

THE BUILT EXPERIENCE: SPATIALITY AND SUPRA-HOUSEHOLD
COMMUNITY AT CERRO SAN ISIDRO, NEPEÑA VALLEY, PERU

THE BUILT EXPERIENCE: SPATIALITY AND SUPRA-HOUSEHOLD
COMMUNITY AT CERRO SAN ISIDRO, NEPEÑA VALLEY, PERU

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Lay Abstract

This research examines how everyday experiences of space influenced life in the early urban center of Cerro San Isidro in Peru's Nepeña Valley, focusing on the period between 800 BCE and 200 BCE. I explore how people navigated, perceived, and lived within their built environment—and how those spatial practices fostered cooperation and identity. Using drone mapping, ground-penetrating radar, excavation, and walking surveys, I identify clusters of households—"supra-household communities"—that were physically distinct but socially connected. I argue that these communities formed the foundation of how the settlement was organized and how people cooperated. I also demonstrate that shared experiences, especially visual and movement-based interactions, contributed to the development of a collective identity. This study challenges traditional notions of urbanism, demonstrating that urban centers can emerge through lived experience and shared practice, rather than centralized power. It highlights how people created meaningful lives together through the spaces they built and used.

Abstract

In this dissertation, I examine how everyday experiences of space influenced life in the early urban center of Cerro San Isidro in Peru's Nepeña Valley, with a specific focus on the Early Horizon period (800–200 BCE). Rather than focusing on traits, monumentality, or state authority, I investigate how people experienced, navigated, and lived within their built environment, and what those patterns reveal about community, cooperation, and identity. I employ a multi-modal, integrated methodology using Unmanned Aerial Vehicles (UAVs), Ground-Penetrating Radar (GPR), excavation, and pedestrian survey results, paired with Geographic Information Systems (GIS). Through this methodology, I advance three central hypotheses. First, Cerro San Isidro represents a form of low-density urbanism within a broader, integrated regional network. Second, I demonstrate that supra-household communities were present at Cerro San Isidro, based on evidence of spatial clustering, physical distinctiveness, and the presence of multiple households; these communities formed the basis for settlement organization. Third, shared experiences—specifically visibility and movement—reinforced cohesion and supported collective identity within supra-household communities and across the settlement. These findings demonstrate that early urban life at Cerro San Isidro was made meaningful through the experience of built space.

Supra-household community identity and cooperation were not abstract ideals, but lived realities, reinforced through the spatial layout of the settlement and the ways its residents engaged with it. I argue that to fully understand early urban life, we must look not only at how space was constructed, but how people interacted with and lived within what was built. Through this dissertation, I contribute to ongoing efforts to deconstruct Western models of urbanism by emphasizing the diversity of urban forms and trajectories and by highlighting the centrality of everyday experience in shaping early urban populations.

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List of Abbreviations and Symbols

AD – Anno Domini

AMS – Accelerator Mass Spectrometry

BC – Before Christ

BCE – Before Common Era

CE – Common Era

CSI – Cerro San Isidro

DEM – Digital Elevation Model

EH – Early Horizon

EIP – Early Intermediate Period

GIS – Geographic Information Systems

GPR – Ground Penetrating Radar

GPS – Global Positioning System

IP – Initial Period

JAXA – Japan Aerospace Exploration Agency

LCA – Least-Cost Analysis

LH – Late Horizon

LIP – Late Intermediate Period

Masl – Meters above sea level

MNV – Minimum Number of Vessels

MH – Middle Horizon

PIACSI – Proyecto de Investigación Arqueológica Cerro San Isidro

SNA – Social Network Analysis

UAV – Unmanned Aerial Vehicle

Declaration of Academic Achievement

Kayla Golay Lausanne conducted the research presented in this dissertation under the supervision of Dr. Andrew Roddick, Dr. Shanti Morell-Hart, and Dr. David Chicoine. The research questions were developed in consultation with the supervisory committee. Permits for this research were granted by the Ministerio de Cultura del Perú (Resolución Directoral 000235-2022-DCIA/MC). GPR and UAV data collection and analysis were carried out by Kayla Golay Lausanne. Pedestrian survey, excavation, and ceramic data were collected by the Proyecto de Investigación Arqueológica Cerro San Isidro team under the supervision of Dr. David Chicoine and Jeisen Navarro Vega. Radiocarbon dating was conducted at the Oxford Radiocarbon Accelerator Unit (ORAU) and the University of Arizona laboratory, with analysis completed by Dr. David Chicoine. Subsequent data analysis of materials used in this dissertation was undertaken by Kayla Golay Lausanne. While some of the data were produced collaboratively in the field, all interpretations and writing are the sole responsibility of the author. This project was supported by funding from the Social Sciences and Humanities Research Council (SSHRC), the Ontario Graduate Scholarship (OGS), the National Science Foundation (Award #1853905), and the Department of Anthropology and Faculty of Social Sciences at McMaster University.

1 Dissertation Goals and Overview

One of humanity's most transformative innovations was the emergence of urban centers, where physical infrastructure helped to interweave people's lives to create vibrant communities marked by complex social, economic, and cultural ties. In many regions of the world, early urbanization reshaped human history, offering new settings and affordances that shaped how people lived, interacted, and shared identities. At the heart of this transformation were what I refer to as supra-household communities—groups of households bound not only by proximity but by shared spaces and social connections (Baird et al. 2017; Carter 2023; Cohen 1985; Hodder 1987; Hodder 1990). These communities formed the essential fabric of early cities, forging collective identities and shaping daily life in ways that transcend simple definitions of urbanization. The emergence of early urban centers in the Andean region reflects not only shifts in population density and spatial organization but also transformations in how communities were enmeshed in social, cultural, and political landscapes.

This dissertation examines how the supra-household communities at Cerro San Isidro (760 cal. BCE-1453 cal. CE), situated within Peru's Nepeña Valley, played a foundational role in shaping early Andean urbanization. I argue that Cerro San Isidro represents a population center within a low-density urban system due to the dispersed yet interconnected network of settlements in the surrounding region, the ceremonial function of Cerro San Isidro, the presence of ceremonial public architecture in the landscape, and evidence of labour mobilization and modular community-based organization at Cerro San Isidro. By considering Cerro San Isidro as part of an urban settlement, I challenge Western urban models of density and centralization, recognizing that urban life can emerge through dispersed forms of organization. Additionally,

framing Cerro San Isidro part of an urban settlement allows for greater comparative conversations about the diversity of urban forms in the Andes.

Similarly, through this dissertation, I argue that the modular units at Cerro San Isidro are supra-household communities due to the presence of spatial clustering, physical distinctiveness, and multiple households. I am particularly interested in daily life during the incipient stages of urbanization, when people first chose to cooperate and live in close-knit communities. By investigating daily life, spatial organization, and the interactions within and between these communities, I analyze how Cerro San Isidro's residents fostered a collective identity amidst times of considerable geopolitical turmoil.

By exploring the spatial, social, and economic interactions among the ancient Cerro San Isidro communities, I shed light on how their organization facilitated social cohesion, cooperation, and collective identity formation, even as broader regional instability pressured surrounding settlements. I argue that the shared, face-to-face social experiences at Cerro San Isidro were central in shaping new forms of political arrangements, departing from previous patterns of settlement dispersal (Billman 1996; Reindel 2009; Silverman 1993; Willey 1953; Wilson 1988). Through daily interactions, engagement with culturally significant landmarks, and economic cooperation, these shared experiences – what psychologists also call the “village effect” (e.g., Pinker 2014) – reinforced a strong sense of belonging and mutual support among residents. Throughout this thesis, I employ an experiential approach to explore how the spatial layout, movement, and visibility within and among supra-household communities contributed to a cohesive identity amongst Cerro San Isidro residents while also fostering cooperation within the settlement as a whole. The strengths of an experiential approach are its ability to understand past social realities as dynamic and lived, offering a more human perspective of communities and

the forms of cooperation and belonging they fostered. Using an embodied, sensory experience to assess communities highlights human variability at the community level, to see how movement, perception, and interaction with space and each other shaped identities and relationships in different ways. In addition, applying this approach in urban settings allows us to understand that urban spaces are not just architecture but the everyday experiences of the people who live within them.

The Andean region has been a critical area for early urban studies, as it boasts a long, complex, and unique urban prehistory, characterized by great cultural diversity, varied environmental and geographical contexts, and distinctive spatial forms (Rowe 1963). While pre-Hispanic Andean urbanism was largely overlooked until the early 21st century, recent decades have seen a shift in attention due to broader re-evaluations of what constitutes a city. As numerous scholars (Alt and Pauketat 2019; Makowski 2008; Marcus and Sabloff 2008; Storey 2006; Yoffee 2009; Yoffee 2019; Yoffee and Terrenato 2015) have argued, traditional Western models—grounded in processual, linear, and teleological frameworks—have long constrained the recognition of diverse urban trajectories. These traditional models prioritize bureaucratic centralization, high population density, and state formation—criteria that many Andean settlements do not typically fulfill. They often assume that urban development is a linear phenomenon characterized by progressive stages that produce a uniform pattern with universally agreed-upon defining features. In the last two decades, Andean scholars (Isbell 2004; Janusek 2004; Jennings 2016; Makowski 2008, 2016, 2023) have questioned early assumptions about linear, traditional ideas of urban development and highlighted that urban societies in the Andes developed much differently from other parts of the world, in part due to this region's environmental and geographical conditions and historical processes. Similarly, urbanity in the

Andes developed in various ways, with some of its most iconic societies, particularly the Inka, having non-urban or peri-urban settlements (Kolata 2013). As such, recent archaeological research in the Andes has moved away from these linear models— such as the assumption that cities develop in a progressive sequence from ceremonial centers to fully urbanized, densely populated settlements—to consider and emphasize diverse urban forms, as seen in the reinterpretation of sites like Pikillacta and Caral as ceremonial-administrative centers rather than cities in the traditional sense (Makowski 2008; Swenson 2011; Warner 2010).

A substantial body of literature explores the origins and development of early urban settlements by examining the factors that contributed to their emergence, growth, and transformation over time (Cowgill 2004; Hutson 2016; Smith 2010b, 2023). While scholars have attempted to analyze the relative causal weight of different “prime movers,” they have paid comparatively little attention to the materiality and spatiality of day-to-day lives within ancient cities. Yet, understanding how people interacted with built environments, moved through urban spaces, and engaged with material culture is essential for reconstructing how urban life was organized, experienced, and made meaningful. This perspective shifts the focus from abstract models of urban development to the lived realities that shaped and sustained ancient urbanism on the ground. In the Central Andes, for instance, much research has focused on the monumental nature of urbanism and whether their associated political systems conformed to “state-level” formations. Recently, however, scholars have shifted their attention to the lived experiences of people within these spaces and their materiality. Urban centers represent crucibles of human interaction, where diverse communities coexist, negotiate identities, and forge collective narratives. By focusing on how people created, maintained, and transformed spaces,

archaeologists can better explore the material and spatial dimensions of day-to-day life in ancient cities.

By exploring the formation of supra-household communities, that is, multiple households sharing a common identity, at the urban center of Cerro San Isidro, Nepeña Valley, Peru, I investigate how people structured their lives, interacted within shared spaces, and navigated the complexities of urban living. The archaeological study of these communities, which sit between household and city levels, reveals the organization of cities, the administrative strategies of the elite, and the forces structuring city form. Supra-household community studies create an avenue to move beyond basic units of household activity to examine community building, identity formation, and negotiations within the urban fabric of a city (Pacífico 2019; Pacífico and Truex 2019). Scholars exploring such communities have made significant contributions to our understanding of sociopolitical change, offering insight into the relationships between households and city and/or state administration (Fargher et al. 2019; Truex 2019). By moving beyond the household/city scale, the analysis of “intermediate” level supra-household communities helps bridge the gap between domestic life and broader urban institutions.

By assessing the complexities of supra-household communities, we can gain insight into the social, economic, and political structures underpinning early urban landscapes. Communities serve as a critical interface where everyday practices mediate between individual households and broader top-down processes, such as state administration, elite authority, and institutional control. Larger social formations—including civic or state-level identities, religious ideologies, and political mandates—are negotiated, adopted, or even contested within these intermediate groups. Exploring how supra-household communities align with or diverge from dominant city or state identities allows us to trace moments of conformity, adaptation, or resistance. For

example, supra-household communities could reinforce, reinterpret, or subvert state ambitions depending on context. We can address how the social environment influences and is influenced by the identity of its residents. Furthermore, understanding these dynamics reveals how supra-household communities in the past functioned to provide a sense of belonging, foster attachments, and construct the place's meaning.

The social identity of a community is anchored in the idea of a shared space through lived experiences (Carsten and Hugh-Jones 1995). Sharing spaces means that residents often jointly participate in daily activities. This can be a socially potent phenomenon that informs on people's perception and cultural expectations (Mac Sweeney 2011). Social practices, interaction, and encounters have been argued for decades as forming and being informed by human perception, particularly in relation to community identity formation (Bourdieu 1977; Buber 1947; Giddens 1984). For example, Bourdieu (1977) emphasizes how habitual practices—or habitus—structure how individuals perceive and engage with the world, thus reproducing social identities over time. Giddens (1984) similarly stresses the recursive relationship between structure and agency, where individuals both draw upon and modify social norms through their actions. In recent years, archaeology as a field has also been incorporating notions of phenomenology and experience of space in interpretive frameworks of identity (Brück 2005; Hodder and Hutson 2003; Tilley 2016). Earlier work on theories of practice, particularly by scholars like Bourdieu (1977) and Giddens (1984), emphasized that identity is constituted through repeated, embodied actions in space, highlighting the recursive relationship between daily practices and social structures. These insights shift the focus from identity as a static label to identity as something performed and negotiated through practice. Phenomenological approaches built on this by arguing that lived experience—how people perceive, move through, and emotionally engage with space—is

fundamental to how they understand themselves and their communities. By foregrounding sensory and embodied experience, phenomenology enables archaeologists to explore identity not just as a social construct, but as something shaped through spatial encounters, memory, and perception.

In this research, I argue that social experiences within communities served as mechanisms that fostered identity formation and subsequently cooperation within four supra-household formations at Cerro San Isidro. I focus on two avenues of experience – visibility and movement. Visual experience refers to the way individuals observe and interpret the physical characteristics of a space. In a settlement characterized by significant topographic variation—and consequently, diverse lines of sight—visibility likely plays a crucial role in how individuals interact with one another and other key places within the valley. Who is seen, what is seen and from where affect how authoritative, belonging and shared memory are negotiated in the landscape. On the other hand, movement experience pertains to the way people navigate and move through a space. Patterns of movement structure interactions, encounters and routines that foster cooperation or reinforce social boundaries. Analyzing movement provides insight into how people experienced communal life and how their movement influences a shared sense of identity through practice. By assessing the visual and movement experiences of these four communities, I highlight how experience influences the cooperation of supra-household communities.

The Central Andes is an ideal region for conducting this research due to its rich urban history, intertwined with the prominence of supra-household communities. There are various types of supra-household communities seen in the Andes, such as *ayllu* (Doyle 1988; Zuidema 1964; Zuidema 1973), neighbourhoods (Chicoine and Whitten 2019; Covey 2020; Pacifico 2019; Swenson 2019; Vallières 2012), and patio groups (Isbell 2008; Marsh 2016), amongst others. The

presence of supra-household communities across diverse temporal and social contexts underscores their importance as fundamental building blocks of Andean societies, providing social, economic, political, and cultural foundations in various urban and non-urban environments. Understanding the dynamics of these communities offers valuable insight into the everyday lives of urban residents. Scholars have suggested that supra-household groups such as *ayllus*, patio groups, and kin-based residential clusters often played a significant role in urban social organization (Doyle 1988; Jennings and Berquist 2023; Smith 2010a; Zuidema 1973). These groups appear to have helped organize labour, ritual activities, and resource distribution, and may have served as key points of connection between individuals and broader political or religious institutions. In urban settings, they likely contributed to patterns of social interaction and spatial organization, shaping how residents experienced and participated in urban life.

My focus is on Cerro San Isidro, an archaeological complex in north-central Peru (Figure 1.1). It is strategically located in a mid-elevation circumscribed region referred to as the Moro Pocket. The site can be operatively divided into two sectors based on previous archaeological research: Puente Piedra (PV31-50) and Cerro San Isidro (PV31-51) (see Proulx 1968). Puente Piedra consists of an ashlar-like stone building (aka megalithic) that was partially tumbled during the Ancash earthquake of 1970. My project focuses on the Cerro San Isidro sector, a natural mound that has been modified by its inhabitants through a series of anthropogenic terraces and at least sixteen architectural platforms, which I identify and further discuss in Chapter 5. In Chapter 5, I also make the case for Cerro San Isidro as an urban population core within a low-density urban system due to the dispersed but interrelated nature of settlement in the Moro Pocket, the ceremonial function of Cerro San Isidro, the presence of public ceremonial architecture in the

landscape, the requirement of labour mobilization, and the community-based modular organization.

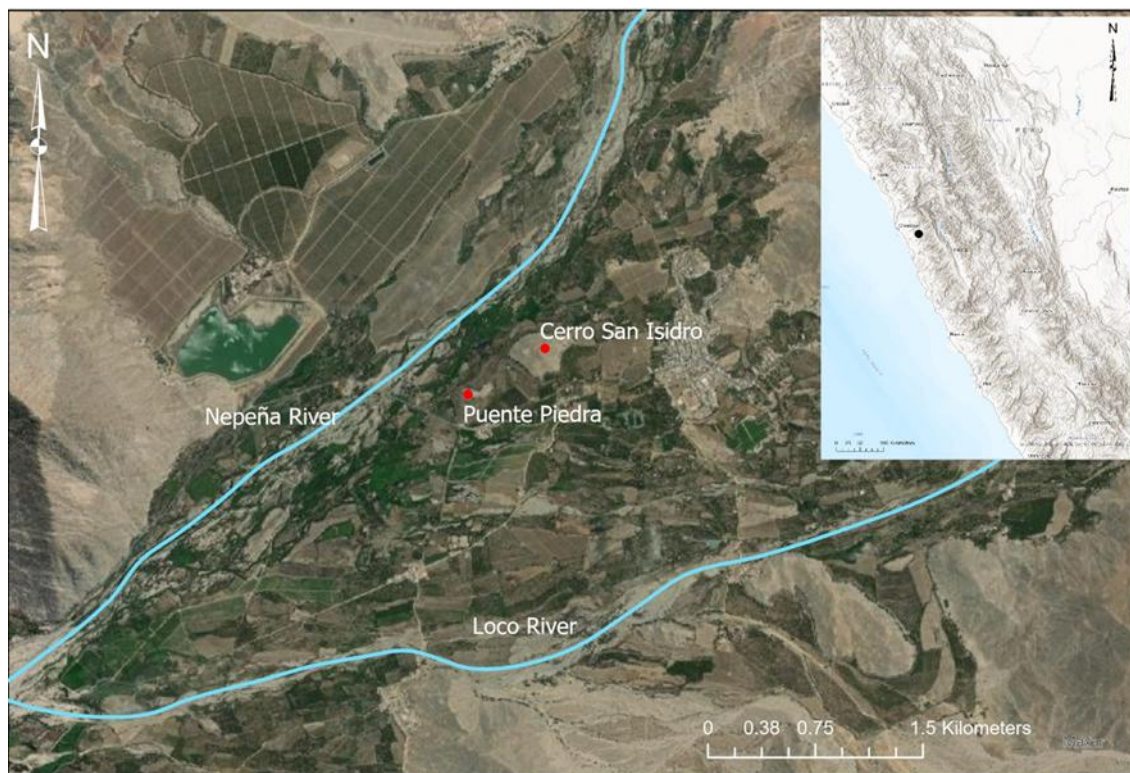


Figure 1.1: Map of Cerro San Isidro Archaeological complex within the Moro Regions of the Nepeña valley.

Based on archaeological sampling, including radiocarbon dates and excavation data, the site underwent three primary phases of occupation: the Early Horizon (EH) (800 – 200 BCE), the Early Intermediate Period (EIP) (200 BCE – 600 CE), and the Late Intermediate Period (LIP) (1000 – 1470 CE). As I am interested in assessing early urban life and cooperation, I focus this project on the Early Horizon occupation of Cerro San Isidro. During this time, Ikehara (2015) argues that Cerro San Isidro was an important population center, where the population of the Moro Pocket soared from 1,500 people between 800-450 BCE to 10,000 between 450-150 BCE (Figure 1.1). Similarly, at this time, the Moro Pocket was a bustling space, featuring a series of large megalithic centres, residential areas, and agropastoral fields, all of which were potentially part of an integrated urban network, as I argue in Chapter 5.

This research project is part of a larger initiative, the *Proyecto de Investigación Arqueológica Cerro San Isidro*, co-directed by David Chicoine and Jeisen Navarro Vega (Chicoine and Navarro Vega, 2021). The San Isidro field project itself is part of a larger research effort focused on understanding the emergence of divine lordships in the north-central Peruvian Andes, co-led by George F. Lau and David Chicoine (Lau et al., 2023). I joined the team in the field in 2022 at Cerro San Isidro, where I carried out aerial and geophysical surveys using an Unmanned Aerial Vehicle (UAV) and Ground Penetrating Radar (GPR) to map the settlement and its surrounding landscape. Through mapping operations and pedestrian surveying, we identified and delineated dense clusters of architecture. The closeness of houses, but physical separation of these clusters, gives purchase to the existence of spatially distinct supra-household communities. As part of the larger initiative aimed at understanding power and spatiality at Cerro San Isidro, Chicoine and Navarro Vega's team conducted excavations at four of these dense residential clusters. This thesis examines the spatial organization and material practices within these four supra-household communities, using data from excavation and spatial analysis to explore how daily life, social interaction, and community structure were shaped and expressed across the settlement.

Cerro San Isidro emerged during a period of regional reorganization marked by shifting political hierarchies, new forms of religious expression, and changes in settlement patterns, making it a valuable location for assessing early urbanization processes. This site represents a localized response to broader disruptions, making it especially useful for exploring how communities negotiated emerging forms of collective life and spatial organization. The abrupt end to the Cupisnique-Chavín Religious Complex (see Ikehara 2023) sparked geopolitical turmoil and ideological crisis across the coast (Burger 1992; Chicoine et al. 2023; Ikehara 2015,

2021, 2022). Inhabitants changed their ritual life, ceramic styles, political organization, and settlement patterns (Chicoine et al. 2023). Large, open ceremonial centers and mounds were abandoned, and many valleys across the northern coast of Peru witnessed the rise of military conflict and the dispersion of groups into small hamlet communities (Ikehara 2015). However, at this time, the Nepeña Valley experienced increased nucleation as the populations moved into dense settlements associated with irrigation systems and the formation of urban settlements (Ikehara 2015). Chicoine et al. (2021) view the emergence of dense, architecturally differentiated political centers as the materialization of complex social and regional tensions, armed conflicts, and political centralization within the valley. This unique formation of urban settlements within the Moro district makes it an exciting region to study early urbanization processes and life within an early urban settlement, offering a valuable opportunity to learn about the social lives of people in these early urban formations.

1.1 Research Questions

I ask four series of questions, which together work towards understanding how social cohesion, cooperation, and collective identity were fostered within supra-household communities at Cerro San Isidro. I argue that shared social experiences within Cerro San Isidro communities were critical mechanisms of cooperation and identity formation in an early Andean urban centre.

Spatial Organization and Urban Form

The first set of questions investigates the physical structure of Cerro San Isidro to understand how its spatial layout reflects early urban characteristics and the presence of supra-household communities. A central concern of my dissertation is the nature of Cerro San Isidro as an early urban settlement. Before exploring lived experience, movement, or community life, it is

critical to assess whether Cerro San Isidro exhibits the morphological characteristics of an urban center. What makes Cerro San Isidro “urban”? I ask which morphological attributes suggest that Cerro San Isidro is an early urban settlement? Researchers have described Cerro San Isidro as a population center (Ikehara 2015) and urban settlement (Chicoine and Navarro Vega 2023) due to its high population, based on the concentration of ceramic materials, relative to the Moro Pocket, but the exact characteristics of this settlement that make it urban, such as population estimates, structural layout, and connection to local settlements, have not been discussed. This raises questions about what characteristics define an urban settlement in this context.

Because this project investigates how people experience and engage with the built environment—through movement, visibility, and spatial relationships—it is crucial to understand the organization and form of the settlement. By analyzing the site's layout, topography, and architectural configurations, I can assess how space was structured and navigated, and how those patterns influenced community interactions and social cohesion. There have been a few early descriptions of Cerro San Isidro (Daggett 1984; Proulx 1968), which are based on pedestrian surveys of the settlement. These descriptions classify the site as a natural mound modified through anthropogenic terracing and consider it a ceremonial-residential settlement with a large open plaza for ceremonial activities. In what ways does a map of Cerro San Isidro align with or differ from previous descriptions of the settlement? By providing a birds-eye-view and spatial analysis of the site layout and topography, does the settlement description change? Is Cerro San Isidro a natural mound modified through anthropogenic terracing? Is the settlement a ceremonial-residential space with a large open plaza for ceremonial activities? Or do the ground-penetrating radar, UAV, and pedestrian surveys indicate otherwise?

Since I assess urban life through the lens of supra-household communities, conceived as both social relationships and the spatial arrangements that support them, I must consider how such communities were expressed at Cerro San Isidro. Given that the site is considered an urban settlement and supra-household communities are often viewed as universal features of urban settlements (Smith 2010a), which morphological characteristics of the settlement suggest their presence? As mentioned earlier, my assessment of the settlement reveals clustered multi-household structures; however, what specific features indicate that these are supra-household communities?

To address these questions, I draw on a combination of Unmanned Aerial Vehicle (UAV) mapping, ground-penetrating radar (GPR) surveys, excavation results, and pedestrian survey data to reconstruct the settlement layout, examine patterns of architectural clustering, and explore spatial distinctiveness at Cerro San Isidro. Through this approach, I analyze the site's morphological features and compare them to previous descriptions of the settlement to better understand its urban characteristics. Additionally, I investigate the socio-spatial organization to infer the presence of supra-household communities, focusing on the spatial arrangement and clustering of architectural features.

Temporality and Daily Life

The second set of questions contextualizes the lived experience at Cerro San Isidro, with a focus on the Early Horizon period. To fully grasp how people experience space, we must situate the inhabitants in their environments and in time. In particular, I must grapple with the materiality of an urban centre with such a long occupation and a palimpsest of infrastructures and other material remains. How do I create a map of the Early Horizon settlement, the time period of concern? Additionally, what was the nature of life for the populations throughout this

extended occupation? Was habitation continuous across the four supra-household communities, or did patterns of use shift over time?

This series of questions also provides a foundation for understanding the nature of the four supra-household communities under study at Cerro San Isidro. The landscape is imbued with meanings that differ from person to person, influenced by social distinctions such as power and economic status, which shape varied spatial experiences (Kosiba and Bauer 2012).

Therefore, it is vital to consider the context of the people and how they interpret their surroundings, as these interpretations ultimately shape their interactions with the landscape. Previous research (Ikehara 2015), based on surface surveys, indicated that Cerro San Isidro was a population core for elite, or high-status, individuals, characterized by a notable concentration of fine ware ceramics relative to other settlements in the Moro Pocket. Does the ceramic data from these four communities indicate that these were elite or high-status social segments? If all communities were relatively equal, I would expect to see a similar distribution of high-quality and decorative styles throughout each assemblage. However, if specific supra-household communities held higher status, I would anticipate a disproportionate concentration of fine ware ceramics in one or more of these supra-household communities. Alternatively, if no elite communities were present at Cerro San Isidro, I would expect to see little to no fine ware ceramics.

Beyond status, the types and styles of ceramic vessels may also speak to the nature of everyday activities. What was the distribution of ceramic types? Was each community involved in similar activities based on types and styles of ceramic vessels? Or did the communities perhaps participate in different tasks? This line of questioning contributes to a preliminary assessment of the activities in which these four communities were involved. Understanding both

activity patterns and indicators of elite status is essential to exploring how people engaged with and experienced their shared space.

I draw on ceramic analysis, excavation data, and radiocarbon dates to contextualize daily life during the Early Horizon occupation. This material helps establish chronological control, allowing me to evaluate patterns of continuity or variability in occupation across supra-household communities during this period. I also examine ceramic assemblages within each supra-household unit to identify potential markers of elite status and to determine activity patterns within these spaces.

Viewscapes and Social Dynamics in Supra-household Communities

The third set of questions explores how visual experiences—what people could see and what they were seen by—shaped collective identity and social power. By assessing the viewsheds and the “visual experience” of these four supra-household communities, I can learn how vistas influenced the residents' experience of space and how, in turn, this experience shaped their collective identity. This focus on visual experience builds on a well-established body of research demonstrating that visual connection to key landscape features and built forms play a critical role in shaping how people perceive, navigate, and assign meaning to space, factors that are central to the formation of collective identities within communities (Gillings 2012; Ingold 2000; Llobera 2007; Tilley 1994; Van Dyke, et al. 2016).

First, I ask if the viewscapes of four supra-household communities identified at Cerro San Isidro emphasize specific landmarks, architecture, or spatial configurations, such as mountain peaks (often associated with apex ancestors [aka *apus*] in the Andes), *wak'as* (places or landscape features that have agency, social significance, and embody sacred power in the Andean world), water, or other resources? How might the visibility of these features influence group

identity? Research has shown that local, indigenous communities, both in the present and deep past, have strong connections with the landscape, and seeing such features may have shaped their sense of identity and belonging (Bray 2015a; Janusek 2015a; Williams and Nash 2006). If the viewsheds represented or would have influenced particular ideological or ontological purposes, such as affirming communal ties to specific landscape features or regions, or structuring ritual movement, I would expect to see an increased emphasis on the presence of particular *wak'as* or mountains in their viewsheds. For instance, if a community has visual prominence of sacred sites like *wak'as* within the viewsapes, then it would evoke spiritual or religious significance, strengthening the group's cultural identity and sense of belonging.

Secondly, researchers (Foucault 1977; Van Dyke, et al. 2016; Yekutieli 2007) have suggested that unidirectional visibility, that is, to see but not to be seen, suggests power differentials and highlights the visual dominance of others. This visibility-power dynamic would influence of these communities' experience life within this urban settlement. As such, how does the distribution of visibility between the supra-household communities reflect and constitute power relationships? If surveillance or monitoring were affecting community identity at Cerro San Isidro, I would expect to observe some communities with increased visibility while others would have limited visibility of the community with increased visibility. Additionally, visibility of the surrounding landscape is critical for monitoring threats, such as warriors or raiders, which is particularly important to consider during the Early Horizon, a time with increased warfare across the north coast (see Section 2.2.2). Communities with increased visibility of the surrounding landscape may have roles as leaders or protectors of the settlement. Therefore, by assessing both internal and external visibility patterns, we can gain insight into how visibility shaped interactions, power dynamics and identity.

To investigate the visual experiences and their role in shaping community identity and power, I conduct a viewshed analysis using Geographic Information System (GIS) based spatial modelling. This involves calculating lines of sight from the four supra-household communities and overlaying various building and natural landscape features.

Movement and Connectivity

The fourth and final set of questions examines how physical movement within the site and connectivity between supra-household communities contribute to the formation and maintenance of share identity and cooperation. To what extent does the movement of community members within Cerro San Isidro influence the formation of a shared community identity, and how do different types of movement (e.g., ritual procession, resource acquisition) play a role in this process? Along with movement, I am interested in ideas of social connectivity, that is, how supra-household communities are connected to other supra-household communities. How did social networks and connectivity contribute to the formation and differentiation of group identities at Cerro San Isidro during the Early Horizon? Social connectivity is an important consideration, as greater connectivity can facilitate bonds between groups, while a lack of connectivity can reinforce boundaries between them. If communities lack social connectivity, this can reinforce social stratification and distinct group identities, potentially resulting in differential access to resources, wealth, and other markers of inequality. Alternatively, it might also foster stronger intra-group cohesion or the development of parallel networks of reciprocity and identity.

I also assess the extent to which supra-household communities had access to resources and spaces—specifically, whether access was relatively easy or difficult compared to other supra-household communities. Research (Richards-Rissetto 2010, 2012; Richards-Rissetto and

Landau 2013) indicates that access serves as a mechanism of socio-spatial integration, enabling or limiting interaction with essential resources and spaces, thereby shaping the daily lives and connections of community members. Additionally, access can act as a form of control, influencing who can participate in specific social practices or rituals, and thus directly affecting the social experiences and power dynamics within the community (Richards-Rissetto 2010; Richards-Rissetto and Landau 2013). Through experiencing these distinctions, supra-household communities are forging shared identities through access or through restricted access. How did variations in access to resources and ritual spaces between the communities at Cerro San Isidro influence the development and differentiation of community identities? If accessibility influenced the ways people expressed themselves materially and/or consumed things, I would expect to see disparities in resource access and ritual spaces between groups. For example, limited access to ritual space would forge bonds of exclusivity and power among those with access, whereas it would influence those without access to understand their social position in the settlement, create a sense of exclusion, and mark boundaries between them and other groups.

To understand how movement, access, and integration shaped identity and social cohesion at Cerro San Isidro, I use natural and built environment features to construct a least-cost path analysis in GIS. This allows me to model likely pathways between supra-household communities, as well as between these communities and key resources and ceremonial spaces. I then evaluate variations in ease of access to these areas by each supra-household community to assess patterns of integration, exclusion, and spatial accessibility.

1.2 Dissertation outline

My dissertation is organized into nine chapters. In Chapter 2, I provide a background on the historical, environmental, and socio-political landscape of the north coast of Peru, with an

emphasis on the Nepeña Valley during the Early Horizon, to understand the factors that influence urban life. By examining Nepeña Valley's geography, historical timeline, and past archaeological work, this chapter provides essential background, helping to contextualize the emergence of Cerro San Isidro as an urban center.

In Chapter 3, I unpack the definitions and characteristics of urbanism, especially within the Central Andes. I discuss the role of supra-household communities in urban contexts. I frame Cerro San Isidro's urban organization, laying the theoretical groundwork for examining experience within supra-household communities, including literature on social experience with an emphasis on visibility and movement experience, as key to fostering social cohesion, cooperation, and collective identity.

In Chapter 4, I review the methodologies for data collection and analysis, with a particular focus on spatial analysis methods, including visibility and movement assessments. I detail my methods to ensure clarity and replicability and provide a basis for interpreting the spatial dynamics of Cerro San Isidro. The chapter unpacks the use of spatial analysis in examining social experiences, laying the groundwork for analyzing community identity and inter-community interactions.

In Chapter 5, I present the findings on the spatial layout of Cerro San Isidro to address my first series of research questions on urban form and organization. In this chapter, I identify architectural clustering and spatial separation that support the presence of supra-household communities, suggesting that Cerro San Isidro functioned as a low-density urban center within a broader network.

In Chapter 6, I focus on my second series of research questions, which relate to the rhythm of life within the four supra-household communities. This analysis reveals variation in material

culture among communities, potentially reflecting social distinctions and indicating diverse activities within Cerro San Isidro, thereby highlighting the complex social fabric of early urban life.

In Chapter 7, I discuss my third series of research questions by examining how visibility from each community influences social and spatial experiences, with a focus on views of significant landmarks. I demonstrate how sightlines to landmarks, such as mountains and ritual spaces, foster shared experiences and cultural identity, while visibility patterns also suggest power relationships within and between communities.

In Chapter 8, I address the fourth series of questions and analyze how movement within and between communities contributes to social cohesion and connectivity at Cerro San Isidro. Here, I present findings that suggest movement pathways reinforced social bonds within communities and demarcated community boundaries, supporting the hypothesis that shared movement practices facilitated cohesion and identity.

In Chapter 9, I synthesize findings from the spatial, visibility, and movement analyses to offer a holistic view of life at Cerro San Isidro. Through this synthesis, I suggest that social cohesion, cooperation, and identity within these communities, as well as the entirety of the urban center, were shaped by shared experiences unique to the geopolitical, cultural, and environmental context of Cerro San Isidro. I also review findings and contributions and suggest directions for future research.

2 Historical, Environmental, and Sociopolitical Landscape of Nepeña Valley in the Early Horizon

The Nepeña Valley is an important region for understanding the emergence of urbanism during the first millennium BCE. This valley, situated on Peru's north-central coast, witnessed diverse responses to conflict and resource pressures, with populations adopting strategies such as settlement nucleation and defensive planning. The Chavín-Cupisnique Religious Complex (1400-500 BCE) (*sensu* Ikehara 2023) profoundly influenced early social organization, but its decline resulted in the "coastal crisis" (Elera Arévalo 1998; Pozorski and Pozorski 1987), a period of upheaval characterized by highland invasions, increased warfare, and the emergence of new social identities like warriorhood (Burger 1992). This era, known as the Early Horizon (800-200 BCE), witnessed the development of fortified settlements, indicating an increased concern for defence and security, possibly in response to regional competition and shifting political dynamics (Burger 1992: 188; Wilson 1988, 1995).

The Nepeña Valley boasts great geographic and cultural diversity, featuring densely populated walled settlements in the lower valley and defensible hilltop communities, such as Cerro San Isidro, in the middle valley. Cerro San Isidro serves as a case study of how low-density settlements functioned as complex urban centers, shedding light on the interplay of local and regional forces that shaped urban trajectories in the Andes. Nepeña presents a unique opportunity to challenge conventional views of urbanization, offering new perspectives on the nature of early urbanism. Throughout this chapter, I examine Cerro San Isidro in the context of Early Horizon developments in the Andes, emphasizing the interplay between urbanity, the "coastal crisis," and the diverse pathways to settlement nucleation and social organization. This chapter lays the foundation for understanding the emergence and transformation of Cerro San

Isidro by situating it within the historical and sociopolitical context of the Nepeña Valley and the broader north coast. By providing this overview, I aim to contextualize Cerro San Isidro's rise as a demographic center within the Moro Pocket and clarify why Cerro San Isidro is a key case study for examining the mechanisms that foster cohesion and identity within an early urban settlement.

2.1 Geographical Setting

Nepeña is a river valley located on Peru's north-central coast, a region defined by archaeologists (Willey 1971) to include the Lacramarca, Nepeña, Casma, Seco, Huarney, and Culebras Valleys, and often extending to the Santa Valley (Figure 2.1) (Chicoine 2006). Andean archaeologists recognize the north-central coast as a distinct cultural region due to shared material traditions that spread across multiple river valleys, including architectural styles, ceramic decoration and manufacturing techniques, and iconography. However, many of these cultural traditions and broader regional trends extend even further north into what archaeologists call the North Coast, which reaches as far as Lambayeque (Figure 2.1). Throughout this dissertation, I often refer to the North Coast, which include both the north and north-central regions, acknowledging the deep interconnections between them (Pozorski and Pozorski 2018). This region encompasses a desert strip that runs north-south along the coast, bordered by the foothills of the Andean Mountains to the East and the Pacific Ocean to the West. It is made up of a series of river valleys formed by rivers fed by glacial reserves, rain, or lakes from the highlands. These rivers flow westward from the highlands to the coast, providing a rich, fertile environment with relatively consistent access to water, supporting the growth of diverse flora and fauna. Most river valleys are separated by mountain ranges and large desert spaces, making movement between valleys difficult.

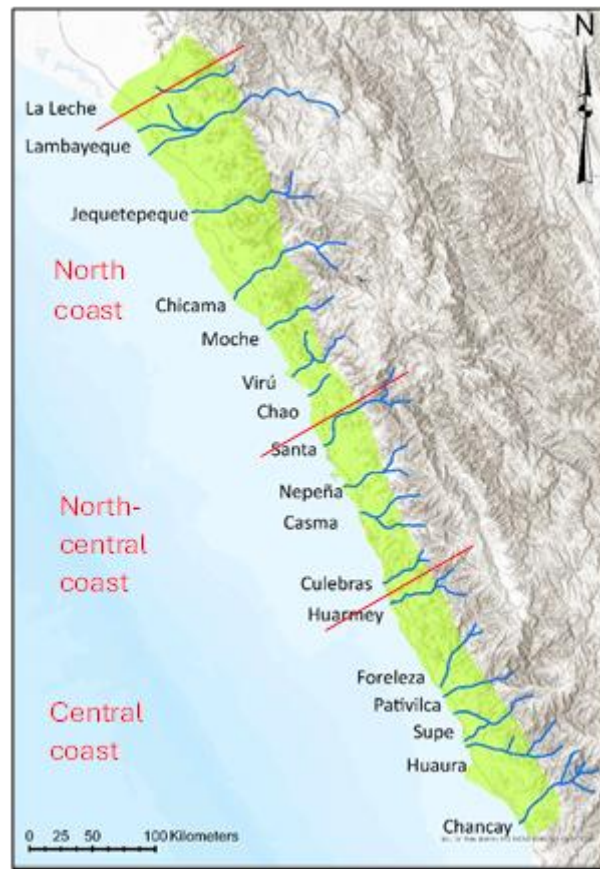


Figure 2.1: Regional classification for the coastal river valleys of Peru, including the north coast, the north-central coast and the central coast.

The Nepeña Valley is approximately 400 km north of Lima. It is characterized by the Rio Nepeña, which is fed by three tributary rivers: Jimbe, Loco (also known as Vinchamarca), and Salitre. The valley, especially the lower and middle portions, has a flat terrain that leads to the Cordillera Negra, making it an ideal landscape for human settlements. The settlements were established along the river from the coast to the highlands, with some located in the low plains and others on hilltops. Archaeologists divide the valley into three main sections: lower, middle, and upper. Originally, Proulx (1968) defined these sections, but they have since been revised to align with similar divisions in nearby valleys (Ikehara 2015; Wilson 1988). This study follows the revised divisions, as outlined in Figure 2.2. The lower valley encompasses the desert landscape near the ocean and extends up to the modern town of San Jacinto at 290-300 meters

above sea level (masl). The middle valley continues from there to cover the yunga, or low-elevation mountains, and ends at the modern town of Jimbe, at approximately 1,000 masl. The Upper Valley continues to the highlands, covering the territory of the Cordillera Negra, at an elevation of 4,500-5,000 masl (Ikehara 2015).

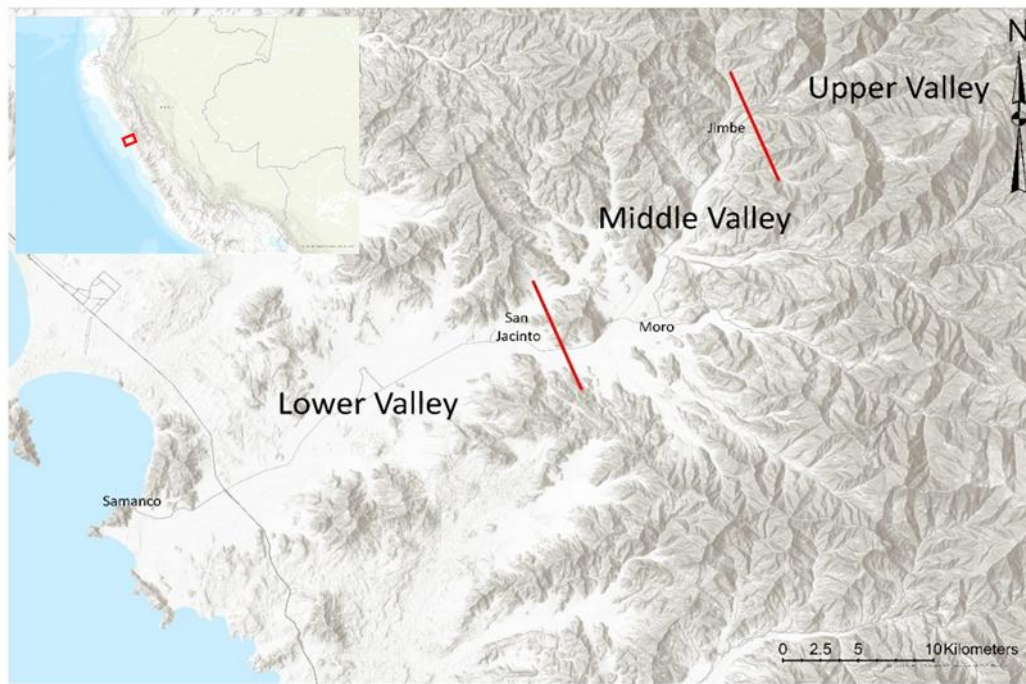


Figure 2.2: Map of Nepeña valley regional divisions, based on Chicoine and Navarro 2020 and Ikehara 2015.

