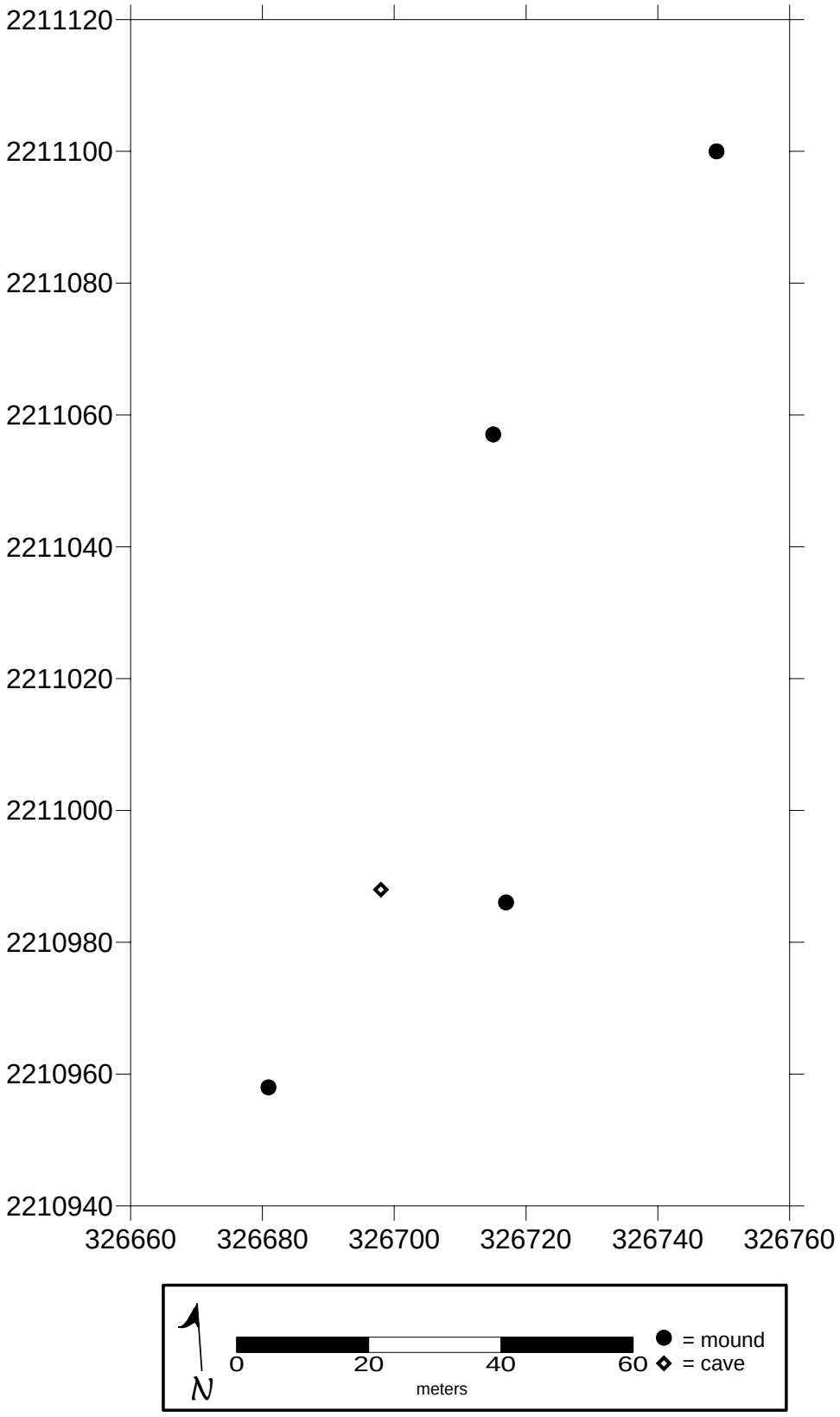

Figure 145. Aktun Santa Elena

Aktun San Felipe

This is another "ventilation hole" and has no name, but was labeled Aktun San Felipe by the author. It is located on the north side of the road between Tihosuco and Dziuche. It is the only cave-like feature known in the *ejido* of San Felipe and lies 3.2 km northwest of the plaza in San Felipe. There is no known nearby settlement and the feature itself is hardly detectable, although it is located right next to a trail. Although there is air coming out of this hand-sized hole, it may be excluded as a cave due to its minimal size.

Aktun San Pablo

San Pablo lies roughly 5.2 km east of the *cenote* in Sacalaca. There is no known settlement near this large cave. The cave is a large *rejollada* in two levels. The upper level is easy to reach, only 2 m below the surface. This level consists of a "balcony" with at least two small vertical holes. The "balcony" makes up one third of the upper part of the *rejollada*. The rest of the *rejollada* consists of a deeper section where rope is needed to enter the vertical drop of 5-6 m. There are horizontal openings to passages at the bottom of the cave.

Differences in Settlement Patterns Related to Climate Change

One obvious observation from this year's survey, in combination with earlier surveys, is that the caves are larger and occur more frequently in the northern part of the Cochuah region. This area corresponds to the fracture zone and the Spanish-controlled area. A slightly larger area has now been surveyed in the southern part of the region, but still the northern part contains more and larger karstic features, as was expected due to the geology of the region.

The average distance between the 10 nearest caves increases as one moves from the north to the south across the fracture zone and the Colonial border (Table 1). The average distance to other karstic features for the *cenote* in Sacalaca (within the zone) is 5 km, with a range from 0.6 km to 8.7 km. For Kuluub (roughly on the Colonial border) the average distance is 5.6 km but with a smaller range from 3.5 to 6.8 km. For Abuelos (outside the Colonial border) the average distance is 7.8 km with a range between 1 and 10.8 km. If we exclude the nearby Sak Chikin the average distance for Abuelos is 8.5 km. However, for Abuelos and other caves to the south (San Salvador and Santa Rosa) there is also the problem of a possible sampling bias since these areas are far from where the local informants live and hence their knowledge of their *ejido* usually decreases with distance as well.

Cenote in Sacalaca		**Kulub**		**Abuelos**	
Sacalaca passage	0.6	Burro	3.5	Sak Chikin	1
Yo'dzonot	2.1	Sacalaca passage	5.2	Salvador	6.7
San Pedro	3.3	Yo'dzonot	5.3	Rosa	9.7
Chakal Ja'as	3.8	Sacalaca cenote	5.5	Elena	9
San Pablo	5.2	Yo'aktun	5.5	Felipe	8.2
Yo'aktun	5.3	Abuelos	5.7	Kulub	5.8
Kuluub	5.5	Felipe	6	Burro	6
Burro	7	San Pablo	6.3	Yo'atun	10.2
Huay Max	8.7	Chakal Ja'as	6.4	San Pablo	10.6
Felipe	8.7	San Pedro	6.8	Gruta	10.8
Average	**5.02**		**5.62**		**7.8**

Table 1. Cave Density

If we include all recorded karstic features in the Cochuah region, as many as 71% (17 out of 24) of them have some form of settlement in their vicinity (within 100 m). If we exclude Aktun San Felipe as a cave this percentage is even greater (75%). This settlement is mainly Prehispanic and there is no decrease of the settlement density in relation to the fewer caves in the southern part of the region. On the contrary, the four known caves in the southern part of the region all have associated Prehispanic settlement. The only karstic features that do have nearby Colonial settlement are *cenotes* (one at Sacalaca and possibly two at Ichmul).

The increasing distance between caves with water would not be great enough to discourage possible Spanish short-term intrusions to establish settlements in the early Colonial period. However, the caves may have been too dispersed and lacked enough water for the Colonial political economy to become established for a longer time. The depth down to ground water also increases further to the south, making it more difficult to excavate wells. Colonial settlement density appears to decrease as the density of caves decreases, but this appears not to be the case for Prehispanic settlement. It remains even and the area south of the fracture zone contains dense Prehispanic settlement. The pattern indicates that settlement density not always is a reflection of water availability and its management.

Most of the water management studies in the Maya area have focused on the southern lowlands and these studies use centralized management models that see water control as a means to control a population, either through utilitarian concerns or ritual and ideology (Lucero 2002, 2006; Scarborough 1998, 2003). In this sense they are partly following ideas developed by Wittfogel (1957) where absolute power is invested in water reservoirs (although not primarily for irrigation as Wittfogel argued). A notable exception to this view is Weiss-Krejci and Sabbas' (2002) study of small depressions in Belize which were not centrally controlled. In the northern lowlands, water was both centralized to "natural" *cenotes* and dispersed to man-made *chultun*s (McAnany 1990). However, in the Cochuah region *cenotes* are few as are large-scale *aguadas* and *chultun*s. Water management seems to have been on a modest scale. Karstic features like caves and *haltuns* may have been utilized, but not on a

greater scale. Water in a *haltun* or in a cave may only have provided drinking water for a few individuals.