This research project focuses on the middle Nepeña Valley, where Cerro San Isidro is located (Figure 1.1). The valley narrows near the end of the lower valley and throughout the initial part of the middle valley; however, it widens to reach approximately 5.5km at its greatest width and extends for about 6.5-7.5km to the confluence of the Nepeña tributaries to the north and east. This area is known as the Moro Pocket, named after the modern town of Moro (Daggett 1984; Proulx 1968). Cerro San Isidro strategically sits at the center of the Moro Pocket, less than one kilometre West of Moro. This region has a subtropical dry climate, characterized by annual precipitation ranging from 100 to 250 mm. The rich soils, availability of water, and an abundance

of sunshine make this an effective space for agriculture (ONERN 1972). Today, farmers cultivate a variety of export crops, including sugarcane, mangos, avocados, and grapes, among others.

There are numerous archaeological sites located within the Moro Pocket; however, for this project, I focus on those that were occupied during the Early Horizon (EH), as this is the temporal focus of the study. Figure 2.3 presents the location of these settlements, categorized by their primary function as defined by Ricard Proulx (1973a) based on architectural styles and surface ceramics. In some cases, sites served multiple functions and are therefore listed more than once. The EH sites include: Kiske (PV31-46), San Juan (PV31-47), Huancarpon (PV31-59), Kushipampa (PV31-56), Motocachy (PV31-48), Paredones (PV31-64), PV31-60, and PV31-61.

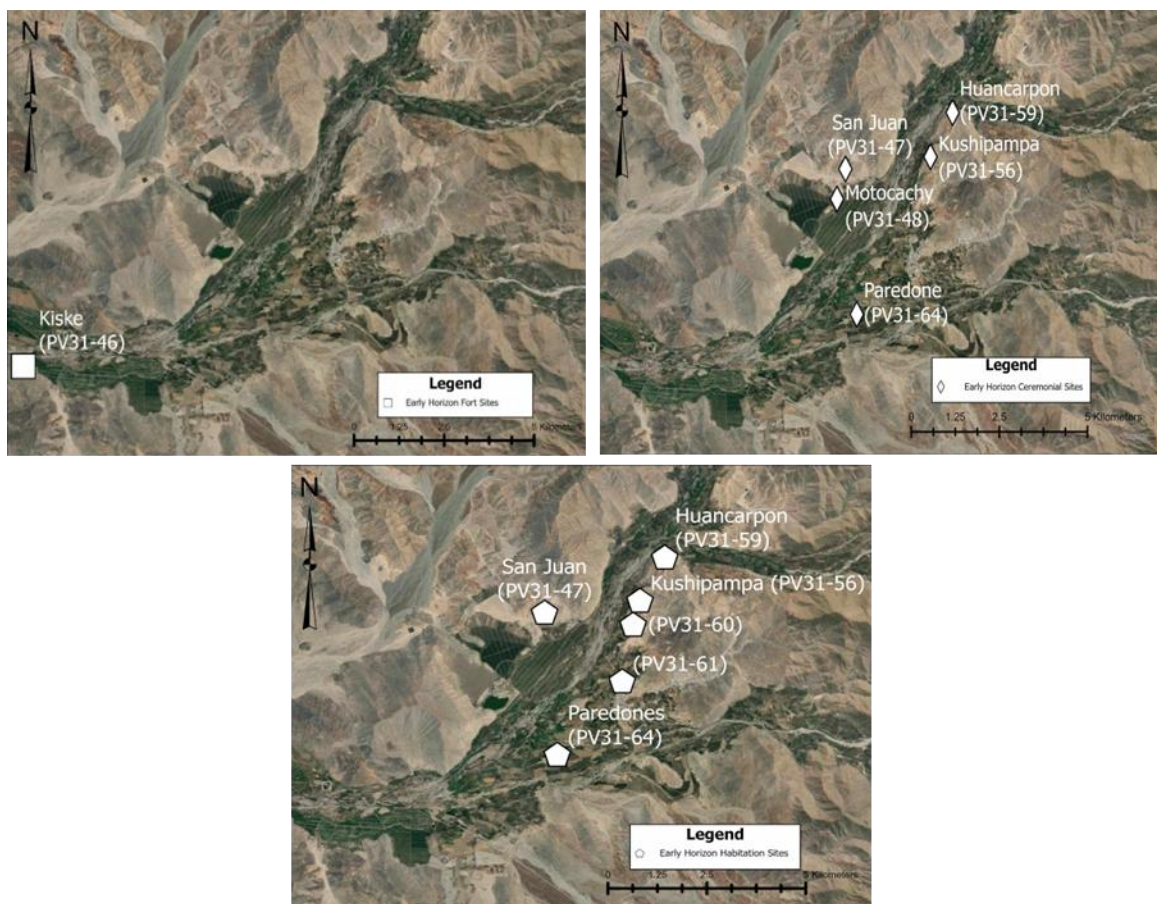


Figure 2.3: Early Horizon Period settlements in the Middle Nepeña Valley, classified by site type, including forts, ceremonial sites, and habitation sites, excluding Cerro San Isidro. Note that some settlements have multiple functions and thus appear in multiple.

Cerro San Isidro is a natural hill which was built up and out through anthropogenic terracing. It consists of sandy, silty loam and granite bedrock. Most of the site has steep slopes, but the terracing created by the early inhabitants produced flat, habitable areas. There are two large rock outcrops within the mound, which likely acted as natural quarries. Approximately 230m West of Cerro San Isidro is Puente Piedra (PV31-50), another natural hill with anthropogenic modification and part of the same archaeological complex as Cerro San Isidro. Puente Piedra, dating to the Early Horizon, features a 3-meter-tall building with retaining walls that support the platform, and an L-shaped stairway to the summit, complete with megalithic lintels and corners (Dagget 1984, 206; Ikehara 2008, 394). Due to the large megalithic temple, this site may have been a ceremonial space used by the residents of the Cerro San Isidro Archaeological Complex. Between the mounds are ploughed agricultural fields where today mangos and avocados are grown. The Nepeña River flanks the northern side of Cerro San Isidro and merges with the Loco tributary directly West of the archaeological complex. Cerro San Isidro is nestled at the confluence of the rivers, making it an ideal location for water access and fertile lands. The location could also have had symbolic significance, as areas where waters meet are often regarded as powerful places by ancient Andean populations. In that sense, it is analogous to other important sites in ancient Peru, including Chavín de Huántar.

2.2 Chronological Framework and Cultural History of the North-Central Coast of Peru

In this section, I establish the chronological framework I employ in this project, drawing on broader urban history and key theoretical perspectives. It then provides an overview of the cultural history of the North Coast of Peru, with a particular emphasis on the Nepeña Valley.

Each subsection reviews broader trends in the North Coast, including any urban developments, before narrowing in on a more detailed analysis of the Nepeña Valley. I position the Cerro San Isidro research within both spatial and temporal contexts, highlighting its relevance within the broader history of Andean urbanism.

Since the early 20th century, Andean archaeologists have sought to establish a comprehensive chronological framework, yielding various temporal schemes. The chronology employed in this research is derived from the system developed by John Rowe, Dorothy Menzel, and Edward Lanning (Lanning, 1967; Menzel, 1977; Menzel and Rowe, 1967; Rowe, 1962). This model establishes a relative chronology based on changes in artifact styles (especially ceramics) from the Ica Valley of Southern Peru (Menzel 1977; Proulx 1985). The framework alternates between 'periods' and 'horizons', with periods defined by localized cultural diversity and horizons as phases of cultural unity over broader regions (Proulx 1985; Rowe 1962). There are six Preceramic periods or phases, from the time prior to the use of ceramics, ~1800 BCE. Following this, there are six ceramic divisions, which consist of three periods – Initial Period (IP), Early Intermediate Period (EIP), and Late Intermediate Period (LIP) – interspersed by three horizons – Early Horizon (EH), Middle Horizon (MH), and Late Horizon (LH) (Figure 2.4). Each of these divisions ties to distinct cultural groups, but it is important to note that the cultural affiliations may not always align with concurrent events in other areas, as this sequence is based on the cultural sequence of the Ica Valley (Menzel 1977; Menzel, Rowe, and Dawson 1971; Rowe 1962).

While many studies in the Nepeña Valley utilize this chronological sequence (Chicoine 2006b; Daggett 1984; Helmer and Chicoine 2015; Proulx 1984), some studies employ the Formative chronology developed by Luis Lumbreras (1974) and further refined by Kaulicke

(1994; 2010) (Ikehara 2015; Shibata 2010). This chronology divides the time between the Initial Period and the Early Intermediate Period into three sections: Early and Middle Formative (Initial Period), Late Formative (first half of Early Horizon), and Final Formative (second half of the Early Horizon). I rely on the Early Horizon chronology. However, I mention the Formative chronology when necessary, as in the discussion of previous scholarship.

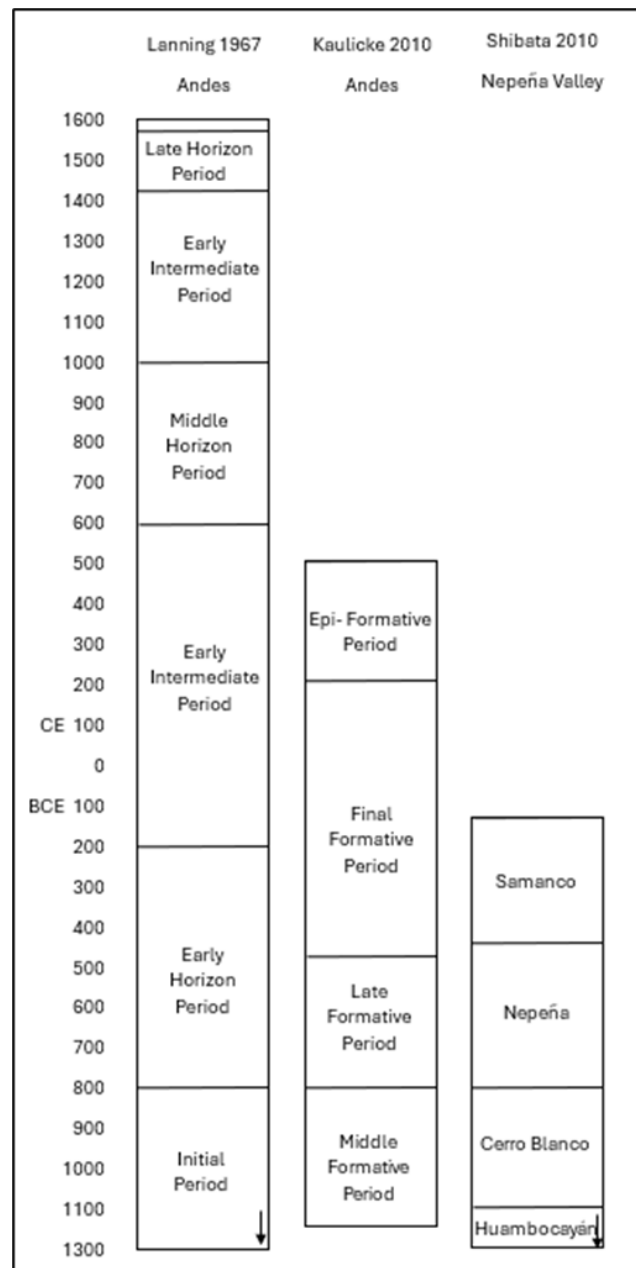


Figure 2.4: Regional chronologies discussed in text.

It is worth noting that archaeological periods are inherently arbitrary and do not accurately reflect the realities of ancient socio-economic and cultural processes. Instead, these time divisions provide a helpful lens for considering broader trends, rather than suggesting fixed or universal timelines. In the Nepeña Valley, cultural developments, as I review in detail below, did not occur uniformly but followed complex and often overlapping trajectories shaped by local circumstances. As such, when I refer to cultural groups, I am referring to the archaeological materials and traditions that archaeologists have assigned to particular groups based on visible patterns in the archaeological record.

In the following section, I review the cultural history of the Peruvian North Coast, with a specific focus on the Nepeña Valley. The purpose of this review is to set up the cultural landscape in which this dissertation is positioned. Within each section, I review the urban trajectory on the North Coast of Peru with references to the appearance of urbanism in the Nepeña Valley. I highlight broader material traditions and how they emerge within the Nepeña Valley, to better position my discussion on the emergence of low-density urbanism and to highlight the unique cultural history of the Early Horizon, which makes this a distinctive space and time for this study.

2.2.1 Initial Period (1800-800 BCE)

The Initial Period (IP) on the North Coast of Peru was a time of major cultural and technological changes. Some of the most notable shifts were the introduction of ceramic technologies and the emergence of a distinct visual culture. People expanded on earlier ceremonial sites, which often featured flat-topped mounds and sunken circular or rectangular plazas, giving these religious centers their characteristic U-shaped layout. These developments represent a continuation of traditions initiated during the Late Preceramic Period (ca. 3000–2000

BCE) (Haas and Creamer 2006; Pozorski and Pozorski 1987). During the Initial Period, significant innovations included the production of ceramic artifacts and advancements in irrigation technology. These developments increased agricultural diversity and complexity, resulting in a broader range of foods consumed (Pozorski and Pozorski 2018; Quilter 2014).

Large ceremonial centers emerged in the Casma Valley at the beginning of the Initial Period, with notable sites including the Sechín Alto Complex and Pampa de Las Llamas-Moxeke (Fuchs et al. 2006; Fuchs et al. 2009; Pozorski and Pozorski 1979, 1998; Pozorski and Pozorski 2005, 2018). Further north, similar monumental centers flourished, including the Caballo Muerto Complex in the Moche Valley (Billman 1996; Pozorski 1980, 1995) and Huaca El Gallo and La Gallina in the Huacapongo branch of the Virú Valley (Zoubek 1997; Zoubek and Iberico Portocarrero 2004). During this period, a shared tradition appeared across material cultures along the north coast, which archaeologists, following Rafael Larco Hoyle (1941), refer to as the Cupisnique.

The Cupisnique (1500 – 500 BCE) is characterized by shared architectural and iconographic traits, including motifs of reptiles, birds, felines, and spiders, reflecting common religious beliefs (Burtenshaw-Zumstein 2014; Elera Arévalo 2009; Larco Hoyle 1941; Nesbitt 2012). Cupisnique ceramic styles, especially black, red-and-black, and polychrome stirrup spout bottles, became defining features of this period (Burtenshaw-Zumstein 2014; Elera Arévalo 2009; Larco Hoyle 1941). While social organization and subsistence strategies are not well understood at this time, their art and architecture suggest a religiously unified society which later included other cultures (Elera Arévalo 1998; Isbell and Cook 1987; Larco Hoyle 1941; Nesbitt 2012; Rowe 1971; Shimada 2014).

Nepeña Valley

In the Nepeña Valley, based on research by Koichiro Shibata (2010, 2011), the Initial Period can be divided into two phases derived from distinctive differences in archaeological materials: the Huambocayán Phase (1500–1100 BCE) and the Cerro Blanco Phase (1100–800 BCE). The Huambocayán Phase is characterized by the construction of the valley's first pyramid mound, while the Cerro Blanco Phase reflects the influence of Cupisnique traditions, particularly U-shaped ceremonial architecture, as seen at sites such as Cerro Blanco and Huaca Partida (Ikehara and Shibata 2008; Shibata 2010).

2.2.2 Early Horizon (800–200 BCE)

John Rowe (1960) implemented the term Early Horizon (EH) to address the terminological ambiguity of this period, which was previously referred to as the "Chavín Period" or "Chavín Horizon,". These terms refer to the appearance of a pan-regional religious phenomenon, known as the Chavín cult or phenomenon, and more recently, the Chavín sphere of influence (Rick et al. 2009; Tello 1943). The Chavín sphere of influence reflects changes in the material culture and settlement patterns across the Andean coast following the decline of Cupisnique influence. However, the processes driving these changes did not occur simultaneously or uniformly, underscoring the limitations of strict periodization and assumptions of cultural homogeneity. As such, the term "Early Horizon" is deliberately used as a neutral temporal designation devoid of assumptions about cultural uniformity during this time.

Historically, archaeologists have defined the Chavín phenomenon after the type site of Chavín de Huántar, a monumental, urban pilgrimage site in the north-central highlands of Peru, which consists of a series of stone-built structures forming a U-shaped structure with plazas, and a complex system of subterranean galleries and canals (Kembel and Haas 2015; Rick et al. 2009). Chavín de Huántar featured a large residential population of 2-3000 people, with evidence

of craft production and social differentiation, which contrasted with the population centers of the Initial Period (Burger 1981, 1984). As such, this has led scholars to argue that Chavín de Huántar was a proto-urban center, a precursor to urban development and one of the first instances of urbanism in the region (Burger 1984).

The Chavín was initially proposed as a "mother culture" (also known as a *cultura matriz*) (Tello 1956), with Chavín de Huántar preceding and influencing coastal settlements. However, more recent scholarship (Burger and Salazar 2008) suggests that coastal centers previously argued to be based on Chavín de Huántar were, in fact, predecessors to the settlement (Burger and Salazar 2008). Chavín de Huántar is considered the largest center in a complex religious network of the Chavín Sphere of Influence, which extended to the North Coast by the phase known as Janabarriu (ca. 800 – 500/400 B.C.) (Rick et al. 2009).

Ceremonial centers at this time were designed to accommodate large audiences, featuring friezes and sculptures that depicted non-human beings with attributes of predators and anthropomorphized beings. These beings were likely actors in these ceremonial centers, participating in feasts and interactions with the population (Ikehara 2023). This period witnessed increased technological innovations, centralized governance, and expanded trade networks (Burger 1988; Kembel and Rick 2004).

By 500 BC, the Chavín sphere of influence lost popularity across the coast, as is reflected in broader regional changes, including the reduction of monument size and associated ritual ceremonies and shifts in settlement patterns to a preference for defensible settlement locations (Chicoine et al. 2023). This period is characterized by a significant increase in warfare, both within individual valleys and among different river basins (Millaire 2020; Topic and Topic 1997). This trend is evident in the settlement patterns throughout northern valleys, which show

clustered sites and the construction of substantial fortifications (Downey 2015; Ikehara and Chicoine 2011). Archaeologists have suggested that the coastal societies faced profound changes at this time, potentially both social and environmental in nature. Scholars (Elera Arévalo 1998; Onuki 2001; Pozorski and Pozorski 1987) often refer to this time as often referred to as the "coastal crisis".

Researchers like Burger (1992) and Wilson (1988) point to the widespread construction of ridge-top settlements and fortified sites as evidence of the upheaval that accompanied the collapse of Initial Period societies. They propose that these defensive structures became a dominant focus of communal efforts during the Early Horizon, reflecting a shift in priorities driven by instability and conflict (Burger 1992: 188; Wilson 1988: 104). The proliferation of defensive settlements throughout the Santa, Nepeña, and Casma valleys has been interpreted as a sign of inter-valley warfare, with groups from Nepeña and Casma raiding the Santa Valley, particularly in years of water security (Wilson 1995). However, Topic and Topic (1997) argue that the warfare across the North Coast may have been connected to ritual battles (*tinku*) rather than purely expansionist wars.

Nepeña Valley

The Nepeña Valley became a critical region for understanding Early Horizon changes, as it showcased both integration into and divergence from broader regional trends. Scholars studying in the Nepeña Valley tend to divide the Early Horizon into two subphases: Nepeña (800–450 BCE) and Samanco (450–150 BCE) (Ikehara and Shibata 2008; Shibata 2010). During the Nepeña phase, evidence suggests increased interregional interaction, as indicated by materials such as obsidian and cinnabar, which suggest long-distance trade networks (Chicoine et al., 2023). The adoption of Chavín-like ceremonial practices coincided with local innovations,

including the development of new pottery styles and the expansion of settlements into defensible locations (Chicoine et al. 2023).

Julio C. Tello (1933; 1943) argues, based on his excavations at the Nepeña sites of Cerro Blanco and Punkurí, that Nepeña settlements were established by the coastal manifestation of the Chavín culture, making the valley a heartland for the Chavín cult. Local centers like Cerro Blanco and Huaca Partida (Shibata 2017) in the Nepeña Valley adopted megalithic architectural styles and elaborate mural art, reflecting their entanglement with highland Chavín networks, which supports Tello's argument. However, Rafael Larco Hoyle (1941; 1963) argued that Nepeña settlements predated Chavín de Huántar and had more stylistic similarities to the coastal Cupisnique tradition. As such, scholars (Chicoine et al. 2023; Proulx 1987) argue that the relationship between coastal sites and the highland Chavín was a lot more complex than previously suggested, and instead of a unidirectional influence, there were dynamic interactions between local and Chavín traditions.

The communities in Nepeña actively engaged with Chavín and Cupisnique networks, while retaining distinct traditions (Chicoine et al. 2023; Shibata 2017). For example, Cerro Blanco and Punkurí were renovated with masonry and megalithic construction reminiscent of Chavín architecture; however, the settlements also incorporated distinct local styles (Chicoine et al. 2023). Similarly, the polychrome murals and friezes at Cerro Blanco depicted motifs similar to those found in Chavín imagery, such as anthropomorphic figures. However, the local artists also incorporated their own symbolic frameworks (Chicoine et al. 2023). This suggests that while there was Chavín influence, Nepeña communities also maintained unique traditions, indicating local agency in cultural exchanges. During the Nepeña Phase in the Moro Pocket, Cerro San Isidro emerged as the largest settlement, with an estimated population of 400 people

based on demographic figures extrapolated from surface ceramic scatters, likely serving as the center of a supra-local community that housed high-ranked households and facilitated interactions between smaller surrounding settlements (Ikehara 2015).

The Samano Phase marks a period of sociopolitical and cultural changes, reflecting broader trends along the North Coast. Monumental sites like Cerro Blanco and Huaca Partida were abandoned, likely around the same time construction at Chavín de Huántar ceased, marking a shift in ritual practices from grand public spaces to smaller, more localized contexts (Chicoine et al. 2023). The region became increasingly fragmented politically, with a shift towards fortified settlements, similar to those in other valleys on the north coast, supporting those archaeologists arguing for increased conflict (Billman 1999; Brennan 1980, 1982; Ikehara 2015). However, following the collapse of the Chavín influence, local populations followed their own trajectories, resulting in significant variations between settlements (Ikehara and Chicoine 2011). At this time, an overarching trend in Nepeña Valley was the reorganization of people into new centers, the first evidence of urbanization in this region.

In the Lower Nepeña Valley, following the abandonment of Cerro Blanco and Huaca Partida, populations began to settle in several settlements along the valley margins. Notable examples of these sites include Caylán (Chicoine and Ikehara 2014), Huambacho (Chicoine 2006b), Samanco (Helmer 2015), and Sute Bajo (Cotrina et al. 2003). These settlements demonstrate an increased focus on defence due to their proximity to foothills and fortifications, and have nearly identical architectural and material signatures but vary in size, with Caylán as the largest at 90 hectares (Chicoine and Whitten 2019; Helmer and Chicoine 2016). Chicoine and Ikehara (2010, 2014) have suggested that Caylán acted as the primary center of a multitiered settlement system, with Sute Bajo, Samanco and Humbacho as satellites of this center.

Architectural and spatial data from these densely walled settlements suggest that large, urban households were organized by specific supra-kin groups (Chicoine et al. 2021; Helmer and Chicoine 2015). These dense-walled compounds feature colonnaded patios (courtyards surrounded by a series of columns), with roofed areas, storerooms, kitchens, low platforms, and plazas arranged around corridors and streets.

In the Moro Pocket during the Samanco Phase, the population continued to reside on defensible hilltops, but the population surged to approximately 10,000 people, leading to the establishment of multiple supra-local communities, based on the distribution of similar ceramic materials (Ikehara 2015). Cerro San Isidro remained an important center of its district, but its regional centrality was diminished, and the demographic center shifted to Kushipampa (Ikehara 2015). New settlements and megalithic ceremonial centers were established, reflecting increased sociopolitical fragmentation and continued concerns about defensible locations. These changes align with broader regional decentralization trends and evidence of intergroup conflict during this period. In opposition to the orthogonal layouts and open, horizontally oriented compounds in the lower valley, these settlements comprise hilltop complexes, thus vertically emphasized, with terraces and platforms following a non-orthogonal layout. So, while broader trends of conflict and reorganization are evident in this region, the Moro Pocket settlements exhibit distinctly different settlement organization responses.

2.2.3 Early Intermediate Period (200 BCE – 600 CE)

The Early Intermediate Period (EIP) is characterized by the emergence of the Virú, the region's earliest state, situated within the Virú Valley. This period is characterized by significant changes in settlement patterns and the expansion of irrigation systems (Downey 2014; Millaire 2010b). Archaeologists widely recognize this time as the proliferation of urban settlements

across the north coast (Bawden 1977; Bawden 1996; Brennan 1978, 1980, 1982; Chapdelaine 2001, 2002; Millaire 2010a; Millaire and Eastaugh 2011; Shimada 1994; Topic 1977).

Populations surged and settlements spread throughout the Virú Valley. The capital of this polity, the Gallinazo Group, was an urban center featuring approximately 30 architectural mounds, covering 40 hectares and supporting a population estimated between 10,000 and 14,400 residents (Fogel 1993; Millaire and Eastaugh 2011, 2014). This settlement featured a dense city core, characterized by a semi-orthogonal layout that included residential and civic-ceremonial sectors. Smaller centers such as Huaca Santa Clara and fortified administrative sites at the valley neck also emerged. The Virú state expanded northward into the Moche and Chicama Valleys, establishing outposts at the coastal sites of Huaca Prieta and Pampa La Cruz, which facilitated trade and resource exploitation across the coast (Millaire et al. 2016). Distinctive Virú ceramics, such as Virú Negative and Castillo-style pottery, were produced within these spaces (Millaire et al. 2016). Eventually, the Virú abandoned their outposts but maintained control over the Virú valley throughout this period, even as Moche influence grew in neighbouring regions (Millaire 2010a).

The Moche phenomenon emerged around 200 BCE, becoming a dominant tradition across the coast. While initially perceived as a centralized Moche state, with its capital at Huacas de Moche, recent research has challenged this narrative, dividing the Moche phenomenon into Northern (Piura, Lambayeque, and Jequetepeque valleys) and Southern (Chicama, Moche, Virú, Chao, Santa, Nepeña, Huarney and Culebras valleys) Moche regions (Castillo and Uceda Castillo 2008; Giersz 2011). Between these two regions, there were distinctive differences in architecture, burial practices and ceramics, which highlight the diverse regional expressions of the Moche. As such, scholars argue that the Moche phenomenon represents a shared religious

system which unified independent groups (Quilter and Koons 2012). However, in some valleys, the Moche influence was indirect, as seen in Virú Valley, where the Virú retained autonomy but likely engaged with the Moche through trade or tribute (Millaire 2010a).

Around the middle of this period, the Recuay culture appeared in the highlands of north-central Peru. This art style is characterized by white kaolin clay pots, which are typically burnished and decorated with geometric motifs painted in shades of black, brown, red, and orange, or employing negative painting techniques (Lau 2004, 2011). Lau (2011, 56) suggests that the Recuay consisted of small communities that formed a "commonwealth." Recuay settlements were strategically located to facilitate trade among these communities and with coastal peoples.

Nepeña Valley

In the Nepeña Valley, Proulx (1973a) documented 220 settlements with Early Intermediate Period materials, of which 22 had Moche pottery. Proulx (1982; 1984) argues that during this period, the region became part of the Moche expansionist state, with Pañamarca serving as its regional center of power. Moche influence is also seen with the reoccupation of Huambacho in the lower valley (Chicoine 2006b; Chicoine 2011b). Additionally, Proulx (1982) reported 42 settlements featuring Recuay pottery in the Middle and Upper Nepeña Valley, which included towns, fortified hills, and cemeteries. Scholars (Lau 2011; Proulx 1982; Vogel 2016) suggest that the middle Nepeña Valley was a trading zone between the Recuay in the highlands and the Moche along the coast. Recent archaeological excavations and AMS measurements from the Moche ceremonial center (Trever et al. 2017), however, show that the Moche presence in Nepeña dates between the 5th century CE and 9th century CE, thus mostly post-dating the Recuay phenomenon.

2.2.4 The Middle Horizon (600-1000 CE)

During the Middle Horizon (MH) in the Central Andes, significant changes occurred in the archaeological record, resulting from both internal conflicts and external pressures (Billman 1996; Castillo and Uceda Castillo 2008; Koons and Alex 2014; Quilter 2020). The presence of the Moche material culture varied greatly across different regions. Key Moche settlements emerged, such as Galindo in the Moche Valley and Pampa Grande in the Lambayeque Valley (Lockard 2009; Shimada 1994). During this period, a new Moche ceramic style, known as Moche V, originated in the Chicama Valley around 650 CE and spread to the Moche, Jequetepeque, and Lambayeque valleys (Koons and Alex 2014; Quilter and Koons 2012). At the same time, Moche Style IV continued to be produced at sites such as Huacas de Moche in the Moche Valley and Cerro Mayal in the Chicama Valley (Koons and Alex 2014). Additionally, the Moche presence seems to have diminished in many of the southernmost valleys (Quilter and Koons 2012). The variability in ceramic materials suggests that the Moche were influenced by emerging interactions with foreign influences, potentially the growing expansion of the Wari state across the Central Andean region around 600-650 CE (Koons 2015).

The Wari state originated around 500-650 CE in the highland Ayacucho Valley of Peru, with Huari as a prominent city in the valley, housing approximately 60,000 people (Isbell 1997; Isbell 2009, 200). Wari¹ was an expansionist polity that ruled over a diversity of populations throughout the Central Andes (Jennings 2024). The Wari established a network of urban centers, colonies, and ceremonial hubs that connected diverse ecological zones, including coastal deserts,

¹ Note that "Wari" refers to the political entity and the distinctive art and architectural styles associated with this period, whereas "Huari" refers to the city.

high mountains, and jungle slopes. This vast network allowed for the exchange of goods, ideas, and cultural practices across a region previously characterized by localized interactions.

Architecture from this period often incorporated distinct features such as maze-like corridors, interior patios, and D-shaped structures (Jennings and Craig 2001; McEwan and Williams 2012). These elements reflect both local innovations and influences from the broader Wari interaction sphere. Ceramic styles during the Middle Horizon demonstrate a dynamic blend of local traditions and Wari aesthetics. As Wari influence expanded, regional ceramic traditions incorporated elements like geometric patterns and Tiwanaku-inspired iconography, as seen in the Robles Moqo and Conchopata styles (Cook 1994; Lumbreras 1959).

In the southernmost valleys of the north coast and toward the central coast region, the region was occupied by the Casma polity, also referred to as the Casma State or Cama Culture, which expanded during the decline of the Southern Moche polity (Vogel 2003, 2011, 2016, 2018; Vogel et al. 2015, 2016a, 2016b, 2016c). Based on the distribution of Casma-style ceramics, the Casma occupied approximately 300km from Chao to Huarney Valley (Collier 1962; Daggett 1983; Proulx 1973; Thompson 1966; Wilson 1988, 1995).

Nepeña Valley

Within Nepeña, Proulx (1973) and Daggett (1986) note the presence of Middle Horizon materials across 100 sites, as well as the appearance of local ceramic types. However, there have been minimal further investigations on the Wari and/or Casma presence in the region. Wari architectural and ceramic influences appear to be limited to the reoccupation of Pañamarca (Schaedel 1951), while Casma influence is more visible and ubiquitous. The Casma polity becomes increasingly visible in the archaeological record at this time in the Nepeña Valley, where their presence is evident at previous Moche sites, such as Pañamarca (Trever et al. 2017).

In addition, groups producing Casma-style pottery claimed Caylán as a burial ground, as evidenced by intrusive burials in the urban ruins (Chicoine and Ikehara 2010, 2014). The early years of the Casma occupation may have been marked by conflict, as evidenced by their construction of defensible structures, such as large walled settlements in the Nepeña Valley (Vogel 2018).

2.2.5 Late Intermediate Period (1000-1467 CE)

The Late Intermediate Period (LIP) marks the expansion of Lambayeque/Sicán, Casma, and Chimú cultural influence across the north coast of Peru following the decline of the Moche phenomenon. However, the transition was gradual rather than abrupt. The Casma polity began expanding toward the end of the Middle Horizon, and the presence of Lambayeque/Sicán materials gradually increased during this period, particularly in the Lambayeque and Jequetepeque valleys, eventually replacing Moche traditions (Castillo et al. 2012).

Meanwhile, the Chimú Empire flourished within the Moche Valley, where its capital, Chan Chan (ca. A.D. 900–1470 CE), became the largest settlement on the north coast of Peru. Spanning 20 km², the settlement's urban core alone covered 6 km² and supported a population of 30,000 to 40,000 people (Moore and Mackey 2008; Topic and Moseley 1983). The settlement incorporated royal compounds (*ciudadelas*), elite compounds, commoner residential areas, ceremonial mounds, and storage rooms, all of which highlight the complex social, political, and ceremonial organization of Chan Chan (Moore 1996; Moore and Mackey 2008; Moseley 1975; Topic 2009; Topic 1982; Topic 1990). Chimú-style pottery was renowned for its molded black ware and decorated with various anthropomorphic, zoomorphic and geometric designs (Wauters 2016). Around 1200 CE, the Chimú expanded north and south, conquering the Lambayeque in the North (Moore and Mackey 2008; Topic 1990) and the Casma, who still occupied the south

(Daggett 1984; Fung Pineda and Williams Leon 1977; Mackey and Klymyshyn 1990; Proulx 1973a).

Accelerator Mass Spectrometry (AMS) dates from El Purgatorio suggest that the Casma State was at its peak from 1000 to 1400 CE, partially overlapping with the Chimú expansion across the northernmost valleys (Vogel 2018). The exact extent of Chimú and Casma relations is unknown, but evidence suggests these two polities lived in relative peace for centuries (Vogel 2018). However, after 1300 CE, the Chimú initiated their southern invasion into Casma territory, ultimately conquering the Casma state (Vogel 2018).

Nepeña Valley

Within the Nepeña Valley, two main ceramic traditions emerged at this time: the Chimú and the Casma. Vogel (2016) suggests Huacatambo as a possible candidate for a primary Casma center during this time. Chimú influence appears at Huacatambo, Pan de Azúcar, and Maquina Vieja (Proulx 1968). There is also evidence of Chimú ceramic materials and architectural styles at Samanco, Caylán, and Huambacho (Chicoine 2006b; Helmer and Chicoine 2015; Proulx 1968). Proulx (1973a) documented 16 likely Chimú cemeteries.

2.2.6 Late Horizon (1476-1532 CE)

The transition to the Late Horizon began with the conquest of the Chimú by the Inka Empire around 1470 CE (Moore and Mackey 2008). The Inka Empire was the largest Pre-Colonial American empire, characterized by the spread of agriculture, art, architecture, and religious influences (McEwan and Williams 2012; Moseley 2001; Murra 1960). After securing control over their heartland, modern-day Cusco, they expanded through both military conquests and peaceful incorporation around 1400 CE (Covey 2008). The Inka Empire had a complex socio-economic system, including *ayllu* leaders – kin-based socio-economic units (Isbell 1997).

Ayllus shared and cooperated on communal projects, maintained reciprocal obligations among families, and shared resources such as land and raw materials (D'Altroy 2015).

On the North Coast of Peru, following their conquest of the Chimú Empire, the Inka retained many local administrators, allowing them to continue in their roles (Boswell 2016; Tate 2006). As a result, the Inka did not significantly alter the political or social structures of the North Coast of Peru during their relatively brief rule. But, they made notable modifications to some Chimú administrative sites, such as Farfán and Manchan, as well as established administrative hubs, including Viejo in the Chicama Valley (Conrad 1977; Mackey 2003; Moore and Mackey 2008). The Late Horizon culminated with the arrival of the Spanish conquistadors, bringing profound transformations to the Andean world.

Nepeña Valley

In the Nepeña Valley, there is limited evidence of a significant Inka presence. However, Proulx (1973) suggested that a major Inka road crossed the valley near Huambacho, also known as Huambacho Viejo (PV31-103). Additionally, research by Carter and Helmer (2015) indicates that Chimú-Inka elites were buried at Samanco in the Lower Nepeña Valley. During this period, ceramic materials included Inka-style vessel shapes, although they were produced in the local Chimú blackware tradition (Proulx 1973, 80).

2.3 Historical Overview of Archaeological Research in Nepeña Valley

The previous section demonstrates that the Nepeña Valley has a rich sequence of settlements and cultural phases, as well as an abundance of archaeological scholarship over the last two decades. However, several key surveys in the 1900s laid the groundwork for future investigations. Julio C. Tello (1933, 1943) conducted the earliest scientific excavations in the Nepeña Valley in the 1930s, where he documented the early ceremonial architecture of Cerro

Blanco and Punkurí, believing it to be based on Chavín de Huantar. However, Rafael Larco (1941, 1963) argued that these Nepeña settlements predated Chavín de Huántar and had more stylistic similarities to the coastal Cupisnique culture. Larco and Tello's research remained the primary narrative for the Nepeña Valley until Donald Proulx (1968; 1973c; 1984) and Richard Daggett (1984) conducted the first systematic survey of the Nepeña Valley, with a focus on the lower and middle Nepeña Valley.

Donald Proulx's (1968, 1973, 1985) research explored settlement patterns, architecture, and artifacts within the valley to trace the sequence of cultural phases. He discovered over 200 archaeological sites, which included both ceremonial and residential elements. His findings provided significant insight into the cultural timeline of the region and its social and political frameworks. Building on Proulx's work, Richard Daggett (1984) identified an additional 143 sites. His research further examined settlement patterns, architectural styles, and the spatial distribution of these sites, with a specific focus on periods of cultural transition, such as the decline of Chavín influence and the emergence of the Chimú. Together, their work laid the foundation for further research in the valley and provided a comprehensive overview of settlements, including a range of ceremonial, residential, megalithic, and fort settlements and their associated occupations.

But since the turn of the century, there have been numerous research projects in Nepeña Valley, with a particular emphasis on the lower portion of the valley (Chicoine and Ikehara 2011; Chicoine et al. 2021; Helmer and Chicoine 2016; Helmer et al. 2012; Rengifo 2014; Sutherland 2017; Trever et al. 2013). Since 2002, Koichiro Shibata (2004, 2010, 2011, 2017) has directed excavations at Cerro Blanco and Huaca Partida, where he has expanded on the chronological sequence for the Formative Period in the Nepeña Valley. David Chicoine conducted research in

2003 and 2004 at Huambacho, examining religious ideology, feasting practices and funerary rituals, particularly how they reflect social and political dynamics during the EH and EIP (Chicoine 2006, 2008, 2011a, 2011b). In 2009 and 2010, Chicoine and Hugo Ikehara (2010) excavated at Caylán to map and document the largest settlement within the Early Horizon (Chicoine and Ikehara 2010, 2011, 2014; Helmer 2011; Helmer, Chicoine, and Ikehara 2012). Building on this work, Matthew Helmer and Jeisen Navarro, along with David Chicoine, conducted research at Samanco in 2012 and 2013 to understand coastal life during the EH, arguing that the site functioned as a coastal village or small town with specialized industrial functions tied to Caylán (Helmer 2011; Helmer and Chicoine 2015). Meanwhile, Carlos Rengifo (2014; 2016) analyzed residential structures at Cerro Castillo, examining their pre-Columbian occupation, settlement dynamics, and connections to Moche culture. Further contributing to research in the valley, Lisa Trever and her team (Trever et al., 2017; Trever et al., 2013) studied Moche art and iconography at Pañamarca, shedding light on the visual culture and religious practices of the period. This body of literature has significantly advanced our understanding of the EP in the lower valley of the Nepeña Valley, while providing valuable insights into the socio-political developments of this period. Such research is relevant for understanding how the Middle Valley, and the Moro Pocket specifically, continues but also departs from these trends.

Hugo Ikehara (2015) conducted surface surveys throughout the Moro Pocket in 2012, focusing on the social and political dynamics of settlements. His research specifically examined the decline of Cupisnique around 750 BCE and the fall of the Chavín, as well as the subsequent coastal crisis at approximately 500 BCE. He explored how cooperation among communities was influenced by the need for defence during times of violence and sociopolitical upheaval, leading to changes in settlement patterns, social structures, and political practices (Ikehara 2015). Ikehara

(2015) notes the presence of supra-local community cooperation, which he refers to as districts. Based on Formative chronology, Ikehara (2015) notes that during the Late Formative period (800-450 BCE), which is the first half of the Early Horizon, the Moro Pocket had an estimated population of 1,240 to 1,870 people, organized into two central districts, labelled as SLC101 and SLC102 (Ikehara 2015, 97-98). At this time, Cerro San Isidro was the major demographic center of district SLC101, housing 87% of the total population. By the Final Formative Period, starting at around 450 BCE, the population in the pocket dramatically increased to an estimated 8,475 to 12,713, potentially as a result of migration (Ikehara 2015, 97-98). Based on demographic data, settlement clustering, and architectural investment, Ikehara (2015, 97) argues that the pocket districts were then reorganized into ten supra-local communities, with the core population center shifting to Kushipampa. Yet, Cerro San Isidro still remained one of the largest population centers and the demographic center of its district (termed SLC205 for this period). Following this period, there was a decline in population and a reorganization of the districts (Ikehara 2015, 98-100). Despite Cerro San Isidro still being the center for its respective district, there was a significant population decline, and Ikehara (2015) argues that this was a time of increased warfare. Ikehara's (2015) research, specifically through his analysis of demography, economic organization, and ceremonial architecture, shows that periods of conflict fostered new forms of cooperation and collective identity driven by the goal of defence.

Throughout his survey, Ikehara (2015) collected ceramic materials across the valley pocket and calculated the ratio of “fine” to “utilitarian” ware to identify elite settlements. Due to a higher-than-average proportion of fine ware, Ikehara (2015, 107) argued that Cerro San Isidro was an elite population center. However, this is based on the distribution of surface ceramics and has yet to be confirmed through excavation and stratigraphic data that would verify the presence

of elite contents. Also, it does not account for intra-site variations, which could reflect a more complex social organization within Cerro San Isidro. Still, Ikehara's research highlights the critical role that Cerro San Isidro played during the Early Horizon as an elite demographic population center.

2.3.1 Cerro San Isidro

In 2019, building on Ikehara's survey, David Chicoine and Jeisen Navarro Vega initiated the Proyecto de Investigación Arqueológica Cerro San Isidro to investigate the development and transformation at Cerro San Isidro, with a focus on the changing relationships to ancestor veneration, death, and divine political legitimacy. Cerro San Isidro presents a unique opportunity to do so, given the complex social and political systems that, following periods of significant transition, impacted the Moro Pocket.

The project employed several archaeological methods during the 2019 and 2022 field seasons. The majority of the work focused on excavations across four areas of the settlement, collecting ceramic and cultural materials from these excavations, which are reviewed in more detail in Chapter 4. In the 2019 season, the team noted a complex stratigraphic sequence indicating three main occupational phases: an early phase with stone and mud architecture, contemporary with the Early Horizon, a middle phase with adobe architecture, contemporary with the Early Intermediate Period (EIP), and a late phase with stone architecture, associated with the Late Intermediate Period (Chicoine and Navarro Vega 2021). Between 2019 and 2022, the team excavated 570 square meters and produced a wealth of artifacts, including 57 complete ceramic vessels, 20,478 diagnostic pottery sherds, 588 non-pottery ceramic objects, 224 textiles, 107 metal objects, 7,119 NISP (37.65 kg) of vertebrate animal remains, 35,904 NISP (41.53 kg) of malacological remains, and 2,376 NISP (2.5 kg) of macrofloral remains.

During this investigation, 48 radiocarbon samples were sent for AMS dating by Chicoine and Navarro, establishing the settlement's timeline from 760 cal BCE to 1453 cal CE. The radiocarbon dates, architectural styles, and material culture indicate three main phases of occupation – the Early Horizon, the Early Intermediate Period, and the Late Intermediate Period. Between the EIP and LIP, there is a gap in dates, which aligns with the poor visibility of corresponding diagnostic material remains (i.e., Moche, Wari) from survey and excavation procedures.

An important finding for this research project is an upright stone located on the Upper Platform, the highest terrace at Cerro San Isidro (Figure 2.5). This stone is 40 X 50 cm with a depth of 37 cm (Chicoine 2024). It was founded within a room, where the stone was placed in a prepared clay floor with about 30 cm protruding above the surface and was later encircled by a semi-circular stone cist. AMS dates place the stone within the EH, but the cist structure around the stone was likely constructed around the turn of the Common Era (Chicoine 2024). The excavation around the stone yielded offerings such as ground stones, marine shells, camelid



Figure 2.5: Upright stone located on the Upper Platform. Left: The stone is enclosed within a semi-circular stone cyst. Right: The same upright stone exposed after removal of the cyst.

coprolites, and isolated human remains. Notably, there is dissolution on the portion of the stone that sticks out of the ground, suggesting that liquid ash or other substances were placed on the stone (Chicoine 2024). These findings suggest the stone was an important ritual monument, possibly the site of dedication or offering. Chicoine (2024) suggests this stone may be an example of a huanca stone, based on its context, shape, and the ritual practices associated with it. Huanca stones are believed to represent ancestors who were transformed into stone and worshipped as tutelary divinities, a concept widely recognized in the Ancash region (Duviols 1977, 1979; Lau 2016). People typically placed these stones in high-visibility areas such as mountain ridges or platform tops, which aligns with the positioning of the stone at Cerro San Isidro (Bazán del Campo and Wegner 2006). Archaeological evidence, including caches of artifacts and signs of burning at the foot of the stone, suggests that the huanca stone at Cerro San Isidro played a significant role in ritual offerings, further supporting its identification as a huanca stone (Lau 2016). Given its prominent ceremonial context and material associations, I refer to this stone as a huanca stone throughout this dissertation.

Chicoine and Navarro (2021, p. 82) argue that the Cerro San Isidro archaeological complex, which includes Cerro San Isidro and Puente Piedra, served as a demographic hub for the Moro Pocket, as described by Ikehara (2015). The archaeological evidence suggests the existence of large residential complexes, expansive public spaces, passageways, and a high density of ceramic artifacts. Additionally, they support Ikehara's (2015) notion that Cerro San Isidro was a center of leadership, as indicated by the discovery of fine ceramics, musical instruments, food remains, and residential architecture. These findings suggest significant celebrations and rituals, likely to consolidate power and facilitate political negotiations (Chicoine and Navarro Vega 2023).

In 2022, I joined the project team to assist in creating a detailed settlement map. While the project's main goal was to focus on leadership roles, I contributed by narrowing my focus to the community level. I concentrated on daily life and community experience within the settlement.

Since Cerro San Isidro housed a significant population during the Early Horizon, it provides an excellent opportunity to study how people clustered and interacted within a settlement, particularly in uncovering mechanisms of cooperation. Studying Cerro San Isidro provides critical insights into how communities adapted their spatial layouts and practices in response to disruptions, much of which occurred with the collapse of the Chavín and Cupisnique influences. By studying Cerro San Isidro, we can bridge the gap between regional trends and the lived experiences of community members during a transformative period in Andean history.

2.4 Significance of Early Horizon Cerro San Isidro

The Early Horizon marks a period of profound sociopolitical and settlement pattern transformations across the North Coast. While much of the archaeological evidence across the north coast points to population dispersal into defensible hamlets, the Nepeña Valley presents a striking contrast, with the emergence of densely fortified settlements in the Lower Valley and dispersed yet interconnected urban centers in the Middle Valley. The dynamic transformations observed in the Nepeña Valley during the Early Horizon highlight the region's significance in understanding the broader sociopolitical and cultural shifts that unfolded on the north coast of Peru. While much attention has been given to major ceremonial centers such as Cerro Blanco and Punkurí, further research is needed to investigate how settlements like Cerro San Isidro fit within the broader framework of interaction and urban development during this period.

Despite extensive research on settlement distribution and regional organization within the Middle Nepeña Valley, particularly during the EH, there has been a limited focus on intra-

settlement dynamics. Previous studies, such as those by Ikehara (2015), have primarily examined broad socio-political trends and regional interactions but have not investigated how communities were structured at the household and community levels. There is a significant gap in understanding how domestic spaces were organized and how social interactions took place within settlements. While past research has documented settlement locations and architectural styles, it has not thoroughly explored the spatial layout of Cerro San Isidro, leaving unanswered questions about movement patterns, residential clustering, and overall settlement organization. Research at Cerro San Isidro presents a unique opportunity to fill this gap by investigating how urban communities navigated instability, revealing not only the physical layout of the settlement but also the mechanisms of cooperation and collective action that sustained its inhabitants, as I aim to do through this project. By examining how people organized their living spaces, engaged in social and economic interactions, and maintained cohesion in the face of uncertainty, this study provides essential insights into the processes that shaped early urban life in the Andes.

Additionally, there has been little attention to the mechanisms that foster social cohesion and cooperation at the community level. Cerro San Isidro's role as a population center at a time of socio-political upheaval presents an opportunity to study how cooperation was established through shared experiences. Despite the changes that occurred during the Early Horizon, most studies have focused on regional scales, rather than the effect of these changes at the community level. Investigating Cerro San Isidro's response to these disruptions would provide critical insights into how the settlement reorganized its spaces, fostered community integration, and navigated instability.

Furthermore, a disconnect remains between regional trends and the lived experiences of individuals within settlements. While broader settlement patterns in the Moro Pocket have been

well-documented, little is known about how these macro-scale changes translated into everyday life at Cerro San Isidro. By addressing these gaps, my doctoral research focused on community-level interactions at Cerro San Isidro, bridging this divide, contributing to a more nuanced understanding of early urbanization, social organization, and the lived experiences of people during a critical period in Andean history. This chapter has provided the necessary cultural and historical foundation for the spatial and social analysis of Cerro San Isidro in the following chapters.

3 Exploring Urbanism, Supra-household Communities, and Social Experience

In the previous chapter, I examined the sociopolitical and environmental context of the Nepeña Valley, highlighting its significance as a region that witnessed the experimentation with new forms of urban organization during the Early Horizon period. Thus, Cerro San Isidro represents a significant case for understanding the early stages of urbanism in the Andes. To move beyond identifying broad patterns of settlement and landscape use, it is necessary to examine how people lived in these emerging urban spaces—how they interacted with one another, engaged with their built environments, and formed cohesive communities. This chapter provides the theoretical foundation for answering these questions precisely. Drawing on interdisciplinary literature, I explore how urban form, supra-household communities, and the experience of space—particularly through visibility and movement—shaped social cohesion, cooperation, and the formation of collective identity at Cerro San Isidro.

To build this framework, I begin with a review of global and Andean urbanism studies, focusing on how archaeologists have defined urban centers, including recent discussions of low-density urbanism. As I suggested in Chapter 1, Cerro San Isidro might represent a center within a low-density urban system; therefore, it is crucial to outline the characteristics that support this classification. Additionally, I frame this dissertation around supra-household communities and inquire about the morphological characteristics of supra-household communities at Cerro San Isidro. As such, I discuss the various definitions of supra-household communities, the current state of community studies in anthropology, and how these communities fit into the discussion of urban spaces in the Andes. This discussion provides the necessary literature to understand life in these spaces and to evaluate the presence of these units at Cerro San Isidro.

Throughout this dissertation, I argue that shared experience is a crucial mechanism for fostering cooperation and identity within supra-household communities, which is proven through the study of visibility and movement. The second half of the chapter introduces frameworks for analyzing lived experience within urban space to support this argument. I draw on phenomenology, practice theory, and archaeological approaches to social experience to conceptualize how daily practices and spatial perception generate shared meaning. This theoretical foundation is essential for addressing my third and fourth sets of research questions, which focus on how visual and movement experiences structured interaction and identity within and between supra-household communities.

In summary, this chapter links theory to practice, outlining the interpretive lenses through which I analyze the spatial data presented in Chapters 5–8. By situating Cerro San Isidro within broader scholarly conversations on urbanism, community, and experience, I show how the built environment facilitated collective life at Cerro San Isidro. These frameworks ultimately support my central argument: that shared experience within and between supra-household communities was a foundational mechanism for cooperation and identity formation in this early Andean urban center.

3.1 Rethinking Urbanism in the Andes

In the previous chapter, I traced that long-term urban trajectory on the north coast and specifically in the Nepeña valley to contextualize Cerro San Isidro as an urban center. This section builds on this foundation by addressing one of the central research questions of this dissertation: *What makes Cerro San Isidro urban?* I argue that Cerro San Isidro is part of a low-density urban system, an interpretation that requires consideration of how such a form of urbanism is defined and recognized. Through this section, I lay the conceptual groundwork for

this discussion by reviewing archaeological models of urbanism globally, with a focus on Andean contexts, and conclude with a review of the characteristics of low-density urbanism. By doing so, I establish a criterion by which Cerro San Isidro can be evaluated.

3.1.1 Global and Andean Urban Models

Since the end of the 20th century, there has been an increasing acceptance that urbanism is not a fixed or universal category but a variable and context-dependent process (Alt and Pauketat 2019; Charlton and Nichols 1997; Graeber and Wengrow 2021; Jennings 2016a; Makowski 2008; Marcus and Sabloff 2008; Nichols and Charlton 1997; Sindbæk 2022; Smith 2020; Smith 2003b; Storey 2006; Trigger 1985; Yoffee 2009; Yoffee and Terrenato 2015). This discussion has proliferated across archaeological research in the Andean region due to the considerable variability in settlement organizations over time and space. Traditional models of urbanism, typically based on large, dense, state-administered centers such as Teotihuacan, Mohenjo-Daro, or Uruk, have long dominated archaeological discourse. These models tend to define cities by specific sociological traits—such as population size, density, and architectural complexity—or by their functional roles, including administrative, economic, or religious centrality (Smith 2003; Trigger 1985; Cowgill 2004). Yet these approaches often obscure the diversity of urban trajectories found in different regions, particularly in the ancient Andes, where political structures, religious practices, and community organization frequently diverge from normative expectations.

Defining urbanism is challenging because it is often treated as a monolithic concept, yet no single definition can fully capture its diverse expressions across different historical and cultural contexts. A single attribute cannot define urban settlements due to the various forms and functions cities take through time and space. Definitions generally fall into two categories:

sociological and functional. Sociological definitions of urbanism typically emphasize measurable traits, such as settlement size and density (Wirth 1938), while functional definitions stress the role of a settlement within a broader network, as seen in Trigger's (1972) influential proposal that cities perform specialized functions in relation to their hinterlands. However, both approaches have limitations. Sociological definitions risk excluding smaller or spatially dispersed centers, while functional definitions require comprehensive knowledge of settlement systems that is often difficult to obtain archaeologically.

More recent approaches have shifted toward viewing urbanism as a set of emergent processes rather than a fixed set of traits. This includes the interconnected processes involved in establishing, maintaining, reproducing, and transforming urban configurations (Lefebvre 2003, 16; also see Cowgill 2004, 526). These perspectives focus on the social, spatial, and experiential dimensions of city life—how residents interact with their environments and each other and how urban configurations are created and reproduced over time (Cowgill 2004; Lefebvre 2003; Smith 2020, 2023).

While there have been a variety of claims by Andean scholars regarding the earliest forms of urbanism (Haas and Creamer 2006; Makowski 2008; Pozorski and Pozorski 2008; Shady 2006), most agree that large-scale urbanism on the Northern coast of Peru can be best seen at the turn of the Common Era, in the Early Intermediate Period with the Gallinazo, Moche, Lambayeque, and Chimú phenomena (Bennett 1950; Moore 2003; Rowe 1963; Schaedel 1978; Shimada 1994). Recently, however, scholars have highlighted early forms of urbanism present on the coast of the Nepeña Valley (see Chapter 2). These urban forms often represent incipient urbanism, that is, the formation of urban settlements where no previous agglomerations or clusters of residences were visible archaeologically.

In the Andean region, scholars have examined urban development through various frameworks, including the functional and sociological definitions mentioned above. Makowski (2008), drawing on Collier (1955), Rowe (1963), and Lumbreras (1974), outlines three classification schemes that have shaped our understanding of Andean urbanism: comparative, pragmatic and axiomatic. Makowski (2008) classifies Collier (1955), who compared urban phenomena in the Andes to those elsewhere in the world, as an example of comparative definitions. In particular, Collier (1955) emphasized the role of irrigation systems in the emergence of urbanism, suggesting that the control over such systems led to population growth and the rise of warrior elites, as seen in the Wari Empire (Collier 1955). Rowe's (1963) definition of urbanism, which Makowski (2008) classifies as pragmatic, describes urban spaces based on permanency and functional attributes, considering sites as permanent dwelling sites with managers, military personnel, craftsmen, and merchants. He argues nuclear distribution is not a diagnostic trait as both large settlements distant from one another (achoritic) and nuclear (synchoritic) existed in antiquity (Rowe 1963). Lumbreras' (1974) definition, which Makowski (2008) classifies as axiomatic, follows Gordon Childe's (1950) conception of urbanism that relied on the presence of large complexes with monumental architecture, surrounded by dwellings, workshops, and storage areas.

However, no single origin or criterion can be used to describe all cities and urban spaces, particularly in the Andes; instead, scholars must understand urban phenomena within the context in which they are found. Recent scholarship has called for a departure from traditional linear models and a recognition of the diversity of urbanism in the Andes (Makowski 2008; Swenson 2011; Warner 2010). Scholars have increasingly moved away from rigid trait lists and

classificatory schemes in favour of analyzing the processes that make spaces urban (Cowgill 2004, 526; Lefebvre 2003, 16).

Makowski (2023) similarly critiques the assumption that urban settlements universally shared features like dense populations, market economics or political centralization. When considering Andean urbanism, he agrees with Kolata (1997, 253) that it could be described as ‘anti-urbanism’ as it challenges these Eurocentric city models, prioritizing ritual, political ideology, sacred geography, and ancestor veneration (Makowski 2023). He points to seven characteristics of pre-Hispanic urbanism in the Andes, which he argues are common characteristics of Andean urbanism (Makowski 2023):

- 1) Ceremonial Center Focus: Most urban settlements were primarily ceremonial in function.
- 2) Dispersed Ceremonial Architecture: Public ceremonial architecture is often spread across the landscape and linked to sacred geography.
- 3) Funerary and Ancestry Cult Centrality: Oriented around ancestry worship.
- 4) Monumental Architecture without Demographic Density: Monumental architecture appears even with no dense, permanent population.
- 5) Discontinuous Urban Trajectories: Cities rose suddenly and were later abandoned or transformed without continuity.
- 6) Dispersed Settlement Patterns: Most Andean populations lived in dispersed settlements.
- 7) Instability of Settlement Systems: occupational hiatuses within settlements.

Combined, these common features of Andean urbanism highlight the diversity of settlement organization within the region and underscore the importance of context-based understandings of

urbanism. As I explore in Chapter 5, these characteristics provide a useful framework for evaluating the urban nature of Cerro San Isidro and offer a starting point for understanding how the site fits within broader patterns of Andean urbanism.

In line with this shift, I approach urbanism not as a rigid definition or a strict list of traits, but as a dynamic set of social, spatial, and organizational processes. I focus on what urban spaces do, not only in terms of governance or economic administration, but how they support cooperation, enable relationships beyond the household, and create shared social meaning and identity. I define urban spaces as having integrated, multi-scalar organizations, which are created, maintained and supported within a settlement. There would be evidence of urban processes which support these relationships, such as labour mobilization, spatial coordination across groups, shared ritual or ceremonial practices, and supra-household coordination. I am adopting a functional lens that moves beyond strictly economic, administrative and/or infrastructural roles, instead focusing on what these spaces do for the people, specifically the social and organizational functions these spaces fulfil for the people. These social and organizational functions, however, are supported by physical features, such as buildings or roads, that shape how and where these functions occur. Thus, by assessing such physical features, we can learn about the functions, but also about the kinds of social relations that created and were created by these features. I also seek to do so in relational and contextual terms, by considering the historical, social, economic, and political conditions in which they are situated, recognizing that these functions differ in various contexts.

By situating Cerro San Isidro within this broader framework, I adopt a model that foregrounds social experience, cooperation, and spatial interaction as key components of urban life. Rather than asking whether Cerro San Isidro meets a predetermined definition of a city, I

examine how its built environment structured relationships between supra-household communities, and how movement and visibility facilitated collective identity and social cohesion. This approach allows me to frame Cerro San Isidro as an emergent urban center whose form and function were embedded in the unique historical, environmental, and social conditions of the Early Horizon Andes. I draw on Makowski's common characteristics of Andean urbanism not as fixed criteria, but as a starting point for thinking through how Cerro San Isidro fits within broader regional traditions. These features offer a useful comparative lens, which I return to in Chapter 5 to consider the ways Cerro San Isidro both reflects and departs from familiar patterns of Andean urban form.

3.1.2 Low-density Urbanism

This dissertation tests the hypothesis that Cerro San Isidro was part of a broader low-density urban network across the Moro Pocket. To evaluate this scenario, it is essential to review the literature on low-density urbanism, which provides the comparative and conceptual grounding for my analysis of Cerro San Isidro's morphology in Chapter 5. Geographer Jean Gottman first introduced the term low-density urbanism in the 1950s to describe what he called a "Megalopolis", a string of closely interconnected urban settlements (Gottman 1957). While this term was originally employed and widely recognized among scholars studying contemporary urbanism (Angel 2012; Angel et al. 2012; Doxiadia 1968; Gottman 1961; Morrill 2006), it has also been applied to ancient societies (Coningham and Gunawardhana 2011; Evans et al. 2007; Fletcher et al. 2003; Groslier 1979; Sabloff 1990; Sharer and Traxler 2006).

Gordon Willey (1956, 1965), a pioneering figure in Americanist archaeology, explored dispersed settlement patterns at the lowland Maya settlement Tikal. Here, he documented ritual centers with extensive settlements of dispersed households, plazas and raised roadways. While

Willey did not use the term "low-density urbanism," his observations revealed an interconnected system of urban settlements integrated into rural landscapes, effectively blurring the distinction between the rural and urban. This pattern, later referred to as low-density urbanism (Fletcher 2011, 284), challenges the notion of clear rural-urban boundaries, instead highlighting that scattered clusters of semi-rural settlements are integrated into an urban network.

Low-density urban settlements have been a recurring feature in past societies, evident in urban complexes such as Greater Angkor (Evans et al. 2007; Fletcher et al. 2003; Groslier 1979; Pottier 1999), Anuradhapura and Pollonaruwa in Sri Lanka (Coningham and Gunawardhana 2011; Devendra 1959; Gunawardana 1971), Amazonian lowlands (de Souza et al. 2018; Heckenberger et al. 2008), and multiple Maya settlements in lowland Central America (Sabloff 1990; Sharer and Traxler 2006; Willey 1956b, 1965). Research has demonstrated that despite hesitancy to recognize agrarian settlements as part of a network, low-density settlements were both widespread and fundamental to various groups, including hunter-gatherers, pastoralists, agro-hunters, and farmers, as well as mobile urban communities (Fletcher 2009, 2011, 2019). Today, Fletcher's (2009, 2011) research has gained broad acceptance, alongside growing recognition of the continued relevance of low-density urbanism in the modern world.

The presence of low-density urbanism has mostly been studied in the lowlands of Mesoamerica (Fletcher 2011; Smith 2011), Sri Lanka (Coningham and Gunawardhana 2011; Gunawardana 1971), and Southeast Asia (Evans et al. 2007; Fletcher 2011; Pottier 2000). There are however, studies on low-density urbanism in broader regions, which have become a significant focus of archaeological urban inquiry, including European *oppida* (Moore 2017), Great Zimbabwe (Chirikure, et al. 2017; Garlake 1970; Pikirayi and Chirikure 2011), Cahokia (Baires 2015; Kelly and Brown 2014; Pauketat, et al. 2015), Chaco Canyon (Drake, et al. 2014;

Price, et al. 2017; Vivian 1970; Wills and Dorshow 2012) and more recently Amazonian Bolivia (Prümers, et al. 2022).

As I previously reviewed in Section 3.1.1, urban scholars have begun to reevaluate what it means to be urban. This shift in perspective provides opportunities to consider low-density urban systems in the Andes. Many pre-hispanic settlements in the Andes were spatially dispersed, such as those in the Culebras Valley (Makowski, et al. 2011), the Cusco heartland (Covey 2008), the Jequetepeque Valley (Dillehay, et al. 2023), the Mantaro Valley (Parsons, et al. 2000), the Moche Valley (Billman 1996), the Nasca Valley (Silverman 1993), the Palpa Valley (Isla and Reindel 2005; Reindel 2009), the Santa Valley (Wilson 1988), and the Virú Valley (Willey 1953). While not all of these qualify as low-density urbanism, they demonstrate that dispersed spatial configurations were common in the region. Recognizing this pattern encourages us to ask what additional criteria signal the presence of urbanism in low-density forms and to consider that spatial dispersion was a recurring feature within the Andes.

Low-density urbanism is generally understood as urban settlements that are integrated but dispersed throughout rural landscapes (Fletcher, 2011). However, we still face questions about what constitutes an urban area, rather than simply low-density settlements. Isendahl (2012, 1112) characterizes low-density urbanism as a collection of residential areas and spaces with urban functions, such as political, religious, economic, administrative, or other activities that influence the surrounding rural areas. However, this definition raises longstanding debates about the nature of urban functions. Stoner and Stark (2021), based on Evens et al. (2007), Fletcher (2009), and Isendahl and Smith (2013), similarly define low-density urbanism as urban centers characterized by monumentality, regional importance, and evidence of planning but without dense populations and clear urban-rural boundaries. While I do not claim to have a definitive answer as to what

makes a space urban, I approach urbanism by considering what the spaces do for people, how they shape social relations, foster identities, and enable cooperation, rather than how they fit into classic models, as noted above in Section 3.1. From this perspective, these definitions are useful as they highlight what these spaces do, that these spaces function as urban not by physical density but shared purpose and practice, which in turn fosters these social components I am interested in.

Given that these spaces are then argued to have an urban function with a population dispersed across the landscape, there are different characteristics scholars have employed in assessing these spaces, which I use to consider the low-density urban nature of Cerro San Isidro in Chapter 5. Low-density urbanism, like its high-density counterparts, comprises highly diverse landscapes with intricate and various architectural and social structures, including different trajectories of growth and decline and size variability, ranging from a few square kilometres to 1,000 km² (Fletcher 2019, 2). Chapman and Gaydarska (2016), who consider global perspectives of low-density urbanism, highlight five common traits exhibited by most, but not all, low-density urban settlements. These characteristics are summarized in Table 3.1. The first of these is major building projects, which were often transformed at different phases of the settlement history (Chapman and Gaydarska 2016, 290). The authors draw attention to Cahokia (Pauketat 2009), where temples and monuments were rebuilt, correlating with settlement social changes (Chapman and Gaydarska 2016, 290). The authors similarly note it is the process of building itself which is perhaps more important (Chapman and Gaydarska 2016, 290); the process of labour mobilization reflects power and leadership as the power to mobilize labour could be reflective of power over others (DeMarrais 2016) and the collective actions on individuals forge and maintain community bonds and identities (Carballo 2013; Carballo and Feinman 2016).

Table 3.1: Characteristics of low-density urban settlements, as described by Chapman and Gardyska (2016).

Characteristic	Description
Monumental Building Projects (Labour mobilization)	Major ceremonial, civic, or religious construction; often rebuilt over time, reflecting social change.
Community-Based Modular Organization	Settlement layouts based on kin-linked residential modules, often nested within larger social and political hierarchies.
Seasonal or Episodic Occupation	Populations fluctuate due to pilgrimage, migration, or temporary political presence.
Reduced Emphasis on Mortuary Rites	Less centralized burial practices; possibly reflecting tensions between household and elite ideologies
Lack of Clear Successors	Settlements are often not replaced by direct successors in the same location or region.

Chapman and Gaydarska's (2016, 290) second trend is the presence of modular planning practices based on kinship, in which case individual households are linked together under a greater household leader but under the overall settlement leader. They draw on Pauketat's (2009) work at the low-density urban settlement of Cahokia, where modular architecture at the residential neighbourhood level consists of a series of buildings linked to plazas. Chapman and Gaydarska (2016) suggest that these units had their own leadership while still being governed under a larger overarching authority. These modular units correspond to my definition of supra-household communities, suggesting that the presence of supra-household communities is a critical component in defining these spaces as low-density urbanism, aligning with Smith's (2010) argument that supra-household communities are present in all urban settlements.

The third characteristic Chapman and Gaydarska (2016) highlight is the presence of seasonal variations in the populations (Chapman and Gaydarska 2016, 291). This is particularly visible in pilgrimage settlements throughout the Andes, which had a rotating population (Silverman 1994). The authors (Chapman and Gaydarska 2016) discuss the Solomonic Empire of

Ethiopia, which moved its population and soldiers (up to 80,000 people) every few weeks, from their low-density urban center (Marcus 1994).

The fourth characteristic is a reduced emphasis on mortuary practices, as Chapman and Gaydarska (2016, 291) argue that the centralization of ideological authority within ruling elites likely created tensions between households and central authority, particularly in times of death. They identify these patterns at Cahokia, many European oppida, Great Zimbabwe, and the Amazon, although the authors acknowledge exceptions (Chapman and Gaydarska 2016). Given the importance of ancestral veneration to ancient Indigenous communities (discussed further in Section 3.4), I suspect this criterion may not apply in Andean contexts.

The fifth trend Chapman and Gaydarska (2016, 291) note is that low-density urban settlements often lack clear successors within the same location or throughout the surrounding region. The authors draw on the example of Cahokia from Pauketat (2014), where the settlement occupation ended with a series of burning events, followed by population dispersal with no re-emergence of monumental centers. They also point to instances, such as at Ile Ife, where a settlement may remain and be symbolically important, but the urban infrastructure was never rebuilt after the decline (Chapman and Gaydarska 2016, 291).

In sum, while I move away from rigid definitions of urbanism that rely on population densities or centralized administration, I maintain that urban settlements, whether low-density or not, can be recognized as integrated, multi-scalar organizations that function to create shared identity, cooperation and relationships beyond the household. Some of the features identified by Chapman and Gaydarska (2016) as characteristics of low-density urban settlements, such as supra-household communities and labour mobilization, support the kinds of social relationships I

argue are fundamental to urban life. Thus, in Chapter 5, I examine the presence of these features when I consider the urban nature of Cerro San Isidro.

Chapman and Gaydarska (2016) identify patterns of supra-household communities in low-density urban spaces, where neighbourhoods function as key units of social organization. Their study of the Trypillia mega-sites in Ukraine demonstrates how the settlement was structured around decentralized community networks, with public buildings, like assembly houses, serving as focal points for interaction in some neighbourhoods (Chapman and Gaydarska 2016, 290). If we follow Smith's (2010a) suggestion that supra-household communities exist in all urban centers, then it stands to reason that they are also fundamental to low-density urban settlements. Given the nature of low-density urbanism—characterized by clusters of houses dispersed across the landscape—it seems likely that the close interaction within these clusters fosters the formation of supra-household communities. Studying these units in low-density urban systems is essential for understanding how social cohesion, cooperation, and identity were maintained in dispersed yet interconnected settlements.

Low-density urbanism provides a useful framework for recognizing Cerro San Isidro as a form of urbanism shaped by local conditions and regional dynamics. Approaching the site in this way allows us to shift attention from what it lacks according to traditional urban criteria to what it reveals about the spatial and social practices of its inhabitants. To better understand these dynamics, the next section explores the concept of supra-household communities as one possible organizational form within low-density urban systems.

3.2 Supra-Household Communities as Social and Spatial Units

This section explores the concept of supra-household communities—groups that extend beyond individual domestic units but operate below the level of centralized political institutions.

I lay out the conceptual framework necessary to address my research question *what morphological characteristics of the settlement suggest their presence?* To answer this question, I first examine anthropological and archaeological theories of community, focusing on how communities are defined, recognized, and studied in the archaeological record. I then turn to discussions of supra-household organization in the Andes specifically, where kinship, shared labour, and spatial clustering played central roles in community formation. Together, these perspectives help situate the architectural and spatial patterns observed at Cerro San Isidro within a broader interpretive framework, supporting my argument that supra-household communities were present at Cerro San Isidro and were vital spaces for fostering cooperation in this early urban settlement.

3.2.1 Theorising Community

As I noted in Chapter 1, I use the term supra-household community in place of the more commonly used term 'neighbourhood' to emphasize a broader scope of social organizations within urban settings. As such, I use this term to encompass a variety of different types of supra-household community organizations, such as neighbourhoods, house societies, *ayllus*, gated communities, patio groups, districts, etc. Recently, scholars (Betzenhauser and Pauketat 2019; Chicoine and Whitten 2019; Dueppen 2019; Pacifico 2019; Pacifico and Truex 2019; Stone 2019; York et al. 2011) have discussed the importance of assessing supra-household communities to better understand the lives of people within these urban spaces.

The term "supra-household community" refers to groups of multiple households and their associated social, economic, and political aspects, such as production (Bogaard 2017), economic organization (Usher, et al. 2003) and social differentiation (Falconer and Fall 2013). It has also been referred to as supra-household groups (Baird, et al. 2017; Carpenter and Prentiss 2021;

Kahn 2021), supra-household corporates (Baird, et al. 2017), and supra-household institutions (Carpenter and Prentiss 2021). Recently, scholars like Carter (2023) have explicitly used the term to describe multi-household communities. Despite its widespread use, the term does not have a fixed or universally recognized definition, as supra-household communities can take many historically and culturally specific forms, including neighbourhoods,

In this study, I use supra-household community to refer to socio-spatial, emergent institutions that encompass multiple households and develop shared beliefs and/or understandings, contributing to the development of a community identity. This approach allows for flexibility and diversity by focusing on a shared social identity as the defining characteristic of these spaces. Social identities of supra-household communities focus on the relationships between people and a given space. In developing this definition, I draw on a combination of ideational and interactional approaches to community (Yaeger and Canuto 2000), which emphasize both how people perceive themselves as part of a group and how their identities are produced and reproduced through routine social interaction. This blended perspective recognizes that supra-household communities are not only spatially bounded units, but socially constituted ones—whose cohesion is actively produced, maintained, and transformed through ongoing, shared experiences and practices embedded in daily life.

I use the term supra-household community as it encompasses the diverse array of social structures and relationships which exist in settlements, providing a comprehensive understanding of settlement dynamics and organizations. In reference to urban settlements, urban communities were and still are complex and multifaceted, consisting of various social groups and hierarchies which extended beyond the boundaries of individual households. These communities are characterized by intricate networks of interaction, and using the term supra-household

community acknowledges the interconnectedness of these different groups. As scholars of household archaeology have highlighted (Hendon 2009; Truex 2019; Ur 2014; Wilk and Ashmore 1988; Wilk and Rathje 1982), life in urban settings is especially dynamic due to constant negotiation of space, labour and social roles as well as changes and movement of people. The term supra-household community captures this dynamism by emphasizing the fluidity of social relationships and the ongoing process of interactions and experiences which shape these communities over time. Rather than viewing these groups as static entities with fixed boundaries, we can recognize them as dynamic social spaces that were constantly evolving in response to changing economic, political, and cultural forces.

The term supra-household community then emphasizes the social processes that occur within multi-household groups, while considering a variety of forms in which these units may appear, such as neighbourhoods, patio groups, and other types of collective social structures. In this discussion, I will be using the term 'supra-household community' to refer to any group consisting of multiple households that share common social, economic, or political characteristics beyond the household level. While I may refer to certain scholars discussing “supra-household communities,” they might use different terms, such as 'neighbourhoods' or 'patio groups,' to describe these or similar groupings. Likewise, various culturally specific terms, like the Andean *ayllus* and the Aztec *calpulli*, serve as analogs to the concept of supra-household communities.

I chose to use the term ‘supra-household communities’ because it can encompass a variety of different types of multi-household collectives without the definitional, cultural, or historical baggage often associated with more specific terms, such as “neighbourhood” or “district”. By using this broad, flexible framework, I can focus on a variety of diverse material

and social forms that these groups may take, rather than adhering to assumptions about how they should look or function. However, I do not dismiss the physical manifestations often associated with neighbourhoods, such as spatial clusters and physical distinctiveness, as I review below; instead, I interpret them through the lens of interaction and meaning. I focus on the types of relationships and experiences these spatial arrangements facilitate.

Utilizing the concept of supra-household communities facilitates a more comprehensive comparative analysis of multi-household collectives across space and time. At the same time, the term ‘supra-household’ communities is a practical starting point for assessing multi-household groups within a settlement, as it can be used to establish the social and spatial boundaries of a group without prematurely determining what form they took. From this, terminology can be further refined in terms that are regionally or culturally specific, such as districts, ayllus, or patio groups. Nevertheless, using supra-household communities as a heuristic is analytically meaningful on its own because it highlights the fundamental social processes that occur when households cooperate, regardless of the cultural or historical manifestations of those groups.

A methodological concern that has long been significant in archaeology is the relationship between patterns in the material record and the social or cultural groups these patterns might represent. Archaeologists often face uncertainty regarding whether the categories they create, such as pottery types or spatial patterns, truly map onto the social or cultural realities of past peoples. Scholars such as Binford (1962), Canuto and Yaeger (2000), Clarke (1968), and Hodder (1978) have argued that spatial patterns do not always map neatly to social entities. Social systems are often open and overlap in space, as seen in Glass’s (1948) analysis of Middlesbrough and Alexander’s (1972) concept of nodal networks, where units do not perfectly coincide but also do not remain entirely disjoint.

However, in this research, I argue that spatial relationships can actively reinforce social relationships—that physical proximity fosters shared experiences, routine interactions, and identity formation practices. Thus, while social and spatial boundaries may not always align perfectly, in certain instances, the physical layout and organization of spaces can serve as markers of supra-household communities, providing insight into the social dynamics that exist within them. In these cases, spatial boundaries do not merely represent physical separation; rather, they facilitate social interactions and the forging of relationships. Therefore, we can use spatial patterns to infer the presence of supra-household communities and subsequently assess their social components.

Hutson (2016) notes that there are four criteria that can be used to identify features similar to neighbourhoods (i.e., supra-household communities) in the archaeological record. This includes 1) spatial clustering, 2) focal nodes, 3) stylistic clustering, and 4) craft specialization. For the purposes of this research, I focus specifically on spatial clustering as it is directly relevant to my work at Cerro San Isidro. Spatial clustering refers to the clustering of households or settlements that may correspond to social units greater than the household (Hutson 2016, 73). This works under Tobler's law, as proposed by geographer Waldo Tobler (1970), who argued that things that are near are more related to things that are far apart. In other words, houses that are physically close are also socially close. In this view, physical proximity is not merely a reflection of architectural convenience but an active condition that fosters social interaction. Social ties are likely to emerge in close geographic proximity, supporting greater opportunities for cooperation, shared labour, ritual participation, and the development of collective identities.

Spatial clusters are used by many archaeologists to define the physical boundaries of supra-household communities (Arnould 2008; Friedman 2009). For example, through reviewing

historical and ethnographic data, Michael Smith (2011) presents three cases of spatial clusters of houses in low-density urban settlements, including the Aztec *calpolli* and the African cities of Bida and Addis Ababa. He argues that the clusters exhibited activities and characteristics, such as ethnic and occupational similarities, shared administrative roles within the settlement, or ceremonial focus, typical of urban neighbourhoods, both in premodern and modern cities (Smith 2011, 65). Similarly, Canuto and Yaeger (2000) emphasize that proximity among households can produce socially meaningful groupings through everyday practices, creating emergent, socially embedded units. These supra-household communities function not just as aggregations of dwellings, but as frameworks through which shared values, identities, and forms of governance are negotiated. Spatial clustering provides not only a spatial setting but also the material infrastructure which aids in fostering and maintaining community bonds. Thus, spatial clustering, while physical, can be a powerful mechanism through which social interaction is facilitated and bonds are forged.

Another spatial characteristic used to define the physical boundaries of supra-household communities is physical barriers (Smith 2010a). Physical barriers can be human-made, such as walls and canals, or natural environmental features such as rivers or ditches. These features serve to delimit the spatial extent of household groups, reinforcing boundaries by restricting movement and channelling interaction. Importantly, they tend to increase social interaction among those within the same enclosed area while limiting it across boundaries, thereby fostering tighter intra-group cohesion. In this way, physical barriers reinforce the same kinds of social boundaries established through spatial clustering and are often found in combination with it.

For example, in several Maya cities, archaeologists have identified low walls that encircle residential clusters (Hutson 2016). Along the Copán River Valley, Leventhal (1979) documented

household groupings separated by drainage ditches, which served both practical and social functions by segmenting the settlement into discrete community units. Similarly, at Dzibilchaltún, Kurjack (1974) observed that distinct residential clusters were separated by broad areas of vacant terrain.

Another fundamental—yet often underemphasized—physical characteristic of supra-household communities is the presence of multiple households. While this may seem self-evident, it remains a critical baseline for identifying these socio-spatial units archaeologically. Whether described as neighbourhoods, districts, or clusters, all forms of supra-household communities presuppose the presence of several households. The presence of multiple households is more than just a quantitative threshold—it reflects the potential for social interaction beyond the nuclear family, enabling collective activities. Thus, identifying multiple households in close proximity provides not only a material basis for defining the physical extent of supra-household units but also opens the door to inferring the presence of social interactions. As such, an essential step in spatially defining supra-household communities is the identification of multiple households within a give area.

In Chapter 5, I explore the presence of supra-household communities at Cerro San Isidro by examining spatial clustering, physical boundaries, and the presence of multiple households. Through detailed spatial analysis, I assess the extent to which these features are present and how they may delineate the physical boundaries of supra-household groupings. This analysis directly supports my research question concerning whether such communities existed at Cerro San Isidro and how they were materially expressed in the built environment.

Once I have established the physical presence of these units, the remainder of the thesis shifts focus to the social dimensions of these spaces. Rather than simply asserting that physical

characteristics produce social outcomes, I examine how shared spatial arrangements provided a framework within which social relationships could be cultivated. I emphasize that while spatial proximity and architectural design may set the stage, it is through shared experiences that community identities and cooperation were forged. In this way, I move from identifying the material preconditions of supra-household communities to analyzing the social processes they facilitated—exploring how these communities operated, how cohesion was maintained, and what these dynamics reveal about broader urban life.

At Cerro San Isidro, there are clear, spatially distinctive architectural platforms that encompass multiple households. Given the spatial segregation of these platforms, which could promote increased interaction and shared experiences among household members, I hypothesize that they represent supra-household communities. A key aspect of the Cerro San Isidro research is to understand the socially meaningful nature of these spaces, specifically, how community identity, cooperation, and cohesion were fostered within them. To situate my work within the broader context of Andean scholarship, the following section examines previous studies of supra-household communities in the region.

3.2.2 Supra-Household Communities: An Andean Perspective

One of the best examples of supra-household communities in the Andes is that of the *ayllu*, often referred to as the basic yet nested unit of socioeconomic cooperation in the Andes, which are social units bound together by kinship, ancestors, and land claims, amongst other criteria (Jennings and Berquist 2023; Kellett 2022). When the Spanish invaded, the central Andes were organized by *ayllus*, which remain important groups in the region's political, economic and social organization (Doyle 1988; Zuidema 1964). They serve as actors of collective action, which encompasses multiple households, lineages, or entire regions, and provide group members with

certain rights and responsibilities (Jennings and Berquist 2023). These groups establish expectations for roles and behaviours among group members. Overall, an *ayllu* is a group of individuals with a shared identity that ties them to each other. *Ayllus* are nested and can recombine at different regional and demographic scales depending on the context, making their archaeological study particularly challenging (Abercrombie 1998; Isbell 1978; Nash 2009; Platt 1986; Rostworowski and Murra 1960).

William Isbell (1997) applied a postmodern approach in the study of the Andean *ayllu* by arguing that the social organization of Andean spaces embodied the *ayllu* and must be understood through the context of ancestor worship, rather than traditional models of urbanism. Research by Wernke (2006; 2013) in the Colca Valley provided a novel theoretical and methodological approach to understanding the *ayllus* through the application of GIS, architectural analysis, and settlement archaeology. Through this work, Wernke (2013) tracked how the region's *ayllus* changed from prehistoric to colonial times. His analysis employed ethnohistorical census, topographic, and GIS data to reconstruct household-level land ownership patterns in order to reconstruct *ayllu* residential disruptions. This method highlights the changing cultural landscape of the region, while providing a framework for identifying and documenting ancient *ayllus*.

Bioarchaeology has also made advances in assessing cranial modification as a form of social identity linked to different *ayllus* (Kurin 2016; Velasco 2025). Stable isotope analysis has also been used to examine subsistence practices and population origins (Torres-Rouff et al. 2017). Ancient DNA has been utilized to document demographic and mobility trends, which suggest kin relationships within and across *ayllus* (Baca et al. 2012; Bongers et al. 2020). Although it should be noted that these interpretations represent different possible readings of the

material and should not be seen as definitive models. The case studies, however, demonstrate the potential and complexity of documenting and understanding supra-household communities in the Andes. They demonstrate that social forms are represented in the archaeological record through multiple means, ranging from landscape organization to biological markers.

While the *ayllu* remains one of the most discussed forms of supra-household community forms within the Andean region, archaeologists have assessed a variety of other forms, including barrios at Chan Chan (Topic 1980), multifamily compounds at Huacas de Moche (Chapdelaine 2009), barrios at Pampa Grande (Shimada 1994), gated communities and neighborhoods at Caylán (Chicoine and Whitten 2019), Salinar site neighbourhoods in the Nepeña Valley (Helmer and Chicoine 2016), mutable neighbourhoods of Late Moche in Jequetepeque Valley (Swenson 2019), and supra-household groupings and neighbourhoods of Tiwanaku (Couture 2003; Janusek 2003), amongst many others. These scholars employ different methods and theoretical frameworks to document what I argue are supra-household communities. Despite the use of different terminology—barrios, neighbourhoods, or compounds—all refer to distinctive multi-household groups with shared identity or traditions, making them forms of supra-household communities.

At Chan Chan, Topic (1980) refers to these groups as barrios, the Spanish term for neighbourhood, which are social and spatially distinct spaces, differentiated by similar kinship and activities, having small irregular agglutinated rooms (SIAR) (Topic 1980, 281). Through his excavation, Topic (1980) argued that each barrio represented functional and social communities, and that urban life emerged not only through top-down elite control but also through the internal social dynamics of these lower-status communities. Chapdelaine's (2009) research at Huacas de Moche discusses an urban grid characterized by streets and separate compounds, which

Chapdelaine (2009, p. 185) notes are larger than individual or family households. Through variability in faunal remains, architecture, and material goods between the compounds, Chapdelaine (2009) argues that the compounds have different specialized activities, such as ceramic production, production of adobes, metallurgy, weaving, and beer making, amongst others. These tasks supported life within the inner city of Huacas de Moche but also those living in the hinterlands, making these supra-household communities vital economic units for the maintain of urban life. Through this research, Chapdelaine (2009) reveals how urban life emerged through supra-household communities where the internal organization of space fostered these larger collective units, which aid in sustaining the economic nature of urban life.

At other Moche sites, Galindo and Pampa Grande, scholars note distinctive barrios, defined by differences in size and development of residential architecture and by the type and quantity of wealth-related artifacts (Attarian 2003, 190). Through an analysis of pottery style, Attarian (2003) notes that the barrios at Galindo and Pampa Grande reflect immigrant communities that maintained elements of their original identities within the larger urban centers. This research demonstrates that urban settlements were also shaped by the persistence and negotiation of diverse supra-household communities.

Similarly, at Tiwanaku, Couture (2003) and Janusek (2003) note bounded compounds that constituted supra-household groupings (Janusek 2004, 187). Through excavations, spatial analysis and a comparative study of the architectural forms, these scholars argue that Tiwanaku was built around corporate groups with specific production activities and was vital to the maintenance of social order within the settlement. Janusek (2004) highlights that groups were active agents in shaping Tiwanaku; these supra-household communities were the building blocks of political, economic, and social life at Tiwanaku. This perspective shifts attention away from

top-down statecraft to questions about how local communities negotiated and constructed urban life and subsequently opens up new questions on identity, labour and authority within urban settlements.