The problem of water accessibility is well documented for the northern Maya lowlands. This is a two-folded problem; water access is partially periodic (the annual rainy and dry seasons and long-term climatic changes) and partially geological (permeable limestone and a flat topography with little to no soil not allowing for streams and rivers to develop). These problems are, of course, interrelated. The northern part of the contemporary Yucatan peninsula has a tropical monsoon climate with rainfall between May and September. A large percentage of this rain evaporates or seeps away in the permeable limestone bedrock (Ward and Wilson 1985).

Flaws in palaeoclimatic models

Let us begin with the periodic problem related to meteorology and climatology. Regularity of rainfall is important since this affects when to clear forest, burn, plant and harvest (Dahlin et al. 2005). However, the weather is unpredictable due to localized droughts, thunderstorms and hurricanes. Past meteorological patterns were also unpredictable and this unpredictability changed in intensity during different periods. Palaeoclimatic studies in the Maya area tend to see such climate changes as driving and deterministic forces that directed the sociopolitical development (Brenner et al. 2002; Folan et al. 1983; Gill et al. 2007; Gunn et al. 2002; Hodell et al. 2007).

For example, Gill (2000) uses the rain charts from 20th century Merida and correlates decreased precipitation noticed in the meteorological record with droughts and famines mentioned in textual sources. He discusses similar phenomena during the Colonial period when droughts and famines were recorded and, for the meteorological data, he largely is dependent on Farriss' account (1984), but he has used this source selectively. When Farriss explains demographic declines during or after the Colonial period droughts as the result of populations moving into uncontrolled areas in order to escape demands of the Colonial regime (1984:75), Gill rather sees people dying from starvation and thirst despite the fact that he mentions Farriss' information (2000:310).

Thus, population decline can partially be described by movement out of areas of Spanish control and not only by death (which for certain also occurred). In fact, to quote Farriss: "we have no way of comparing the mortality caused by famines before and after the conquest. But it is difficult to escape the conclusion that the Maya would have fared better without the sometimes well meaning but almost invariably disastrous intervention of the Spanish" (1984:63). She shows that the Spanish "innovations" both raised the mortality of the Maya and lowered their fertility. These "innovations" were the congregation program, changing marriage customs and family residential patterns, and the imported cattle that destroyed crops. These factors introduced by the Spaniards are ignored or downplayed in Gill's account.

Colonial communication technology, such as ships, pack animals and wheeled vehicles, could potentially have facilitated transport of subsistence and made the Colonial population better prepared for droughts compared to those of the Prehispanic era. The Colonial power could have used these improvements to come to the rescue with imported subsistence goods in the case of famine. However, Farriss (1984:62) suggests that this help would only have benefited the Spanish population in the Colonial cities of Merida and Campeche. When a shortage was approaching, private grain merchants and officials went through the villages and bought grains to sell in the cities. This resulted in a food shortage for the people

outside the major Colonial cities. Gill (2000:305) gives us several examples from Colonial sources mentioning people dying in streets and parks, but he ultimately fails to mention that these are Colonial political landscapes and that Prehispanic political landscapes lacked these patterns. Neither of the examples he gives where people are starving in the rural areas are useful for understanding Prehispanic times (Gill 2000:308). The rural areas had been depleted to sustain large Colonial towns. No such pattern of distribution of subsistence is known from Prehispanic times.

In short, Gill's argument for how people and society reacts to droughts rests on shaky foundations. He imagines that people, despite their knowledge of past droughts, had no strategy to cope with them; they died when the drought was hard enough. This scenario may fit the Colonial period but it does not explain the Terminal Classic demographic shifts.

Gill projects his modern and Colonial scenario to the Terminal Classic and even older periods. Here, he relies on sediment cores from different lakes, including Lake Chichancanab in the Cochuah region, which only is 7 km from the westernmost site mapped this season (Tabasquito). The sediment cores indicate an extended dry period during the Terminal Classic (Curtis and Hodell 1996). During this period there were several droughts which are fairly contemporary with the "collapse" and therefore the droughts are seen as the main causes for the "collapse". But as shown above, this is largely based on Colonial analogies.

There is another problem with Gill's catastrophic scenario and that is his choice of theory and his belief in cultural "collapses". This deserves a greater discussion elsewhere, but here it is enough to give a brief summary. Gill sees climate as one thermodynamic system generating bifurcations in another thermodynamic system (culture). The whole nature/ culture dichotomy reaches its apogee in a study like his. Clearly, climate and culture are not systems in themselves, they rather form *assemblages* of various scales where climate factors and "cultural" factors are working parts of a greater emerging whole. These assemblages also have similarities to dissipative structures in thermodynamic systems far from equilibrium but they do not maintain the nature/ culture dichotomy (DeLanda 2002, 2006; Deleuze and Guattari 1987; Prigogine and Stengers 1984).

To sum up, Gill explains the Terminal Classic "collapse" through the analogy of how droughts affect modern and Colonial settlement. Add to this that his model almost completely ignores detailed Terminal Classic settlement data, apart from Chichen Itza which is a somewhat anomalous site in this context (Dahlin 2002), and we have a too generalized view in which climate determines settlement.

What the CRAS survey(s) show is that there is a dense settlement extending from at least San Felipe in the east to Candelaria in the west (10-15 km from Lake Chichancanab). This settlement appears to date to the Terminal Classic, particularly Candelaria, and it is located south of the area controlled by the later Spaniards. There are no known water sources that can be securely dated to the Terminal Classic or any other period. Even if the few known wells in this area are of Prehispanic origin, they are far fewer per person compared to Colonial towns. How do we explain such a settlement density without large water sources? Maybe there are other dynamics in settlement that we have overlooked?

The Terminal Classic settlements were not the same as during the Colonial period. Settlement patterns were changed by the Spaniards, but this is a change that seldom is noticed even by the historians of the Colonial period. The early Spanish congregation of settlement is well known, but what the historians (and Gill) have missed, or at least underestimated, is how the Prehispanic settlement fluctuated in

relation to climate changes in a non-catastrophic way. It changed back and forth in between the "collapses" as well. The large centralized sites that "collapsed" in the Terminal Classic are also the result of a less drastic "congregation" following various cycles (Marcus 1998). Colonial settlement appears not to have been capable to change along with these climate changes. Instead changes in settlement during Colonial droughts are explained as migration, as lines of flight out of the Colonial regime. This is probably not the result of a collapse or a desperate search for food, but rather an age-old strategy to cope with frequent drier conditions. People did not stay in place to await an approaching drought. As in Colonial times, the Prehispanic population probably had relatives living at other sites and there may have been seasonal movement or dispersal, at least during long-term droughts. However, since we tend to visualize the geopolitical landscape as consisting of polities with contiguous spaces we may argue that it was impossible to move anywhere one wanted and that such migrations would lead to conflicts and warfare. But it is important to note that Prehispanic geopolitics did not consist of contiguous spaces as Martin and Grube (2000) have shown. The Colonial power on the other hand tried to homogenize the territory into a contiguous space. Space was striated on a grand scale (Deleuze and Guattari 1987).

The Chicxulub fracture zone and the Colonial border

Such a shifting settlement pattern has partly to do with the geological substrata, the other problem with water accessibility. As we now know, the limestone bedrock is not homogeneous throughout the Maya area. However, there is a common tendency among the historians on the Colonial period (and Gill) to treat the Yucatan peninsula as a homogenous landscape (affected by a heterogeneous climate). At first glance this is an easy assumption to make, but if we rise up to a regional level we can see that there is a major difference that happens to cut through the CRAS area and that is the Chicxulub fracture zone. As mentioned earlier, the concentration of caves decreases at the Colonial border which more or less corresponds to the end of the fracture zone.

The landscape is not homogeneous since water sources, cultivable soils and settlements have particular distributions, which are clearer if we compare settlements around what became the Colonial border. I am arguing that the change in settlement strategy in Colonial (and modern) time, compared to the Prehispanic period, can only be explained by new Spanish politics. This has passed largely unnoticed in historical sources, but it is clearer in the archaeological record, particularly if we compare the two periods.

Contrary to the expectations of the modern and Colonial-based drought models, CRAS's investigations of nearly 90 sites in an area 7 - 37 km east and northeast of Lake Chichancanab contradicts the palaeoclimatic models. Our investigations show that during the Prehispanic droughts the settlement increased in areas far from permanent water sources, particularly around "dry" caves without access to permanent water (Normark 2006). This was the result of spreading risks to several econiches. It stands in contrast to the pattern seen during the Colonial period when the Spaniards congregated the settlements to permanent water sources (*cenotes*) and wells which were made possible to excavate with iron tools.

Cenotes are available within the extensive Chicxulub fracture zone. The *cenotes* are partly formed by subsidence of the limestone that was formed on top of the impacted older bedrock (Morgan and Warner 1997). The extent of this fracture zone is still debated. Originally it was argued to have a radius of 90 km, counting

from the center near the port of Chicxulub. This is the 5-km-wide band called the ring of *cenotes* (Escolero et al. 2002:358). The ring of *cenotes* is permeable and affects the flow of groundwater and hydrogeologically it isolates Merida from the rest of the peninsula (González-Herrera et al. 2002). This fact should also be taken into consideration since Gill uses Merida's meteorological record from the 20th century in order to describe how droughts affect society. Areas outside Merida had access to more groundwater due to the fracture zone and hence were less affected by decreased rain (even if water levels decreased in *cenotes*).

Researchers have detected three other rings caused by the Chicxulub impact and the outer edge of the outer ring has a radius of roughly 170 +- 25 km (Sharpton et al. 1993:1565). However, this is not a homogenous ring since to the west we have the Ticul fault zone that reduces the extent of the fracture zone in this area. The fracture zone extends further away to the southeast (into the Cochuah region), and possibly even more to the east. The concentric Holbox fracture zone has been suggested to be part of the greater Chicxulub fracture zone as well (Pope et al. 1993:99-101), and this area is more than 170 km from the center of the impact. This fault zone in the Yalahau region has *cenotes* and wetlands (Fedick and Morrison 2004).

The border of the Chicxulub fracture zone (the fourth ring) cuts through the Cochuah region in between the two largest known Prehispanic sites (Ichmul to the north and Yo'okop to the south). The area within the fracture zone is the area the Spaniards controlled. If we overlay the greatest extent of the proposed fourth ring (170 km from the center) with that of Farriss' (1984:17) proposed colonial border (in 1680) we see that they partially overlap in the Cochuah region (Figure 146). The two kinds of borders are roughly 10 km apart and neither one of them were or are clearly delimited. However, the proposed extension of 170 km does not include the *cenote* at Sacalaca and the large *rejolladas* at Chakal Ja'as and San Pablo. These karstic features are, however, within the radius proposed by Sharpton and others (1993): 145-195 km from the port of Chicxulub. The distribution of caves in the region partly follows the concentric rings of the fracture zone. Yo'aktun, the *cenote* at Sacalaca, Santa Cruz and Xtojil are in line. The southernmost alignment known in the region is between San Salvador, Abuelos, and Gruta de Alux. These are also aligned with the Colonial border in 1680. If these caves form the edge of the fracture zone than only Santa Rosa and Sak Chikin are truly outside the fracture zone.

In any case, the Colonial extension beyond the 170-km limit in the eastern peninsula can partially be explained by the need of a coastal control. In the interior of the peninsula, there seems to be little extension of the early Colonial border beyond the fourth ring (Figure 146). The fracture zone formed the border of Spanish control but it was possible for the indigenous population to move across the border during the Colonial period droughts, something pointed out by Farriss (1984). In the Cochuah region, the area south and east of the fracture zone lacked permanent water but had better agricultural opportunities due to deeper soils. This area lacks larger Colonial and Spanish derived settlement, but as this year's survey shows it has several Prehispanic sites despite its lack of permanent water sources. The density of Prehispanic settlement on both sides is more or less the same.

As of yet, no *cenotes* have been encountered south of the fracture zone within the CRAS area (that is if we extend the fracture zone another 10 km). The Prehispanic inhabitants in the southern part of the Cochuah region used a seasonal

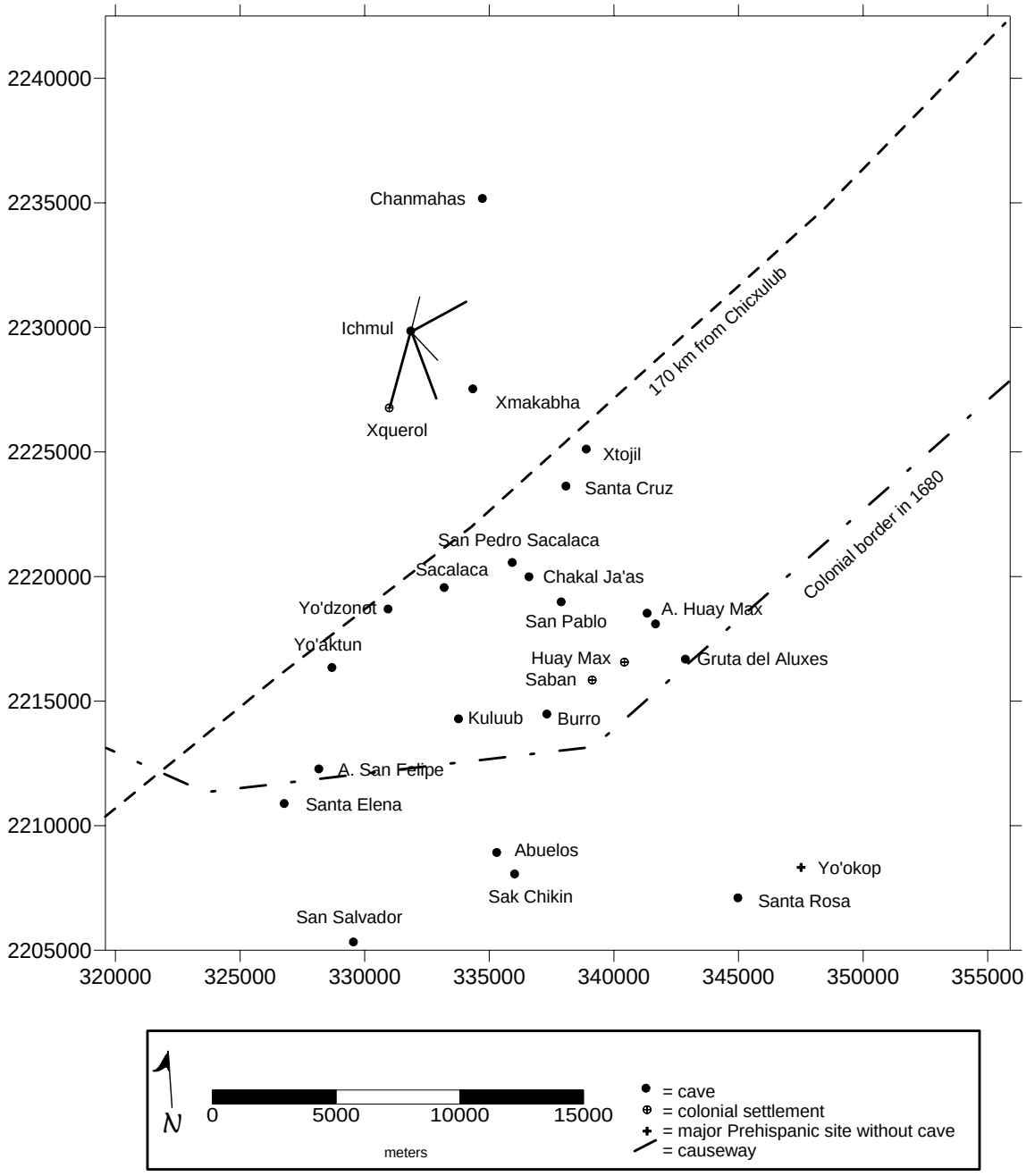

Figure 146. Caves and Their Relation to the Colonial Border and the Chicxulub Fracture Zone

aguada at Yo'okop (Shaw et al. 2000) and perhaps *haltuns* and *chultuns* at other sites. Two *chultun*s are located 250 and 600 m from the large well at Sisal. No mounds were directly associated with the *chultun*s in this year's survey, with the exception of Chumkatzin. Apart from these possible water reservoirs, there are few known water sources for the inhabitants south of the fracture zone.

Wells

During this year's survey, I also located over 50 wells in the region. Those that could be mapped were the ones located in public areas. Wells located in contemporary *solares* or other private properties were usually out of reach. This investigation was needed since wells often are believed to be from the Colonial period or later. The ground water table is similar throughout the region, 26 m below surface in the northern part of the region (Nohcacab) and 27 m in the southern part of the region (San Salvador). It was hard to excavate wells without the metal tools the Spaniards introduced. However, since wells have been found in association with *ranchos* that also are located within Prehispanic ruins, there have been speculations that some wells are Prehispanic in origin. This would explain why Prehispanic people could live in the region despite the lack of other water sources.

The distribution of the wells can be seen in Figure 147. Wells show strong connection to congregated and modern settlement. This pattern would be even stronger if wells within *solares* and other private properties were taken into account. This connection is not just restricted to the central part of the Colonial and modern communities, but it extends outward as well. For example, the wells along the road to Yo'okop probably are located near a Colonial road leading to Fortin Yo'okop rather than the Prehispanic site called Yo'okop. It is questionable that wells excavated down to ground water were Prehispanic in origin, but there might be another option here.

Ranchos are late Colonial settlements, often seen as the effect of the Bourbon reforms and the *hacienda* expansion after 1750 (Alexander 2003). If the wells at *ranchos* located within Prehispanic ruins also were Prehispanic, one would expect a much earlier Colonial utilization of these water resources. It is therefore not unlikely that the wells at *ranchos* began as Prehispanic *chultun*s that were extended in depth down to the water table. Another option is that the wells originated as Prehispanic shallow wells. Some of the wells encountered in the survey were not deep enough of ever reaching the ground water so there is also a possibility that people used shallow wells in the Prehispanic past (Robichaux 2002). These wells utilized perched water that lay on an impermeable stratum below. Some wells may even have been caves, like one observed near Sacalaca (Figure 148). This well is also shallow and filled with debris. However, such shallow wells were also dependent on rain since they did not reach groundwater. Such wells could therefore have been excavated further in depth during Colonial times when it was possible to penetrate harder substrate. Only late in the Colonial period, when demands and population increased, were these sites resettled to become independent from the *haciendas*.