Vallières' (2012) work at Tiwanaku focused on Mollo Kontu, which they argue is a non-elite neighbourhood of Tiwanaku, made up of multiple compounds. Vallières (2012, 122) also notes that compounds, barrios and neighbourhoods are similarly used interchangeably, noting in this specific context that often a neighbourhood or barrio has multiple compounds within its boundaries. By centring their analysis on these supra-household communities, Vallières (2012) reveals how community identity and social differentiation happen beyond the household, within these communities. They argue that shared practices, specifically cuisine-based, shaped group affiliation and identity. Vallières' (2012) highlights that supra-household communities maintained meaningful autonomy within urban settlements. This study is important in highlighting how diversity, but also cohesion, were managed in ancient urban settlements through these everyday practices within supra-household communities.

Covey (2008) addressed the nature of pre-Columbian Andean neighbourhoods and argues that neighbourhoods brought together distinct political-ethnic groups from distant regions to the local, sacred landscape of the Inca capital to expand Inca Imperialism. This idea of bringing together distinct peoples in neighbourhoods is mirrored in Pacifico's (2019) assessment of neighbourhoods in the 15th-century site of El Purgatorio. Pacifico (2019, 126) argues that neighbourhoods integrate diverse historical processes, power, and potentially distinct factions of people, but in different ways, depending on their context. For him, neighbourhoods create a familiar space for households with various dissimilarities and examining neighbourhoods as integrated diverse groups within cities can aid in our understanding of negotiations between

households and broader urban institutions (Pacífico 2019, 126). In both studies, supra-household communities are considered integrative spaces of diverse peoples within urban settlements, revealing the dynamic social landscape of urban settlements. This perspective has encouraged me to explore how cohesion was created and maintained within supra-household communities and how they interacted with and contributed to broader urban infrastructure. It opens up new questions about how cohesion and cooperation were forged from the ground up, not only through top-down planning but the spatial and social practices of supra-household communities.

Supra-household communities have been a popular avenue of research on the north coast of Peru. Helmer and Chicoine (2016) examined incipient urbanism at Caylán and Samanco in the Nepeña Valley during the EIP. Through excavation and architectural mapping, Helmer and Chicoine (2016) note that wall-compounds or enclosures were the basic unit of residential life at these two settlements, but were organized differently at each site. This is particularly relevant to my work at Cerro San Isidro, where I consider supra-household communities as the basic unit of residential and social organization.

Similarly, Chicoine and Whitten (2019) apply the concept of neighbourhood at Caylán. The authors analyze the spatial arrangement of wall compounds, which they see as residences for multiple families (Chicoine and Whitten 2019). Through an evaluation of layout and planning at Caylán in combination with excavation data, the authors challenge a monolithic approach to neighbourhoods, that is, the assumption that neighbourhoods are fixed, uniform and follow a single universal model. They draw attention to alternative forms, specifically 'house societies', following Lévi-Strauss (1975), where membership and identity are rooted in the "house" which entails titles, properties, (real and fictitious) kin ties, and shared ritual practices. This research highlights the importance of supra-household communities as the basic unit of urban

organization and shows how urban spaces were built, maintained, and shaped at the community level.

Further north, through an assessment of settlement patterns, Swenson (2019) identifies intermediate socio-spatial units which do not align with the classic vision of permanent, stationary neighbourhoods. Instead, Swenson (2019) notes that these intermediate sociopolitical associations transcend familiar and household alliances and are intentionally created and maintained in specific settlements, even when the occupation of an area was seasonal. He uses the concept of neighbourhood as an analytical tool to explore variability in intermediate-scale social groups, and ultimately shows that what counts as neighbourhoods in the archaeological record may be fluid, ephemeral and contextually specific. Swenson's (2019) research demonstrates that linear, Western notions of cities are inadequate in capturing the complexity and fluidity of social formations on the north coast of Peru.

Taken together, these studies show that supra-household communities were central to the organization of Andean urbanism. Whether referred to as neighbourhoods, compounds, or *ayllus*, these groups structured everyday life. This brief literature review highlights the diversity of supra-household communities in terms of both form and function – they were not always clear bounded units, but could be flexible, negotiated spaces shaped by local contexts. Some supra-household communities were rooted in kinship, whereas others were forged through rituals, craft production, or shared co-residence. Importantly, archaeological studies reveal that supra-household communities were not secondary to broader urban infrastructure or elite authority, but rather urban life was organized from the bottom up through the cooperation of these intermediate-scale groups. Supra-household communities were not just something reproduced within a space, but through people's everyday interactions and experiences in and through the

built environment, creating a sense of belonging and relatedness. These studies directly inform this dissertation as they reinforce my argument that cooperation and identity were forged within supra-household communities, rather than imposed from above.

3.3 Theorizing Social Experience in Archaeology

This section provides the foundation for understanding how cooperation and shared identity emerged from the lived, embodied experiences of space within Cerro San Isidro's supra-household communities. Building on the previous discussions of supra-household communities, I examine how people engaged with their build environments; I turn to the social and experiential dynamics that made and make supra-household communities meaningful.

Supra-household communities were not only spatial arrangements or logistical units, but also social collectives in which bonds were continuously forged through routine engagement with one another and their shared spaces. The layout of these communities influenced how individuals interacted with one another and how they perceived their place within the collective. The repetition of shared experiences within these environments helped cultivate a sense of belonging and a shared group identity. Living together creates a sense of identity, but it is not merely cohabitation that accomplishes this. Instead, it is the shared social experiences among neighbours and co-residents that develop bonds and connections. However, while shared experiences can foster unity, they can also highlight differences, sometimes reinforcing divisions within or between groups—a process known as schismogenesis (Bateson 1935). This concept suggests that interactions within communities can both strengthen cohesion and generate social differentiation as individuals or subgroups define themselves in contrast to others.

Here, I draw on insights from phenomenology and practice theory. Such perspectives merge in their understanding that space is not only a backdrop but an active medium in which

people construct meaning, memory, and identity, rather through actions within these spaces or active engagement with the space itself. Living in the same space creates the foundation for the shared experiences of residents; so, while individuals may experience a space in different ways, the fact that they inhabit and move through the same spaces lays the groundwork for commonality in experience and meaning-making (Mac Sweeney 2011; Thomas 1996). Living together in close spatial proximity fosters not only habitual encounters and repeated interactions but also shared rhythms of daily life. Such patterns can foster the development of shared social norms, expectations, and ultimately, a supra-household identity. From this standpoint, the physical co-location of households is not just a demographic fact but a socially meaningful arrangement that enables group identity to take shape over time. The act of dwelling together within a defined built environment provides the spatial scaffolding through which social ties are cultivated and remembered.

Supra-household communities were not simply aggregates of co-residing individuals; they were socially co-produced through the repeated shared experiences of space. Shared experiences include everything from the routes residents walked daily to the views they shared. As communities participated in daily life within the same spatial frame, they developed a sense of mutual belonging. Here, I focus on two key modes of embodied spatial experience: walking and visual perception. These everyday acts during co-residences, ie, moving together and seeing the same things, serve to bring residents into a social collective based on shared experience.

Walking is not simply a means of navigating physical space but a spatial practice through which individuals inscribe meaning into the built environment. De Certeau (1984) likens walking in a city to writing within a text – while an author is bound by the pages of a book, they write the material they choose, just as pedestrians may be bound by the spatial order of a city, but they

can create their own routes that may challenge dominant spatial orders. Lefebvre (1991) builds on this by arguing that although architectural layouts play a foundational role in the creation of space, people express their freedoms through how they move through and interact with those spaces. Scholars such as Lefebvre (1991) and Gieryn (2002) argue that buildings and spatial layouts structure movement, guide interaction, and shape the experience. While architectural layouts may suggest prescribed routes or channels of movement, it is through the repeated, everyday acts of walking that people actively produce spatial meaning. Walking becomes a form of social performance that both reflects and reinforces social relationships between households, neighbourhoods, and the larger urban community. The ability to walk to, through, or around certain spaces communicates social access, belonging, and affiliation. In this way, movement through space contributes to the articulation of social ideologies and power structures. In Section 3.5, I expand on the experience of walking by addressing the concepts of accessibility, socio-spatial integration, connectivity, and the role of spatial movement in fostering shared experience within the supra-household communities of Cerro San Isidro.

In tandem with movement, visual experience (what people could see) played a vital role in shaping communal understandings of space and identity. Viewscapes are never neutral; they are socially and symbolically constructed (Ingold 2000). Cerro San Isidro has significant topographic variations, especially between supra-household communities, which would have influenced what each supra-household community was seeing and subsequently affected how they experienced and interpreted their surroundings. These visual encounters helped individuals locate themselves in relation to others, to communal landmarks, and to ideologically significant places.

Following Ingold (2000), vision is not a passive act of detached observation but an embodied and participatory practice. As Andreas Glaser (1998) argues, space also plays an active role in shaping identity. Glaser (1998) insists that identity is formed through interactions with other people but also with space itself, forming an interactive relationship between self, others, and their space. Visual perception becomes a relational and affective act that reinforces spatial belonging and social knowledge. Therefore, shared visual experiences help to produce and stabilize collective identities. In what follows, I expand on this discussion of visual experience, examining how sight contributed to the everyday experiences of individuals and communities within the built environment. This section draws on a range of archaeological studies that use visual analysis to understand how spatial arrangements, sightlines, and visibility shaped social interaction, movement, and identity. I highlight how archaeologists have employed visual analysis to explore the experiential and symbolic dimensions of vision. I give particular attention to the Andean contexts where visual perception has been a critical avenue for interpreting the social and ritual lives of people and communities.

3.4 Experience and Visibility

To explore how visual experience influenced cooperation and identity within the supra-household communities at Cerro San Isidro, I review the broader scholarship on visibility and landscape experience and situate myself within this discussion. I begin by reviewing the primary uses of visibility analysis in archaeology to establish a foundation for my own approach. I demonstrate how archaeologists have used visibility analysis in different contexts to ground my discussion of Cerro San Isidro within a broader framework. I then shift from the technical application to exploring how archaeologists have interpreted visibility data through different theoretical lenses - economic, interpretive, and political. I then turn to Andean-specific

approaches to visibility and space, particularly the significance of sacred landscapes and the visibility of particular landscape features. Drawing on these strands, I position my own approach, which I apply to the viewsapes of the supra-household communities at Cerro San Isidro, where I integrate economic, interpretive and political frameworks while also considering Andean ontologies of space.

Recently, experiential archaeologists have turned their attention to visibility, to who can see whom and what can be seen across ancient landscapes, as the sense of sight is fundamental to experiencing space (Van Dyke, et al. 2016). Visibility analysis consists of creating spatial models of all geographical areas that can be seen from a set point; these images of the is referred to as a viewshed or viewscape. In recent years, landscape archaeologists have used visibility analysis to understand the connections people in the past made with their environments. Themes of focus include symbolism, communication, defence, and shared identity (Van Dyke, et al. 2016). At Cerro San Isidro, I will consider how viewsheds impacted the daily experiences of group members and their collective identity in an incipient urban space.

Archaeologists have used visibility analysis to assess potential site locations or rationale for selecting a site, based on visibility from the settlement (De Montis and Caschili 2012; Sevenant and Antrop 2007). For instance, Sevenant and Antrop (2007) use visibility analysis to understand the relationship between settlement patterns, land use zoning, and landscape visibility in two settlements in Greece: Paros (Cyclades) and the Lassithi plain (Crete). They hypothesize that residents placed settlements where fertile and intensively used grounds can be easily controlled. Their visibility assessment suggests the residents had strong visual control of the territory, with intensively used land being significantly more visible.

Visibility analysis is also used to understand the intentional placement of monuments and structures within a landscape by assessing visibility to and from these features. Using such an approach, researchers have gained insight into their significance, purpose and potential ceremonial or ritualistic functions (Bourgeois 2013; Čučković 2015; Gaffney and Stančič 1991; Lake and Woodman 2003; Ruggles and Medyckyj-Scott 1996; Wheatley 1995). For example, Lomsdalen (2022) questions whether prehistoric temple builders in Malta purposely positioned their temples to be prominent in the landscape and interconnected with other temples and whether their positionality suggests relationships with celestial bodies. Their findings reveal that the temples were strategically located for high visibility and intervisibility (that is, visibility to other temples). Moreover, temple entrances were aligned with specific celestial objects, suggesting a deliberate incorporation of celestial observations into temple design (Lomsalen 2022). Overall, their research suggests that the placement, orientation, and design of the temples were guided by a cosmology, indicating a deep connection between the temples, the landscape, and celestial phenomena.

Renfrew (1979) used the visibility of monuments to determine the extent of social territories. Through his analysis of megaliths in the Orkneys, Renfrew (1979) assesses land visibility from each monument to infer the extent of different social territories, with the monuments as the visual focal point demarcating the boundaries. Researchers also use visibility analysis is also to assess settlement choice in regard to defensibility (Loots, et al. 1999). Loots et al. (1999) conducted a visibility analysis to study the Hellenistic outer defences at the archaeological site of Sagalassos and analyzed the reciprocal relation and intervisibility between a fortress and two watchtowers situated on mountain tops north and southwest of the city. The authors note that the

watchtowers effectively guard specific sections of the main approaches to the city and interact with each other in terms of visibility.

Generally, viewscales are relatively easy for archaeologists to create; all that is required is an elevation model of the area in question, which is added to a GIS layer along with a center point of observation. The viewshed geoprocess then produces a map highlighting all visible areas from the center point of observation. However, the real complexity lies in the interpretation – visibility alone does not inherently explain why certain areas were chosen for settlement, nor how those viewscales were engaged with or perceived by people. It requires theoretical grounding to be analytically useful. Here, I review three different approaches and clarify my position within them.

Drawing on Kosiba and Bauer (2012), there are three primary theoretical frameworks used to assess experience within landscape archaeology and, more specifically, visibility analysis: economic, interpretive, and political. While different in interpretation, these approaches highlight that GIS-based research is not an endpoint but a step toward further interpretation. These three frameworks then guide how the resulting data is interpreted.

Economic-based approaches are some of the first to come from landscape studies, with the basic premise that societies are organized around the distribution of economic resources. This approach considers cultural adaptation to landscapes because of social and economic resources, such as agricultural landscapes (Kosiba and Bauer 2012, 63). There are multiple studies which apply GIS-based analysis to predict site locations relative to soil types, vegetation, slope, hydrology and agricultural productivity (Brandt, et al. 1992; Duncan and Beckman 2000; Hunt 1992; Mehrer, et al. 2005; Wescott and Brandon 2000). There are studies in which modelling optimal foraging behaviours and prehistoric pathways can be used to identify regional settlement

types (Limp 1991; Madry and Rakos 1996). Viewshed analyses are used in economic-based approaches to assess how the visibility of the landscape might have benefited a group to better monitor game, supervise agricultural fields, or oversee spaces (Krist and Brown 1994; Lock and Harris 1996; Madry and Crumley 1990; Maschner 1996). Similarly, viewshed analysis compares visibility between settlements and considers those with the greatest visibility as more defensible and desirable (Gaffney and Stančić 1991). Some studies consider both defensibility and land production, such as Jones (2006) study of Iroquois communities in choosing their settlement locations based on productive soil and to maintain the defensibility of their settlement. However, anthropologists (Smith 2003) have criticized this approach, arguing that their limited emphasis on economics offers a vague representation of the specific cultural values and political agendas which often underlie the formation of societies and settlement locations.

In direct response to the economic approach is the interpretive approach, which draws on phenomenological and experiential-based archaeology. Interpretive scholars begin from the understanding that individuals are emotionally connected with their environment and cultural meanings are reproduced through their bodily experiences and perceptions of different landscape features (Kosiba and Bauer 2012, 64). Generally, this approach assumes people assign cultural significance to their environment and treat their environment as a topography of meaning and memory. The majority of interpretive GIS-based landscape analysis focuses on replicating past sociocultural perceptions of the landscape by modelling visibility (Gaffney and Watson 1996; Llobera 1996; Maschner 1996; Ruggles and Medyckyj-Scott 1996; Wheatley 1995; Wheatley and Gillings 2000). For example, Chapman (2003) argues that the visibility of Neolithic monuments in the Great Wold Valley of England was created to include earlier monuments within their viewshed, which would create an experiential link to the past (Kosiba and Bauer

2012, 65). Similarly, Gaffney et al. (1996) assess visibility from various Iron Age monuments in the Kilmartin area, such as rock art, henges, and standing stones. They broke the visibility down based on the different types of monuments to assess how these monuments interacted. From this analysis, Gaffney et al. (1996, 153) concluded that specific areas had increased visual prominence over others, and these three types of monuments emphasize the real, perceived relationship between temporally separated monuments.

While such case studies emphasize monuments, there have been clear indications of settlement locations selected for a greater affordance of particular landscape markers (Cummings 2003; Cummings and Whittle 2003; Fisher et al. 1997). An early example is Fisher et al (1997), who conducted a visibility assessment on Bronze Age cairns, burial areas on the Isle of Mull, Scotland, who were interested in determining the significance of visibility in the location of archaeological settlements. This study noted an increased visibility of the sea than any other landscape marker, indicating the cultural significance of the ocean for those creating the Cairns.

Scholars (Gillings 2012; Kosiba and Bauer 2012) critique the interpretive approach due to the assumption of a general, systemic cultural relationship between high visibility and high significance, without concern over differential experiences and individual agency. Kosiba and Bauer (2012, 64) argue that this approach does not take into account how power relations may result in different experiences of the same environments or landscape markers. This critique resulted in the “political landscape approach” (Kosiba and Bauer 2012, 66). Scholars of this approach understand that individuals can perceive the same environment in different ways. It considers that barriers, boundaries, and significant places can elicit particular sociocultural perceptions (Kosiba and Bauer 2012, 66). For example, Wernke and Whitmore (2009) use GIS

tools to assess historical, ethnographic and archaeological data in the Colca valley, Peru, as they question the relationship between agricultural resources and the nutritional demands of households. They note significant inter and intra-community social differences in household consumption, land wealth and nutrition (Wernke and Whitmore 2009).

Proponents of a political landscape approach argue that social differences result in different experiences of space. Kosiba and Bauer (2012), for instance, assess archaeological data from the Inka capital, Cuzco, Peru, to query how material and spatial boundaries contribute to social inequality. They show that imperial territory was manifested through the production of formal spaces, designed to restrict movement and direct perceptions (Kosiba and Bauer 2012). The authors argue that this model can be used to highlight social and physical differences that create past political landscapes. A critical takeaway from this approach is the recognition that viewsapes are not neutral or universally experienced. Rather than assuming a uniform visual impact, we must consider who is doing the viewing and under what social conditions, as the viewer's social position affects how they perceive space. This perspective encourages us to ask how visibility shapes identities, roles and power dynamics of those engaging with them. To incorporate this approach into my own visibility analysis, I assess the socio-economic status of the four supra-household communities at Cerro San Isidro in Chapter 6 and then apply these insights to my interpretations of their respective viewsapes in Chapter 7.

The political landscape approach, specifically the differential experience of space, is closely tied to another concept of visibility studies: the distinction between seeing and being seen (Van dyke et al, 2016). To see involves the subject as a viewer looking at something, whereas to be seen involves people or places making themselves visible to others (Van Dyke 2016, 206). Unilateral visibility, that is, for one individual to see but not be seen, suggests unilinear power

relationships and reflects visual dominance of others (Foucault 1977; Van Dyke, et al. 2016; Yekutieli 2007). Seeing others can create these power differentials, as understood within a political landscape approach. In contrast, being observed and subjected to surveillance, as pointed out by Foucault (1977), can lead to self-discipline and other structuring behaviours. This approach, however, focuses only on political aspects of landscapes and social differences rather than considering aspects of ritualism and the sacred landscape.

To summarize, economic approaches assess how the visibility of a landscape may have benefited a group economically. Interpretive approaches argue that people choose settlement locations based on a greater availability of particular landscape markers, influencing their emotional connection with the environment. Lastly, political approaches focus on how power relations can create distinct experiences of space and highlight differences in power. While these three approaches highlight distinctive landscape attributes, we cannot overlook the combined influence of these factors.

No one factor may determine all settlement locations; a single group may use more than one factor to determine a single settlement location. In addition, the continued residence in a space would affect the experience of the space, rather than the selection being for economic or cultural reasons. As Van Dyke et al. (2016) note, there may be overlapping processes, and the purposes are rarely mutually exclusive. Common threads exist among these approaches, and by integrating these, researchers can gain a more holistic understanding of settlement locations, considering economic, cultural, and political factors. Combining these three perspectives when interpreting visibility data creates a more comprehensive analysis of the complex interactions which shape human-landscape relationships. In chapter 7, I take up this integrated perspective to

analyze how viewscales at Cerro San Isidro fostered cooperation and identity formation within the four supra-household communities.

Specifically, I will explore whether the viewscales of the four supra-household communities at Cerro San Isidro highlight specific landmarks, architecture, or spatial configurations and how these features may have influenced group identity. When interpreting the data, I will take an interpretative approach to consider how the visibility of these features may have affected the daily experiences of community members. I will also consider an economic approach, as visibility may have been important for defensive positioning or locating resources. Economic and interpretative approaches go hand-in-hand. For instance, while a settlement location may have been chosen for its defensible visibility, continued living in that area would have impacted the individuals' experiences of those viewscales. Thus, a viewscale does not have to be understood through an economic or interpretive lens alone. Additionally, defensible visibility could also affect power dynamics, drawing on the political landscape approach.

Different power dynamics of these supra-household communities may have influenced their viewscales. Ikehara (2015) argues Cerro San Isidro was a central hub for high-status members during the EH (see Section 2.3.1), and as such, elite dwellers based on top and on the slopes of the hilltop center may have held more power than those living in low-lying areas nearby. I will investigate how these power dynamics may have affected the experiences of these elite members and intra-community relationships. To further this discussion, I ask, how does the distribution of visibility between the supra-household communities reflect power relationships? Following a political landscape approach, the degree of visibility can be reflective of differential power, which will affect how people experience their space, combining both an interpretive and political landscape approach. By using a combination of these approaches when interpreting the

viewscales of the four supra-household communities at Cerro San Isidro, I strive to create a holistic understanding of how the visibility shaped the daily experiences of the inhabitants and view how the surrounding landscape influenced the interactions, collective identities and cohesion amongst and between community residents. This approach will provide a comprehensive understanding of life within ancient urban settlements.

In the Andes, numerous studies have analyzed visibility (Lambers and Sauerbier 2006; Marsh and Schreiber 2015; Mullins 2016; Wernke et al. 2017). These studies build on the growing body of research that views Andean environments as structured, modified, and sacred (Contreras 2010, 242). Sacred landscapes, formed by human-environment interactions and the cumulation of collective human activities, such as religious, cultural, political or economic practices, have long been central to archaeological studies in the Andes (Bray 2015b; Reese-Taylor 2012). Archaeological, anthropological, and ethnographic inquiry indicate that landscapes were part of indigenous Andean peoples' spiritual and animistic world (Bray 2015a; Jennings and Swenson 2018). These sacred places were omnipresent but often difficult to describe compared to Euro-western notions of landscapes (Bray 2015; Jennings and Swenson 2018). Given the importance of landscapes and landscape features in influencing communal identity and experience, I then ask if there are any sacred features present within the viewscales of the supra-household communities and how these would influence the communal experience of space.

For this research project, I am focusing on two Andean concepts of sacred place, which are relevant to viewscales, *wak'as* (also written as *huaca*) and *apu* (similarly referred to as *achachilia*, *Mallku*, and *jacaranda*) (Mader et al. 2023). *Wak'as* is a Quechua and Aymara word which generally refers to material manifestations of power and sacredness. This can include temples, shrines, mummies/ancestors, sculptures, natural places, idols and murals (Allen 2015;

Bray 2015a; Chase 2015; Mannheim and Salas 2015). In early Andean work, *wak'as* were usually described in reference to either an idol, statue, or image or a shrine-like place, often with the two closely related (Bray 2015a, 5). These early conceptualizations of *wak'as* highlight the ontological differences regarding matter and materiality among Andeans and Europeans. Over the centuries, scholars have broadened their definitions and understandings of *wak'as* as physical embodiments of power, which are not an abstract notion, but a natural force, a power which has a presence and is efficacious in the world (Bray 2015a; Janusek 2015). This ontological shift has highlighted the materiality and agency of *wak'as*, who participate in a network of relations that encompasses the social and political worlds of Andean peoples, past and present. *wak'as* were often part of a network of relationships; they were often connected to other *wak'as*, settlements, and places (Bauer 2018; Zuidema 1964). *Wak'as* were powerful aspects of sacred landscapes and significantly impacted the lives of Andean peoples.

Apus are a distinct form of *wak'as* in the ancient Andes; they are prominent mountain peaks that are revered as earthly spirits (Williams and Nash 2006). Mountains were important places for many reasons; they were not only features of the landscape for indigenous Andean peoples but also places of natural and sacred environments (Besom 2009; Castro and Aldunate 2003; Reinhard 1985; Staller 2008; Williams and Nash 2006). Mountain peaks were, and often still are, worshipped as powerful deities; they are sacred places where religious, ritual, social, political and economic practices intersect. *Apus* are revered as earthly spirits who may punish or protect their human constituents; they are active participation in the daily lives of Andean peoples. *Apus* serve as important members of indigenous communities. Sometimes, they are considered ancestors (Anders 1987; Favre 1967) and others as guardians (Rasnake 1986). But generally, they are supernatural forces that are the focus of ritual performances, such as

pilgrimage (Allen 2002), ritual payments made in communal locations such as alters (Isbell 1978), or the spirit is called upon to attend family survives (Bolin 1998). Families will make payment, or *pago*, to *Apu* during ritualized performances, as a veneration of the supernatural mountains to request good fortune or prevent bad fortune (Bolin 1998).

In the pre-Columbian Andes, mountains were often regarded as powerful entities with significant roles in daily and ritual life. During the Initial Period (2000–900 BCE), early coastal centers were frequently U-shaped, oriented inland toward the highlands, a spatial arrangement that some scholars suggest reflects an ideological connection to the mountains (Burger and Salazar 2012; Williams 1985). In the Moche world (c. 200–800 CE), ceramic vessels were modelled after mountain peaks, some depicting human sacrifice at these elevated locations (Bawden 1996; Bourget 2006). Similarly, at Huacas de Moche, human sacrifice rituals occurred at a monument shaped to resemble a mountain (Bourget 2001; Uceda 2001). While Williams and Nash (2006) argue that these practices indicate mountain veneration, the specific conceptualization of mountains in Moche ideology remains a subject of debate. Elsewhere, Alan Kolata (1993) argues that Tiwanaku's urban layout was deliberately designed to represent sacred peaks, aligning with broader Andean traditions of sacred geography (Williams and Nash 2006). The Inka (~CE 1500) conducted child sacrifices on mountains, with some scholars interpreting these acts as petitions to mountain spirits for water or as demonstrations of political legitimacy (Anders 1987; Zuidema 1964). While ethnographic and historical sources confirm the importance of *Apus*—revered mountain spirits—in later highland Andean traditions, applying this specific Quechua term to pre-Inca or coastal contexts requires caution (Gose 2008). However, archaeological, anthropological, and ethnographic evidence suggests that mountains and other prominent landscape features held sustained ritual and symbolic importance

throughout the ancient Andes, even if the precise terminologies and meanings varied across regions and time periods (Besom 2009; Ceruti 2004; Reinhard 1985).

Wak'as and *Apus* are critical notions to discuss when understanding the visual experiences of community members at Cerro San Isidro because the visibility of these agents plays a role in maintaining the complex knowledge of the supernatural. *Wak'as* and *Apus* structure behaviour; they animate the landscapes; community members are aware of their presence and the spirit's oversight, including the potential for good fortune or bad luck (Bolin 1998; Isbell 1978). GIS-based viewshed analysis can provide a means to assess the visibility of *Wak'as* or *Apus*, which would be identifiable by community members. It can be used to investigate the cognitive landscape of the past, that is, how the mind extends beyond the individual to incorporate external features of the environment into processes of perception, memory, and decision-making (Hudson and Milisauskas 2017). Cognitive landscapes are socially constructed and emerge through the interplay between people, places, and cultural meanings, where elements of the physical environment become embedded in thought and practice (Hudson and Milisauskas 2017). In this sense, *wak'as* and *Apus* are not merely physical landmarks but active components of a shared cognitive landscape that structured daily life and reinforced social and religious frameworks and understand how people experienced their lived space.

GIS-based viewshed analysis can provide a means to assess the visibility of *wak'as* or *Apus*, which would be identifiable by community members. It can be used to investigate the cognitive landscape of the past and understand how people experienced their lived space. Similar research was conducted by Williams and Nash (2006), who used a visibility analysis to identify *Apus* and how they related to the expansive highland states during CE 600-1000, particularly the Wari and Tiwanaku. They conclude, based on the visibility of *Apus*, that the Wari and Tiwanaku

utilized mountain worship to establish hegemony over the local populations; they argue that mountains were used as a tool to incorporate local belief systems into an imperial ideology. William and Nash (2006) note that the visibility of *wak'as* can create connections and relations between them and people, through time and space.

While we cannot apply the specific term *Apu* to the Early Horizon, given that it is a Quechua term, mountains appear to have been important agents throughout Andean prehistory. The Moro Pocket, surrounded by mountain ridges, offers possible avenues for exploring how these features may have structured the experiences and interactions of past communities. Moreover, there are numerous megalithic ceremonial centers from the Early Horizon period in the Moro Pocket, which could be viewed as possible *wak'as*. This leads me to question how the presence of these features within the viewscape of different supra-household communities would have influenced their experience of space and how differential viewing of them may have produced distinct experiences and, subsequently, different bonds between communities.

3.5 Experience and Movement

To explore how movement experiences contributed to cooperation and identity formation among the supra-household communities at Cerro San Isidro, I review archaeological approaches to movement throughout this section. I begin with a general overview of how scholars have approached movement and mobility, including the development of pathway studies, cultural dynamics, and theories rooted in social practice and phenomenology. I then consider how ideas of access, spatial connectivity, and socio-spatial integration have been used in movement analysis to explore the relationships between people and their landscapes. I conclude by positioning my own approach within this body of work, drawing on practice theory and social network frameworks to interpret movement at Cerro San Isidro. In doing so, I highlight how

movement experience plays a formative role in shaping shared—or differentiated—community identities.

Movement is meaningful and much more than a physical response to the world; it is a primary foundation for experience and being in the world. Movement is only one aspect of our bodily senses and perceptions of the world, but it is only through movement that we experience the world with our entire body. Movement also facilitates connections between people, places, and things. It is how we explore our landscapes and forge relationships with those around us. As such, movement has been of great discussion amongst archaeological researchers.

The early publications on the characterization of movement in archaeological research demonstrated the potential for this research to contribute to a greater discussion of human lives in the past. For instance, John Hyslop (1984) drew on archaeological evidence of Inka roads to show how long-term, regional research—combined with historical and ethnographic sources—can offer a detailed understanding of movement infrastructure. Similarly, the edited volume *Ancient Road Networks and Settlement Hierarchies in the New World*, edited by Charles D. Trombold (1991), includes a series of movement analysis case studies across the Americas. At this time, new theoretical ground was explored by authors as they tried to bring movement into greater discussions of archaeology theory (Earle 1991; Hassig 1991). But many of these projects highlighted challenges that future archaeological inquiry would have to overcome, including questions of scale and definitions. Networks of movement infrastructure, such as pathways and roads, have no end or beginning; as such, defining these connections is increasingly difficult. The idea of the structure was also of significant discussion; the structures of archaeological knowledge impose further constraints on the examination of moving infrastructure. Despite the widespread presence of these features, most studies have been conducted independently, with

limited cross-referencing. As a result, valuable insights and concepts remain underutilized or are repeatedly rediscovered.

The growing influence of landscape archaeology has brought renewed attention to the importance of movement infrastructure, showing that pathways and routes are not just functional but deeply embedded in the broader patterns of human life (Anschuetz, et al. 2001; Ashmore 2004; Bender 1993; Bender and Winer 2001; Knapp and Ashmore 1999; Low and Lawrence-Zuniga 2003; Rodman 1992; Tilley 2004; Tilley 1994; Wilkinson 2003). This shifting perspective acknowledges that, in any given context, movement infrastructure is meaningful and integral to a broader context of human life.

Some of the earliest approaches to movement research are often concerned with how movement influenced cultural evolution, interactions, and change over time. Some scholars, such as Petrie (1939) and Reisner (1909), understood cultural shifts as the replacement of one group of people with another, whereas some scholars, such as V. Gordon Childe (1928), examined migration patterns and trade networks as imagined channels in which cultural diffusion would flow. These scholars view movement as a mechanism through which social and cultural practices are enacted across the landscape. Some scholars have looked at migration patterns (Barnard and Wendrich 2008; Kelly 1992; Sellet et al. 2006), and some have looked at how movement influences political boundaries (Colburn and Hughes 2010). Generally, such studies focus on how movement can be assessed in a variety of different ways and have a wide-reaching socio-cultural implication for archaeology landscape research, but they remain largely focused on macro-scale processes.

Another body of scholarship has focused on movement as lived experience. Researchers such as Ingold (1993), Tilley (1994) and Thomas (1996), use phenomenological concepts to interpret

past movements of peoples (Bender 1993; Casella 2001; Johnson 2007). Phenomenological researchers recognize that social landscapes are formed through the experience of place, memories, and movement (Gibson 2007, 63). Many of these phenomenological studies are influenced by Bourdieu (1977) and de Certeau (1984), who believe that repeated actions within a space influence individuals' and groups' identities. The phenomenological approach to mobility is often associated with “the mobility turns” (Urry 2007) or the “new mobilities paradigm” (Hannam, et al. 2006; Sheller and Urry 2004; Sorge and Roddick 2012), which critiques studies of movement where humans think and act independently of their material lives; it has reimaged the complexity of mobility and highlight the meanings, politics, and social implications of them.

My theoretical foundations draw heavily on the ideas of social landscape archaeology and practice theory. I understand social landscapes as shaped through the experience of place, time, memories, and movement (Gibson 2007, 63). By building on social landscape concepts, I explore the complex relationship between landscape movement and community members to examine how movement experiences shape communities and foster collective identities. I draw on Bourdieu (1977) and de Certeau (1984), following the idea that repeated movement influences group identity. As reviewed in Section 3.3, actions and practices—like movement—are embedded in social contexts, and it is through these contexts that identities are formed, altered, and sustained (Bourdieu 1990, 55). People with different experiences will forge different identities; therefore, having different movement experiences between supra-household communities within an urban settlement would influence different kinds of identities. Movement patterns may influence the diverse social, political, cultural, or economic identities of supra-household communities. If movement played a role in shaping and sustaining supra-household identity at Cerro San Isidro, I expect to see noticeable differences in terms of movement

experiences between the various communities within the settlement. Movement differences could manifest in various ways, such as different routes taken, different access to spaces, and differential integration within the urban settlement. Conversely, if movement experiences did not have a significant influence on the formation of social identity within these communities, I expect to see similar patterns of movement across the entire settlement.

To explore these patterns, I employ a method that aligns with my theoretical orientation - Least Cost Analysis (LCA). LCA builds upon social network analysis in archaeology, which has its roots in geographical traditional of studying physical space to assess connections and movement; it is a means of providing a visual means of assessing the interaction between entities (Knappett 2011, 2013). While early examples of LCA focused solely on the spatial aspects of exchange and interaction, network analysis has more recently been employed to consider agency and the social construction of reality. For example, Søren Sinbæk (2007a; 2007b) investigated how Viking Age Scandinavia functioned as a highly interconnected region, where this connectivity played a significant role in the emergence of towns. Anna Coller (2013) explored the significance of networks in facilitating the spread of religious ideas within the Roman Empire, whereas Emma Blake (2014) focused on the development of regional identities in societies based on the circulation of elite conception goods. Social network analysis, in combination with ideas of the social landscape and practice theory, offers a means to assess how movement through space and the networks of interaction between people and each other and people and their landscapes influence group identity.

To structure the LCA, I focus on three key foundational concepts—accessibility, social connectivity, and socio-spatial integration—which bring together my theoretical and methodological frameworks. Accessibility refers to the measure of a location's ability to be

reached (attractiveness) or the capacity to leave a location (emissiveness) (Comtois and Slack 2006). Social connectivity describes the degree to which a community is linked to other communities through movement and interaction. Finally, I use socio-spatial integration to capture the combined effects of both access and connectivity—how groups are connected not only to each other but also to the broader landscape they inhabit. Together, these three concepts provide the structure through which I evaluate shared or differentiated movement experiences between the supra-household communities at Cerro San Isidro.

Archaeologists suggest that access serves as both a mechanism of socio-spatial integration within a society, but also one that can control social experiences (Richards-Rissetto 2010; Richards-Rissetto and Landau 2013). Through access, people send messages that integrate some members into a social group, while also defining group boundaries. Through experiencing accessibility distinctions, groups share identity through enabled or restricted access. Patterns of accessibility likely reinforced a sense of unity and cooperation by structuring how individuals moved through and interacted within the space. For example, if a group has increased access to a ritual space compared to others, it can promote a sense of exclusivity and importance, including a sense of ritual power, which would influence or maintain a ritual and elite identity amongst the group. Communities that have increased access to economic resources, such as water or quarries, tend to develop a strong sense of economic power and identity. This is because economic resources are essential for the growth and development of a community, and those who have access to them are likely to have more influence and control over their community's affairs. Conversely, if a community lacked access to both ritual spaces and economic resources, it would suggest a low-status identity, where a collective identity would be forged through lack of access,

which would influence their understanding of their social position in the settlement, create a sense of exclusion, and mark boundaries between them and other groups.

Access has been used by multiple researchers, within and outside of landscapes of movement, given the social implications of access (Andrews and Bill 2005; Hendon 1987; Webster, et al. 1998). Hudson (2012) uses movement, in combination with visibility, to understand the accessibility of prehistoric Pueblo habitation sites, particularly Lion Mountain. In his research, Hudson (2012) concluded that the visibility from settlements was an important quality, as they wanted to see and be seen. However, they restricted access to the residential site by placing the habitation settlements on more difficult to access spaces, such as ridge tops. This placement would allow the community members to prevent access to non-community members, while not specifically noted by the author, but this lack of access would highlight community membership and define community boundaries. There are many examples of access and movement in ancient Maya society, for example, at Copan, the east and west *sacbeob* (aka road or causeway) guided people into the Great Plaza where ritual activities took place (Baudez 1994; Sanchez 1997). Through shared access to these plazas, it sent messages of unity to the community members and forged a shared sense of camaraderie and identity, which maintained social cohesion between commoners and elites (Richards-Rissetto 2010). On the other hand, limited access spaces of royal courts, such as those present at most Maya settlements, were restricted to nobility, which created a spatial control of power (Reents-Budet 2001). The shared access of the elite forged social bonds between them, but it segregated the commoners by not permitting them access, which in turn established and maintained social inequality (Richards-Rissetto 2010). Wernke (2012) conducted an intrasite examination of trails within an early colonial settlement in highland Peru. This study computed the routes from every residence to

both the indigenous Inka ceremonial plaza and the Franciscan colonial plaza. The houses were then ranked based on their accessibility, revealing a pattern where dwellings nearest to the original plaza experienced marginalization, while those closer to the Franciscan-established plaza gained significance. Interestingly, despite their proximity in physical (Euclidean) distance, the two plazas exhibited contrasting levels of importance.

Social connectivity refers to how communities are connected to each other. Movement is a cultural practice that structures the flow of interactions. It is essential in producing and reproducing social networks (Bourdieu 1977; Giddens 1984; Rapoport 1990). Patterns of interaction, which go hand-in-hand with accessibility, influence how people experience both their communities and the settlement as a whole. Based on the close proximity of households within a single architectural platform, we know residents of these households have greater interactions between them, which would result in a greater sense of identity and belonging (see chapter 6). Understanding the connection between communities can be used to infer the relation between the communities of Cerro San Isidro and to consider different experiences of space. Social connectivity draws on the diverse body of scholarship surrounding Social Network Analysis (SNA), which focuses on the connections or ties which connect entities, including people, rather than studying the entities themselves (Collar, et al. 2015; Mills 2017). Social network ties represent various forms of social relationships, such as familial, economic, political, and ritual connections. Social interactions and relationships can only be fully understood in relation to the spaces in which they occur as the physical and social environments in which individuals operate significantly shape the form, function, and dynamics of these networks. Examining social connectivity through the lens of spatiality allows us to explore how proximity, mobility, and access to key locations or resources impact social ties within a community.

Lastly, I look at socio-spatial integration, which considers the combined assessment of access and social connectivity, to look at how communities are connected to places, resources, and people. Those who have greater connectivity to resources, as well as to each other, are likely to have a greater integration within the settlement. Communities with greater integration within the settlement are important to consider because it can facilitate bonds between those interacting and further define boundaries between groups. Richards-Rissetto and Landau (2013) use movement to assess the socio-spatial integration between four socioeconomic groups at the Late Classic (AD 600-900) Maya city of Copan, Honduras. They assessed areas of potential movement and mobility to identify who was most likely to interact with whom, that is, social connectivity, and how they were integrated into the settlement as a whole, based on access to particular resources or parts of the settlement. They determined that those architectural communities with similar socioeconomic status were more likely to interact with those of similar status. Similarly, those groups of lower status were more segregated from other groups, but had increased access to agricultural fields and local shrines (Richards-Rissetto and Landau 2013, 370), whereas elite communities could easily attend events at the ceremonial core or interact with people living close to the core of the settlement, where the rules, royal temples, and residents were more easily reached (Richards-Rissetto and Landau 2013, 371). Through this assessment, they determined that the socio-spatial integration and connectivity of groups correlate with social status; the significant difference in mobility highlights a hierarchical socioeconomic structure, but there are instances where internal variation occurs. In conclusion, they used mobility to highlight that the architectural groups have heterarchical relationships within an overall hierarchy (Richards-Rissetto and Landau 2013).

The archaeological study of landscapes of movement has expanded over the last century throughout Latin America; from discussion of imperial networks (Castro, et al. 2004; Sanhueza Tohá 2004), to inter-settlement mobility such as the complex movement network of Cusco, the Capital city of the Inka (Bauer 1998), and local road routes (Kendall 2000). The history of road building throughout the Andes spans many centuries and cultural groups, with numerous examples of Pre-Inka roads, including the Moche (Beck 1979), Wari (Isbell 2004), and Chincha polity (Wallace 1991).

Many of these archaeological investigations of ancient roadways highlight the economic and political nature of roadways, as they were used for migration, trade and movement of peoples within a single political domain. However, there is a great body of research which highlights the ritual nature of movement in the Andes (Aveni 1990; Bauer 1998; Bauer and Dearborn 1995; Morrison 1978; Zuidema 1964). Andean archaeologists have long understood settlements, temples, and monuments as arenas for ritual traditions within the Andes, with some of the earliest ritual, U-shaped architecture appearing on the North Coast of Peru. But within and between these ritual spaces, scholars have highlighted the importance of movement architecture in facilitating these activities, highlighting the complex relationship between ritual activities and movement. For example, Vranich (2016) studied the Akapana pyramid and nearby sunken court, highlighting how the galleries channelled the movements of pilgrims to the site, which in turn channelled their thoughts and experiences. At Chavín de Huantar, the Old temple comprises a series of tunnels (known as galleries), carved stone monuments and water conduits, creating an immersive processional experience (Rick 2005). The galleries created ritual experiences of sound, confinement, and confrontation with the divine, all of which were controlled through movement (Contreras 2009). There is also archaeological evidence across the Andes of

pilgrimage, such as at Pachacamac, a coastal site near modern-day Lima, used as early as 600-900 CE and later used by the Inca Empire, becoming an important pilgrimage center in Tawantinsuyu, or Chavín de Huantar, which was a pan-Andean pilgrimage site used in the 5th and 3rd Century BCE. (Moore 2003).

In Andean contexts, landscapes of movement are not just about how people move through space; they also concern how people move with the landscape, as well as sacred objects within the landscape, such as tools or sacred monuments (Roddick and Janusek 2018). The relationship between people, sacred objects, and their environment is dynamic, where landscape features, such as *wak'as* (sacred sites or objects), are viewed as active participants in, or even members of, Indigenous communities. Landscape features are imbued with spiritual significance and serve as active agents that interact with their inhabitants. *Wak'as*, for instance, are more than just physical locations—they are understood as powerful entities that influence, guide, and shape the lives of those who engage with them. This view of the landscape transforms it into a network of interrelations, where the physical environment, social practices, and spiritual beliefs converge (Roddick and Janusek 2018).