There is no spatial correlation between karstic features and wells apart from the congregated settlements of Sacalaca and Ichmul (and these karstic features were *cenotes*). A possible exception may be San Salvador. There is for certain no clear association between caves and the later independent *ranchos* and their wells. It is 800 m between Aktun San Pablo and the well in San Diego. Aktun Burro is 1 km from the nearest well. The other caves are further away from known wells, with the possible exception of San Salvador. Although people living at *ranchos* attempted to

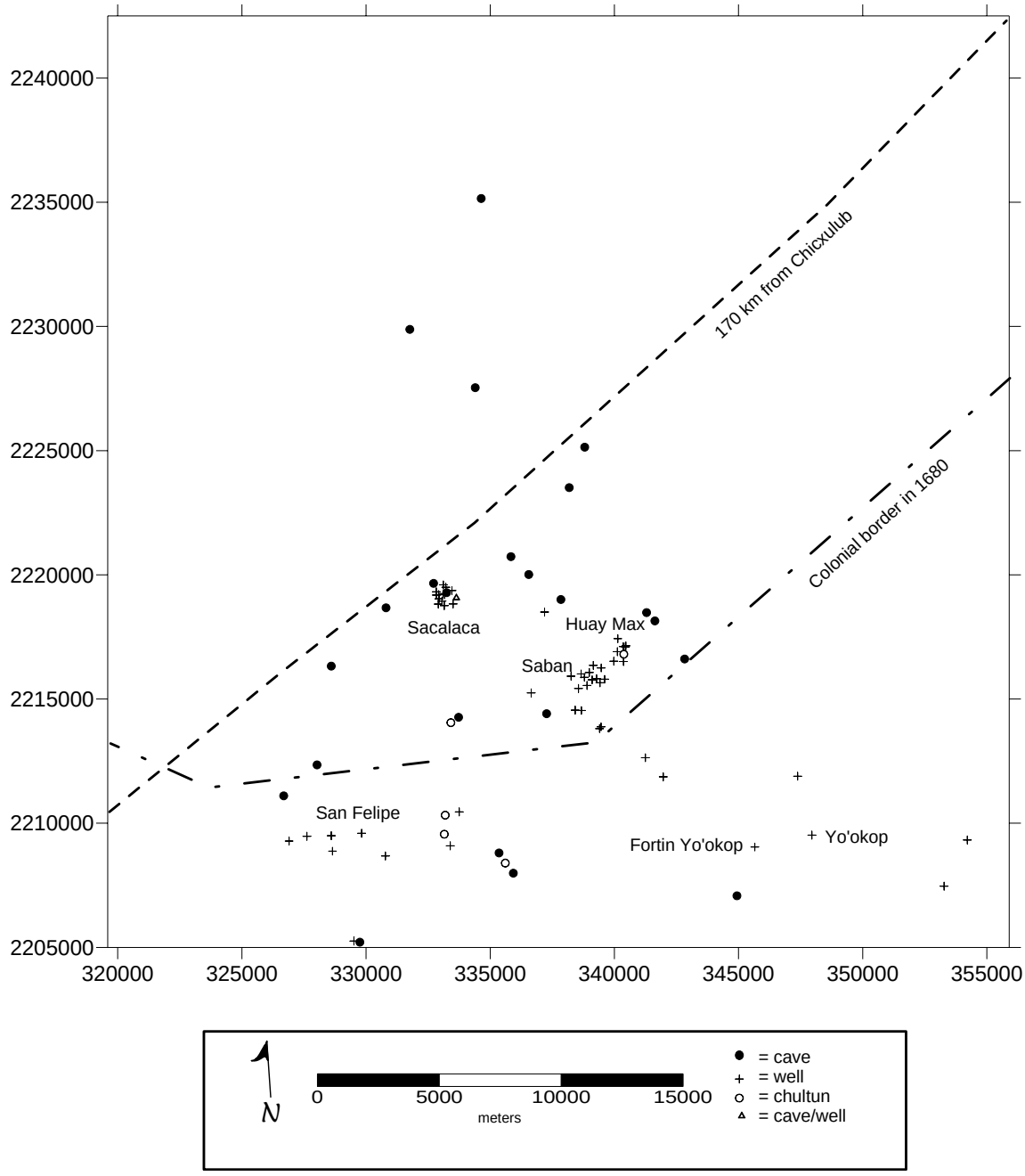

Figure 147. Distribution of Wells

Figure 148. Shallow Well

escape the Colonial elite they seem to have preferred water sources other than caves. It may be that they had adapted to the new economy and partially changed their relations to caves whose water sources for sure were not enough to support cattle.

Thus, the Colonial wells were seldom located near "dry" caves. Whereas Prehispanic settlement utilized caves during droughts, Colonial settlement concentrated near wells during droughts (and wetter periods as well). The wells made Colonial settlement more stable in place compared to Prehispanic settlement. However, it also made them more vulnerable to droughts, being less "nomadic" than before, less prone to move when disaster approached. The *pueblos* became parts of the greater Colonial political assemblages that constrained their constituent parts in a way that was impossible before. Thus, although the population declined in the early Colonial period, due to diseases and other factors, and more land per person were ideally available; this did not make the droughts and famines less severe. The ecological determinist perspectives downplay the role of politics without realizing that subsistence and water management is political before it is ecological (see Smith 2003). This means that there are always decisions to use certain crops, where to live, how much labor should be invested, etc. To say that these decisions only were the result of ecological factors misses the point that the ecological situation for a society always is the result of earlier sociopolitical decisions that have transformed environment. The Terminal Classic people did not live next to "pristine" forests.

Apart from the regional differences on the scale of the Chicxulub fracture zone, Prehispanic people also made local arrangements to conserve water when drier conditions began to prevail. Modifications of the limestone bedrock were used to facilitate drainage of excess moisture during the rainy season and to retain moisture during drier periods (Lohse and Findlay 2000). *Rejollada*s, other naturally damp depressions, and *chich* mounds (consists of pebble- and cobble-sized stones) were used to conserve water or moisture (Beach 1998; Kepecs and Boucher 1996). Chakal Ja'as has a water management feature at the bottom of the *rejollada* (Shaw 2005c). *Sascaberas* (limestone marl pits) at Nohcacab may have been used to collect water (Shaw 2003c). Similar patterns have been found at Sisal during this year's field work. Evaporation from smaller depressions could have been reduced by using covers (Weiss-Krejci and Sabbas 2002), or having large trees that provided shade. The abandonment of such features during Colonial and modern times, due to the congregation politics and ideological changes, made the droughts more severe.

Discussion

The pattern described above indicates that the Colonial settlement had a stronger reliance on permanent water sources than the Prehispanic settlement had. Thus, the Colonial period cannot be used to form collapse models for the Terminal Classic as Gill has done. The historical and modern problems with droughts that Gill discusses are not necessarily only the result of climate changes; they are also the results of unintended consequences of Spanish politics and economies that affect the layout of communities even today. The Spanish conquest led to population decline, settlement congregation, introduction of Catholic doctrines, other biota, technologies and the rural economy was reordered (Alexander 2004; Clendinnen 1987; Forrest 1997; Gerhard 1993; Kepecs and Alexander 2005; Whitmore and Turner 2000). For example,

droughts and famines increased as cattle and henequen plantations were introduced during the Colonial period.

However, in order to understand the Spanish impact on water conservation and settlement strategy we need to understand why Prehispanic settlement concentrated around caves during droughts. In Prehispanic times, caves became central for rituals and cosmology because they were the main features which contained water during the whole year (Brady and Prufer 2005; Rissolo 2005; Stone 1995). Caves and other water associated features were, and still are, central to the sociopolitical identity and cosmology (Brady 1997; Forrest 1997). Brady (2004:12) even argues that *chultun*s were symbolic caves that centered a household in cosmos.

The Spaniards tried to break this relationship to the caves since the Church viewed the caves as locations for pagan rituals. One detectable effect of the new Catholic doctrines is found in the decreased use of caves surrounding congregated settlements during the Colonial period when the "dry" caves lost their earlier central focus in settlement dispersions during droughts. No known Colonial settlement exists near "dry" caves in the Cochuah region but the interior of some caves do have minor traces of Colonial or later activities (Huay Max, Santa Cruz, and Yo'aktun). The caves within the fracture zone continued to be used, but in secrecy, and hence people could not settle near them during droughts. Whether or not the caves in the southern part of the region were used to a greater degree than the ones to the north during the Colonial period is unknown.