The study of movement in the Andean world offers crucial insights into the lived experience of ancient Andean peoples, where movement was not just a physical act but a cultural and spiritual practice. Understanding how individuals moved within their social and physical landscapes—through ceremonial processions, labour, or daily interactions with sacred sites and objects—reveals the intricate ways in which people navigated both the physical and metaphysical aspects of their world. Movement, in the framework of Andean landscapes of movement, is a key mechanism through which identity, social cohesion, and community bonds are formed and maintained. It demonstrates how people did not just move through the Andean

landscape but engaged with it in a relational and embodied way, shaping the collective experience and reinforcing the shared values that defined ancient Andean society.

Throughout this section, I have demonstrated that movement is more than just navigating space; it is deeply embedded in social and cultural practices, influencing how people interact with one another and their environment. Building on phenomenological and practice-based approaches, I use least-cost analysis to evaluate access, social connectivity, and socio-spatial integration within each supra-household community at Cerro San Isidro. By focusing on these movement dynamics, I aim to understand how shared or differentiated experiences of space contributed to collective identity and cohesion within the supra-household communities at Cerro San Isidro.

3.6 Chapter Synthesis

In this chapter, I established the theoretical framework for understanding how urban form, supra-household communities, and the lived experience of space contributed to social cohesion and identity formation. I presented broader debates on low-density urbanism, emphasizing urbanism as a process shaped by social, spatial, and experiential dimensions rather than fixed traits. I provided a list of criteria that I will use to demonstrate the low-density nature of Cerro San Isidro in subsequent chapters. Through a review of supra-household communities, I argued that these intermediate-scale units were foundational to urban life, facilitating cooperation, organizing labour, and anchoring collective identity. I then addressed the role of spatial experience—specifically, movement and visibility—as mechanisms that foster cooperation and identity formation within supra-household communities. Table 3.2 summarizes the analytical framework developed in this chapter, outlining how different aspects of movement and visual perception inform our understanding of social interaction and integration at the site.

This framework guides the analysis in the subsequent chapters. The following chapter outlines the methods used to collect and interpret the spatial and visual data that form the basis of this investigation and addresses how these methods are applied to evaluate the presence and function of supra-household communities at Cerro San Isidro.

Table 3.2: Analytical framework for the studying the experience of space at Cerro San Isidro.

Experience of Space	Dimension	Description	Interpretive Logic	Major Citations
Movement	Access	Who has access to resources or spaces within the natural and built environment.	Spatial organization structures opportunity and exclusion; differential access reveals community boundaries, control, and status	Lefebvre 1991; Gieryn 2002; Smith 2003a; Kosiba and Bauer 2012
	Social Connectivity	The degree to which communities can interact with other communities.	Movement facilitates habitual interaction and bonds; walkable paths and shared routes foster inter-household relationships	De Certeau 1984; Canuto and Yaeger 2000; Van Dyke et al. 2016
	Socio-spatial Integration	The degree to which people can interact with other communities and the environment.	Regular shared movement creates embodied experience and reinforces collective identity	Thomas 1996; Mac Sweeney 2011; Glaser 1998; Ingold 2000
Visibility	Economic	Visibility of fields, roads, or resources from settlement locations	Viewscapes relate to surveillance, resource access, or settlement choice based on productivity or protection	Sevenant and Antrop 2007; Loots et al. 1999; Jones 2006; Krist and Brown 1994
	Interpretive	The symbolic or ritual meaning of visible features, including <i>Wak'as</i> , <i>apus</i> , or monuments	Shared visual access to sacred or ideologically significant places anchors memory, identity, and belonging	Ingold 2000; Kosiba and Bauer 2012; Gaffney et al. 1996; Williams and Nash 2006; Bray 2015
	Political Landscape	How social standing affects perceptions of space; Who is visible to whom; dynamics of surveillance, display, and inequality	Seeing and being seen reflect power relations; dominant viewscapes may assert authority or reinforce social differentiation	Foucault 1977; Van Dyke et al. 2016; Kosiba and Bauer 2012; Wernke and Whitmore 2009

4 Methodological Approaches and Data Analysis Techniques

Chapter 4 provides an overview of the methodological approaches and analytical methods I employed in this research to explore the spatial organization and social dynamics of Cerro San Isidro. Here, I review the methodologies I selected to generate the necessary data to address the research questions outlined in Section 1.1. In Chapter 3, I outlined the various theoretical frameworks guiding this research; I designed the data collection and methods of analysis discussed here to provide empirical evidence to operationalize those theories. In doing so, I lay the foundation for exploring how shared experiences of visibility and movement foster cooperation and a sense of shared identity within supra-household communities.

Chapter 4 proceeds in two stages. First, I provide a comprehensive review of the data collection processes utilized in this study, including remote sensing methods, pedestrian surveys, and excavation techniques. I outline the selection and implementation of each method used to gather data relevant to the spatial and social dynamics of the Moro Pocket. The second stage focuses on organizing and operationalizing these datasets to address the core research questions outlined in Chapter 1. I discuss the analytical techniques used to integrate diverse data types and how these methods were employed to uncover patterns of movement, visibility, and spatial organization that shed light on the social cohesion and community identity within early urban settlements.

4.1 Methodological approaches

I begin with the four key methodologies used in the first phase of spatial analysis: UAV, GPR, pedestrian survey, and excavation. Each stage required data collection and data processing, as detailed below.

4.1.1 UAV

UAV (Unmanned Aerial Vehicle) imagery provides high-resolution, detailed spatial information and topographic features of Cerro San Isidro. This is critical for accurately mapping the site layout and identifying anthropogenic modifications, such as terracing, that may not be easily visible from ground level. I employed a UAV survey to develop a comprehensive birds-eye view of the site, a critical step not only for analyzing the spatial organization but also for evaluating the urban character of Cerro San Isidro. Mapping allows me to identify and consider the features of Cerro Can Isidro that align with the criteria for low-density urbanism, as outlined in Chapter 3. Additionally, UAV imagery allows for precise spatial analysis of architectural and ceremonial spaces, enabling the reassessment of previous settlement descriptions. Building on the framework outlined in Section 3.2, I use UAV imagery to gain a visual understanding of the settlement's layout. Identifying features like residential clusters, spatial boundaries, and groupings of households is an important first step in evaluating the presence of supra-household communities.

4.1.1.1 Data Collection

Investigations at Cerro San Isidro began with producing a high-resolution map of the site. I used a DJI Inspire 1 UAV mounted with a Zenmuse X3 optical camera with a 20mm lens. The primary UAV survey is vital in capturing the spatial components of the site prior to any alteration which occurs from walking through the site or conducting excavations. The UAVs take multiple successive images of a scene that are subsequently stitched together using software, in this case, Agisoft Metashape Pro. The flight must be planned carefully to achieve a complete image of the survey area. This process relies on speed, overlap, height, camera angle, and number of transects,

all of which directly impact the resolution of the final image. The resolution of an image is based on the quantity and quality of the individual pixels - a large quantity and/or small pixels create a high-resolution image, whereas a small quantity and/or large pixels create a low or poor-resolution image. To ensure the greatest resolution and accuracy of the images, we aimed to follow UAV workflows prescribed by multiple scholars (Casana et al. 2017; Federman et al. 2017; Nex and Remondion 2014), which included:

1. UAV fly at 20 meters from the highest point of the site and at a consistent elevation.
2. UAV speed should not exceed 3-4m/s.
3. Flight paths should maintain a linear pattern with approximately 70% front lap and 60% side lap between images.

To ensure the consistency of the survey protocols, we used the automated mode in which the route could be pre-planned in DJI GS Pro. Here, the speed, elevation and overlap of the images can be pre-set. There are several other factors to consider as well, including the quality of the sensor, the survey area, the light of the sun, weather conditions, terrain morphology, and the height of the UAV from the objects to be surveyed. In addition, ideal weather conditions are required for the consistent appearance of the images and for precise results. One of the most difficult issues to address at Cerro San Isidro was the irregular topography; structures are located at varying distances from the camera, thus causing variations in resolution across the site. To account for this variation, I conducted multiple smaller surveys over areas of similar elevations and within each of these areas, each survey starting 20 meters from the highest point. By surveying in this manner, the resolution of each individual quadrant was greater than having conducted the survey from the highest point of the site.

4.1.1.2 Data Processing

The survey of the main mound produced 614 individual images, referred to as orthoimages, collected through the surveys. These were used to develop an orthomosaic, a single, rectified, georeferenced image composed of orthoimages. To create a map of the settlement, I processed the orthoimages using Agisoft Metashape Professional Edition v. 1.5.0 to create a unified orthomosaic. The processing followed the workflow detailed in the Agisoft Metashape User Manual (2023). The first step in generating the orthomosaic is “camera alignment,” where the software identifies tie points across images to align the photos relative to one another. Following this, a “dense point cloud” is created, representing a set of 3D points that map the site shape and topography. To refine the point cloud, two filtering processes were applied: projection accuracy and reconstruction uncertainty. Projection accuracy errors, resulting from poor localization of point projections and false matches, were addressed by removing tie points with projection values exceeding one. Reconstruction uncertainty errors, which occur when points deviate from the object's surface—particularly at image edges where common points are sparse—were filtered by excluding tie points with a reconstruction uncertainty greater than ten.

After applying these filters, I generated the final orthomosaic (Figure 4.1) as well as a Digital Elevation Model (DEM), a 3D model of the settlement to highlight the changes in elevation (Figure 4.2). These images were subsequently uploaded to Esri ArcGIS for digitization and analysis. To complement the additional ground-penetrating radar (GPR) surveys conducted in the fields surrounding the settlement, I performed supplementary UAV surveys to ensure comprehensive coverage of the GPR survey areas. However, due to differing weather conditions—the surveys were conducted over a month apart—the datasets did not merge effectively. Consequently, the supplementary UAV survey data have been incorporated as a

separate layer and are used exclusively for generating images that identify the surveyed areas (Figure 4.3).

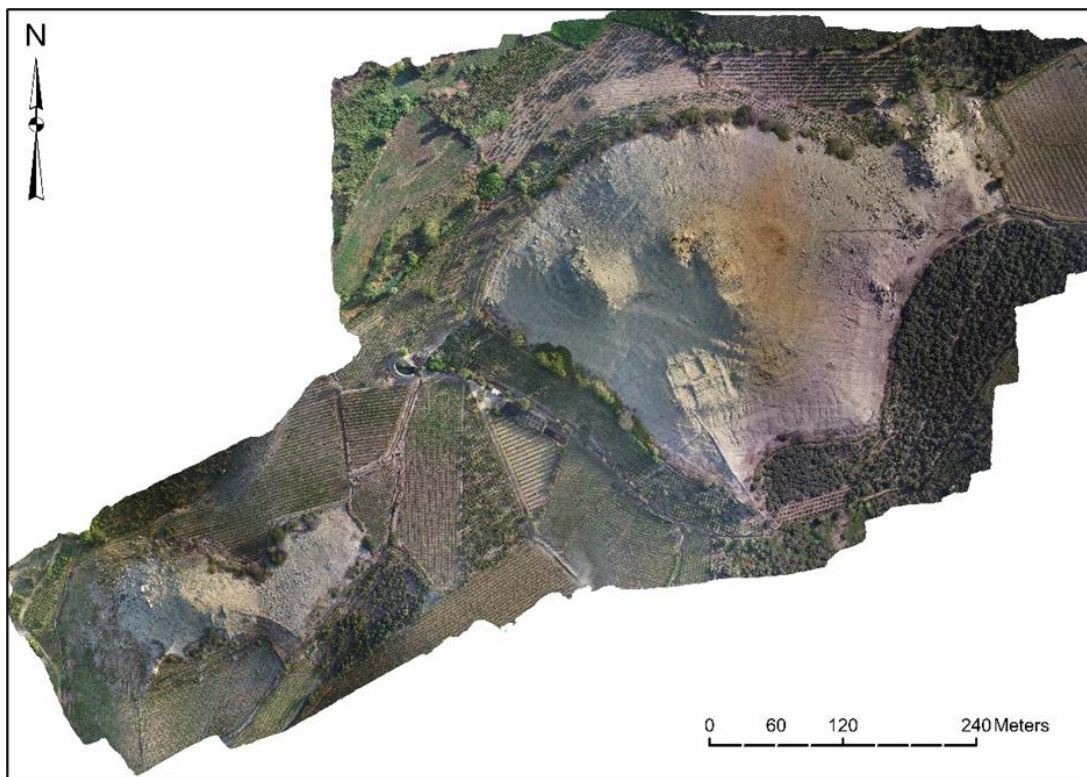


Figure 4.1: Final Orthomosaic of Cerro San Isidro.

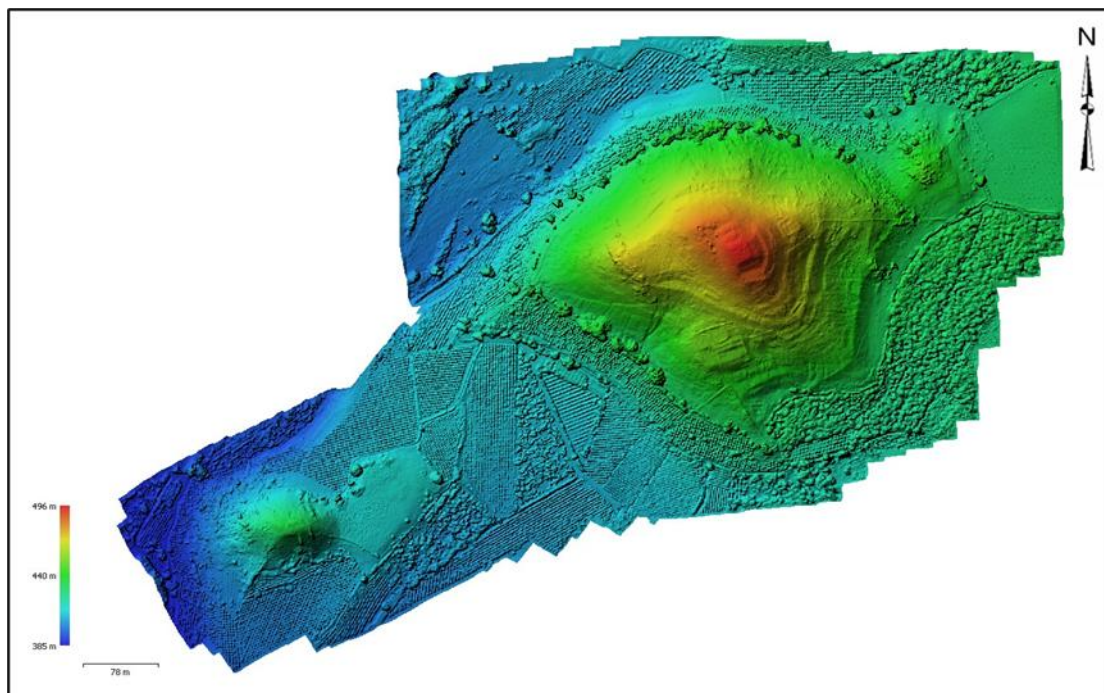


Figure 4.2: Digital Elevation Model (DEM) of Cerro San Isidro.

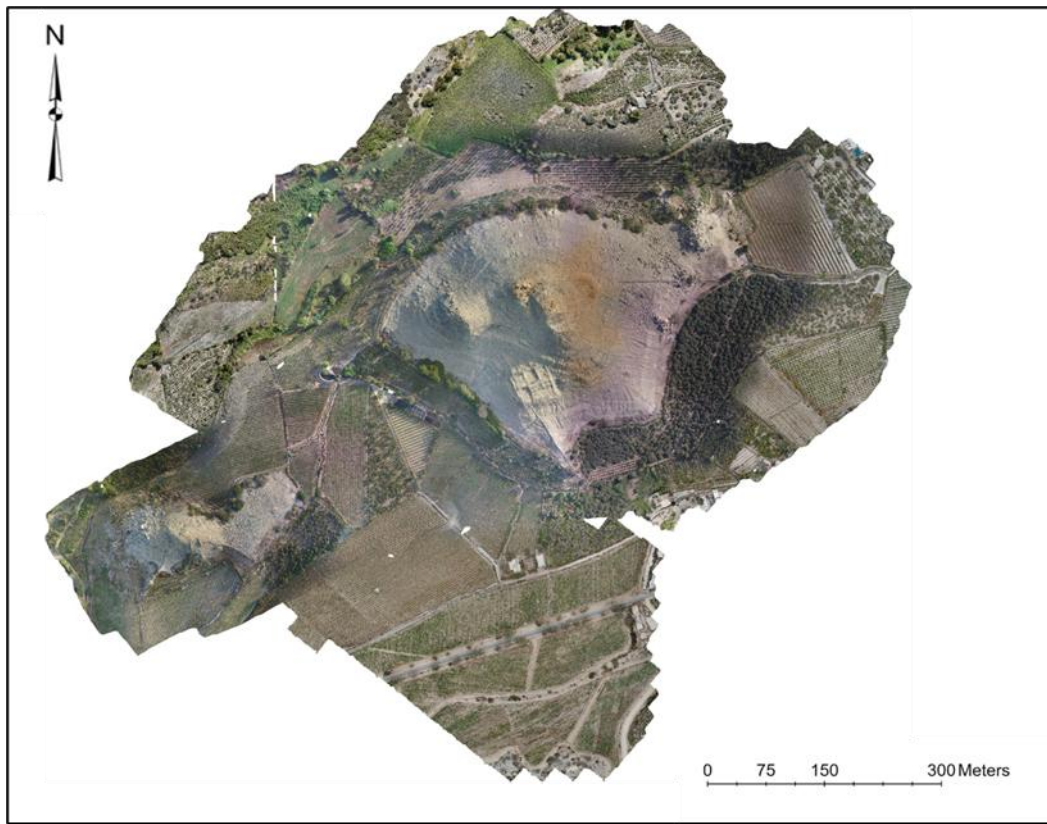


Figure 4.3: Orthomosaic of Cerro San Isidro, including additional UAV surveys of the fields.

4.1.1.3 Data Post-Processing

After producing the orthomosaic, I digitized the above- and near-surface walls to create an architectural map of the Cerro San Isidro site using ESRI's ArcGIS Pro 3.1.3. I digitized the walls by adding a polyline (a connected sequence of line segments in ArcMap) down the center of each wall. While ideally, I would have outlined each wall with polylines to capture variations in wall thickness across the site, the geoprocesses applied for the LCA required individual polylines. The parameters I applied for recording walls included:

- 1) Mapping differential vegetation growth on the surface as walls, indicating subsurface archaeological features.
- 2) Mapping differential soil colours on the surface as walls, also indicating subsurface features.

3) Mapping visible walls on the surface as walls.

Following these steps, I created the final digitized map of on- and near-surface architectural features from the UAV survey (Figure 4.4).

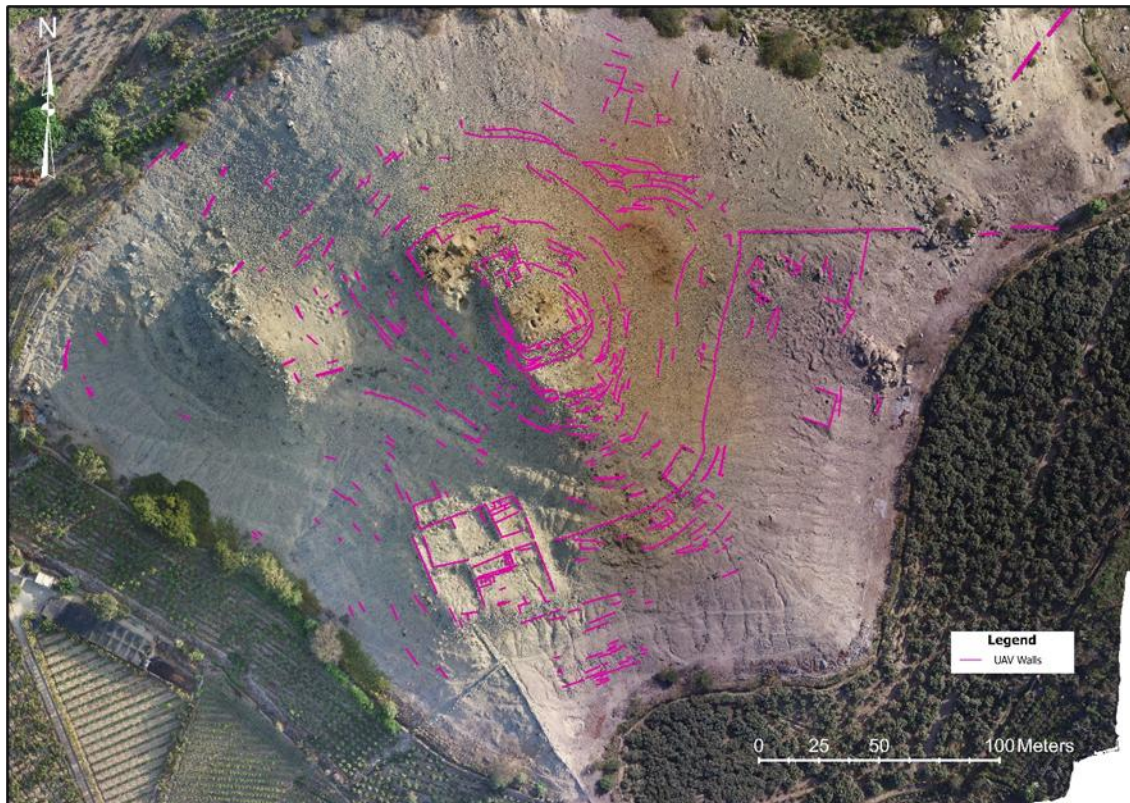


Figure 4.4: Digitized on- and near-surface architectural features at Cerro San Isidro, shown in pink, based on UAV imagery.

4.1.2 GPR

Ground-Penetrating Radar (GPR) is a geophysical tool used to map the spatial extent of subsurface objects or changes in soil and subsequently produce an image of the buried materials. This enables the non-invasive exploration of subsurface features at Cerro San Isidro, providing detailed images of buried walls, structures, and other archaeological features without the need for excavation. This technology is essential for detecting anthropogenic modifications, such as terracing, and identifying the spatial organization of supra-household communities. I employed the GPR here to investigate the urban nature of the settlement, the presence of supra-household

communities, and the accuracy of previous descriptions of Cerro San Isidro. By mapping the spatial organization of the settlement, the survey helps reveal whether anthropogenic modifications align with previous descriptions and allows for comparison with the criteria outlined in Chapter 3 for identifying low-density urbanism and supra-household communities. In addition, by identifying buried structures and clarifying the site layout, GPR contributes to understanding the settlement's urban form, the presence of supra-household communities, and the spatial dynamics that shaped social cohesion and collective identity.

The GPR identifies materials with varying dielectric constants using radio waves, which are propagated downward in pulses as the GPR is pulled along linear transects. A dielectric constant is the ability of a material to store electrical energy, also referred to as relative permeability (Annan 2005). The emitting radio waves are set to the velocity of the dielectric constant of the matrix soil, which in this case is a sandy matrix. Once the emitting wave hits a medium with a different dielectric constant than the matrix soil, it is reflected to the surface and subsequently received and recorded by the GPR. Changes in dielectric constants are due to differences in the physical and/or chemical properties of the material, specifically, changes in composition, density, and moisture content of the buried object. The strength of the reflection is determined by the contrast between the dielectric constants. For instance, dry sand has a dielectric constant of 3-5, granite has a dielectric constant of 4-6, and clay has a dielectric constant of 5-40 (Annan 2005). If the radar wave propagates through a sand matrix and encounters a clay feature, the signal will be greater than the signal received from granite.

While reflections often occur due to changes in soil typology, they can also appear where there are voids in the soil, variations in density, changes in water content, or changes in bedrock (Conyers 2016). But, more importantly for this research, the reflections occur at interfaces

between surrounding sediment and archaeological features due to changes in the composition, density, and moisture content. For example, the contrasting density and moisture content between sun-baked mud brick (adobe) and sand would be identified and mapped by the GPR. A critical aspect of using a GPR, which makes it very appealing to archaeological research, is its ability to assess the depth of identified anomalies. Depth is estimated by the two-way travel time of the reflected radio wave in conjunction with the velocity of the wave, which is dependent on the dielectric constant of materials.

4.1.2.1 Data Collection

I conducted GPR surveys over a total of 2160m² across 43 grids (Figure 4.5), with the Noggin 500® in a SmartTow configuration. The specificities of the GPR mean it requires complete contact with the ground throughout the survey and maintains a linear direction. As such, particular areas at Cerro San Isidro were nearly impossible to survey, including the steep slopes covered in loose rocks. Flat or minimally sloped areas were cleared of loose rocks to create ideal locations for GPR surveys. To gain a more comprehensive understanding of the archaeology at the site, I surveyed a variety of areas that were accessible, including different parts of the site and extending in all four cardinal directions. This approach allowed me to create a more holistic image of the settlement. The GPR survey followed the following parameters:

- 1) Survey transects of 25cm
- 2) Step size set to 0.01m
- 3) The velocity of dry sand (0.12 m/s)
- 4) Depth set to 2m
- 5) The survey must use forward parallel transects

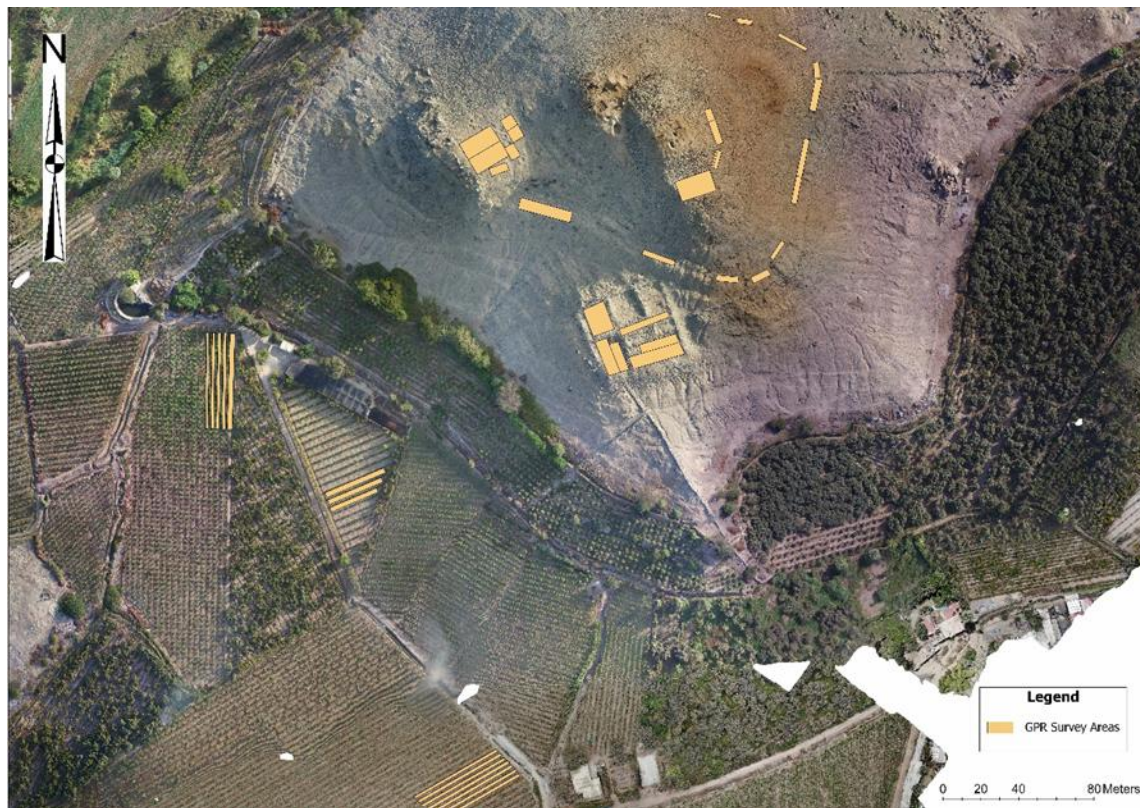


Figure 4.5: GPR survey areas.

The survey transects, also referred to as profile spacing, play an important role in archaeological prospection with GPR. The closer the spacing, the denser the profile will be, which yields higher resolution and quality of horizontal slice images (Perez-Garcia et al. 2010). In general, the determination of appropriate profile spacing is complex and must consider the system frequency, size of the survey area, size of the target object, and practical considerations such as time and cost. Decreased line spacing means increased lines, which is more time-consuming and subsequently increases costs, which is not always realistic for all projects. The Noggin 500® systems manual recommends 25cm intervals or less. Given time constraints and the fact that walls are often thicker and longer than 25cm, this was an ideal spacing to use for this project.

Depth was kept to 2m, as a sample survey revealed an abundance of 'noise' or interference afterwards, making it difficult to use the data. For each survey, the starting position

(0,0) was chosen based on the topography of the site. For instance, in all cases, the GPR survey would go upslope to reduce sliding associated with surveying downslope. A forward parallel survey was used throughout this project, meaning the surveys always started on the Y-axis. This is important since a forward-reverse survey, or zig-zag survey, has the potential for offsetting readings. The GPR features a wheel odometer to keep track of the distance travelled. Prior to each survey, the odometer was calibrated to ensure data quality. The grid areas were based on local topographic features. For example, if there was a steep slope, the survey area ended prior to the slope. Similarly, in instances where an above-surface feature, such as a wall, cut into the survey area, the survey ended before the object and continued from the other survey edge up to the object from the other direction.

4.1.2.2 Data Processing

I processed the Ground Penetrating Radar (GPR) data using EKKO_Project software, which is specifically designed for organizing, processing, and displaying GPR results. To enhance the quality of the outcomes, I processed each grid individually and applied three key filters: migration, envelope, and Dewow. The goal of these features is to reduce the amount of ‘noise’ that occurs in the GPR results. Noise refers to false signatures in the geophysical measurements, such as pipelines, metals, or magnetic bedrock, which make the appearance of anthropogenic features more difficult to discern. Migration is a 2D filtering process that corrects for GPR-based offsets in the dataset (Sensors and Software Inc. 2018). GPR data typically show anomalies as hyperbolas because the radar unit records the buried object at different points along a transect, first as it approaches, again when it is directly above, and finally as it moves away. By applying the migration process, I collapsed these hyperbolic responses into single points based on the radar wave velocity through dry sand (0.12 m/s).

The envelope filter transformed the oscillatory nature of the radar waves, which initially appeared as alternating positive and negative values, into a simplified format with only positive values. This adjustment made the results easier to interpret. Dewow, a time-based filter, removed nonlinear noise known as "wow," caused by the antenna (Sensors and Software Inc. 2018). Dewow filtered out unwanted low frequencies while preserving high-frequency signals by applying a running average to each trace. This process involved calculating the average value of all points in a trace, subtracting it from the central point, and repeating this step along the trace. Once these filtering processes were complete, I adjusted the grain and contrast of each grid image to improve feature visibility. I applied the gain function to counteract the natural attenuation of radar signals with depth, which is crucial for enhancing weak signals. Additionally, I fine-tuned the contrast and saturation of each image to better reveal features.

4.1.2.3 Post-Processing

With these adjustments made, I created a 3D model for each grid, allowing me to examine depth-slices—individual images that display anomalies within specific depth ranges, which I set to 5 cm. All survey areas within the core of the mound only revealed features between 5 and 35 cm in depth. Beyond this depth, a significant amount of 'noise' made it impossible to distinguish linear anomalies. Overall, the linear anomalies show little contrast with the surrounding matrix, making them difficult to distinguish. Excavations revealed a substantial amount of loose rock below the surface, similar to what was observed above. Although the survey areas were cleared at the surface, the loose rock extended below, contributing to the difficulty in interpreting the data. The dielectric constant between the linear anomalies and the surrounding soil showed little variation, as the features were composed of the same loose rock materials. This reduced the clarity of the results and increased 'noise' as depth increased.

Additionally, across some of the GPR survey results, there is vertical banding (Figure 4.6). But within the banded areas, GPR anomalies remain detectable, but less distinct. The vertical banding can be caused by several factors, including interference or antenna noise, the GPR moving over uneven terrain, or changes in the subsurface materials, such as soil moisture or the presence of loose soil (Conyers 2013, 99-110; Goodman and Piro 2013, 165-178). In the case of the vertical banding at Cerro San Isidro, it is most likely a combination of these factors, given the uneven terrain also results in differential moisture retention and areas of increased loose rocks.

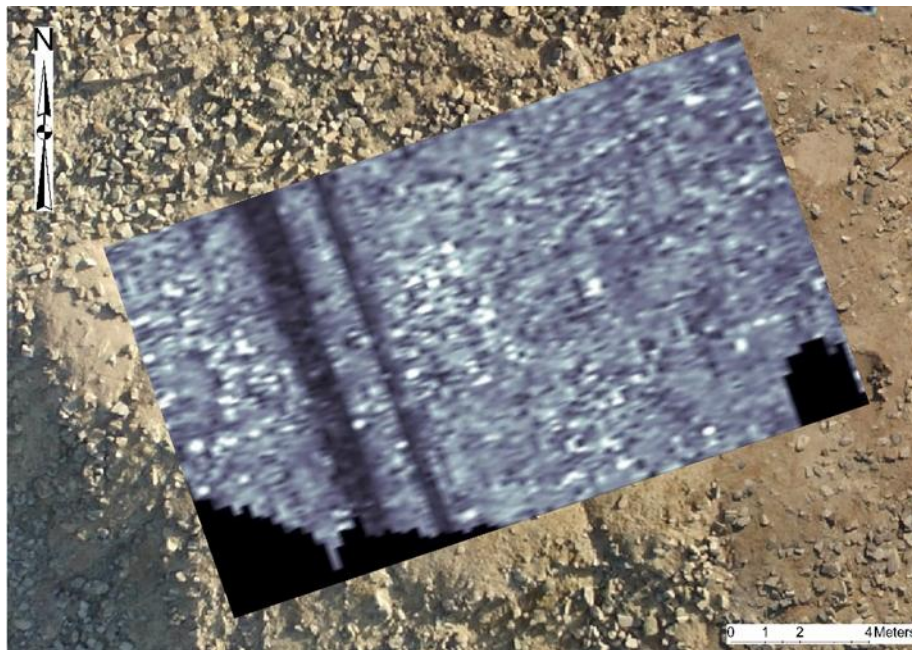


Figure 4.6: Example of vertical banding in GPR results. Black areas represent space where survey transects ended early due to edge of platform.

The field surveys revealed linear anomalies occurring just below the surface, between 0-10 cm in depth. This area has been heavily impacted by modern farming, with significant plowing. The fields are approximately 1.5 meters lower than the surrounding roads and the lowest part of the Cerro San Isidro mound, suggesting that the Uppermost layer of potential

archaeological features has been removed. This likely explains why the linear anomalies appear so close to the surface.

To digitize the combined mound and field dataset, I needed to align the GPR depth slice images with the survey areas. First, I uploaded the individual depth slices into ArcGIS. For all surveys across the settlement mound, the clearest 5cm depth slices used were, ranging across the survey areas from between 10-35cm, whereas the field depth slices ranged from 0-15cm. As such, it is important to consider the depth variability when interpreting the map as depth may reflect different periods of construction, use or even preservation differences.

I obtained the coordinates for each survey grid by flying a UAV over the survey area at an altitude of approximately 10 meters, following the previously established overlap parameters (see 4.1.1). The UAV automatically recorded the GPS coordinates of the images, providing the locations of each flag and, subsequently, the coordinates for each survey grid. I then overlaid the GPR depth slice images onto the map of the settlement. Each flag was marked with a point, and from these points, I georeferenced each depth slice image to its corresponding grid, accurately positioning the GPR surveys within their designated areas.

Once all depth slices were placed in their corresponding survey areas, I digitized the linear anomalies using the same method as for the UAV imagery. Linear anomalies were marked with a polyline down the center. Although the linear anomalies could have been digitized using the polygon function to outline the entire feature and capture its varying widths, the analysis required for this project necessitated the use of polylines. The final digitized GPR imagery is presented in Figure 4.7, overlaid on the UAV imagery of Cerro San Isidro.

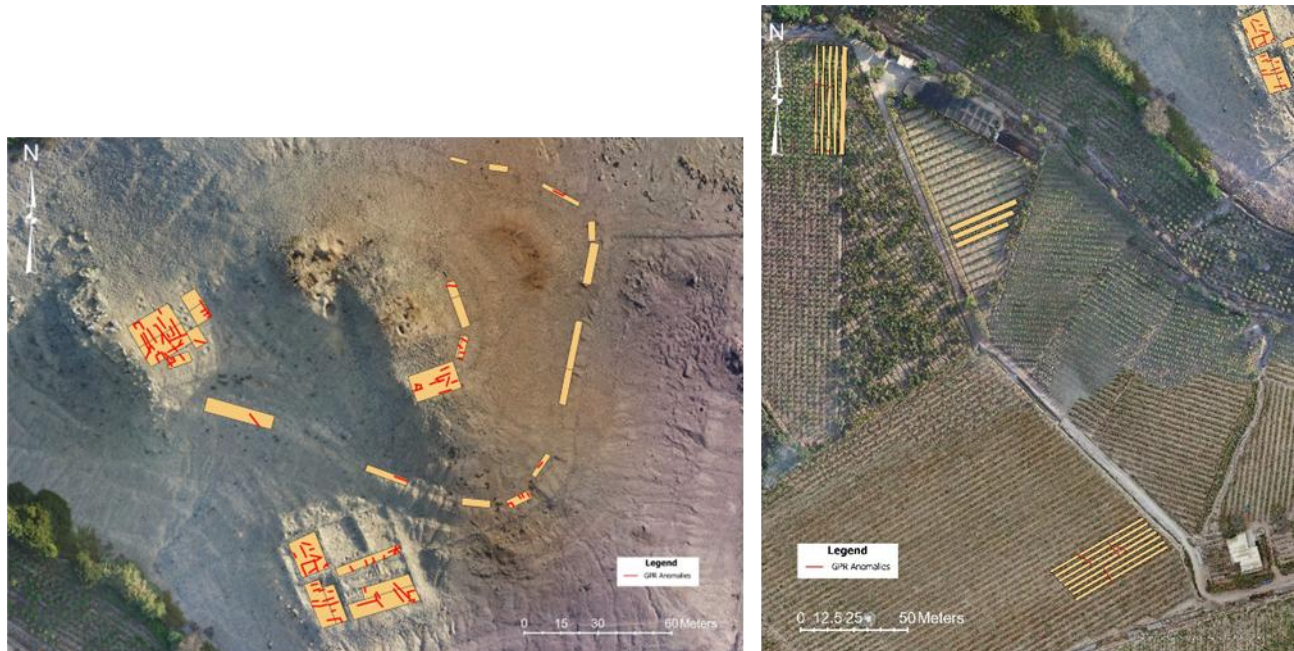


Figure 4.7: Digitized GPR anomalies likely representing sub-surface walls. Left: Results from surveys conducted on the Cerro San Isidro mound. Right: Results from field surveys in the surrounding areas.

4.1.3 Pedestrian survey

Pedestrian surveys are still one of the most reliable archaeological techniques for identifying archaeological sites and artifacts and describing landscape use. This is because pedestrian surveys enable direct, ground-level observations of features that may be overlooked with remote sensing methods. I incorporated pedestrian surveying for this project to provide direct, on-the-ground observations of surface features and artifacts at Cerro San Isidro. By systematically walking across the site, researchers can identify visible architectural elements, ceramic distributions, and other material remains that help contextualize the spatial organization and activities of the settlement. Pedestrian surveys complement UAV imagery and GPR by offering a close-up, detailed perspective of the landscape, which helps in identifying supra-household communities and gives a better sense of how people interact with their environment. Pedestrian surveys are also particularly helpful for thinking about movement through the site, since they identify local landscape features that the residents of Cerro San Isidro may have used

or navigated in their daily lives. The pedestrian survey offers valuable insights into the use of the land surrounding the site. It reveals patterns of activity and habitation that enhance our understanding of the overall layout of the settlement. This information enables me to compare earlier descriptions of the site with the current conditions, directly addressing some key questions I have about spatial organization and how people coexisted in this urban environment.

4.1.3.1 Data collection

In 2022, David Chicoine, as part of the Proyecto de Investigación Arqueológica Cerro San Isidro, conducted pedestrian surveys across Cerro San Isidro and the immediately surrounding area to document the distribution of ceramic materials, anthropogenic features such as water canals and reservoirs, and environmental features utilized by the inhabitants, such as quarries. The pedestrian surveys covered a total area of $\sim 0.75 \text{ km}^2$ and were conducted throughout the agricultural fields surrounding Cerro San Isidro (see Figure 4.8). However, it is important to note that only fields for which landowner permission was obtained were surveyed, resulting in some gaps in coverage. Chicoine walked in 3-4 meter linear transects between avocado and mango trees, visually assessing the land around them. He recorded the locations of pottery clusters, water channels, and quarries using a Garmin Montana 610. Chicoine located two large rock outcrops made of the same type of material, granite, as was used in the sanction of walls at Cerro San Isidro throughout the settlement occupation. Due to the presence of loose stones and their match to construction stones found at the site, he classified these as quarries.

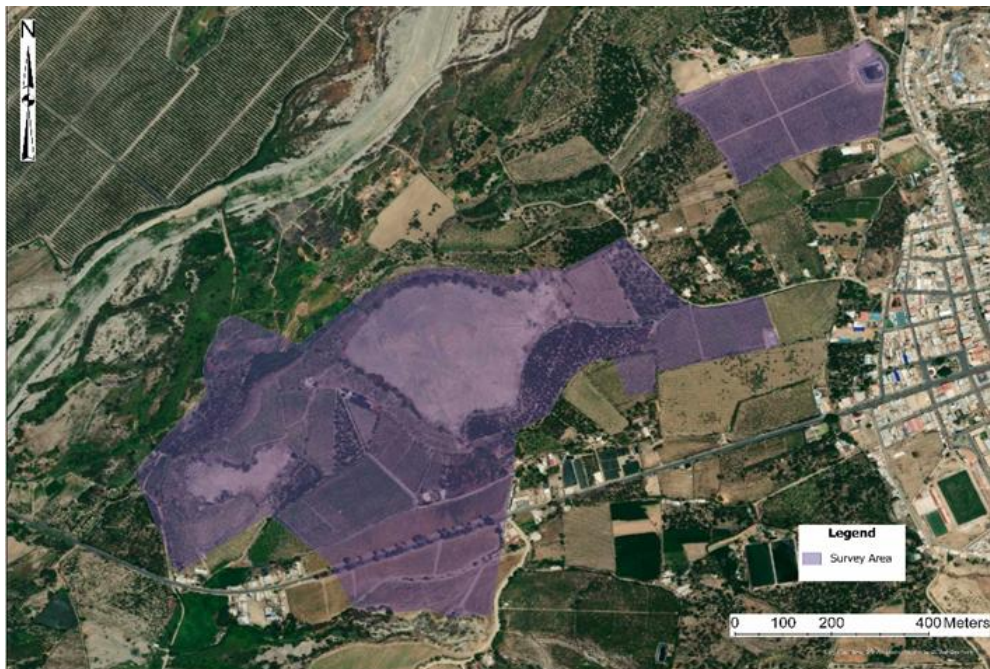


Figure 4.8: Pedestrian survey area, overlaid on ESRI World Imagery basemap.

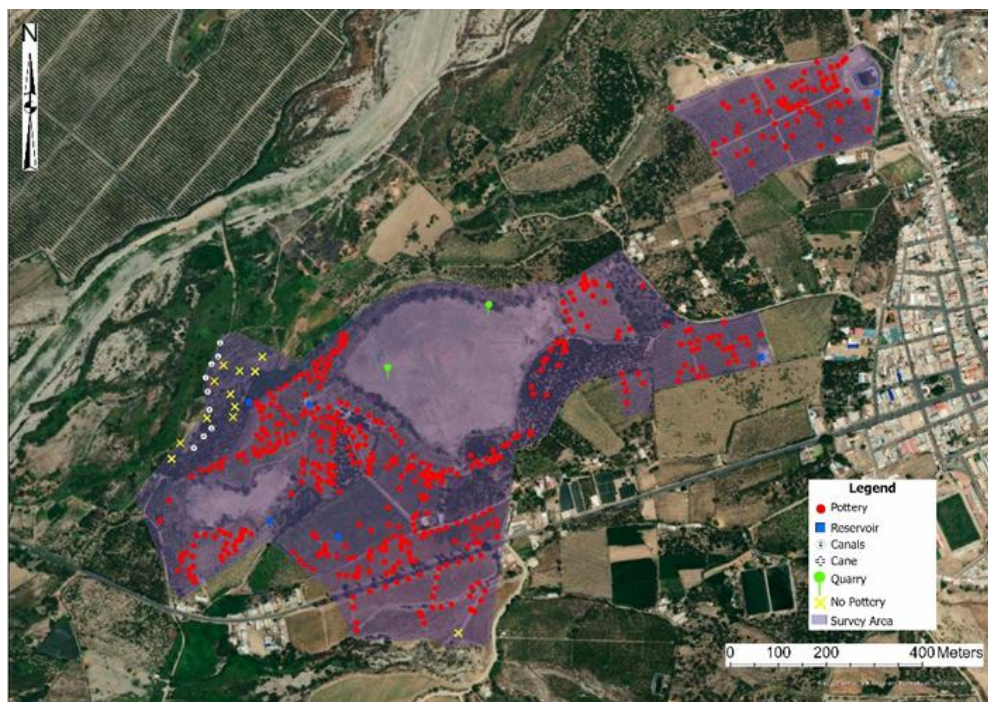


Figure 4.9: Pedestrian survey areas with GPS points identifying various anthropogenic and environmental features, such as ceramic scatter, quarries, and water reservoirs, overlaid on the ESRI World Imagery basemap.

4.1.3.2 Data Post Processing

I uploaded all the GPS coordinates collected by Chicoine into ArcGIS. I overlaid them on both the UAV imagery of the settlement and the region's ESRI Basemap, as the pedestrian survey covered a larger area than the UAV survey. The GPS points were saved as single points and classified based on the type of feature they represented, as shown in Figure 4.9. This information provides contextual information on the distribution of potential occupation as well as the location of features, such as the quarries, which will be included in the movement and visibility analysis.

4.1.4 Excavations

Excavations are essential for this project as they provide direct access to the stratified layers of occupation and material culture at Cerro San Isidro, offering invaluable data on the lived experiences within the settlement. These excavations were conducted by the Proyecto de Investigación Arqueológica Cerro San Isidro (PIACSI) team (2019 and 2022), co-directed by David Chicoine and Jeisen Navarro Vega, to sample architecture, floor depositions, construction patterns, stratigraphy, and material culture. For this project, I draw on architectural features, ceramics, and radiocarbon samples collected during the excavations for the dating of occupation phases, to focus on the Early Horizon and provide details on the spatial organization of these areas. This method provides tangible evidence of the supra-household community social organization, activities, and elite status by analyzing artifact distributions, such as fine ware ceramics, across different areas. Excavation works toward addressing key research questions by uncovering the everyday life of inhabitants, identifying distinct community practices, and validating hypotheses about social connectivity, power dynamics, and group identity within an early urban center. Ultimately, it deepens our understanding of how urban life and collective

identity were formed and maintained in early urban environments while providing important contextual information required for interpreting the spatial analysis results.

I enhanced spatial data by incorporating contextual information from each excavated region, along with detailed descriptions of the buried architecture. Within the excavated sectors, distinct architectural clusters became visible on the excavated terraces. I refer to the architectural clusters as architectural platforms, which I discuss further in Section 5.1.2. The four excavation areas are situated within different architectural platforms across the settlement (Figure 4.10). The targeted distribution of excavation areas aimed to highlight a diverse range of archaeological materials and provide insights into social and spatial organization.

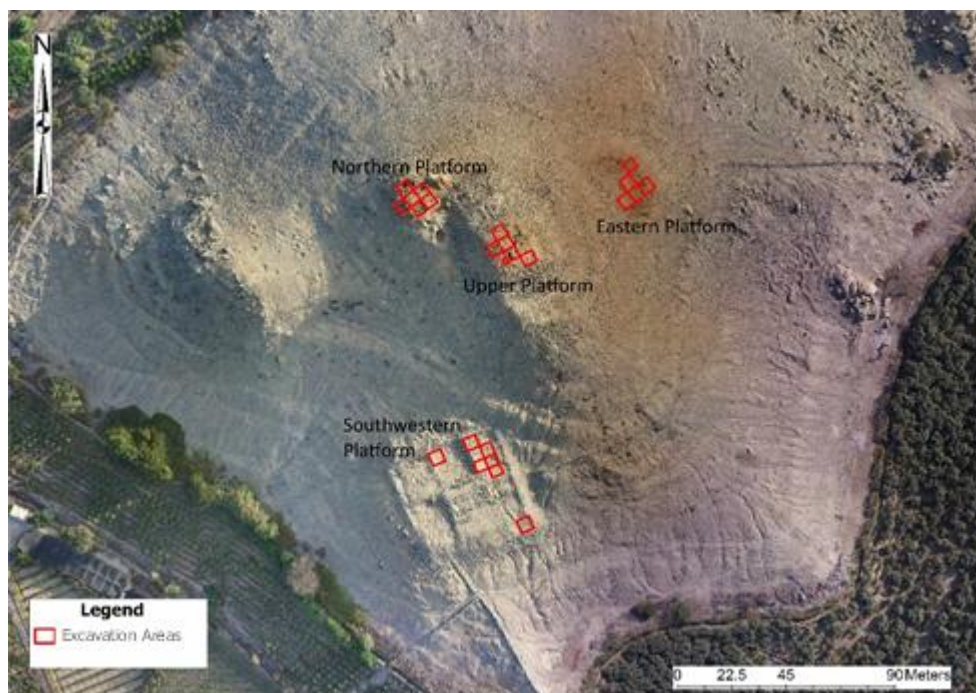


Figure 4.10: Map showing the four excavation areas with their respective names labeled.

In Chapter 5, I argue that the architectural platforms represent distinct supra-household communities, as they consist of multi-household clusters that are physically separate from one another. As such, it may be appropriate to classify these as separate communities, in line with S. Hutson's (2016) framework (see Section 3.2.1). While I will explore this hypothesis further in

Chapter 5, the foundation of this dissertation is an assessment of the social components of life within these spaces, which contribute to the cohesion and identity that define these as distinctive communities. Consequently, my thesis focuses on the four supra-household communities where excavations were conducted, which I term the Northern Architectural Platform, Upper Architectural Platform, Eastern Architectural Platform, and Southwestern Architectural Platform, for the sake of clarity and consistency in this analysis.

The PIACSI team excavated a total of 554 sq m. In 2019, the team excavated seven 5x5m units on the Southwestern Platform (Figure 11a). In 2022, the team completed the remainder of the excavations, including the Northern Platform with five 5x5m units (Figure 11b), five 5x5m

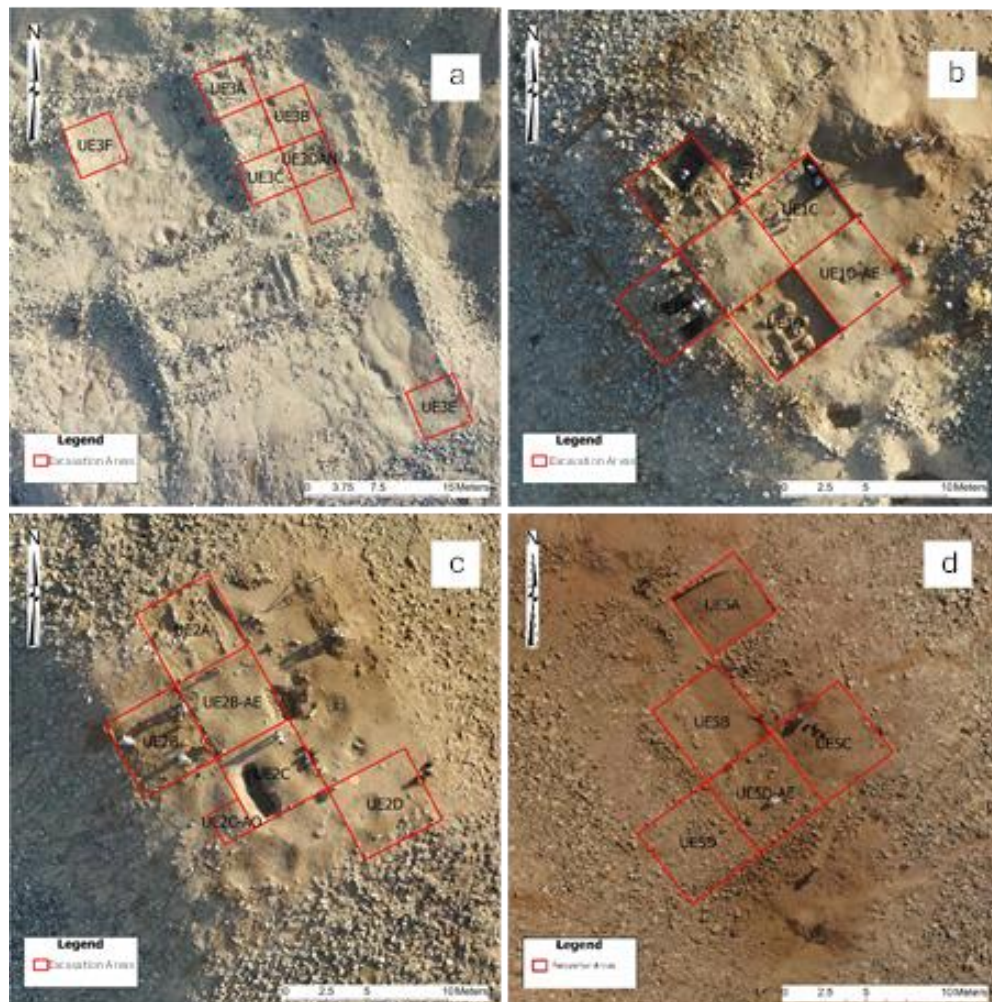


Figure 4.11: Excavation areas with unit labels. (a) Southwestern Platform, (b) Northern Platform, (c) Upper Platform, (d) Eastern Platform.

and one 2x2m units on the Upper Platform (Figure 11c), and, lastly, five 5x5m units on the Eastern Platform (Figure 11d). In addition to these excavations, in 2019 the PIACSI team conducted eight 1x2m test pits at various locations across the settlement core (Figure 4.12). The locations were selected to collect a representative sample across the site and to better understand the stratigraphic sequencing and chronology in different areas of the settlement.

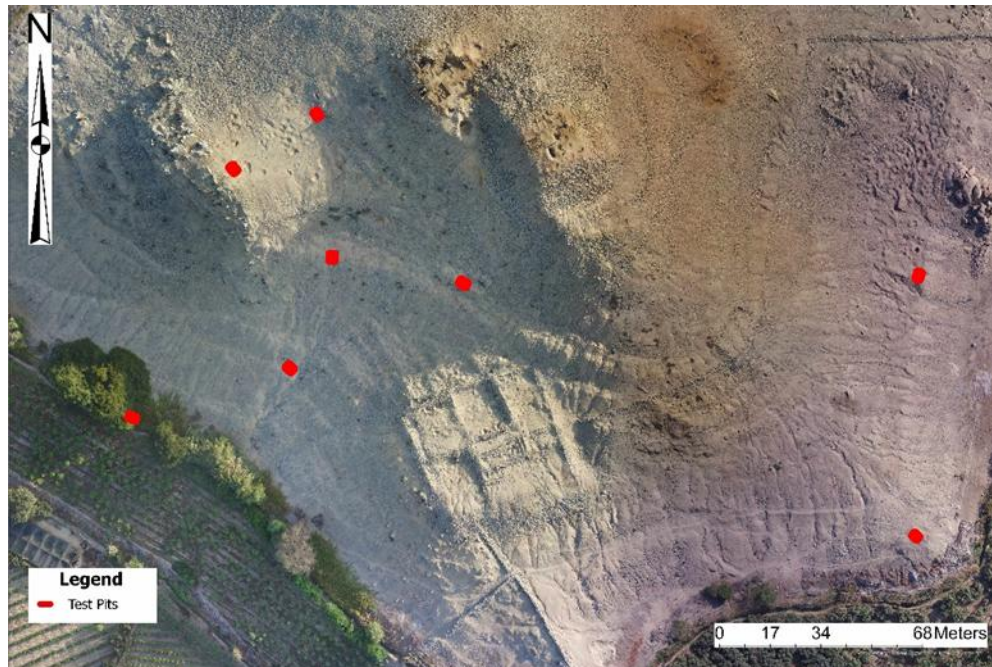


Figure 4.12: Map showing the eight test pit excavation areas.

The excavation team followed the natural and cultural strata, specifically focusing on the divisions between superficial topsoil, floor depositions, construction fills, and middens until sterile subsoil was reached. All soil collected was screened with 1/8-inch sieves, and materials were recorded and stored based on their associated strata. All materials collected were processed, catalogued, and entered into a digital database.

In the following subsection, I provide an overview of the collection, documentation, and processing of excavated materials utilized in this project, including architectural features, ceramic assemblages, and radiocarbon samples.

4.1.4.1 Architectural Features

Architectural features uncovered through excavation are essential for this project because they provide direct evidence of the spatial organization, building practices, and social structures at Cerro San Isidro. The layout of walls, terraces, and other structural elements reveals the configuration of supra-household communities and the broader urban form. The excavated architecture allows us to assess whether the settlement aligns with previous descriptions and evaluate its urban characteristics. The excavation data support key research questions by providing insights into how space was utilized, how different communities were organized, and how spatial arrangements facilitated social cohesion and collective identity.

Throughout the excavations, the PIACSI team recorded the construction techniques of walls, designating walls as EH, EIP, or LIP based on the materials used during the construction of each phase of occupation. Plane drawings, photos, and measurements were taken to record different styles. The documented information will be crucial in producing maps of the different occupational phases and in teasing out the Early Horizon occupation of Cerro San Isidro.

4.1.4.2 Ceramics

To address my research questions regarding the context of each supra-household community, including the question of elite status and activities within each community, I assess variations in material quality, styles, and functions of ceramic assemblages. The following subsection reviews the collection and processing of the ceramic materials.

4.1.4.2.1 Data Collection

Archaeologists typically interpret high-quality and decorated objects, including ceramics, as indicative of high status or elite display (Drennan 1976; Hayden and Villeneuve 2010), while

differences in ceramic types across various communities can indicate diverse activities and social roles. Analyzing ceramics styles associated with the Early Horizon provides insight into how these supra-household communities have used space differently and creates a clearer picture of the social organization of the settlement.

Excavations followed the standards established by the Peruvian Ministry of Culture. Diagnostic ceramics were collected by the PIACSI team during excavations. Diagnostic ceramics are considered as any sherd with a rim or decoration that can be used to determine the style and form of ceramics. While the collection of only diagnostic ceramics biased the data toward decorative ware compared to utilitarian ceramics, given the sheer volume of material coming from the units, it would have been near impossible to analyze and store all artifacts within the project's time frame. In total, the excavations yielded 14,702 diagnostic ceramic sherds and 43 complete ceramic vessels. Some of these vessels were too large to collect so they were photographed, measured and preserved in situ at the end of the excavation. Those that were not too large were catalogued and stored alongside the ceramic sherds.

4.1.4.2.2 Data Processing

In 2019, José Ríos cataloged the ceramic artifacts collected during that field season, and in 2022, Jeisen Navarro Vega cataloged the ceramic artifacts from the 2022 season. Ríos and Navarro Vega recorded a range of descriptors for each artifact, including vessel diameter, internal and external colour, features such as rim, base, or handle, as well as decoration type and location of decoration.

In ceramic analysis, scholars (Chase 1985) recommend establishing a Minimum Number of Vessels (MNV) as straight sherd counts can misrepresent the actual number of vessels present. MNV would have been particularly useful for this project for analyzing the disturbance of vessel

forms and total count of decorated wares, both of which are central for interpreting the activities occurring within each supra-household community, as well as the elite nature of the communities. However, due to the highly fragmentary condition and sheer volume of ceramic materials, it was not possible to establish an accurate MNV within the constraints of this project. As a result, I rely on the raw counts of diagnostic ceramic artifacts. While this can affect the accuracy of the values, neither time nor resources were available in this project for further analysis to mitigate frequency inflation. In the future, more work will be conducted to refine and validate these findings further, but for the purposes of this project and to provide a preliminary overview of social stratification and activities, the current approach provides a base point that highlights key patterns and insights.

During artifact collection in the field, excavators documented the spatial and stratigraphic information for each artifact, including the architectural platform, unit, context and strata. This is critical for associating the artifacts with each supra-household community.

The component of this database most applicable to this project is vessel form, vessel decoration, and the associated time period. During the initial cataloguing, Navarro Vega recorded the presence and absence of decoration, as well as further details on the decorative elements when present, including decoration locations, paint colours when applicable, and decorative explanations. In addition, based on common stylistic attributes of different cultural groups and periods in the region, when possible, Navarro Vega associated one of three time periods to each ceramic artifact, including: 1) Early Horizon (EH), 2) Early Intermediate period (EIP), and 3) Late Intermediate Period (LIP). Additionally, based on the shape of the rim and body of the ceramic artifacts, Navarro Vega classified the form of each artifact based on those commonly

seen within the Andes. This is crucial for the form analysis (see Section 4.2.1.1.2) to assess activities within the supra-household communities.

4.1.4.3 Radiocarbon Dating

Radiocarbon dating is crucial for this project as it provides absolute chronological data for the occupation and use of Cerro San Isidro. By dating organic materials, such as charcoal or bone, radiocarbon samples help me identify the Early Horizon contexts. This method works toward addressing my research questions by confirming the duration and distribution of occupation across the four supra-household communities. Radiocarbon dating also allows for comparisons between different areas of the settlement, helping to assess whether occupation was continuous or varied over time. This temporal information is essential for understanding social dynamics, community identity, and the development of the urban center.

The PIACSI project obtained a permit from the Ministry of Culture of Peru to transport charcoal samples for Accelerator Mass Spectrometry (AMS) dating. A total of 108 samples were collected from secure contexts and sealed in aluminum bags for dating purposes. Of these 108 samples, 48 samples were sent for AMS dating. The 2019 samples were processed at the Oxford lab (ORAU) and the 2022 samples were processed at the University of Arizona lab. These samples were taken from various test pits and units within each excavation area, across different strata, to observe variations in periods of occupation across the site. Figure 4.13 illustrates the locations of all AMS-dated sample sites, while Table 4.1 details each sample's context, including the stratum from which it was collected. Chicoine then calibrated these dates, using OXcal, suggesting a series of 4 or 5 distinct phases, ranging from ~760 BCE to 1453 CE. A plot diagram representing the calibrated dates can be seen in Figure 4.14.

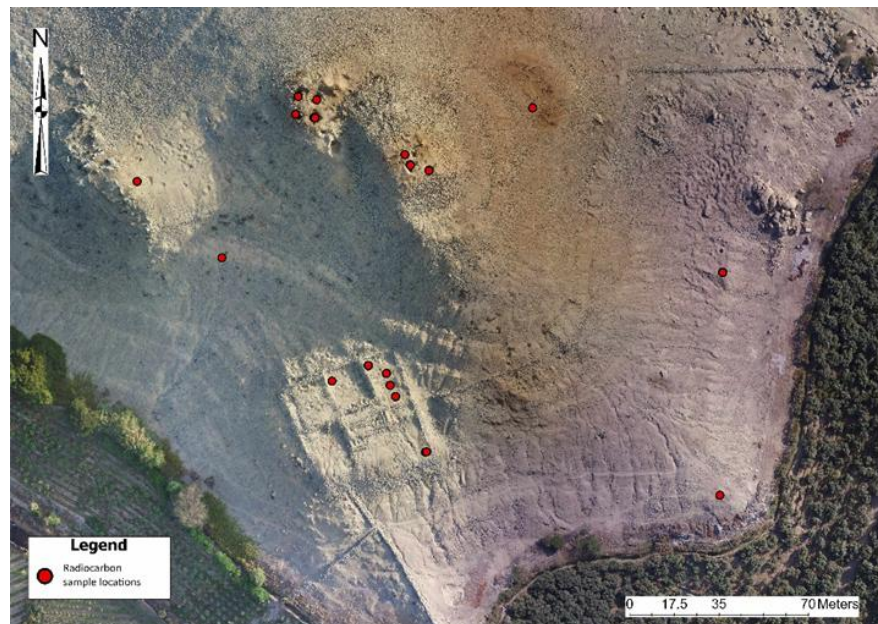


Figure 4.13: Locations of the 41 radiocarbon samples. Note that some samples were collected from the same units but different strata, which may result in fewer visible sample points in the image.

Table 4.1: Radiocarbon samples from Cerro San Isidro with contextual information about sample locations.

Lab #	Cal 95.4%	Unit	Stratum
AA-116132	1422-1453 CE	UE5D	2
OxA-40720	1425-1456 CE	HP1	2
OxA-40718	1446-1612 CE	UE3D	4
OxA-40719	1296-1394 CE	UE3D	5
OxA-40733	1285-1387 CE	UE3D	5
OxA-40717	1275-1383 CE	UE3B	4-5
AA-116129	1272-1382 CE	UE2D	3
AA-116130	1270-1380 CE	UE2D	2
OxA-40722	1226-1286 CE	UE3A	3
OxA-40723	1221-1278 CE	UE3A	4
AA-116127	1181-1270 CE	UE5D	6
OxA-40729	1074-1120 CE	UE3F	5
OxA-40715	1048-1217 CE	HP4	2
OxA-40509	419-534 CE	UE3A	4
AA-116119	415-525 CE	UE1D	3
AA-116136	251-370 CE	UE2C	3
OxA-40716	250-370 CE	HP6	3
AA-116122	246-361 CE	UE1D	6
AA-116134	245-357 CE	UE1A	4-5
AA-116120	243-341 CE	UE1D	5
AA-116135	229-341 CE	UE2D	3
OxA-40714	50 BCE-68 CE	UE3B	5
AA-116137	52 BCE-57 CE	UE2C	4
AA-116121	140 BCE-18 CE	UE1A	3-4
OxA-40725	146-49 BCE	HP1	5
OxA-40726	153-52 BCE	HP1	5
OxA-40724	171-56 BCE	HP1	5
OxA-40721	340-64 BCE	HP2	5
AA-116126	349-66 BCE	UE5D	6
AA-116123	369-156 BCE	UE1B	4
AA-116124	369-156 BCE	UE1A	4
AA-116118	380-188 BCE	UE1C	5-6
OxA-40728	382-189 BCE	UE3E	7
OxA-40730	384-190 BCE	UE3D-AN	6-7
OxA-40731	389-193 BCE	UE3D-AN	6
OxA-40732	394-198 BCE	UE3D-AN	6
AA-116128	399-201 BCE	UE2B-AE	4-5
AA-116131	716-232 BCE	UE2C	5-6
AA-116133	751-404 BCE	UE2C	8-9
OxA-40734	759-416 BCE	UE3D-AN	6
OxA-40727	760-416 BCE	UE3E	7

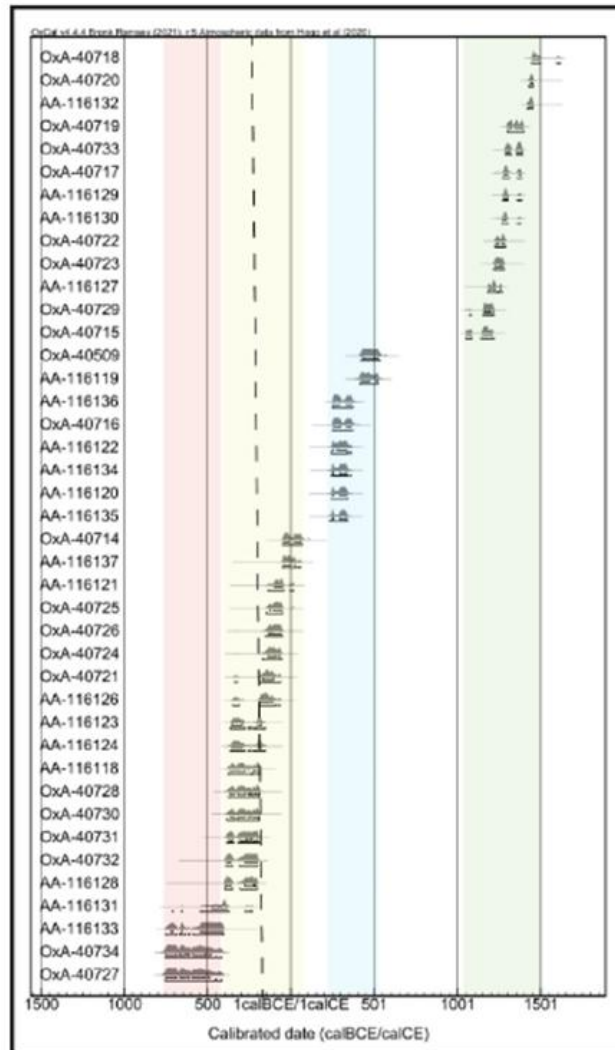


Figure 4.14: Plot diagram of calibrated radiocarbon samples from Cerro San Isidro. Source: David Chicoine (2024).

4.2 Data Analysis

The second phase of analysis involved spatial and material analysis methods with GIS-based mapping and ceramic distribution studies. In this phase I focused on developing detailed maps of Cerro San Isidro, establishing contextual frameworks for the Early Horizon (EH), and examining the spatial organization of communities. Additionally, I generated visibility and movement maps for each supra-household community.

4.2.1 Mapping Cerro San Isidro

This section integrates the diverse data sets discussed above, including GPR, UAV, and excavation data, to create a comprehensive and detailed map of Cerro San Isidro. By integrating these datasets into a single map, I can assess the architectural layout, spatial organization, and anthropogenic modifications of the landscape, providing a detailed view of the site during its Early Horizon occupation. The map helps me address the first series of research questions by providing a visual and spatial analysis of Cerro San Isidro, which allows for determining its urban form, including the presence of supra-household communities, ceremonial spaces, and residential areas. It critically examines how these features align with or challenge previous descriptions of the site as a ceremonial-residential settlement and assesses whether the settlement's morphology supports its classification as an early low-density urban center, as described in Section 3.1.2. Ultimately, this mapping process is a crucial step in understanding how the spatial layout of Cerro San Isidro contributed to social cohesion, cooperation, and the development of a collective identity within the community (see Chapter 5).

As noted above, I documented a series of architectural features from the UAV survey, GPR surveys, and excavations. While each method provides valuable information about the settlement's architecture, from the UAV's aerial perspective to the detailed view of architecture within excavation areas and the medium-scale view of subsurface architectural features with the GPR, it's essential to consider all these results together. In recent decades, many scholars (Campana and Francovich, 2003; Campana and Francovich, 2007; Evans and Traviglia, 2012; Lambers et al., 2019; Maktav et al., 2009) have integrated remote sensing findings into single maps, thereby reducing the flaws of each method and resulting in a more comprehensive dataset. As the goal of this project is to assess the EH occupation of the settlement, it is ideal to have a

map that represents only features associated with the EH occupation. While this is particularly challenging with UAV and GPR data, given that I cannot visually distinguish between architectural types and context, I was still able to identify walls from the excavation data. As I discussed in Section 4.1.4.1, I designated excavation walls in ArcGIS as EH, EIP, or LIP. To focus on the map from the EH, I only included excavation walls that are indicative of the EH. Following this, I merged the UAV walls, GPR linear anomalies, and EH excavation walls into a single dataset, as shown in Figure 4.15, overlaid onto the UAV imagery of the settlement.

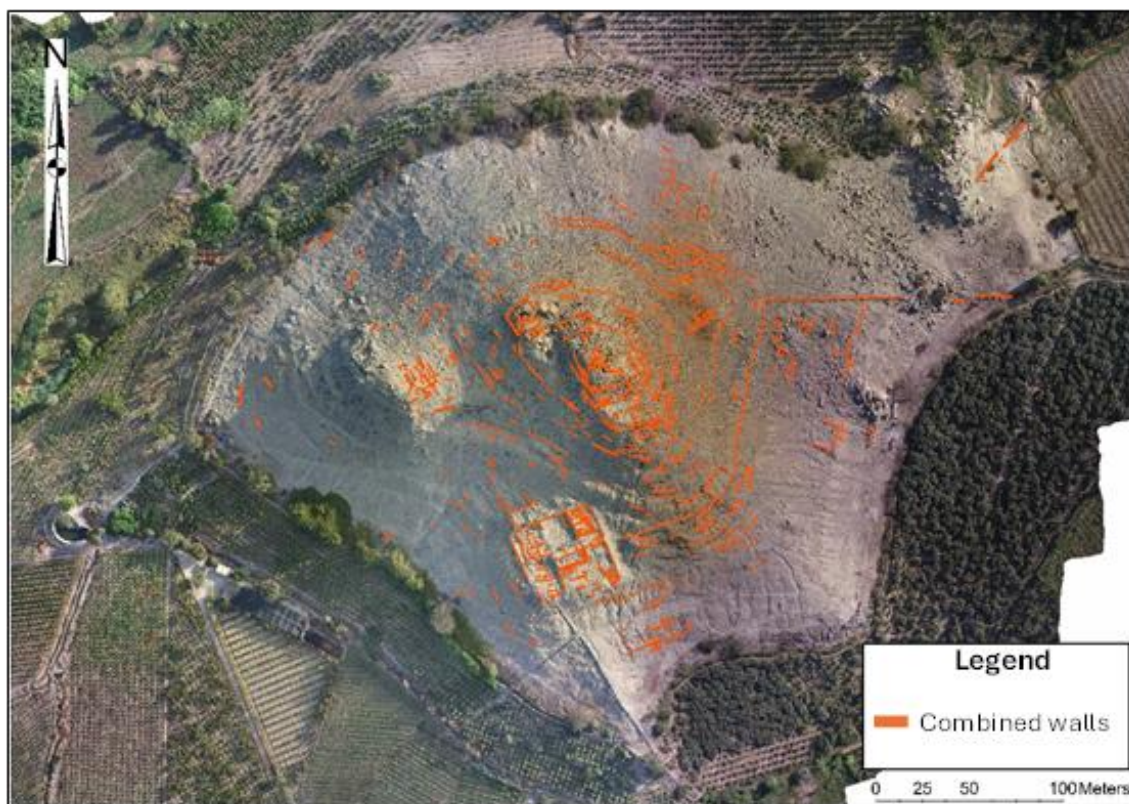


Figure 4.15: Composite map of walls identified through UAV imagery, GPR results, and excavation data.

This map serves as the basis for all analyses in the remainder of this thesis. In Chapter 5, I use this map to discuss the spatial organization of Cerro San Isidro, including the distribution of architecture and the presence of supra-household communities. Currently, this map presents a palimpsest of multiple time periods. In Chapter 6, I present a time-sensitive map that represents the occupation of Cerro San Isidro during the EH.

4.2.2 Contexts of Cerro San Isidro

This section synthesizes and reviews the ceramic materials used to address my second series of research questions. I focus on how material culture provides insight into the chronology of the settlement, the activities carried out within the different supra-household communities, and their socio-economic status. The section provides a detailed analysis of the ceramic types and distribution patterns, which will be used to directly answer the research questions in Chapter 6, where I investigate the rhythm of life in this early urban settlement during the EH. This includes an assessment of the chronology of the settlement based on ceramic materials, a form analysis, and a decoration analysis.

4.2.2.1 Chronological analysis

One of this project's goals is to establish a chronological sequence for Cerro San Isidro, including creating a map that solely represents the EH. Ceramic material plays a crucial role in this assessment, as specific ceramic styles are closely tied to specific time periods. As noted in Section 4.1.4.2, Navarro Vega classified each ceramic artifact by time period (when possible), based on common attributes and stylistic traits characteristic of the EH, EIP, and LIP. To further analyze this data and identify which excavated areas show evidence of EH occupation, I organized the ceramic data by excavation unit, detailing the stratigraphic layers and the total count of EH, EIP, and LIP ceramics associated with each stratum, as presented in Table 4.2. Additionally, I calculated the percentage of each stratum's assemblage that corresponds to each

ceramic phase. With this information, I extracted all strata with a greater than 50% EH ceramic assemblage to highlight all strata which indicate EH occupation.

Table 4.2: Ceramic data organized by excavation unit, illustrating the stratigraphic layers and the total counts and percentage of EH, EIP, and LIP ceramics associated with each stratum.

Architectural Platform	Unit	Strata	Total Count (n=)	Counts				Percentage (%)			
				EH	EIP	LIP	Unknown	EH	EIP	LIP	Unknown
Northern	1A	3	84	53	10	21	0	63.10%	11.90%	25.00%	0.00%
Northern	1A	3-4	32	18	7	7	0	56.25%	21.88%	21.88%	0.00%
Northern	1A	4-5	44	23	20	0	1	52.27%	45.45%	0.00%	2.27%
Northern	1A	6-7	7	6	1	0	0	85.71%	14.29%	0.00%	0.00%
Northern	1B	2	161	85	39	37	0	52.80%	24.22%	22.98%	0.00%
Northern	1B	3	308	277	15	16	0	89.94%	4.87%	5.19%	0.00%
Northern	1B	4-5	3	2	1	0	0	66.67%	33.33%	0.00%	0.00%
Northern	1B	5	7	6	1	0	0	85.71%	14.29%	0.00%	0.00%
Northern	1B	6	8	7	0	1	0	87.50%	0.00%	12.50%	0.00%
Northern	1C	3-4	96	58	35	3	0	60.42%	36.46%	3.13%	0.00%
Northern	1C	4-5	144	126	18	0	0	87.50%	12.50%	0.00%	0.00%
Northern	1C	5-6	99	96	2	1	0	96.97%	2.02%	1.01%	0.00%
Northern	1C	6-7	1	1	0	0	0	100.00%	0.00%	0.00%	0.00%
Northern	1C	7-7	1	1	0	0	0	100.00%	0.00%	0.00%	0.00%
Northern	1C	8-7	1	1	0	0	0	100.00%	0.00%	0.00%	0.00%
Northern	1C	9-7	1	1	0	0	0	100.00%	0.00%	0.00%	0.00%
Northern	1C	10-7	1	1	0	0	0	100.00%	0.00%	0.00%	0.00%
Northern	1C	11-7	1	1	0	0	0	100.00%	0.00%	0.00%	0.00%
Northern	1D	3-4	98	64	28	1	5	65.31%	28.57%	1.02%	5.10%
Northern	1D	5-6	106	93	13	0	0	87.74%	12.26%	0.00%	0.00%
Northern	1D	6	564	307	257	0	0	54.43%	45.57%	0.00%	0.00%
Northern	1D	6-7	176	168	7	1	0	95.45%	3.98%	0.57%	0.00%
Northern	1D	7	36	33	3	0	0	91.67%	8.33%	0.00%	0.00%
Northern	1D-E	4-5	413	275	137	1	0	66.59%	33.17%	0.24%	0.00%
Upper	2B	2	246	210	10	26	0	85.37%	4.07%	10.57%	0.00%
Upper	2B	3	155	150	5	0	0	96.77%	3.23%	0.00%	0.00%
Upper	2B	3-4	31	26	5	0	0	83.87%	16.13%	0.00%	0.00%
Upper	2B	4	28	27	0	1	0	96.43%	0.00%	3.57%	0.00%
Upper	2B-E	1-2	31	16	7	8	0	51.61%	22.58%	25.81%	0.00%
Upper	2B-E	2	31	23	4	4	0	74.19%	12.90%	12.90%	0.00%
Upper	2B-E	3-4	9	5	2	2	0	55.56%	22.22%	22.22%	0.00%
Upper	2B-E	4	29	22	7	0	0	75.86%	24.14%	0.00%	0.00%
Upper	2B-E	4-5	157	152	3	2	0	96.82%	1.91%	1.27%	0.00%
Upper	2B-E	5	3	3	0	0	0	100.00%	0.00%	0.00%	0.00%
Upper	2C	2	172	112	16	44	0	65.12%	9.30%	25.58%	0.00%
Upper	2C	3	134	110	0	24	0	82.09%	0.00%	17.91%	0.00%
Upper	2C	3-4	18	15	3	0	0	83.33%	16.67%	0.00%	0.00%
Upper	2C	5-6	30	30	0	0	0	100.00%	0.00%	0.00%	0.00%
Upper	2C-O	3-4	32	28	4	0	0	87.50%	12.50%	0.00%	0.00%
Upper	2C-O	4-5	97	90	5	2	0	92.78%	5.15%	2.06%	0.00%
Upper	2C-O	5	16	16	0	0	0	100.00%	0.00%	0.00%	0.00%
Upper	2C-O	5-6	16	16	0	0	0	100.00%	0.00%	0.00%	0.00%
Upper	2D	3	42	30	1	11	0	71.43%	2.38%	26.19%	0.00%
Southwestern	3A	5	21	20	1	0	0	95.24%	4.76%	0.00%	0.00%
Southwestern	3B	5	11	10	1	0	0	90.91%	9.09%	0.00%	0.00%
Southwestern	3D-N	4-5	308	204	101	3	0	66.23%	32.79%	0.97%	0.00%
Southwestern	3D-N	5	613	546	41	25	1	89.07%	6.69%	4.08%	0.16%
Southwestern	3D-N	5-6	327	303	20	4	0	92.66%	6.12%	1.22%	0.00%
Southwestern	3D-N	6-7	30	30	0	0	0	100.00%	0.00%	0.00%	0.00%
Southwestern	3E	3	2	2	0	0	0	100.00%	0.00%	0.00%	0.00%
Southwestern	3E	6	134	73	28	33	0	54.48%	20.90%	24.63%	0.00%
Southwestern	3E	7	20	20	0	0	0	100.00%	0.00%	0.00%	0.00%
Southwestern	3F	5	57	46	6	5	0	80.70%	10.53%	8.77%	0.00%
Eastern	5A	5	36	30	1	5	0	83.33%	2.78%	13.89%	0.00%
Eastern	5A	6	31	26	0	5	0	83.87%	0.00%	16.13%	0.00%
Eastern	5A	8	5	4	0	1	0	80.00%	0.00%	20.00%	0.00%
Eastern	5B	3	65	39	1	25	0	60.00%	1.54%	38.46%	0.00%
Eastern	5B	4	171	120	8	43	0	70.18%	4.68%	25.15%	0.00%
Eastern	5C	4	68	51	9	8	0	75.00%	13.24%	11.76%	0.00%
Eastern	5C	5	6	3	0	3	0	50.00%	0.00%	50.00%	0.00%
Eastern	5D	3	205	144	9	52	0	70.24%	4.39%	25.37%	0.00%
Eastern	5D	4	78	41	9	28	0	52.56%	11.54%	35.90%	0.00%
Eastern	5D	5	189	158	25	6	0	83.60%	13.23%	3.17%	0.00%
Eastern	5D	6	552	476	32	44	0	86.23%	5.80%	7.97%	0.00%
Eastern	5D-E	2	565	452	28	85	0	80.00%	4.96%	15.04%	0.00%
Test Excavations	HP-2	5	2	2	0	0	0	100.00%	0.00%	0.00%	0.00%
Test Excavations	HP-7	2	50	27	2	11	10	54.00%	4.00%	22.00%	20.00%
Test Excavations	HP-8	1	23	13	2	8	0	56.52%	8.70%	34.78%	0.00%

One challenge of ceramic analysis based on assigning styles to specific time periods is that ceramic styles can persist beyond the era of their origin, either through continued use by later generations or through the intentional replication or incorporation of earlier styles into later contexts. This means that ceramic styles traditionally associated with one time period could actually be present in another. To account for this, and to consider ceramics that may outlast or predate the time periods typically associated with them, I include all ceramic materials—whether they are typical of the EH, EIP, or LIP—from strata containing over 50% EH ceramics. This approach allows for the inclusion of artifacts not traditionally linked to the EH, moving beyond a strictly cultural-historical framework.

A potential issue with this method is the assumption that strata with over 50% EH ceramics represent an EH occupation, even if other ceramics from different periods are present. This overlooks the possibility that later or earlier groups reused these areas, resulting in a mix of materials from multiple periods. Despite these issues, I am choosing this approach considering all ceramics from strata with a majority EH presence, which allows me to consider ceramic materials typically associated with different periods, thus accounting for the possibility of overlapping use of styles.

4.2.2.2 Form analysis

By examining the shapes, styles, and uses of ceramic vessels, we can infer the types of activities—such as food preparation, storage, and consumption—that occurred in different areas of Cerro San Isidro. This analysis then provides insight into the daily activities occurring within supra-household communities. On the North Coast of Peru, scholars have used vessel form to discuss food-related activities (see Gamarra and Gayoso 2008; Mehaffey 1998; Ringberg 2012), including studies focused on the Early Horizon in the Nepeña Valley (Sutherland 2017;

Sutherland et al. 2020), demonstrating that form analysis is a well-established and productive approach in this region. This analysis also helps differentiate between functional spaces and highlights how shared or specialized activities contributed to social cohesion and identity formation within these communities.

As part of the cataloguing, Navarro Vega recorded the form of ceramic artifacts when they could be determined based on the shape of the rim and body of the ceramics. Form types were identified based on those commonly seen through ethnographically and archaeological research within the Andes. Complete vessels are best for defining vessel form; but the complete preservation of vessels is unrealistic. However, scholars such as Braun (1980) and Hally (1983; 1986) have demonstrated that form and function can be determined from the rim sherds of vessels. Focusing on ceramic materials from strata associated with the Early Horizon (EH), Navarro Vega identified the form of 5,746 out of 7,266 diagnostic ceramic artifacts from this period. Of those with identifiable forms, I categorized the ceramics into five functional groups—cooking, storage, food preparation/serving, food presentation/serving, and specialty items—based on the frameworks of Henrickson and McDonald (1983) and Ringberg (2012). These classifications were made according to the mechanical performance and physical properties of the vessels, as outlined by Ringberg (2012, 192). The specific properties and associated vessel types are described in Table 4.3. By analyzing the distribution of these functional categories across different supra-household communities, we can identify potential similarities and differences in their activities. This, in turn, allows me to infer the social identities and day-to-day lives of these communities, which will be discussed in more detail in Section 6.2.1.

There are several important limitations to consider in this analysis. Classifying ceramics into specific functional categories based on form and mechanical properties may not always

Table 4.3: Framework for categorizing ceramic vessels at Cerro San Isidro by functional category. The table outlines each category, the specific functions of the vessels, their associated mechanical and physical attributes, and vessel form examples.

Functional Category	Function	Mechanical properties or physical attributes	Vessel Forms
Cooking	Ceramic tools and vessels used to cook food.	Rounded Base and Thin Walls: Designed for efficient heat transfer and thermal shock resistance, with textured exterior surfaces and coarse tempering. Slightly Constricted Necks: Allow manipulation of contents while minimizing spilling, heat loss, and evaporation.	Olla sin cuello, Olla con cuello, Olla miniature
Food Preparation/ Serving	Ceramics as tools in both cooking and dining; used to facilitate the preparation of food.	Openings: Designed for easy access, content manipulation, and visibility. Surface Treatments: Burnishing or slipping reduces permeability, evaporation, and leaking.	Colador, Rallador
Food Presentation/ Serving	Ceramics designed to present or serve food, for everyday dining and special occasions.	Openings: Allow for easy visibility, filling, and removal of contents. Varied Investment: Ranging from minimal to significant craftsmanship.	Botella, Cántaro, Disco, Garrafa, Individual Cuenco, Plato, Paleta, Tazón, Vaso
Specialty items	Ceramics that serve specific or niche functions.	Unique shape: Distinctive features, such as shape, tailored to their specialized use. Varied size and shape: Ranges from small to large, accommodating a variety of functions.	Crisol, Figurina, Regadera
Storage	Ceramics specifically designed for various materials, include liquid and dry goods.	Stable Bases: Ensures that the vessels remain upright and secure, especially important for both small and large containers. Varied Capacity: Ranges from small and easy to lift and pour to large and potentially immovable when filled. Larger vessels offer high volume, while smaller ones provide ease of handling. Lips and Openings: Includes thickened or modified lips for easy covering and secure closure. Shape and form: The form may be tall and narrow for efficient space utilization and stacking. Vessels are likely to be uniform in size and shape, especially when intended for stacking or space-efficient storage.	Canchero, Cuenco, Jarra grande, Tinaja

reflect their actual use, as some vessels could have served multiple or evolving purposes that we cannot fully capture. Additionally, sampling variations across the different excavations of supra-household communities—particularly since one area was excavated in a previous year—could introduce biases into conclusions about activity patterns. Ceramic form analysis also assumes that the distribution of ceramic materials directly corresponds to specific activities, which may overlook other factors, such as trade, that influence the presence of ceramics. For my thesis, I use form analysis as a preliminary assessment of activities within the supra-household communities and I acknowledge that these limitations may affect the outcome of this analysis. Future research

will be necessary to develop a more detailed and nuanced interpretation that addresses these issues more comprehensively.