Caves are therefore good indicators of settlement changes since settlement appears to have concentrated around the caves during Prehispanic droughts but not during Colonial droughts. Take Gruta de Alux as an example (see "Gruta de Alux" this volume). It is most likely a late Terminal Classic or Postclassic settlement clustered around a cave. Earlier settlement at the site appears to be located further away from the cave.

There is an interesting pattern at locations where Colonial settlement emerged near *cenotes*. At Maní, a funnel-shaped *cenote* was covered during the Colonial period and new Christianized wells were excavated nearby in order to destroy the old connection between water and "pagan" beliefs (Forrest 1997). Ichmul also has wells excavated near where we believe the *cenote*(*s*) may have been located, which is within the church area, particularly near or even below the Black Christ church (Flores and Normark 2005). It is not unlikely that people covered the *cenote*(*s*) mentioned in early Colonial sources (RHGY 1983). At locations where the Black Christ is worshipped there is also a cave or a *cenote* present (Navarrete 1999).

Thus, the Spaniards did not recognize, or they ignored, the relation between caves and agriculture. Their *congregación* policy forced people to move to larger and denser settlement concentrations with permanent water sources rather than near "dry" caves. This policy was resisted by the local population and they often left the congregated settlement. The community strategies to solve water shortages during droughts thereby changed in a long-term perspective.

It is not just water/ rain that is needed during droughts, but also a dispersed settlement that spread risks to several econiches (McAnany 1995). The Colonial reorganization did not completely change the strategy of dispersion, but it is not unlikely that settlements were far more mobile in Prehispanic times. Caves were important in

these fluctuating settlement patterns, but probably not as sources of water per se. Rather, it was their ritual importance and their location in what may have been fairly untouched forest when the drought set in that may have been of importance. If people lived closer to permanent water sources during wetter periods, they would also have used areas closer to their permanent settlements, leaving areas near caves untouched, particularly in the southern Cochuah region where caves are more dispersed. The caves became attractive during droughts, perhaps because they may have been left untouched for a generation or two and allowed a high forest to grow in its vicinity. This forest could be cleared for *milpas* when lands closer to the permanent settlement were depleted through anthropogenic causes and thus became more affected by droughts (Shaw 2003b). As Chew (2007:42) argues: "Landscapes that have not suffered continuous deforestation and have forest reserves juxtaposed with agricultural or pastoral lands continue to be productive for the human communities. These landscapes are not as vulnerable to climatological and natural disturbance changes."

Small communities emerged around these caves during Prehispanic droughts and they were largely abandoned when climate changed back to wetter conditions. This also means that all settlements in a given area in the Terminal Classic were most likely not occupied at the same time, at least not during droughts. Mobility would therefore considerably reduce the demographic figures for settlements and their carrying capacities. There may not have been millions of dead people as Gill suggests.

The area of Spanish Colonial control became established very early and changed little during 270 years. It appears not to have expanded beyond the fracture zone in the east and southeast (the exception is a road to the military fortress at Lake Bacalar and the settlements along that road). Thus, the Chicxulub impact and its effect on the karstic environment that emerged when the ocean above the impacted seafloor disappeared, in combination with the Spanish landscape exploitation strategy, which they brought over from the Mediterranean area, became an obstacle for the expansion of the Colonial power in this particular region. This gives us a far more complex scenario of embedded spatial scales (the Spanish empire, non-contiguous Prehispanic polities, and the Late Cretaceous/Early Tertiary seafloor) and folded temporalities (Cenozoic era, Prehispanic- and Colonial periods) to consider when we try to understand events in the Cochuah region.

There is some indication that the Chicxulub fracture zone may have formed a sociopolitical boundary during the Prehispanic era as well, although on a smaller scale. The small, clustered plazas located at San Felipe, San Lorenzo, Benito Juarez and Tabasquito have so far only been found south of the fracture zone. Whether or not they formed part of polities other than the ones to the north can only be answered through excavation and continued mapping.

Part 6: Summary and Analyses

Chapter 44: Unmapped Historical Features

Adam Kaeding

The fundamental indication of historical components in the Cochuah region is the presence of a well that reaches the water table. While the possibility remains that these wells are modifications of Prehispanic water-management features, it has yet to be demonstrated conclusively that any fully functional wells existed in the region before the arrival of the Spaniards. As is evident throughout this report, there is a considerable degree of variability between the historical sites that develop around their central wells. Generally speaking, these have been introduced as ranchos and haciendas, but the wells are equally fundamental to the large *cabacera* centers as well as the smaller *visita* satellite settlements that housed the majority of the historical population. It appears, then, that any number of variations could develop around a well, but we have yet to locate any historic sites in the region that lack a well. As a result, it seems safe to say that the well would always have been a primary concern predating any further evolution of the site. Following this model, one could predict the presence of wells unaccompanied by any more complicated historical features. In fact, this is exactly that pattern noted throughout the region. The following is a list of the well features that are distributed throughout the Saban *ejido*, but, because of the lack of significant additional architecture appearing relevant to the historic period, were not mapped in any detail. The locations of each of these wells were registered with GPS and are included on the regional site map (Figure 2).

Chumpich

This site is characterized by only a well. The well itself is worthy of mention because it is of a huge diameter – roughly double that of the other round wells we have seen in the region. Meanwhile, the standard rancho complex would include at least some indication of a corral. At Chumpich there is no such corral. There are several insubstantial *albarradas* in the area of the well but none of these reveal any particular alignment or isolate an area. Likewise, there is no evidence for any foundations or other historic features in the immediate area.

To the southwest of the well there lies a distribution of Prehispanic mounds. These are currently easily visible within a cleared *milpa*. Though they haven't been thoroughly investigated, they seem to be fairly well preserved with and include *pilas*, platforms and range structures.

Yaxche

Yaxche is similar to Chumpich as it is characterized by little more than a well. The central well has only a few *albarradas* in the vicinity. These display no identifiable pattern. There are also two *pila* fragments in the area of the well that seem to be from separate *pilas*.

South of the well, in an area currently used as *milpa*, there is a scatter of small mounds and platforms. At least one of these mounds has been disturbed in two areas – possibly in a looting effort, but more likely as a means of salvaging construction stones.

Kancep

This site is only a well. The well itself is notable because it is a perfectly square cut, which has not been seen elsewhere in the region. This may suggest that the well cut is more recent in origin. Meanwhile, there are no other features in the region including *albarradas*. In fact, this site even lacks any evidence of a protective border for the well itself.

Rancho San Pablo

San Pablo, in fact, seems to demonstrate a fairly standard well and corral pattern. The *albarradas*, however, are small and poorly preserved. Because of this characteristic and project time constraints we were unable to map out the layout of the site. There is a *pila* next to the well itself, but no other features in association.

Yaxche (2)

This site, the further south of the two named Yaxche, is also essentially a well. Its only distinctive feature is a very tall tower to the side of the well, presumably the anchor for the crossbar over which water would have been drawn. Its compliment on the other side of the well has collapsed. There are some small *albarradas* in the area, but none that suggest a corral outline. There is also a nearby modern house structure. It is possible, though as of yet undetermined, that this modern structure sits on top of older foundations.

Rancho Kaní

Kaní is a fully operational and fairly expansive modern *rancho*. There is nothing outside of the well itself that appears to be of older origins.

Rancho Venadito

Like Rancho Kaní, this is a modern rancho whose only historic elements are the well itself, and, in this case, a nearby *pila*. The rest is a functional, operational rancho. The owner of Venadito supports this observation claiming that the well was the only feature in the area when his family constructed the rest 30 years ago.

Las Palmas

This is a well in a cleared *milpa*. Because of the lack of vegetation, it is clear to see that the well stands alone with no other architecture, including *albarradas*. The *milpero* using this land claims that the well itself reaches into a cave or *cenote*. There is nothing observable from the well itself to support this claim, though it is certainly not impossible.

Rancho Nevela

Like several in the Saban *ejido*, this rancho has very little associated architecture. There is, in fact, a small (4 X 4 meter) corral roughly 20 meters to the south.

Though we were unable to locate any other architectural features, our guides inform us that the site has a fairly rich recent history. For example, in recent years, Rancho Nevela was the location for a Cha'Chak ceremony which would have necessitated a small perishable structure and a wooden table. Similarly, there is a story concerning a family that lived here within the last generation – the son of whom still resides in Saban. This family would have had at least one perishable structure near the well. The fact that we were unable to locate any trace of these recent and known structures attests to the near invisibility of such architecture in the region.

Rancho Balche

Here is another example of a well with no other associated historic features. Because it is an operational ranch, Balche has all of the expected features. Aside from the well, however, none of these show any suggestion of antiquity.

It is certainly possible that there are other unused and unknown wells throughout the Saban *ejido*. As can be noted from our site map, however, it seems that we have collected a fairly comprehensive sample of such features in every direction. The sites listed above as 'Ranchos' are designated as such either because of some suggestion of a larger agricultural function for the area or because the well is currently the water source for a contemporary rancho. All of the names used are those currently in use by the people of Saban to refer to these wells or general areas.

Part 6: Summary and Analyses

Chapter 45: Conclusions

Dave Johnstone

We had proposed to study settlement dynamics within the Cochuah region, especially as it related to broad trends of nucleation and dispersion over time. However, the limitations on our permit prohibited the gathering of chronologically sensitive materials that might have permitted the establishment of both regional and temporal variability for a number of sites within the study area. As a consequence, our theoretical orientation has been limited to more traditional geographic models which lack a historical component, and therefore focus on the relationship between sites and geomorphology.

Within the current study area, there are noticeable differences between the northern portion of the study area, and that of the south. To the north of a line approximately corresponding to the Dziuche-Tihosuco road, the region falls within the Chicxulub fracture zone. The northern portion of the study area has more variation in the local topography, with greater access to the freshwater aquifer in the form of *cenotes* (karstic sinkholes) and caves. Greater relief has produced more erosion, and bare bedrock outcrops cover up to half of the land surface. The intervening flat bottomland is covered with a thin layer of iron rich soil, or *chacluum*. Thicker deposits of stony organic *kakab* soils tend to accumulate at the slope break between hill and bottomland. South of the Chicxulub fracture zone, the topographic relief is much reduced. Bedrock outcrops constitute only approximately 20 percent of the surface area. With less erosion, the soils are deeper. Humid, dark, organic *boxluum* soils are more commonly encountered. Unfractured caprock does however limit access to the water table. Freshwater is often limited to *aguadas*, most of which are seasonal in nature.

The geographic model envisions natural, geological settings as being critical in conditioning settlement. This hypothesis holds that geomorpological differences between the Chicxulub Fracture Zone, and the region beyond the Fracture Zone would have conditioned settlement. It is believed that the ancient Maya, like farmers today, would have recognized the deeper soils beyond the Zone as being valuable agricultural assets. At the same time, the Fracture Zone opened *cenotes* and caves, providing rare surface access to fresh water and to water related ritual. These differences in local environmental conditions between the sub-regions might have been sufficient to promote different settlement responses as climatic changes occurred. In particular, we might expect that bedrock might help to promote the establishment of new settlement during the Terminal Classic drought, as these outcrops were modified to store rainwater in *chultunes* (manmade cavities below the caprock).

It is hypothesized that, when water was relatively plentiful, the presence of deeper soils would have been a primary settlement determinant favoring settlement in the southern portion of the study area. Alternately, during drier periods, the availability of year-round surface water would have caused different sites, within the Fracture Zone to the north, to be preferable.

Much of our efforts during the 2008 field season were concentrated south of the fracture zone, a section of the study are that had been under-surveyed to date. The primary criterion for site location in the southern region seems to be the immediate association with pockets of deep, fertile soil, that are often still under cultivation today. As there are few natural rises in bedrock, to which settlement might otherwise conform, the sites in the southern portion of the region often display a higher degree of spatial planning and organization than do sites within the fracture zone. Sites in the south are more likely to display a dominant orientation, and the reservation of formal plazas. The absence of natural high places has likely also influenced the construction of artificial high zones in the form of acropolis groups. Shaw has suggested that many of the wells within the study area may have been constructed in prehispanic times. If this is true, then it might explain why the majority of these features were located south of the fracture zone, where lack of natural access to groundwater would have made the construction of these features more imperative than in the northern portion of the study area.

Though most of the newly surveyed Precolumbian sites could be classified as tertiary or quaternary sites within the settlement hierarchy, the amplification of the mapped area of San Felipe to include a *sacbe* linking a palace to the ceremonial 'center' of the site would characterize this site as a secondary site commensurate in size and social importance with Sacalaca. The unexpected discovery of what appear to be three ballcourts in the southern portion of the region and their absence within the fracture zone is likely related to social ritual. Ballcourts are often envisioned as artificial clefts, or entrances to the underworld. These features might be an indicator of the postulated 'Peten corridor', though that from Gruta de Alux possibly dates to the Postclassic period.

In the northern portion of the region, access to water was likely a primary determinant in settlement location, with many of the larger sites associated with *cenotes*, or the deeper caves. Instead of constructing wells, sites in the north sometimes contain *chultunes*, which are absent in the south. These chultunes may be taking advantage of the abundance of surface bedrock to aid in the diversion and capture of pluvial water. Those caves not containing water may have still held ritual roles as entrances to the underworld, and their frequency may explain why the absence of ballcourts in the northern part of the region.

Sites in the fracture zone seem to be characterized by organic development, free from the more highly organized spatial planning of sites south of the fracture zone. Geomorphological considerations may have played a role, as more formal site organization may have been sacrificed in order to take advantage of natural topographic relief in the situation of platforms and superstructures.

A zone without apparent Prehispanic occupation coincides with our proposed demarcation line between the fracture zone and the flatter region to the south. It is tempting to view this as a no man's land between polities. If this were to be the case, we might expect the ceramics from the northern portion to differ somewhat from those in the southern portion.

The identification of circular foundation braces as a possible temporally sensitive feature diagnostic of the Postclassic raises exciting possibilities for identifying

occupations dating to this period. Until this point, the only chronologically distinctively Postclassic architecture has been the mini shrines and their associated masonry altars.

With our historic component, some patterning is evident, although there is less distinction between zones than in the Precolumbian period; possibly because of a change in the subsistence focus to livestock. Two different resources may have helped to determine the location for some of the ranchos. If Shaw is correct, and many of these wells are Prehispanic, then the presence of preexisting wells may have been the primary determinant for the placement of ranchos. Alternatively, the presence of ancient settlement as a resource for quarried stone to build the corals and *albaradas* may have been the principal draw for ranch locations. What is apparent is that Haciendas seem to be located between 6 and 15 km from the major Colonial settlements of Saban, Sacalaca, and Ichmul. In this case, the 'commuting distance' may have played a role in the need for an on-site foreman or a house for the landholder. Of note is the limited variation in coral size. It would be interesting to know if this was a function of the relative carrying capacity of the region, or reflected certain restrictions imposed by the Colonial powers.

There do seem to be broad differences between the settlement of the sites within the fracture zone and those sites to the south. I have suggested that some of these could relate to basic geomorpological differences between these two zones. Alternatively, cultural forces such as differences in the nature of rulership might also account for the distinctive settlement in the two areas of our study. Hopefully this can be resolved through future excavation that will permit a more dynamic view of changing settlement through time.

References

Alexander, Rani T.

2003 Architecture, *haciendas*, and economic change in Yaxcabá, Yucatán. *Ethnohistory* 50(1):191-220.

2004 *Yaxcabá and the Caste War of Yucatán: An Archaeological Perspective*. University of New Mexico Press, Albuquerque.

Álvarez, Cristina

1997 *Diccionario etnolingüístico del idioma maya yucateco colonial*. *Volumen III: Aprovechamiento de los recursos naturales*, Universidad Nacional Autónoma de México, México.

Beach, Timothy

1998 Soil constraints on Northwest Yucatan, Mexico: pedoarchaeology and Maya subsistence at Chunchucmil. *Geoarchaeology* 13(8):759-791.

Bracamonte, P.

1994 *La memoria enclaustrada. Historia indígena de Yucatán, 1750-1915, Historia de los pueblos indígenas de México*. CIESAS, México.

Brady, James E.

1997 Settlement configuration and cosmology: the role of caves at Dos Pilas. *American Anthropologist* 99(3):602-618.

2004 Constructed landscapes - exploring the meaning and significance of recent discoveries of artificial caves. *Ketzalcalli* (1):2-17.

Brady, James E. and Keith M. Prufer (editors)

2005 *In the Maw of the Earth Monster: Mesoamerican Ritual Cave Use*. University of Texas Press, Austin.

Brenner, Mark, Michael F. Rosenmeier, David A. Hodell and Jason H. Curtis

2002 Paleolimnology of the Maya lowlands. *Ancient Mesoamerica* 13(1):141-157.

Campos-Enríquez, J. O., F. J. Chávez-García, H. Cruz, J. G. Acosta-Chang, T. Matsui, J. A. Arzate, M. J. Unsworth and J. Ramos-López

2004 Shallow crustal structure of Chicxulub impact crater imaged with seismic, gravity and magnetotelluric data: inferences about the central uplift. *Geophysical Journal International* 157:515-525.

Chew, Sing C.
2007 *The Recurring Dark Ages: Ecological Stress, Climate Changes, and System Transformation (World Ecological Degradation) by* AltaMira Press, Walnut Creek, CA.

Clendinnen, Inga
1987 *Ambivalent Conquests: Maya and Spaniard in Yucatan, 1517-1570* Cambridge Latin American Studies, 61 Cambridge University Press, Cambridge.

Connors, Martin, Alan R. Hildebrand, Mark Pilkington, Carlos Ortiz-Aleman, Rene E. Chavez, Jaime Urrutia-Fucugauchi, Eduardo Graniel-Castro, Alfredo Camara-Zi, Juan Vasquez and John F. Helpenny
1996 Yucatán karst features and the size of Chicxulub crater. *Geophysical Journal International* 127(3):F11-F14.