4.2.2.3 Decorative analysis

Decorative analysis of ceramics plays a critical role in addressing social status within supra-household communities (Drennan 1976; Hayden and Villeneuve 2010). By examining decorative styles, motifs, and the craftsmanship of ceramic vessels, we can assess the distribution of prestige items often associated with wealth and elite standing. This approach can help confirm previous suggestions that Cerro San Isidro housed the elite members of the urban population center. The following section presents the organization and analysis of ceramic materials, which will be used to assess the socio-economic status of Cerro San Isidro's supra-household communities.

I categorized all ceramic materials associated with EH strata by decorative technique and type. Ceramic types are categories constructed by archaeologists to help organize assemblages, typically based on regional research emphasizing stylistic traits. While ceramic types can highlight patterns across regions, cultures, and time periods, they can also become confusing when similar styles are classified under different names. For instance, ceramics with a white-on-black painted design are referred to as both Gallinazo Negative and Virú Negative in different contexts (Millaire 2009). To avoid confusion, I categorize ceramic styles based on broad decorative stylistic attributes rather than assigning specific type names, which are often linked to particular cultural groups.

Here, I use technique to refer to the broad decorative method applied to a ceramic vessel, such as press-molding or incising. Ceramic types are specific expression of decorative techniques, detailing how the decoration is achieved. For example, 'Incised' is a technique with

types like Red Incised, Black Incised, Kaolin Incised, Banded Lozenge, Circular Zone Incised, White Incised, Orange Incised, and Post-Fire Scratched. There are 13 main techniques within this collection, including Appliqué, Burnished, Impressed, Incised, Modeled, Molded, Painted, Palletized, Plain, Polished, Press-molded, Punctate, and Stamped. But there are additional categories when two techniques are used, such as Stamped and Punctate or Painted and Incised. Table 4.4 presents the breakdown of techniques and types.

This classification is useful for assessing the socio-economic status of the varying supra-household communities by considering the distribution of “high-status” descriptive types by the community as well as the ratio of fine-ware to plain-ware (see Chapter 6). Certain decorative styles – such as Stamped Circle and Dot, Pattern Burnished, and Textile Impressed (Chicoine 2010) – are often associated with elite or ceremonial contexts on the North Coast of Peru. As such, scholars (Bayman 1999; Costin 2001; Inomata 2001; Trubitt 2000) argue that the presence of higher portions of fine ware is likely of a higher social status. However, this approach assumes that decorative styles directly reflect social structures, even though the use, meaning, and value of these styles are highly context-driven. As such, they should be considered a potential proxy rather than definitive evidence of status and interpreted in combination with vessel forms and spatial distribution. Future work would benefit from a more in-depth investigation into how elite status can be accurately identified in the past.

4.2.3 Communities and Viewscapes

By examining the viewsheds, or what individuals could see from specific points within the settlement, visibility analysis helps reveal how spatial arrangements influenced daily life and interactions. As I highlighted in Section 3.4.1, visibility sheds light on the role of prominent landmarks, such as sacred mountains or other significant features, in shaping community identity

Table 4.4: List of ceramic decorative treatments and types of decorative treatments.

Treatment	Types of Decorative Treatment
Appliqué	Red
Burnished	Pattern Burnished
Impressed	Textile Textile (Fine) Textile (Net)
Impressed and Punctate	Paddle Impressed, Quadrangular Punctate
Incised	Banded lozenge Black Post-Fire Scratched Red White
Modeled	Red
Molded	Black Kaolin Red
Painted	Black Green Negative Orange Orange and White Red Red and Black Red and Orange Red, Orange and white Red, White, and Black White White on Red
Painted and Incised	Red and Black Red and Orange White
Plain	Black Kaolin Red
Polished	Black Pattern Polished Red
Press-molded	Black Red
Punctate	Angular Zoned Punctate Triangular Zoned Punctate Zoned Punctate
Punctate and Incised	Cylinder Stamped and Circular Punctate Zoned Punctate and Incised
Stamped	Circle and Dot Cylinder Cylinder Stamped Triangular
Stamped and Incised	Cylinder Stamped

and cohesion. Visibility patterns also provide insight into power dynamics, as increased visibility of certain areas could indicate surveillance or control, while limited visibility might reflect social stratification. Ultimately, understanding how visibility impacted residents' experiences allows for a deeper exploration of social and spatial dynamics, contributing to the broader goal of understanding life in early urban settlements. This section reviews the visibility analysis using ArcGIS.

The application of GIS has emerged as an important tool to model human scales of space and aspects of human experience (Rennell 2012). GIS provides a way to explore places and landscapes as an experiential phenomenon. GIS was introduced to the field as a tool for predictive modelling through quantitative measurements of space, it was seen as opening new and exciting methodological and theoretical possibilities (Cummings 2008; Gillings 2012; Judge and Sebastian 1988; Tilley 2004). But despite early interest in the application of this tool in landscape archaeology, it was not well received by all landscape theorists (Gillings 2012). Throughout the early 2000s, many researchers cautioned against the use of spatial technologies in experiential analysis (Tilley 2004; Thomas 2004). The deterministic modelling created with GIS was rejected as reductionist and functionalist (Gaffney and van Leusen 1995). Scholars, particularly post-processualists, were concerned with how the derived results were applied to past peoples and considered 'sterile' and 'regressive' (Sui 1994). While the exact rationality behind these criticisms varies, Gillings (2012) argues that two key factors influence this skepticism: timing and the toolbox problem. The possibilities of GIS as a tool for experiential archaeology came at the same time as a re-theorisation of the concept of landscape (Gillings 2012, 603). This timing created tension, as GIS was not viewed as an effective tool for addressing phenomenological aspects of the landscape. The toolbox problem refers to the

perception of GIS as a collection of methods searching for an issue to solve (Gillings 2012, 604). GIS was viewed as a tool which could only be applied to existing theoretical frameworks rather than presenting new ways of doing and expanding on previous conceptions. As a result, GIS was employed within existing frameworks, rather than as a tool to expand or reshape our understanding of landscape.

However, GIS has developed substantially since the early years of GIS application and is now used to develop alternative theoretical perspectives that prioritize the experiential and social-cultural dimensions of spaces, including how individuals and communities perceive, move through, and engage with their landscapes (Kosiba and Bauer 2012; Llobera 1996; Van Dyke, et al. 2016; Williams and Nash 2006). Visibility models have been one of the most successful ways of doing so. Wheatley (1995) was one of the first scholars to use GIS to assess visibility in an archaeological context. In his investigation of the inter-site visibility of Neolithic long burrows in the Salisbury plain of southern Britain. While visibility modelling applications using GIS highlight the cognitive, perceptual, and symbolic importance of landscapes, some critique it as providing an objectified view of the archaeological world (Thomas 2004). Many scholars emphasize that interpreting the results of visibility analysis is crucial to avoid this criticism, as the results produced by GIS are merely a starting point for reinterpretation and not an explanation in themselves (Kwan 2002; Llobera 2007; Lock 2000). GIS data can be read in many ways; as such, the interpretation is a critical step of the process (Llobera 2007, 67). The different theoretical frameworks laid out in Chapter 3 (i.e., economic, interpretive, and political) must be applied to GIS outputs, rather than using the outputs as a final conclusion.

4.2.3.1 Methodology for Creating Viewsheds

Viewsheds were generated in ArcGIS Pro to further investigate the experiential relationships of four supra-household communities at Cerro San Isidro. I used the Spatial Analyst Geodesic Viewshed tool, which uses a Digital Elevation Model (DEM) of the heights and geomorphology of the ground, to determine what is visible from a given point. As this analysis extends beyond Cerro San Isidro's immediate environment, which I recorded with the UAV, I used an open-source 30m pixel resolution DEM captured by the Japan Aerospace Exploration Agency (JAXA). The JAXA DEM dataset covers the entirety of Nepeña Valley. It's worth noting that the imagery used here has a relatively low resolution, which means that some terrain areas may appear invisible (or visible) when they are not. This limitation is due to the generalizations of the terrain caused by the low resolution. For the best visibility results, I recommend using the highest resolution DEM available. Currently, I use the highest open-source resolution dataset available in the Nepeña Valley region, particularly the Moro Pocket area. Though it is important to acknowledge the potential for errors in fine-grained, detailed analysis, this dataset provides a good overview of visibility from particular vantage points.

The Spatial Analyst Geodesic Viewshed tool operates by transferring the given elevation surface into a geocentric 3D coordinate system. It then runs a line of sight to each pixel cell center from a specified observer point. I established several observation points to analyze Cerro San Isidro, with one at the center of each of the four supra-household communities. I then used the Geocentric Viewshed tool (spatial analyst), setting the observable height parameter to 1.5 meters to account for the height of the viewers. This value is similar to the values set for the same process by other scholars (Gonzalez-Macqueen 2018; Rennell 2012). However, the observation point at the center of each platform, at an observable height, does not consider the structures on each platform that may block visibility. Visibility would be from the outside of the

structures, between the retaining wall and the structures. Therefore, one would most likely have to move around the platform to have a complete view rather than standing in any random spot.

It is therefore important to note landscape features within the viewsapes of each community. To do so, I accumulated data from multiple sources (Helmer and Chicoine 2016; Proulx 1973b) regarding settlement locations and settlement types during the Early Horizon. As noted in Chapter 2, Proulx (1973b) and Helmer and Chicoine (2016) categorized settlement types during the Early Horizon by function, including ceremonial, habitation, or fort. These functions may have been associated with different meanings and thus invoked different visual experiences. The location of these settlements is shown in Figure 2.3.

I similarly note landscape features (Figure 4.16), such as water and ancient roadways. I determined the water location based on the local floodplain within the valley, which I included as a polygon feature in ArcGIS. Lastly, I digitized the ancient roadway location based on Proulx's (1973a, 86) survey of the Morro Pocket, georeferencing his map into ArcGIS using major



Figure 4.16: Map of ancient landscape features in the Moro Pocket and surrounding areas of the Nepeña Valley, Peru.

landscape features as control points. However, it is unclear when this road was made and used, and it is possible that it does not relate to the EH occupation of Cerro San Isidro. This will be considered when evaluating and interpreting the visibility of this feature.

4.2.4 Communities and Movement

By studying patterns of movement, we can explore how different types of mobility shaped social cohesion and collective identity. Movement analysis helps reveal how physical spaces structured human interactions and how these interactions contributed to the formation of supra-household communities (Llobera et al. 2011; Murrieta-Flores 2012; Van Leusen 1993; Verhagen 1995; Verhagen 2018; Verhagen et al. 2014; Verhagen et al. 2019). Through this approach, we can assess how movement within and between these communities fostered social connectivity, cooperation, and a shared communal identity. Here, I review the use of GIS in movement analysis to address such questions.

There are two common ways of conducting movement analysis within archaeological studies through the application of Geographical Information Systems (GIS). This includes space syntax (SS) and least-cost analysis (LCA). Space syntax was originally developed for architectural and planning purposes, but due to the presence of architecture at archaeological sites, it has since been applied to archaeological research (Hillier and Hanson 1984). Space syntax allows the analysis of structures of space to predict pedestrian movement (Bustard 1996; Ferguson 1996; Hillier and Hanson 1984; Shapiro 2005; Stuardo 2003). This approach is usually applied to settlements with the presence of a grid or planned layout.

Space syntax is both a methodology and a theoretical framework for addressing mobility; it helps researchers assess site configurations as a cultural product and to infer social interactions and the organization of space. Space syntax assumes people are more likely to move to or

through some spaces over other spaces, based on the way the buildings and spaces are organized. It then infers social connectivity through identifying which spaces are configured to have greater access than others (Hillier, et al. 1993; Hillier 1999; Hillier and Hanson 1984). This method has been useful in archaeological research, particular in urban spaces where architectural maps have been produced (see Fisher 2009, Parmington 2011, Stuardo 2003). The foundation of a Space syntax analysis is an axial map, which is a two-dimensional representation of space (Ratti 2004). But movement does not occur on a flat surface; it occurs over hills and around barriers such as water or steep slopes. Space syntax considers rooms, doors, and walls, but not the surface between these objects that impede or encourage movement (Ratti 2004). However, in recent years, scholars have begun to address these limitations in Space Syntax modelling (Jiang and Claramunt 2002; Jiang and Gimblett 2002; Ratti 2005; Shelton 2012).

Today, the least-cost analysis (LCA) method is the preferred method to explore movement, sometimes with space syntax. LCA, in the most basic sense, assumes humans will economize aspects of their environment and will attempt to limit the costs of travelling in a landscape. This is known as the principle of least effort (Zipf 1949, 7). Cost, however, is defined by the researchers, who use all available information to create an appropriate cost (such as time, difficulty of terrain, or accessibility). It is common practice when modelling movement to measure the speed of movement or energy expenditure (Verhagen et al. 2019). Using speed assumes that people will select a route which takes the least amount of time, based on the average speed of humans over particular environments. Energy expenditure measures cost as the effort required to travel a path, accounting for factors like slopes, distance, uneven terrain, and natural or human-made obstacles. Due to this approach, which considers topographic variability, I chose to use it in my analysis of movement at Cerro San Isidro, rather than Space Syntax.

LCA offers a means to reconstruct previously unknown connections between people, places, or objects, and through these connections, discuss many complex political, cultural, or economic questions of past populations. LCA can be used in many ways, such as determining routes of movement between settlements, locating unknown settlements, indicating the importance of settlements or features, and determining nomadic routes across a landscape. LCA is popular because of its multifaceted nature. By viewing landscape movement as a cost, it results in patterned behaviours of interaction – with less cost, there will be less interaction (White and Surface-Evans 2012). People are more likely to engage with or travel to areas that are easier to access. While this assumption has been criticized for oversimplifying human behavior, it serves as a useful heuristic tool for developing baseline networks of movement.

However, in addition to this general critique, several other issues emerge when applying LCA in archaeological inquiry. One is the assumption that people will always act efficiently. However, it is likely that there were other paths which were less costly that people would take due to individual, social, cultural, or environmental reasons. As such, we must keep in mind that there are most likely instances where the modelled paths were not those used. A key method used to address this concern is identifying and testing past routes by interviewing descendant communities, conducting textual analysis, exploring the distribution of artifacts, and performing remote sensing (Branting 2012). In fact, many scholars (Branting 2007; Branting 2009; Hudson 2012; Poehler 2009; White 2015) use such methods to determine the accuracy of LCA. However, the preservation of archaeological data used to support possible LCA routes is not always available, given the large areas in which LCA analyses are often performed (Close 2000; Kelly 1992). Similarly, the ability to talk with descendant communities or analyze archives with routes of movement is not always possible. As I discuss further in Chapter 5, we were unable to

excavate the entire site of Cerro San Isidro. However, my analysis of the settlement's topography, using GPR surveying, revealed anthropogenic terracing containing little to no architectural structures. I argue these spaces are possible roadways. As such, for the LCA analysis, I take into account the presence of these roadways when considering movement. By doing so, I hope to provide routes that were more likely to be used in the past.

It is also important to emphasize that the least-cost analysis (LCA) model I developed for Cerro San Isidro does not capture the entire pathway system of the settlement. Many additional pathways likely exist beyond those identified in this study, and the routes created also represent idealized situations that may or may not present real paths. Nevertheless, this analysis offers predictions regarding the routes utilized by the various supra-household community members in relation to key settlement features. While this path assessment provides insights into potential movement patterns, it should not be viewed as a definitive representation of mobility during the Early Horizon at the site. Still, the model reveals potential spatial relationships that suggest how different communities may have interacted with one another and with the landscape, offering a glimpse into how movement shaped community interaction and the shared—or differentiated—experience of space across the settlement. Future research, incorporating more comprehensive data and potentially new methodologies, will be essential to refine these models and to better understand the complexities of movement within Cerro San Isidro.

4.2.4.1 Mapping Movement

There are many ways to perform LCA analysis depending on the research questions, models used, and variables used for the costs (White and Surface-Evans 2012). Here, I used raster models, as is common in archaeological research (Gustas and Supernant 2017; Nolan and Cook 2012; Rademaker, et al. 2012; Richards-Rissetto 2012; Surface-Evans 2012). Raster models

divide space into a series of cells, of equal shape and size, in a grid format. Each of these cells has a value associated with it, and for movement modelling, these values are the cost of moving through that cell. Compared to the other model types, the benefit of using a raster model is its ease of application and the speed at which the process can be completed (Johnston and de la Barra 2000, 135). Raster models are more efficient at modelling the natural landscape beneath the raster grid, especially in large areas (Ullah and Bergin 2012). However, the limitation of raster modeling method is that people do not move around in a grid-like formation but in a more linear way (Branting 2012). Grid-based movement can become increasingly more problematic with large pixel sizes, which create more generalizations over a greater area and may cover features of different costs. In other words, if the pixel is too large, it will mask variations, altering the outputted model (Kvamme 1990). While there are no clear workarounds for moving through a grid format, having a high resolution, with smaller pixels, reduces significant errors.

I address three aspects of movement with the least-cost analysis, as discussed in Chapter 3—accessibility, social connectivity, and socio-spatial integration—to explore my research questions. Accessibility refers to the ease with which a location can be reached (attractiveness) or exited (emissiveness) (Comtois and Slack 2006), serving as a mechanism of control that shapes the social experience of space. Social connectivity refers to the likelihood of interaction between groups (Richards-Rissetto and Landau 2013), which I use to assess how connected the four supra-household communities are to one another and to other groups at Cerro San Isidro. Finally, socio-spatial integration examines how well groups are integrated into the settlement, considering their connection to places, resources, and people. To address accessibility, I generate pathways between each supra-household community and key economic resources, such as the two local quarries and water sources, as well as ritual sites like Puente Piedra and an upright

stone on the Upper Platform. For social connectivity, I establish pathways between each supra-household and all other architectural platforms—16 platforms in total, as outlined in Chapter 5. Finally, socio-spatial integration considers the combined pathways across all locations. Overall, I developed pathways for 20 key locations related to each of the four supra-household communities, resulting in 40 pathways per community (emissive and attractive) and a total of 160 pathways across the entire study.

The workflow to create these pathways consisted of seven steps in ArcGIS, each building on the previous:

Step 1: Elevation surface

The Digital Elevation Model (DEM) I produced from the UAV imagery (4.1.1) is the starting point for this analysis, with a resolution of 13.6cm. This is a particularly high resolution, meaning there is less chance for the generalization of the surface data within the pixels. However, people do not move in 13.6cm intervals either; using such a small scale causes significant issues in representing realistic human movement patterns². To address this, I decreased the resolution to 1 meter using the aggregated geoprocess, ensuring that people would be modelled as moving in 1-meter intervals. This adjustment strikes a balance between maintaining the detailed topographic information of the site and allowing for a more practical representation of human movement. By smoothing out the terrain at a 1-meter resolution, I can better simulate how people navigated through space without the noise created by overly fine data, thus providing a more accurate reflection of mobility patterns at Cerro San Isidro.

Step 2: Costs

² At such a small scale, the data becomes too granular, causing the analysis to overly emphasize minute variations in the terrain that would not realistically affect a person's movement. This can lead to skewed results, as individuals do not adjust their paths based on such tiny changes in elevation or surface texture.

As noted above, LCA analysis require ‘costs’, which are applied to each individual pixel. Then the path from A to B, will be based on the lowest cost of the pixels, i.e. the algorithm will select the lowest valued cell(s) to move through. The variables used to determine cost vary greatly between archaeological projects, depending on the specific research goals and the availability of data. Generally, there are three broad categories of variables to select from: 1) Environmental, such as terrain, vegetation or hydrology 2) Cultural, or important features of the landscape that may encourage movement in a particular direction, such as shrine, trails, roads, or settlements, 3) Physiological, or human biology which many influence movements, such as caloric energy or different abilities (White and Surface-Evans 2012). One of the critiques of LCA is that it fails to address more social components of lives; for example, one may go out of their way from point A to point B in order to visit a friend or an important place on the way. The cultural variables are used in hopes of addressing this concern; however, it is important to note that people have their own agency, which may not always align with predictive models and the vast array of cultural unknowns. Individual choices, personal experiences, and social relationships can influence movement in ways that cannot be fully captured by cultural variables alone. As a result, while incorporating hypothesized cultural factors improves the analysis, there is uncertainty in the complexity and unpredictability of human behaviour.

I generated an LCA by using ArcGIS. I wanted to consider a series of ‘costs’ which would influence movement across Cerro San Isidro. These costs were then represented spatially as a friction surface—a raster layer in which each cell holds a value indicating the accumulated costs from the impedance, or friction, of movement. The friction surface I created reflects a continuous plane, incorporating topographical, cultural, and environmental features. To create a comprehensive friction surface for the LCA analyses at Cerro San Isidro, I incorporated five

distinct categories into the model. These categories include slope, facilitators, compelling features, barriers, and absolute barriers, each of which is associated with a specific cost value. It is essential to note that the cost values I assigned to each category are, to some extent, arbitrary and based on my own assumptions about what constitutes a more or less costly feature. For example, when considering the slope of a particular area, I assign a higher cost to steeper inclines, since they are more difficult to traverse than gentler slopes. Similarly, when assessing facilitators, or features that make movement easier, I assign a low cost to areas with movement infrastructure and a higher value to those without. Ultimately, the goal of the friction surface is to create a comprehensive and accurate model that reflects the real-world challenges and opportunities presented by a particular landscape. By incorporating a wide range of physical, cultural, and environmental factors into the model, it is possible to gain a more nuanced and sophisticated understanding of the landscape. The costs I associated with each category range from 1, being the least costly, to 3, being the costliest, and 999, as impossible to move through, all of which are presented in Table 4.5.

The slope represents the steepness of a surface. Slope is created using the DEM, which I gathered from the UAV surveys discussed previously in this chapter. In ArcGIS, I applied the slope geoprocess, which converted the elevation into slopes, measured by degrees. The outputted raster has the value of each pixel representing the slope in degrees. A slope surface, rather than elevation, was used as it better simulates pedestrian movement across the landscape. I then reclassified the slope values, which is a process of changing the values of the raster. I did so to create categories of ideal to less ideal slopes. Based on Shields's (1982) classification of slopes, I reclassified the values of the slope cost surface to reflect walking over more difficult terrain and easier terrain; the goal here is to make walking in steeper areas more costly than in less steep

areas. Based on my experience at Cerro San Isidro, there are many areas which are very difficult, if not dangerous, to walk through. The slope categories and associated values are shown in Table 4.5. I selected these values to encourage movement over areas with less of a slope but really discourage movement over steeply sloped areas.

Table 4.5: Categories and assigned cost values for friction surface modeling.

Terrain Feature	Classification	Cost Value
Slope	Little to none (0-3 degrees)	1
	Gentle (4-9 degrees)	1
	Moderate (10-15 degrees)	2
	Steep (16-30 degrees)	3
	Excessively steep (>31 degrees)	999
Facilitators	Areas with facilitators (e.g., pathways)	1
	Areas without facilitators	3
Compelling Features	Areas with compelling features (e.g., ritual spaces)	1
	Areas without compelling features	3
Barriers	Water features	3
	Non-water areas	1
Absolute Barriers	Structures & cliffs	999
	Rest of the landscape	1

Facilitators are features that encourage movement, such as pathways, staircases, or terraces. I created polygon features over each of these features, which I then converted into a single raster and reclassified. All areas in which the features were not covered, that is, areas that were not facilitators, were assigned 3, but areas which included facilitators were assigned 1. Classifying the pixels in this way made facilitators less costly and non-facilitators more costly. Compelling features are social, cultural, or religious phenomena that may encourage movement in a particular direction. This can include water, ritual spaces, resource areas, etc. I followed the same process as with facilitators, creating polygons over all features I considered compelling,

which includes a ritual space at the top of Cerro San Isidro. I consider compelling features equally as important as facilitators, as such, when I converted the features into a raster and reclassified, I classified all compelling features as 1, and all areas without compelling features as 3.

Barriers are all features which impede movement. At Cerro San Isidro, the only barrier I included was water, specifically the Nepeña River. If the river's depth today is similar to what it was in the past, people likely could have moved through it. But it would be more difficult to move through. I outlined the water with a polygon and converted it to a raster, which I then reclassified. All water features were given a 3, and the remaining area was given a 1. This is to highlight that movement through water would slow, but not completely limit, movement. That said, none of the paths generated in this project actually required crossing the river, so while I assigned a higher cost to this feature, it ultimately did not affect the final movement routes. Lastly, absolute barriers are features which can be moved through. These can be topographical, such as cliffs or ditches, or anthropomorphic features, such as buildings. At Cerro San Isidro, I wanted to highlight that people would move around structures, not through them. As such, all structures, which were documented and outlined in Section 4.2.1, were included. In addition, there is a cliff at the site in the north-eastern portion of the site. I outlined this cliff with a polygon as well. These features were then converted into a single raster and reclassified, with all barrier features being 999 and the rest of the landscape as 1. I made this value significantly higher than others to highlight the ways movement would have been discouraged over these barriers.

Step 3: Friction Surface

I generated the final friction surface by combining the reclassified raster layers (from Step 2) into one single raster file using the Raster Calculator tool. The resulting friction surface provides an estimation of the cost to move across the area under consideration. This is also a cumulative surface; since I added each file together, the values from each individual cell were combined. This cumulative surface accounts for the accumulation of all cost variables I included in this assessment. For instance, say a cell in the raster is classified as steep with a cost value of 3, a non-facilitator with a cost value of 3, and a barrier with a cost value of 999. In this case, the total cost of that cell would be 1005. This cost value is derived from the sum of the costs of each of the three components that make up the cell. The cumulative surface generated from the combination of the separate raster files provides an essential tool in estimating the resistance to movement across the study area.

Step 4: Distance Accumulation

The Least-Cost Analysis (LCA) requires defining a starting point for each pathway. I created point files for all 21 locations involved in this analysis, placing each point at the center of the architectural platforms. For each starting point, I used the Distance Accumulation tool to calculate the cumulative cost of travelling outward from the source point based on the friction surface generated in Step 3. The source location and direction rasters guided movement across the friction surface, enabling the calculation of potential movement costs from the starting point to surrounding areas. This process was repeated for each of the 21 locations, ensuring that every supra-household community's travel pathways to and from the other 20 locations were accounted for.

Step 5: Path Cost

Following the distance accumulation step, I applied the Cost Path tool to determine the least-cost path to a specific destination. Each path required a defined endpoint, as the tool calculates the route that minimizes travel effort based on the friction surface. In total, I generated 160 least-cost paths, representing travel to and from all 20 locations for each supra-household community. For each pathway, I recorded the cumulative cost and distance, capturing the total effort required for travel.

Step 6: Raster to Polyline

I converted the least-cost path produced in step 5 from raster format into a polyline for visualization. This polyline represents the optimal route across the landscape, following the path of least resistance based on the cost surface.

Step 7: Calculate cost/distance

The final results of this method include 160 pathways, each with an associated distance (in meters) and a cumulative cost value, based on the cost factors outlined in Step 2. To assess accessibility and social connectivity, I used a cost/distance ratio to evaluate the ease of travel. By dividing the cumulative cost by the distance for each pathway, I calculated a value that represents the average cost per meter travelled, see Appendix A. These values then allow for a quantitative comparison of travel difficulty and distance for each supra-household community. I do not consider distance alone, as it only accounts for the linear measurement between two points, ignoring critical factors that can significantly affect travel. By incorporating the cumulative cost, which includes variables like slope, barriers, and facilitators, I can better assess the actual effort required to traverse the landscape. Dividing the total cost by the distance travelled generates a value representing the average cost per pixel, which reflects the difficulty of movement over different terrain.

I believe this method provides a useful proxy for estimating movement between locations as it accounts for both the physical distance and the environmental challenges encountered along the way. Similar studies, such as Richards-Rissetto and Landau (2013), use LCA analysis with cost factors but focus on travel time rather than the cost/distance ratio. While travel time can offer a more realistic reflection of human decision-making in movement, it was not feasible to apply it in this analysis, as the output values in this project could not be easily converted into time-based travel through the landscape. Future work would be needed to convert these cost values into time-based metrics. Comparing time-based travel with the cost/distance ratio could yield valuable insights into how different factors influence human decision-making in movement. Such comparisons would help further understand the dynamics of accessibility and connectivity within the landscape.

One limitation of the least-cost analysis (LCA) method is that it assumes homogeneous movement patterns, treating all individuals as having similar physical abilities and preferences, which oversimplifies human decision-making. Similarly, this method operates under the assumption that people will always choose the least-cost route, which is an oversimplification, as individuals may opt for different routes for other reasons, such as aesthetic preferences or personal connections. I agree that it is unlikely that people planned routes based only on energy-reduction principles, but the least-cost analysis provides a useful approximation for understanding general patterns of movement across the landscape. It enables us to examine how terrain, barriers, and facilitators may have influenced travel decisions, even if not all factors are accounted for. By focusing on cumulative cost rather than distance alone, the method offers a more holistic approach to modelling movement, as it considers how different features shape the

ease or difficulty of travel. However, it should be seen as a starting point rather than a definitive reflection of historical travel behaviour.

Another issue lies in the arbitrary cost assignments for the friction surface, where subjective values (e.g., 1 for facilitators, 999 for barriers) could significantly influence the results, making them sensitive to these assumptions. But the cost assignments serve as a practical framework for analyzing movement patterns in the landscape. They enable researchers to quantify and visualize how various terrain features impact travel. While the specific values may not capture every nuance of human behaviour, they provide a consistent basis for comparison across pathways.

4.3 Chapter Synthesis

This chapter has outlined the methodological foundation of my multi-scalar investigation into how shared experiences within the supra-household communities at Cerro San Isidro fostered cooperation and a sense of collective identity. Through this approach, I integrate UAV mapping, GPR survey, pedestrian survey, excavation data, ceramic analysis, and GIS-based modelling to address the four central sets of research questions introduced in Chapter 1.

The spatial organization and urban form of Cerro San Isidro will be examined in Chapter 5 using UAV imagery, GPR scans, and excavation data to evaluate whether the site exhibits characteristics of a low-density urban center, as presented in Section 3.1.2. This reconstruction of the settlement also allows me to assess the physical attributes indicative of supra-household communities (see Section 3.2.1), which I will explore in the following chapter. The excavation data, radiocarbon dating, and ceramic analysis—contextualized through the site map—provide the basis for establishing the chronology of Cerro San Isidro and creating a map reflective of its Early Horizon occupation. This material evidence supports my investigation into activity patterns

and possible social stratification within the supra-household communities, shedding light on the social dynamics that likely shaped how space was experienced (see political landscape approach in Section 3.4). The viewshed analysis enables me to examine how visual experiences influenced the daily lives of the four supra-household communities at Cerro San Isidro and how prominent landscape features may have shaped these experiences. Finally, the movement analysis provides a model for assessing access, social connectivity, and integration (see Section 3.5) within and between each supra-household community. By quantifying these aspects of experience, I can explore how movement shaped social interactions and cohesion.

In sum, Chapter 4 demonstrates how I have selected each methodological approach to address specific components of my research questions. Together, the methods reviewed here provide a cohesive framework for analyzing how spatial arrangements, visual connections, and movement intersect with social experience to produce and maintain cooperation and identity within the supra-household communities of Cerro San Isidro. The following chapters apply the combined methodology, with the theoretical frameworks laid out in Chapter 3, to address each set of my research questions.

5 Mapping the Archaeological Landscape of Cerro San Isidro

In previous chapters (Chapters 1 and 2), I noted the absence of a map of Cerro San Isidro. Previous documentation of the site relied on low-resolution satellite imagery, including historical photos and pedestrian surveying. This provided researchers with vital information on the settlement's shape and size, but offered limited insights into archaeological features, topography, and site organization. A high-resolution map of an archaeological settlement is critical for reconstructing past landscapes, observing patterns of human activities and, in turn, providing insights into the socio-cultural dynamics that shape settlements. In this chapter, I present this new map. I also build on the theoretical and methodological frameworks established in Chapters 3 and 4 to address the first set of research questions concerning the spatial organization and urban form of Cerro San Isidro. I turn to this material to evaluate the spatial layout of the site: In what ways does a map of Cerro San Isidro align with or differ from previous descriptions of the settlement? By providing a birds-eye-view and spatial analysis of the site layout and topography, does the settlement description change from earlier descriptions based on pedestrian surveying of the settlement? Is Cerro San Isidro a natural mound modified through anthropogenic terracing? Is the settlement a ceremonial-residential space with a large open plaza for ceremonial activities? Or do the ground-penetrating radar, UAV, and pedestrian surveys indicate otherwise?

As I established in Chapter 3, I aim to move beyond conventional Western models of urbanism to consider how Andean settlements, like Cerro San Isidro, reflect distinct spatial forms. Drawing on literature on urbanism and low-density urbanism (see Section 3.1.2) and using the map of Cerro San Isidro, I produced in Section 4.2.1., I ask, *which morphological attributes suggest Cerro San Isidro is an early urban settlement?* Researchers have described Cerro San Isidro as a population center (Ikehara, 2015) and an urban settlement (Chicoine and

Navarro Vega, 2021), but the exact characteristics that define it as an urban settlement have not been discussed. This raises questions about what characteristics define an urban settlement in this context. Drawing on Chapman and Gaydarska's (2016) characteristics of low-density urbanism, such as major building projects and the presence of modular planning practices based on kinship, and Makowski's common characteristics of Andean urbanism (see Section 3.1.1), I evaluate whether Cerro San Isidro fits within this framework.

In addition to evaluating the urban nature of Cerro San Isidro, a critical component of my research asks, *What evidence suggests the existence of distinct supra-household communities?* Given that Cerro San Isidro is considered an urban settlement and supra-household communities are often viewed as universal features of urban settlements (Smith 2010a), *what morphological characteristics of the site, such as spatial clustering (Hutson 2016), physical distinctiveness (Smith 2010a), and the co-location of multiple households within a defined area (see discussion in Section 3.2.1), indicate their presence?*

These questions help clarify not only the physical layout of Cerro San Isidro but also its social organization. They allow me to begin evaluating whether the site's spatial structure supported the kinds of social relationships I argue were central to early urban life. As outlined in Chapter 1, the central goal of this project is to understand how cooperation and shared identity were fostered within supra-household communities at Cerro San Isidro. I suggest that shared experiences—mediated through movement, visibility, and spatial interaction—were key mechanisms for building cohesion in early urban settings. This chapter begins to test that argument by examining whether the built environment at Cerro San Isidro was organized in ways that enabled those shared experiences.

5.1 Morphological Analysis of Cerro San Isidro

To begin evaluating whether Cerro San Isidro functioned as an urban settlement—and whether it exhibits physical indicators of supra-household communities—it is necessary to examine the site’s physical form, including its topography, structural layout, and the overall organization of its built environment. Here, I present a morphological assessment of the site, drawing on the map created in Section 4.2.1, which integrates data from GPR surveys, excavation units, and UAV imagery. Unlike earlier descriptions of Cerro San Isidro, which were based on pedestrian surveys and low-resolution imagery, the integration of data from remote sensing, excavation, and pedestrian surveys offers a more detailed view of how space was modified and used. In particular, I focus on identifying areas of anthropogenic modification to infer where people were likely living, and to highlight physical characteristics—such as residential clustering—that can help assess the presence of supra-household communities. Since one of the criteria I use to define supra-household communities is the presence of multiple households within a shared and bounded space, I also include population estimates across the settlement as part of this assessment.

As I noted in Section 4.2.1, once the GPR, excavation, and UAV imagery were combined, architectural features only appeared on flat areas and not the steep slopes. As such, to identify areas of potential anthropogenic activities, it is crucial to identify the regions that are flat or have a minimal slope. In ArcGIS, I applied a slope geoprocessing tool to the UAV elevation information to identify minimally sloped areas to infer areas in which architecture appears to cluster. The slope tool identifies the slope gradient in degrees from each cell within the image. This can be seen in Figure 5.1. and 5.2. The slope is classified into colour-coded groups through a classification scheme called natural breaks (Jenks), which breaks groups into classes of similar

values and where there are natural boundaries (or breaks) in data values. This method is useful as it creates meaningful groups of data and highlights differences between data values.

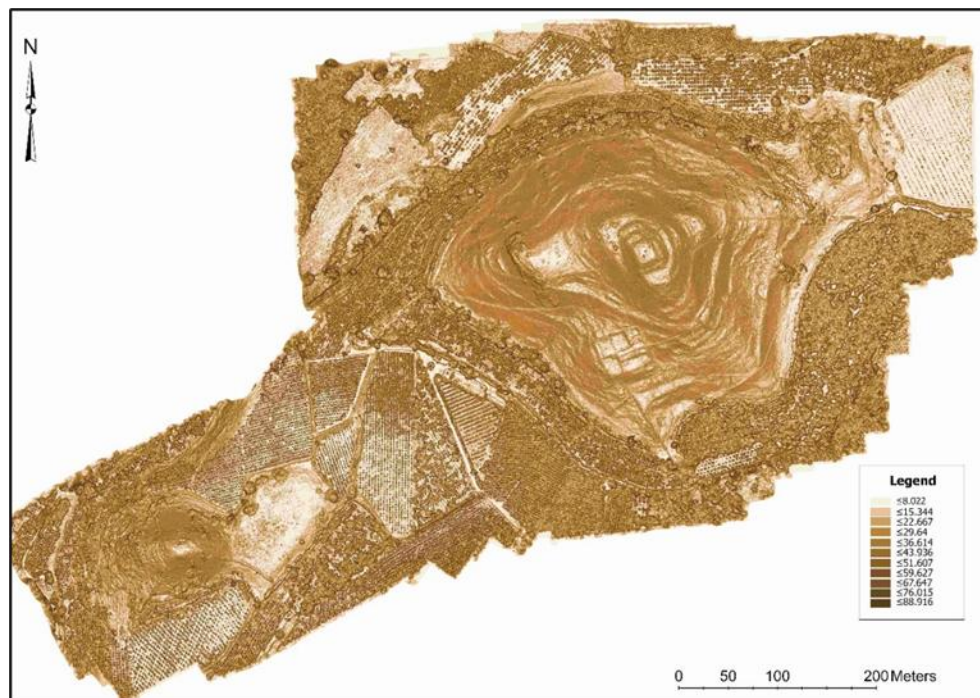


Figure 5.2: Slope gradient across Cerro San Isidro.

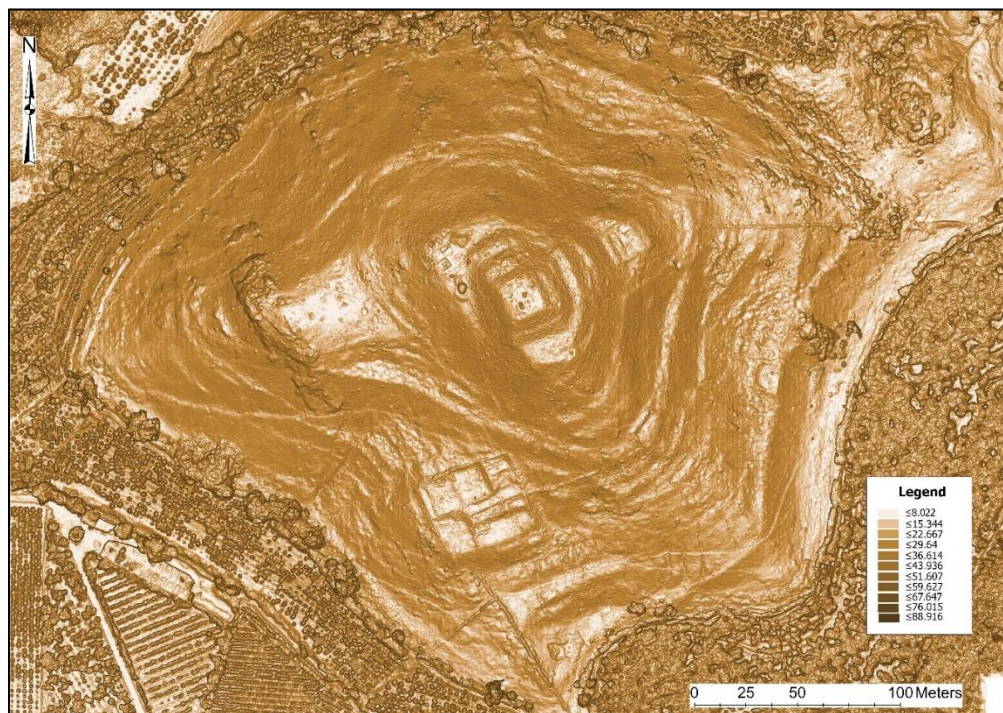


Figure 5.1: Slope across Cerro San Isidro, Zoomed in to core.

To better identify areas of anthropogenic activity, I divided the slope gradient into two categories: 15 degrees or less, and 15.001 degrees or more (Figure 5.3). I chose 15 degrees as it is a moderate slope that is still usable, and most terraces and flat areas in the settlement are less than 15 degrees. Additionally, the natural breaks (Jenks) classification indicates a natural break around 15 degrees. This allowed me to capture the different flat-lying areas and make inferences about areas of human activity. Figure 5.4 includes polygon features which outline the flat-lying areas identified in Figure 5.3. However, there are multiple different types of flat laying areas, which include bulldozed areas, architectural platforms, terraces, and pathways; these are specified in Figure 5.5. Based on pedestrian surveying of the site, I designated areas along the lower portion of the settlement that contemporary individuals levelled as “Bulldozed areas”. Terraces are flat-lying areas that generally follow the curvature of the mound and, in many cases, have retaining walls along the perimeter. I defined pathways as all narrow trails which did not follow the curvature of the settlement and did not have retaining walls, which would make them terraces. Many of these pathways are used by contemporary community members as ways to cut through and around the settlement and the archaeological team on this project to access different areas of the settlement. As such, they may be contemporary modifications to the settlement, which must be considered if using them to discuss movement pathways. Lastly, I defined areas as architectural platforms with surface or near-surface features identified through UAV, excavation, test pits, or GPR surveys. However, not all terraces were surveyed; some spaces currently labelled as terraces might be architectural platforms (although their narrowness suggests otherwise).

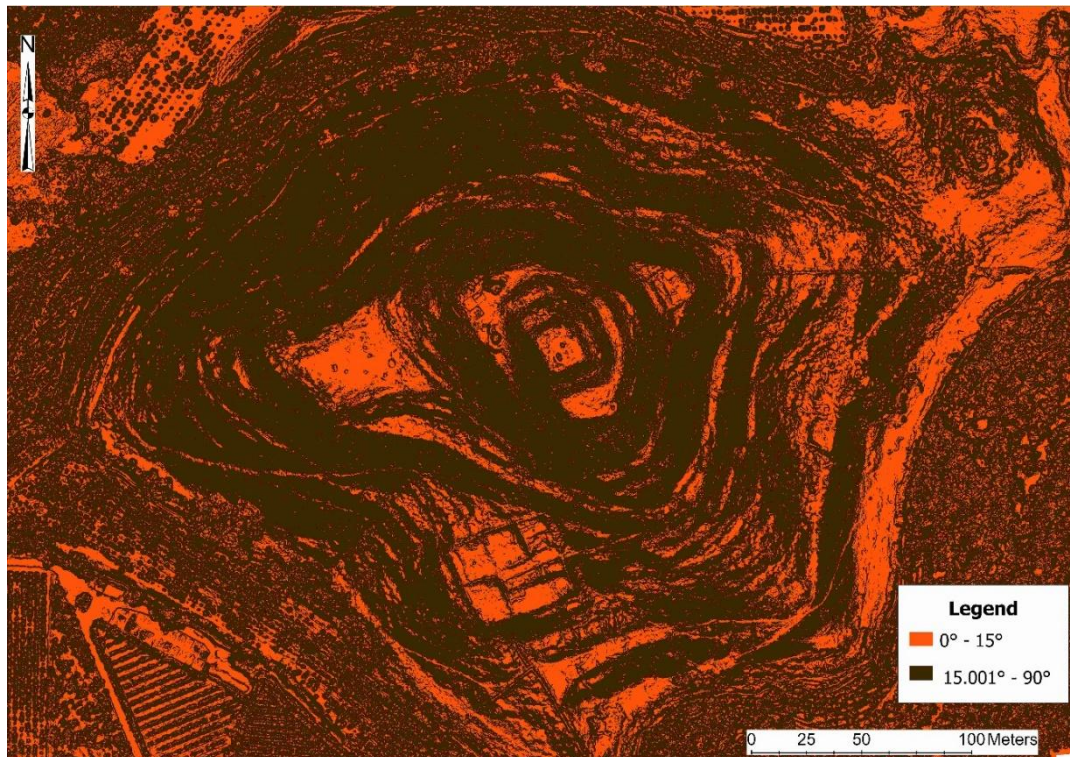


Figure 5.3: Slope of Cerro San Isidro, Reclassified by little and high slope.