Corrigan, Catherine M.
1998 *The Composition of Impact Breccias from the Chicxulub Impact Crater, Yucatan Peninsula, Yucatan, Mexico*, Michigan State University.

Curtis, Jason. and David A. Hodell
1996 Climate variability on the Yucatán peninsula (Mexico) during the past 3500 Years, and implications for Maya cultural evolution. *Quaternary Research* 46:37-47.

Dahlin, Bruce H.
2002 Climate change and the end of the Classic Period in Yucatan: Resolving a paradox. *Ancient Mesoamerica* 13(2):327-340.

Dahlin, Bruce H., Timothy Beach, Sheryl Luzzadder-Beach, David Hixson, Scott Hutson, Aline Magnoni, Eugenia Mansell and Daniel E. Mazeau
2005 Reconstructing agricultural self-suffiency at Chunchucmil, Yucatan, Mexico. *Ancient Mesoamerica* 16:229-247.

DeLanda, Manuel
2002 *Intensive Science and Virtual Philosophy*. Continuum, London.

2006 *A New Philosophy of Society: Assemblage Theory And Social Complexity*. Continuum, London.

Deleuze, Gilles and Felix Guattari
1987 *Thousand Plateaus: Capitalism and Schizophrenia*. University of Minnesota Press, Minneapolis.

Demarest, Arthur A.
2001 Review: Climatic change and the Classic Maya collapse: The return of catastrophism *Latin American Antiquity* 12(1):105-107.

Escolero, O. A., L. E. Marín, B. Steinich, A. J. Pacheco, S. A. Cabrera and J. Alcocer
2002 Development of a protection strategy of karst limestone aquifers: The Merida Yucatan, Mexico case study. *Water Resources Management* 16:351-367.

Fagan, Brian
2004 *The Long Summer: How Climate Changed Civilization*. Basic Books, New York.

2008 *The Great Warming: Climate Change and the Rise and Fall of Civilizations*. Bloomsbury Press, London.

Farriss, Nancy M.
1984 *Maya Society Under Colonial Rule: The Collective Enterprise of Survival*. Princeton University Press, New Jersey.

Fedick, Scott L. and Bethany A. Morrison
2004 Ancient use and manipulation of landscape in the Yalahau region of the northern Maya lowlands. *Agriculture and Human Values* 21:207-219.

Fedick, Scott L. and Anabel Ford
1990 The Prehistoric Agricultural Landscape of the Central Maya Lowlands: An Examination of Local Variability in a Regional Context. *World Archaeology,* Vol. 22(1):18-33.

Flores Colin, Alberto
2003 Archaeological Reconnaissance of Outlying Sites in the Ejido of Sacalaca. In, *Final Report of the Cochuah Regional Archaeological Survey's 2003 Field Season*, ed. by J.M. Shaw. College of the Redwoods, Eureka.

Flores, Alberto C. and Johan Normark
2005 The central portion of Ichmul In *Final Report of the Cochuah Regional Archaeological Survey's 2005 Field Season*, edited by J. M. Shaw, pp. 7-24. College of the Redwoods, Eureka, CA.

Folan, William J., Joel Gunn, Jack D. Eaton and Robert W. Patch
1983 Paleoclimatological patterning in southern Mesoamerica. *Journal of Field Archaeology* 10:453-467.

Forrest, David W.
1997 *The Landscape of Mani: Metaphor and the Construction of Community in Yucatan*. University of Florida.

Franzén, Lars
2001 Global Warming and the Peatland/Ice Age Hypothesis. In *Proceedings of the 1st International Conference on Global Warming and the Next Ice Age*, Halifax.

García-Acosta, V., J. M. Pérez-Zevallos and A. Molina del Villar
2003 *Desastres agricolas en México. Catálogo histórico. Tomo I: Épocas prehispanica y colonial (958-1822)*. Fondo de Cultura Económica and CIESAS, México.

Gendrop, Paul
1997 Diccionario de arquitectura mesoamericana, Editorial Trillas, reimpresión 2007, México.

Gerhard, Peter
1993 *The Southeast Frontier of New Spain*. Norman and London, University of Oklahoma Press.

Gill, Richardson B.
2000 *The Great Maya Droughts*. University of New Mexico Press, Albuquerque.

Gill, Richardson B. and Jerome P. Keating
2002 Volcanism and Mesoamerican archaeology. *Ancient Mesoamerica* 13(1):125-140.

Gill, Richardson B., Paul A. Mayewski, Johan Nyberg, Gerald H. Haug and Larry C. Peterson
2007 Drought and the Maya collapse. *Ancient Mesoamerica* 18(2):283-302.

Gillespie, Susan D.
1991 Ballgame and Boundaries. In *The Mesoamerican Ballgame*, edited by V. Scarborough and D. R. Wilcox, pp. 317-347. University of Arizona Press, Tempe.

González-Herrera, Roger, Ismael Sánchez-y-Pinto and José Gamboa-Vargas
2002 Groundwater-flow modeling in the Yucatan karstic aquifer, Mexico. *Hydrogeology Journal* 10:539-552.

Gore, Al and Davis Guggenheim
2006 *An Inconvenient Truth* (film). Paramount Classics.

Gunn, Joel D., Ray T. Matheny and William J. Folan
2002 Climate-change studies in the Maya area. *Ancient Mesoamerica* 13(1):79-84.

Haug, Gerald H., Detlef Günther, Larry C. Peterson, Daniel M. Sigman, Konrad A. Hughen and Beat Aeschlimann
2003 Climate and the collapse of Maya civilization. *Science* 299:1731-1735.

Hodell, David, Mark Brenner, Jason H. Curtis and Thomas Guilderson
2001 Solar forcing of drought frequency in the Maya lowlands. *Science* 292:1367-1370.

Hodell, David, Jason H. Curtis and Mark Brenner
1995 Possible role of climate in the collapse of the Classic Maya civilization. *Nature* 375(1):391-394.

Hodell, David A., Mark Brenner and Jason H. Curtis
2005 Terminal Classic drought in the Northern Maya lowlands inferred from multiple sediment cores in Lake Chichancanab (Mexico). *Quat Sci Rev* 24:1413-1427.

2007 Climate and cultural history of the Northeastern Yucatan Peninsula, Quintana Roo, Mexico. *Climate Change* 83:215-240.

Houck Jr., Charles W.
2006 Cenotes, Wetlands, and Hinterland Settlemen, In *Lifeways in the Northern Maya Lowlans New Approaches to Archaeology in the Yucatan Peninsula,* ed. by Jennifer P. Mathews and Bethany A. Morrison, pp 56-76. The University of Arizona Press, Tucson.

Johnstone, Dave
2006 *Final Report of the Cochuah Regional Archaeological Survey's 2006 Analysis Season*. College of the Redwoods, Eureka, CA.

Kepecs, Susan and Rani T. Alexander (editors)
2005 *The Postclassic to Spanish-Era Transition in Mesoamerica: Archaeological Perspectives.* University of New Mexico Press, Albuquerque.

Kepecs, Susan and Silviane Boucher
1996 Pre-Hispanic cultuvation of *rejollada*s and stone-lands: new evidence from northeast Yucatan. In *The Managed Mosaic: Ancient Maya Agriculture and Resource Use*, edited by S. L. Fedick, pp. 69 - 91. University of Utah Press, Salt Lake City.

Kurjack, Edward Barna and Garza Tarazona
1980 *Atlas Arqueológico del Estado de Yucatán*, Instituto Nacional de Antropologia e Historia, Central Regional del Sureste.

Lefticariu, Mihai
2004 *Diagenetic History of the Cenozoic Carbonate Sedimentary Rocks of the Northwestern Yucatan Peninsula, Mexico*, Northern Illinois University.

Landa, Diego de
1998 Relación *de las Cosas de Yucatán*, Editorial Dante, Mérida, México

Levi, Laura J.
2003 Space and the Limits to Community, *In, Perspectives on Ancient Maya Rural Complexity*, ed. by Giles Ianone and Sam Connell, pp. 83-93. Cotsen Institute, Los Angeles

Lloyd, Christopher
2002 Locality and Observations of Group C and *Sacbe* 2. *Final Report of Proyecto Arqueológico Yo'okop's 2002 Field Season*, ed. by Justine M. Shaw, pp 109. College of the Redwoods, Eureka, CA.

2005a "The Site of San Felipe," In *Final Report of the Cochuah Regional Archaeological Survey's 2005 Field Season*, ed. by Justine M. Shaw, p. 151-153, College of the Redwoods: Eureka, CA.

2005b "San Felipe Operation 1," In *Final Report of the Cochuah Regional Archaeological Survey's 2005 Field Season*, ed. by Justine M. Shaw, p. 154-161, College of the Redwoods: Eureka, CA.

Lohse, Jon C. and Patrick N. Findlay
2000 A Classic Maya house-lot drainage system in northwestern Belize. *Latin American Antiquity* 11(2):175 - 185.

Lucero, Lisa J.
2002 The Collapse of the Classic Maya: A Case for the Role of Water Control. *American Anthropologist* 104(3):814-826.

2006 *Water and Ritual: The Rise and Fall of Classic Maya Rulers*. University of Texas Press, Austin

Marcus, Joyce
1998 The peaks and valleys of archaic states. In *Archaic States*, edited by G. M. Feinman and J. Marcus, pp. 59 - 94. School of American Research Press, Sante Fe.

Martin, Simon and Nikolai Grube
2000 *Chronicle of Maya Kings and Queens*. Thames and Hudson, London.

McAnany, Patricia A.
1990 Water storage in the Puuc region of the northern Maya lowlands: A key to population estimates and architectural variability. In *Precolumbian Population History in the Maya Lowlands*, edited by T. P. Culbert and D. S. Rice, pp. 263-284. University of New Mexico Press, Albuquerque.

1995 *Living with the Ancestors: Kinship and Kingship in Ancient Maya Society*. University of Texas Press, Austin.

Mendoza, Blanca, Virginia García-Acosta, Victor Velasco, Ernesto Jáuregui and Rosa Díaz-Sandoval
2007 Frequency and duration of historical droughts from the 16th to the 19th centuries in the Mexican Maya lands, Yucatan Peninsula. *Climatic Change* 83:151-168.

Morgan, J. and M. Warner
1997 Size and morphology of the Chicxulub impact crater. *Nature* 390:472-476.

Nalda, Enrique
2000 Dzibanché: un Primer Acercamiento a su Complejidad. *In Guardianes del Tiempo*, edited by Adriana Velázquez Morlet, pp. 37-71. Universidad de Quintana Roo/Instituto Nacional de Antropología e Historia, Chetumal, Quintana Roo, Mexico.

Navarrete, Carlos
1999 El cristo negro de Esquipulas: origen y difusión. In *Estudios: Revista de Antropología, Arqueología e Historia, 3ª Epoch*. Universidad de San Carlos de Guatemala-Escuela de Historia-Instituto de Investigaciones Históricas Antropológicas y Arqueológicas, Guatemala.

Normark, Johan
2003 Caves and settlement in the *ejido* of Sacalaca. In *Final Report of Cochuah Regional Archaeological Survey's 2003 Field Season*, edited by J. M. Shaw, pp. 70-91. College of the Redwoods, Eureka, CA.

2006 *The Roads In-Between: Causeways and Polyagentive Networks at Ichmul and Yo'okop, Cochuah Region, Mexico*. Göteborg University, Göteborg.

Pope, Kevin O., Adriana C. Ocampo and Charles E. Duller
1993 Surficial geology of the Chicxulub impact crater, Yucatan, Mexico. *Earth, Moon, and Planets* 63:93-104.

Prigogine, Ilya and Isabelle Stengers
1984 *Order out of Chaos: Man's New Dialogue with Nature*. Bantam, New York.

Reed, Nelson
1964 *The Caste War of Yucatán*. Stanford University Press, Stanford, CA.

RHGY
1983 Relación de Ichmul y Tikuch*.* In *Relaciones Histórico Geográficas de la Gobernación de Yucatán, Tomo II*, edited by M. de la Garza. Universidad Nacional Autónoma de México, México.

Rissolo, Dominique A.
2005 Beneath the Yalahau: emerging patterns of ancient Maya ritual cave use from northern Quintana Roo, Mexico*.* In *In the Maw of the Earth Monster: Mesoamerican Ritual Cave Use*, edited by J. E. Brady and K. M. Prufer, pp. 342-372. University of Texas Press, Austin

Robichaux, Hubert R.
2002 On the compatibility of epigraphic, geographic, and archaeological data, with a drought-based explanation for the Classic Maya collapse. *Ancient Mesoamerica* 13(2):341-345.

Scarborough, Vernon L.
1991 Courting in the Southern Maya Lowlands: A Study in Pre-Hispanic Ballgame Architecture. In *The Mesoamerican Ballgame*, edited by Vernon Scarborough and David R. Wilcox, pp. 129-144. The University of Arizona Press, Tucson.

1998 Ecology and ritual: water management and the Maya. *Latin American Antiquity* 9(2):135-159.

2003 *The Flow of Power: Ancient Water Systems and Landscapes*. SAR Press, Santa Fe.

Sharpton, Virgil L., Kevin Burke, Antonio Camargo-Zanoguera, Stuart A. Hall, Scott Lee, Luis E. Marín, Gerardo Suárez-Reynoso, Juan Manuel Quezada-Muñeton, Paul D. Spudis and Jaime Urrutia-Fucugauchi
1993 Chicxulub multiring impact basin: Size and other characteristics derived from gravity analysis. *Science* 261:1564-1567.

Shaw, Justine M.
2003a Ejido of Sacalaca. In, *Final Report of the Cochuah Regional Archaeological Survey's 2003 Field Season*, ed. by J.M. Shaw. College of the Redwoods, Eureka.

2003b Climate change and deforestation: implications for the Maya collapse. *Ancient Mesoamerica* 14(1):157-167.

2003c *Ejido* of Xquerol. In *Final Report of the Cochuah Regional Archaeological Survey's 2003 Field Season*, edited by J. M. Shaw, pp. 6-17. College of the Redwoods, Eureka.

2004 Sites with caves in the *ejido* of Sacalaca. In *Final Report of the Cochuah Regional Archaeological Survey's 2004 Field Season*, edited by J. M. Shaw, pp. 134-146. College of the Redwoods, Eureka.

2005a "The Site of Sisal," In *Final Report of the Cochuah Regional Archaeological Survey's 2005 Field Season*, ed. by Justine M. Shaw, p. 162-164, College of the Redwoods: Eureka, CA.

2005b "Sisal Operation 1," In *Final Report of the Cochuah Regional Archaeological Survey's 2005 Field Season*, ed. by Justine M. Shaw, p. 165-170, College of the Redwoods: Eureka, CA.

2005c Chakal Ja'as Operation 1. In *Final Report of the Cochuah Regional Archaeological Survey's 2005 Field Season*, edited by J. M. Shaw, pp. 107-113. College of the Redwoods, Eureka.

2008 *White Roads of the Yucatan.* The University of Arizona Press, Tucson

in preparation Settlement pattern shifts in the Cochuah region. In *2500 Years of Occupation in the Cochuah Region*, edited by J. M. Shaw.

Shaw, Justine, Sandra Bever, Annie Hanks, Tara Holman, Dave Johnstone, Maya Kashak, Christopher Lloyd and Veronica Miranda.

2002 *Final Report of The Selz Foundation's Proyecto Arqueológico Yo'okop 2002 Field Season: Excavations and Continued Mapping*, edited by Justine M. Shaw. College of the Redwoods: Eureka, CA.

Shaw, Justine M., Dave Johnstone and Ruth Krochock

2000 *Final Report of the 2000 Yo'okop Field Season:Initial Mapping and Surface Collections*. College of the Redwoods, Eureka, CA.

Smith, Adam T.

2003 *The Political Landscape: Constellations of Authority in Early Complex Polities*. University of California Press, Berkeley.

Stone, Andrea J.

1995 *Images from the Underworld: Naj Tunich and the Tradition of Maya Cave Painting*. University of Texas Press, Austin.

Tedlock, Dennis

1996 *Popol Vuh: The Definite Edition of the Mayan Book of the Dawn of Life and the Glories of Gods and Kings*. Simon & Schuster, New York.

Velázquez Morlet, Adriana, Edmundo López de la Rosa, Maria del Pilar Casado López, and Margarita Gaxiola

1988 *Zonas Arqueológicas de Yucatán*, Instituto Nacional de Antropología e Historia, México.

Ward, W. C. and J. L. Wilson

1985 Geology of Yucatan platform. In *Geology and Hydrogeology of the Yucatan and Quaternary Geology of the Northeastern Yucatan Peninsula*, edited by W. C. Ward, A. E. Weidie and W. Back, pp. 1-19. New Orleans Geological Society, New Orleans.

Webster, David

2002 *The Fall of the Ancient Maya: Solving the Mystery of the Maya Collapse*. Thames and Hudson, London.

Weiss-Krejci, Estella and Thomas Sabbas

2002 The potential role of small depressions as water storage features in the central Maya lowlands. *Latin American Antiquity* 13(3):343-357.

Whitmore, T. M. and B. L. Turner

2000 Landscapes of cultivation in Mesoamerica on the eve of the conquest. In *The Ancient Civilizations of Mesoamerica: A Reader*, edited by T. M. E. Smith and M. A. Masson, pp. 119-143 Blackwell Publishers, Malden

Wilson, Reginald

1974 Okop: Antigua Ciudad Maya de Artesanos. *INAH Boletin* Epoca II:9: 3-14.

Wittfogel, Karl

1957 *Oriental Despotism: A Comparative Study of Total Power*. Yale University Press, New Haven.

Young, Tatiana

2005 CRAS 2005: Mapping and Excavations at Parcela Escolar, In *Final Report of the Cochuah Regional Archaeological Survey's Field Season*, ed. by Justine M. Shaw, pp. 116-124. College of the Redwoods, Eureka, CA.