Figure 5.4: Polygons outlining areas with slope gradients ranging from 0 to 15 degrees.

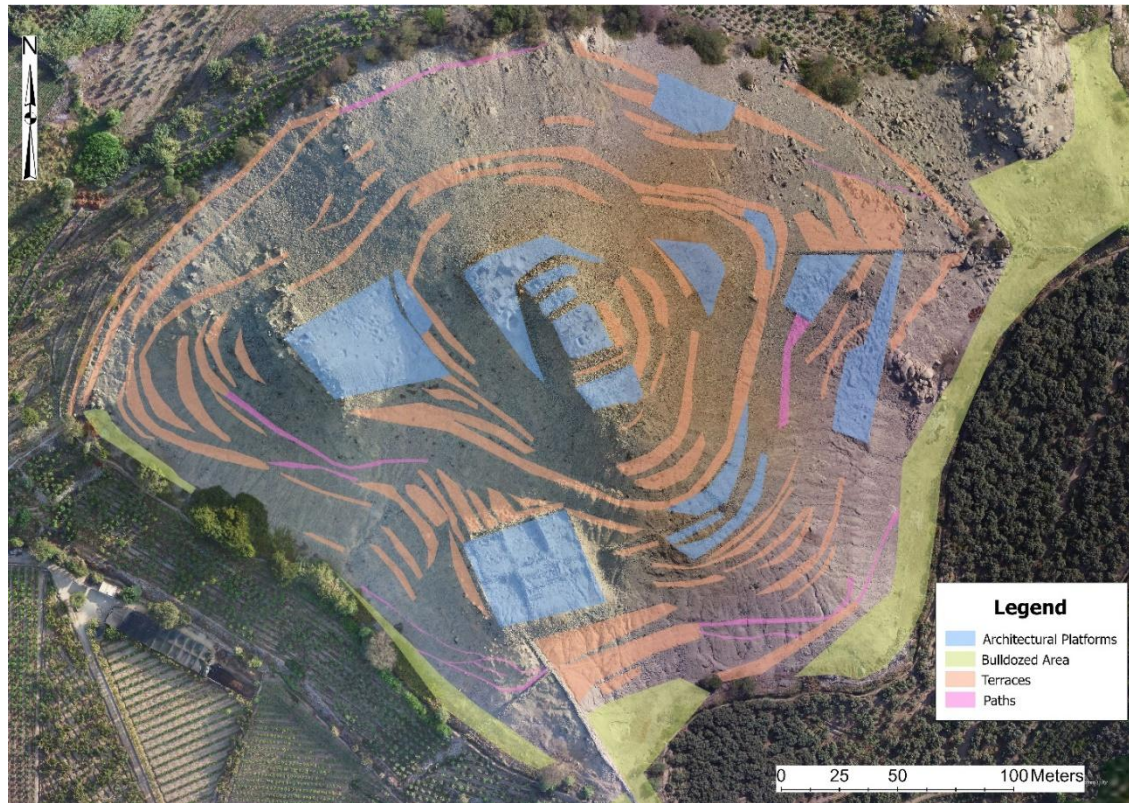


Figure 5.5: Low slope areas (0–15°) classified by type, including architectural platforms, bulldozed areas, terraces and pathways.

Some of these terraces created and maintained the shape of the settlement, while others are much longer and connect to different parts of the settlement. There is one long terrace which covers the circumference of Cerro San Isidro (Figure 5.6). This terrace, which the PIACSI team colloquially refers to as La Banda because of its elongated shape, runs across the middle of the settlement and connects the discrete areas. The team had a hypothesis that La Banda might have been an ancient foot pathway or “street” used by the inhabitants to move around the settlement. In 2022, I conducted eleven GPR surveys across different segments of La Banda (East, South, and Western sides) to determine if this hypothesis was accurate, in which case I did not find any linear anomalies cutting across the width of La Banda. Instead, I found multiple linear anomalies running parallel to it and along its perimeter. La Banda is interrupted at one point by a series of structures visible from the UAV survey. I categorized that segment as an architectural platform

(See Figure 5.6, Areas A). However, this area is much wider than the other portions of the terrace, and only the front portion of this platform has structures. As such, the back portion could be part of La Banda and not an architectural platform. Other than this interruption, the rest of La Banda has no features. Ground truthing needs to be done to confirm if these linear anomalies are walls. But if we assume that these were walls, they would most likely be the retaining walls of La Banda, which would give the terrace its shape. As such, the data support the early hypothesis that La Banda is a roadway, most likely used to travel around the settlement.



Figure 5.6: La Banda, as outlined in red, highlighting single area where La Banda is interrupted.

The identification and classification of the flat lying areas at Cerro San Isidro provides a basis for understanding how space was organized across Cerro San Isidro. As such, I characterize the site's morphology as a series of anthropogenic terraces, roadways, and architectural platforms. The architectural platforms are individual residential zones separated by steep slopes.

Although some platforms are in closer proximity to others, physical barriers distinguish the architecture within each platform. While there are 16 architectural platforms here, this study focuses on four of these platforms, as these regions have also been excavated by the PIACSI team, which allows me to compare both physical and spatial data. These four platforms include the Southwestern Platform, Northern Platform, Eastern Platform, and Upper Platform, as identified in Figure 5.7. Also, note that other platforms discussed throughout this study are named for easy reference. But, for the analysis of Cerro San Isidro's morphological characteristics, I will examine the layout and organization of all 16 of the platforms.

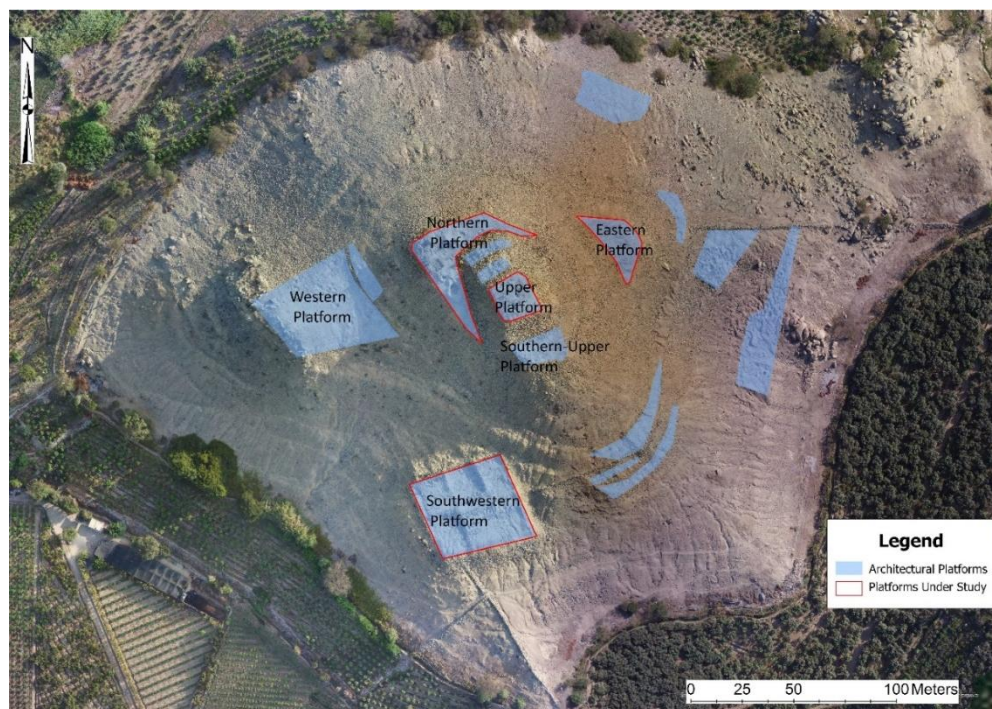


Figure 5.7: Map with primary architectural platforms labelled.

My morphological interpretation of Cerro San Isidro can now be compared to earlier descriptions of Cerro San Isidro, as reviewed in Section 2.3.1, which describe the settlement as a natural mound with terraces, architectural compounds, and a large plaza (Chicoine and Navarro 2021). When comparing the flat areas with the walls I identified from the UAV surveys (Figure 5.8), there is a series of retaining walls used to create the shape of the terraces and architectural

platforms. The retaining walls appear to be intentional constructions to maintain a specific shape. Excavation data also highlights raised bedrock under archaeological material, suggesting this is a natural mound of granite bedrock. The presence of anthropogenic terracing above natural bedrock supports early descriptions of Cerro San Isidro as a natural mound which was anthropogenically modified through terracing.



Figure 5.8: Comparison of UAV walls and flat areas.

Scholars (Chicoine and Navarro 2021) have also described Cerro San Isidro as containing a large plaza, which they identified as a key feature of the settlement layout. Such spaces in the Andean past were used for viewing and participating in public ceremonies (Ikehara 2015; Proulx 1973b). My GPR surveys of the settlement identified multiple terraces and architectural platforms, including the Western Platform, which was originally described as a plaza (Chicoine and Navarro Vega 2021; Ikehara 2015; Proulx 1973b). The GPR survey identified numerous linear anomalies between 5-30cm in depth (Figure 5.9A). While many of these anomalies follow the direction of the bedrock (NW-SE), others run adjacent to the bedrock. These anomalies are

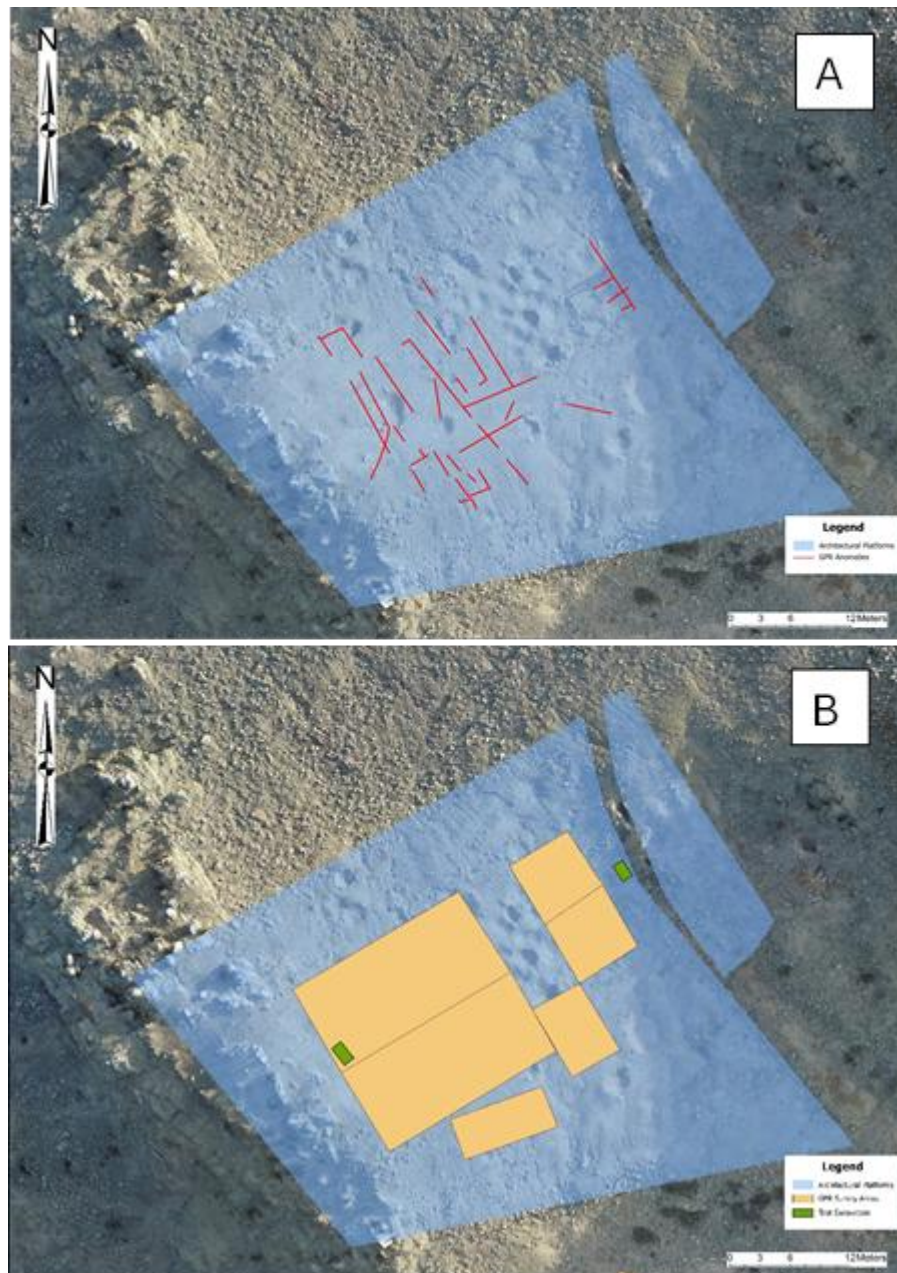


Figure 5.9: Comparison of GPR and excavation on the Western Platform: (A) GPR results from the Western Platform. (B) GPR survey areas with the locations of test pits.

thus likely not bedrock, but instead walls. In 2019, the PIACSI team excavated a test pit on this platform (Figure 5.9B); this test pit was void of architectural features, which led to this early hypothesis of a plaza. However, the GPR survey similarly did not document features in this area, but did in other areas. This test excavation noted no elements or artifacts in the first 15cm of soil

(stratum 1), but found the remains of ceramics, charcoal, and coprolites in stratum 2 (15 cm-30 cm). Lastly, the final stratum (30-39cm) prior to sterile soil yielded ceramics, textiles, malacological, and animal remains. The ceramic style led the team to hypothesize these were from the Early Horizon occupation (Chicoine and Navarro 2021). The layers of occupational materials correlate with the depth of walls identified in the GPR surveys, suggesting the walls found in the GPR survey were also likely associated with the EH. It should also be noted (see Section 4.2.2.3) that the GPR results were not available after 30cm due to increased noise in the data; as such, the feature could carry below this depth. Additionally, the test excavation from 0-39 cm in depth did not encounter bedrock, which would rule out bedrock as the cause of the linear anomalies in the GPR surveys from 5-30 cm in depth.

In sum, the direction and depth of the linear anomalies suggest they are walls not bedrock. Although the test pit did not locate any architectural features, it was in an area where the GPR (conducted later) also did not reveal any buried features. Additionally, the potential walls were placed at the same depth as Early Horizon materials. As such, I hypothesize that the Western Platform was not a plaza, but instead an architectural platform which was occupied during the Early Horizon. Further investigation is necessary to confirm this hypothesis, but the current evidence supports this theory. It is worth noting that, given the limited number of surface walls, there is a possibility that this space was used as a plaza during later stages of the settlement. This would alter the function of this space and the overall population estimates for other periods of occupation at Cerro San Isidro, as it would exclude this space from the residential calculations.

Early research has also focused on Puente Piedra and Cerro San Isidro as the sole architectural components of this archaeological complex. In general, the exact extent of Cerro

San Isidro was unknown due to agricultural encroachment. I conducted GPR surveys in the agricultural field surrounding Cerro San Isidro (Figure 5.10) to assess the extent of the settlement. With the landowner's permission, I conducted surveys along narrow transects between the agriculture and water canals. These fields have clear evidence of land levelling, or ploughing, by contemporary farmers. In some areas, the agricultural field is 1-2 meters deeper than the water canals and local roads, suggesting they were ploughed a great deal. Upper layers of occupation, if present, were removed. These survey results indicate multiple linear anomalies which cross-cut the survey transects and run adjacent to the canals (Figure 5.11). These anomalies are located at 30-40cm in depth in Survey Area 1 and 0-10cm in Survey Area 3. No anomalies were located in survey Area 2. Survey area 3 had the greatest amount of ploughing, which could be why the anomalies appear closer to the surface.



Figure 5.10: GPR Surveys in agricultural fields to the Southwest of Cerro San Isidro.

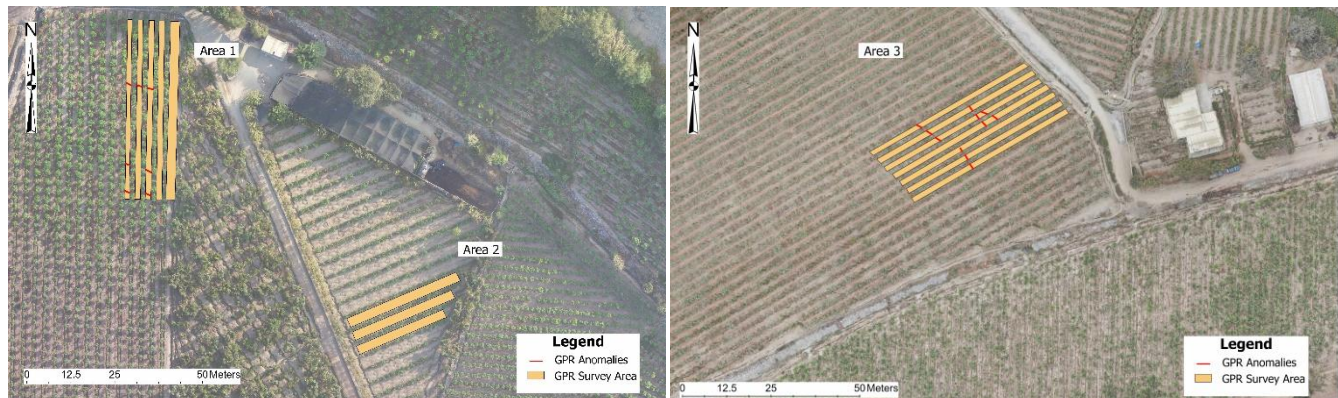


Figure 5.11: GPR surveys results in agricultural fields to the Southwest of Cerro San Isidro.

Ground truthing to confirm these results was not possible, as the local landowners wished to be as non-invasive as possible to protect their crops. However, the fact that these anomalies cross-cut survey grids on either side of contemporary water canals and run opposite to the canals suggests they are anthropogenic anomalies and potentially walls. This suggests that there were people living in the fields surrounding the mounds of Cerro San Isidro and Puente Piedra, which would significantly extend the size of the settlement. Since we do not have excavation or radiocarbon materials from this area, we are unable to determine the time of occupation. It has been argued that the settlement population during the Early Horizon Period (EH) was the largest (Ikehara 2015). Therefore, it is logical to assume that the land surrounding the settlement was also inhabited during this time. However, without excavation data, this can only be hypothesized.

To further assess the boundaries of the settlement, project director David Chicoine conducted pedestrian surveys in the region surrounding Cerro San Isidro, as was described in Section 4.3. These survey areas were limited to fields in which local landowners gave permission to be surveyed. While conducting these surveys, Chicoine took coordinates of all ceramic scatters and modern channels (Figure 5.12). The surveys covered from the local Nepeña River to an offshoot of the Loco River. Between these rivers, he documented an abundance of ceramic remains. Based on the location of water channels, it is unlikely that geomorphological processes

would cause this widespread distribution of ceramic materials. This, in combination with the presence of potential walls in the fields, leads us to believe that Cerro San Isidro's occupation extends beyond the mound, upward to both the local rivers. Even if we were to assume the settlement extent was limited to the areas where Chicoine located ceramics (Figure 5.13), it would cover 49.2ha, which is approximately 5X the size of the Cerro San Isidro itself (~10ha). Future ground truthing and more surveying is needed to verify this extent, but at this point, we can conclude that the boundaries of Cerro San Isidro extend beyond the raised mound and into the surrounding fields.

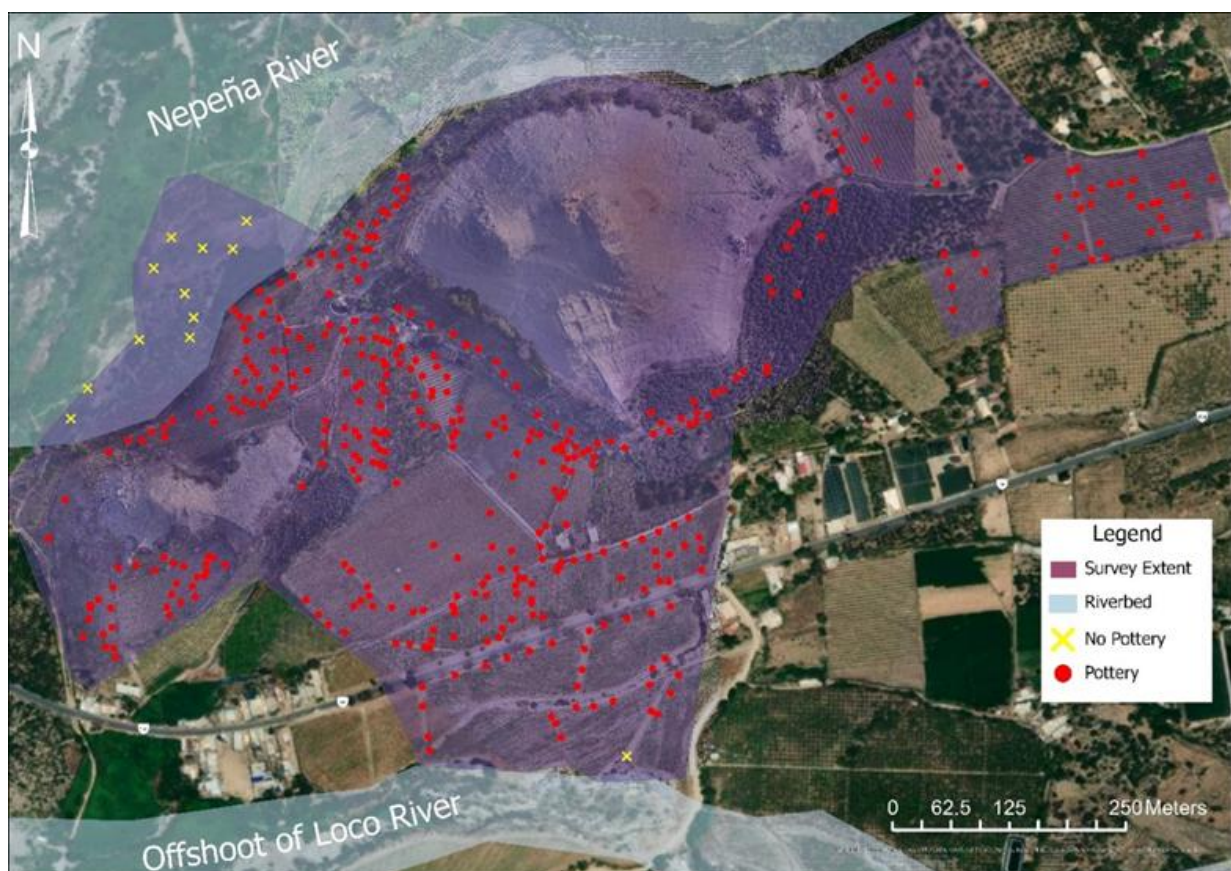


Figure 5.12: Pedestrian survey results of pottery extent.



Figure 5.13: Potential extent of Cerro San Isidro based on pottery distribution.

Taken together, considering the settlement's occupation of the surrounding fields and the absence of a large plaza within the primary mound itself, it is possible that a plaza—an element commonly found in Andean settlements—may have been present in the low-lying area that is now fields. Adjacent to Puente Piedra, in the area between it and Cerro San Isidro, there is a flat terrace where an intrusive, later-period cemetery is located (Figure 5.14). Given the regional trend in the Andes where civic spaces, such as plazas, were reused for mortuary activity in later periods (see Bradley and Williams 1998; Kaulicke 2015), the flat terrace between Puente Piedra and Cerro San Isidro possibly functioned as a public plaza during early occupations. But further research is needed to investigate this hypothesis. A useful comparison can be made with Cerro Blanco (1100–450 cal. BC), located approximately 18 km down valley from Cerro San Isidro (Helmer, et al. 2018). Cerro Blanco, with an approximately 300-year overlap in occupation with

Cerro San Isidro (760 cal. BCE–1453 cal. CE), was a mound-and-plaza complex composed of three platform mounds that opened toward the upper valley and framed a substantial open-air plaza situated between the mounds on the flat-lying fields (Helmer et al. 2018). This layout provides a precedent—given the overlapping occupation and shared valley setting—for the possible presence of an off-mound plaza at Cerro San Isidro.

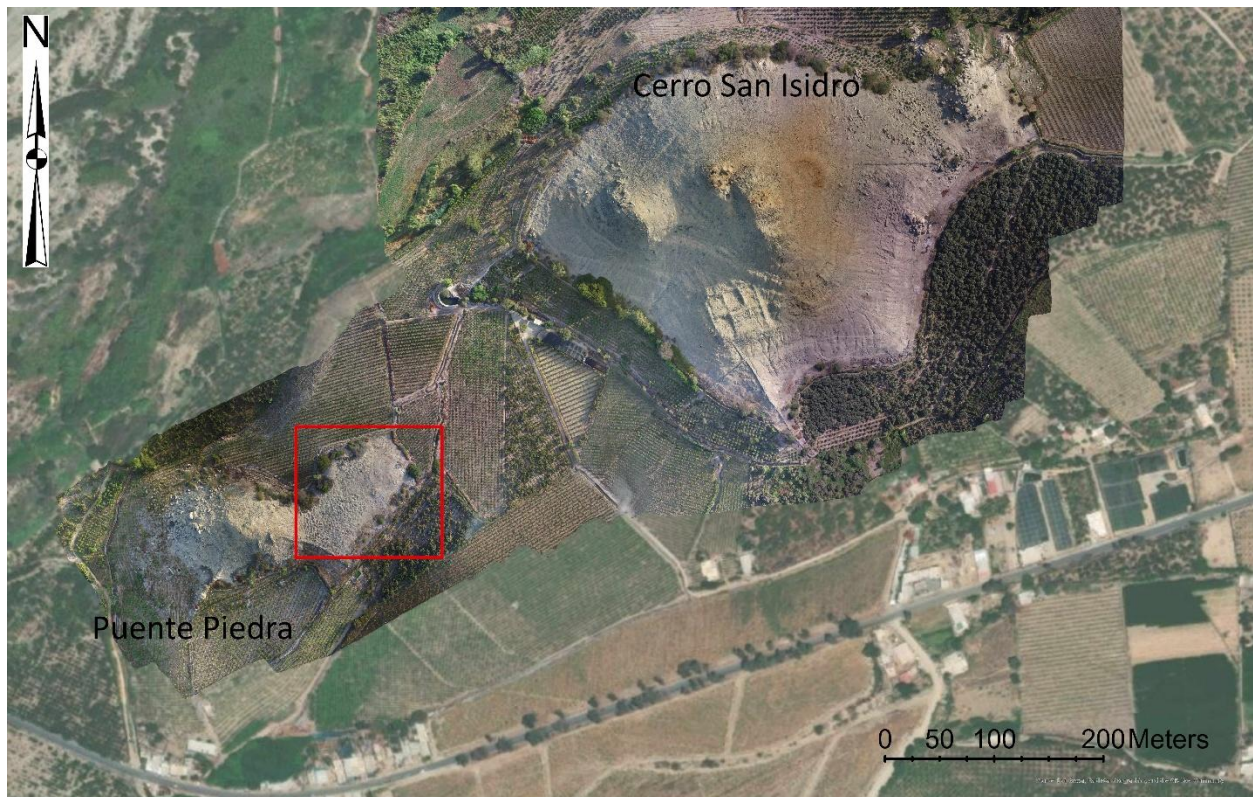


Figure 5.14: Red square indicates a flat terrace located between Cerro San Isidro and Puente Piedra, where a later-period intrusive cemetery was established.

5.1.1 Population Estimates

In Section 3.2.1, I argue that one of the key indicators of supra-household communities is the presence of multiple households within a given area. Since I define these communities as those that encompass more than one household, identifying their presence at Cerro San Isidro requires estimating the population associated with the architectural platforms. As the preceding

analysis shows, only certain portions of the site were occupied; now that these areas have been identified, population estimates can be more accurately calculated.

Researchers have used numerous methods to assess the population, ranging from the total area occupied to the distribution of ceramic scatter. A common estimate method used in urban settings is a room-to-people ratio (Haviland 1972; Longacre 1975; Webster and Freter 1990). The room-to-people ratio involves counting the number of rooms and using a ratio based on how many people could occupy that many rooms. This method is advantageous because it does not include public spaces in the population count, which would increase population counts for shared spaces. However, it has been criticized when the research program fails to take into account the contemporaneity of the structures and is often an oversimplification of ethnographic evidence (Paine 2005).

Another approach focuses on the surface area of roofed space, as there is a correlation between roof area and inhabited space (Hassan 1981). However, the roofed space method similarly suffers from contemporaneity issues. Pottery scatters and the density of other artifacts have been used to estimate the size of populations, based on the assumption that pottery needs to be replaced within a certain time and space. Density of pottery can then be associated with the number of people who would use that pottery (Drennan et al. 2011). But the pottery density method assumes pots break at a consistent time and in a constant manner. Similarly, it requires an assumption on the direct, quantifiable relationship between the quantity of refuse and the size of the population (Santley 1990). Another common method, which is useful when assessing large areas without architectural data, is calculating population based on the area of space needed to sustain a person (Berrey et al. 2015). This area-based population method is beneficial for studying large areas with no identifiable structures; however, it does not take into account non-

residential space or contemporaneity of space. In sum, assumptions are always made when estimating population, but the choice of type needs to be made based on the data available and the goals of the estimate.

The available data only allows for certain types of estimates. For example, we do not have information on the number of rooms at Cerro San Isidro; therefore, we cannot do population estimates based on room counts. Currently, the only population estimates for Cerro San Isidro are from Hugo Ikehara (2015) (see Section 2.3), who calculated the population density of the Moro Pocket from 800 B.C. to the 16th century based on the densities of pottery scatters. Ikehara (2015, 97-99) notes from 800-450 B.C. Cerro San Isidro was the population center of the district, with approximately 1358 people in the district and 391 people at Cerro San Isidro. Between 400-150 B.C., there was a significant increase in the population of settlements in the area, including Cerro San Isidro. This led to the emergence of new settlements and the formation of multiple districts, which Ikehara (2015, 87) argues are supra-local communities (*refer to the Ikehara 2015, Figure 3-2*). As a result, Cerro San Isidro lost its status as the primary settlement in the area but remained an important population center for its district. The district of which Cerro San Isidro was a part of became smaller than before, but still had its population boom to 1214 people.

While these estimates provide a good understanding of the changing landscape of the Moro Pocket, I require a more specific, fine-grained analysis of populations at Cerro San Isidro. As such, I explored several ways to assess the population of the settlement based on the data available. Firstly, If we were to follow the ratio of 50 people per hectare (see Feinman and Nicholas 2012, 135-136), then the potential extent of Cerro San Isidro at 49 Ha, as noted previously, could sustain a population of 2,450 people, which is greater than the estimates given

by Ikehara (2015). Similarly, the Cerro San Isidro mound could house 500 people following this method. This is close to Hugo Ikehara's (2015) population value of 391 people at Cerro San Isidro from 800-450 B.C. However, applying a population estimate based on total area does not address non-residential space or contemporaneous occupation. For example, assessing the population across the mound as a whole does not take into account that of the 10ha of land, architectural platforms only count for 9.27% of the land.

Assessing the population based on the understanding that a person requires 4m^2 to 6m^2 has been a cross-culturally recognized practice (Brown 1987; Casselberry 1974; Kolb, et al. 1985; LeBlanc 1971; Naroll 1962; Peterson 2006). However, when applying this to large areas without an understanding of the architectural space, it does not consider non-residential space, such as public spaces, or even structures, such as walls. Generally, this ratio is used in relation to the amount of roofed or floored areas across a settlement (Brown 1974; Casselberry 1974; LeBlanc 1971; Naroll 1962). However, we do not have this information for all of Cerro San Isidro – It would require a large-scale excavation. But, in 2019 and 2022, the PIACSI team excavated a total of 530m^2 , and in those areas, the ratio of floor to walls can be determined. Here, I propose that by calculating the average ratio of walls to floors in the excavated areas, we can project to the rest of the occupied space and then apply the ratio of 4m^2 to 6m^2 per person. For example, if one 25m^2 excavation unit contained 5.1m^2 of walls, then it would comprise 20.4% walls and 79.6% floor. Therefore, there would only be 19.9m^2 of floor space, and based on the ratio of 4m^2 to 6m^2 per person, the population would be ~3-5 people. To ensure an accurate estimate, I calculated the average ratio of floor to wall from all excavated areas. The result was 75.08% floor to 24.92% walls (see Appendix B). By applying this ratio to the total area of the architectural platforms (9027m^2), we can estimate the total floor space to be 6777.47m^2 . Using

the ratio of 4m^2 to 6m^2 per person, this gives us a final population estimate of 1694.4 to 1129.6 people, respectively.

But I should note some assumptions being made using this floor-to-people population method. One is that the ratio will remain consistent across the settlement. Yet the floor space in one area may be greater than the space in another, as was seen during this assessment when calculating the floor-to-wall ratio in each excavated area (see Appendix B). However, I hope that averaging these ranges produces a more encompassing and accurate ratio over space. Similarly, another difficulty with population estimates of space is that they do not always consider non-residential spaces. When public spaces are counted as part of the total area, the population counts become inflated; this is because these estimates are based on assumptions about how much living space an individual needs. As I noted previously, I suggest that during the EH, Cerro San Isidro did not have any public spaces within the core of the settlement. Therefore, calculating the population from architectural platforms that only consider residential space provides a more accurate representation of the entire population.

Another assumption with the floor-to-people population method is that it does not account for differential occupation; some of the excavated walls belonged to different periods, so the floor-to-wall ratio would change over time. A way to address this temporal problem would be to associate the different walls of excavated areas with different time periods and work from those ratios. Determining the age of walls at Cerro San Isidro is difficult since wall materials from the EH (~800-200 BCE) occupation were reused in later LIP (~1000-1500 CE) structures. In other words, the ratio of wall to floor may have changed over time, and some walls may not accurately reflect the given population of the EH occupation. The population estimates thus only approximate the population during the EH.

Additionally, as I discuss further in Chapter 6, radiocarbon dates and excavation materials suggest the architectural platforms were likely uniformly occupied during the EH, but that during later occupations, not all platforms were occupied. This means that the population estimate is inaccurate for later periods. To create a population estimate for the other periods of occupation, based on my projection of the floor-to-wall ratio, we would need to identify the architectural platforms occupied during the LIP.

5.1.2 Settlement Organization

The analysis of Cerro San Isidro's spatial features indicates that during the EH occupation, the settlement was made up of a series of terraces and architectural platforms constructed on a natural mound, as described in early records (Ikehara 2015). The settlement's early inhabitants transformed it into its current shape by constructing walls and terraces, giving it shape and structure. My analysis, however, diverges from early records in a few ways. Cerro San Isidro was most likely a residential settlement with no large public spaces, such as a plaza within the core of the settlement. The settlement extends well into the fields beyond the natural mounds, making Cerro San Isidro much larger than originally thought. Finally, my population estimates of the architectural plazas, which I hypothesize, as explored further in Chapter 6, were all occupied during the EH period, the population was perhaps greater than previously anticipated.

This mapping highlights the importance of multimodal assessments of ancient urban settlements. By incorporating multiple lines of data, we can change our understanding of ancient settlements. For example, by examining the topography of the area, I was able to determine how the settlement was organized and occupied. Similarly, by examining GPR data in combination with test excavation data, I was able to infer the use of particular areas of the settlement. When studying urban settlements, it is often difficult to study them in their entirety, especially when the

majority of the structures are buried. As such, a multimodal methodology to studying early urban settlements can provide new insights into the archaeological landscape.

5.2 Landscape and Environmental Insights

Cerro San Isidro is bordered by the Nepeña River, which would have provided a valuable water source to the settlement residents. Similarly, toward the south is an offshoot of the Loco River, which would provide greater water accessibility (Figure 5.15). Within the settlement, there are two large granite rock outcrops, which would have provided granite rock materials used to create structures and stone tools (Figure 5.13). Toward the north, along the valley edge, there is an ancient road system documented by Proulx (1973A, 85), which I digitized and added to GIS based on major landscape markers. The exact age of this ancient roadway is unknown; however, if present during the EH, it would have provided a vital roadway for the inhabitants.

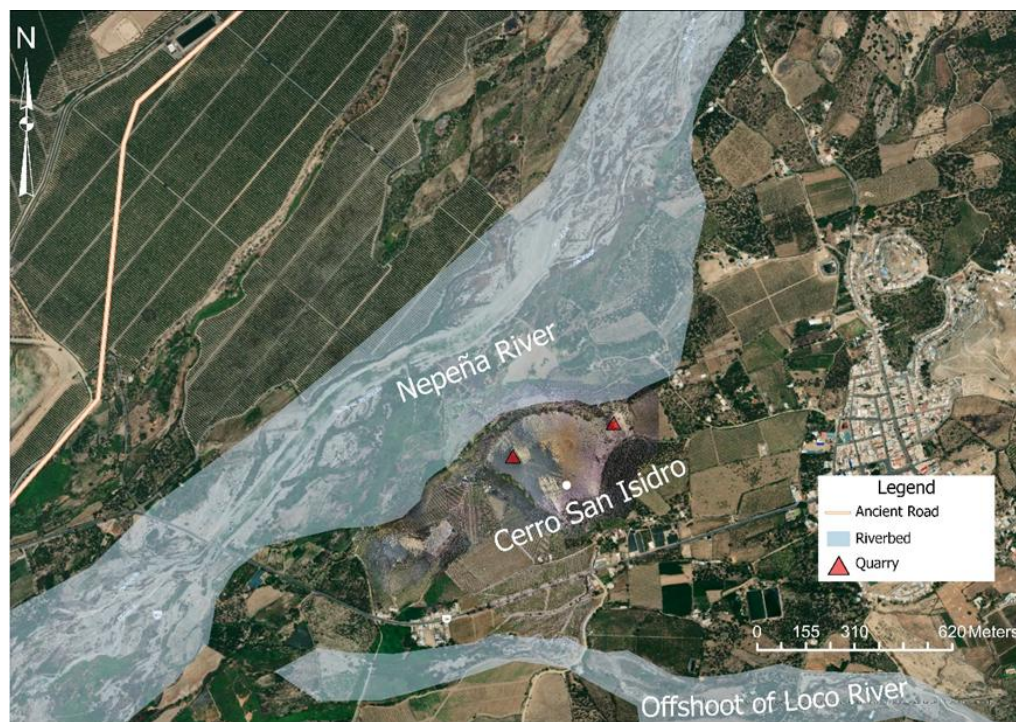


Figure 5.15: Anthropogenic environmental features around Cerro San Isidro.

As highlighted in Chapter 2, there are numerous EH settlements, ranging from forts to ceremonial centres, in the Nepeña Valley. Many of these settlements are located at a close distance to Cerro San Isidro, within the Morro pocket (see Figure 2.3).

5.3 Cerro San Isidro as an Early Urban Settlement

In Chapter 3, I noted that Andean urbanism differs from the kinds of urbanism seen in ancient Mesopotamia, Middle Eastern Cities, and current Western ideals of urbanism. Over the last two decades, Andean scholars have shown the distinct forms of urbanism in the region. One common form is low-density urbanism, whereby the population is dispersed across the landscape, and generally, there is a greater amount of open space than there is compacted occupied space (Angel et al. 2012). Such open space can represent agricultural land, unoccupied urban space, forests, or natural landscape changes (Hawken and Fletcher 2021). Density is often used as a classic measure for urban form; however, this has inhibited the analysis of low-density urbanism. High demographic density has proven to be an insufficient proxy for urban settlements as there is no consistent measure for how dense an urban settlement should be.

This broader perspective on urbanism aligns with recent scholarship that highlights how Andean settlements challenge traditional Western urban models, including Makowski (2023), who recently assessed common characteristics of urban settlements within the Andes. Of these characteristics, Makowski (2023, 177) describes many north-coast Andean populations that lived in dispersed settlements located at a visual distance from each other, as is the case within Ikehara's (2016) supra-local communities in the Moro Pocket. Similarly, Makowski describes instances where Andean settlements are considered urban when they have the function of ceremonial centers. As described in Section 2.3.1, Cerro San Isidro is described as a civic-ceremonial center, which is supported through the presence of a Huanca Stone and associated

offerings on the Upper Architectural Platform, supporting Makowski's approach. In addition, Makowski (2023) suggests that public ceremonial architecture can also appear dispersed across rural landscapes in relation to important sacred geography. While Cerro San Isidro has a ceremonial component, as I suggest above, there was likely no large public ceremonial architecture, particularly plazas for viewing ceremonies, within the mound of Cerro San Isidro. Again, this could be present in the surrounding fields, but as of now, this is not present here. However, there were numerous EH megalithic ceremonial sites within visual distance of Cerro San Isidro, possibly serving as gathering places for larger communal rituals. However, rather than a strict separation between ceremonial and residential functions, it is possible that ritual activities occurred within the settlement itself, woven into the fabric of daily life.

The common urban characteristics of north-coast Andean settlements described by Makowski (2023) indicate that Cerro San Isidro can be considered urban within an Andean framework. Given the dispersion of the settlement and the past research (Ikehera 2015) that points to the interconnected nature of the settlement in Moro Pocket, I argue that Cerro San Isidro is better understood as part of a low-density urban system. Across the Moro Pocket during the EH, there were dozens of coeval settlements within walking distance of each other, such as Huancarpon, Paredones, Kushipampa, and others, as shown in Figure 2.3. In addition to these settlements, there were numerous unnamed smaller residential settlements.

Within the network of coeval settlements, Ikehara (2015) identifies multiple supra-local communities, or districts, in this region based on surface artifact density. He contends that each supra-local community comprised of a series of hamlets dispersed low-lying terrain of the Moro Pocket and connected with one or more Hilltop ceremonial centers, where interaction among supra-local community members was more frequent than with people living outside of them

(Ikehara 2015). Due to increased warfare during the EH and the presence of thirty-six residential and non-residential fortified structures within the Moro Pocket, Ikehara (2015, 2022) argues that all settlements formed a defensive coalition within the pocket, while maintaining autonomy at the supra-local level. The supra-local communities were linked to the fortified ceremonial centers, probably elite residences, and likely coordinated in defence, governance and ceremonial life within each supra-local community.

The boundaries and focal points of these supra-local communities changed over time, but Cerro San Isidro consistently remained a focal ceremonial center for its supra-local community. From 800-450 B.C., Cerro San Isidro was the major population center of a large district, which totalled 1358 (Ikehara 2015, 97). By 400-150 B.C., there was a sevenfold increase in population to nearly 10,000 people and a reorganization in supra-local communities (Ikehara 2015, 97). During this later period, Cerro San Isidro remained a central population center for its supra-local community, which decreased in size, but lost its status as the primary center in the Moro Pocket, with Kushipampa becoming the primary center in terms of population (see figures 4.5-4.7 in Ikehara 2015). I contend that Ikehara's supra-local communities exemplify low-density urbanism, characterized by an interconnected series of settlements dispersed across the landscape. My interpretation is supported by Ikehara's analysis of settlement patterns in the Moro Pocket, where he shows a series of focal hilltop ceremonial centers linked to the surrounding by smaller hamlets. This combination of spatially dispersed residential clusters, integrated ceremonial and spatial organization, with multi-scale coordination across the landscape, demonstrates defining features of low-density urbanism.

While the evidence from across the Moro Pocket reveals an interconnected system, I focus here on Cerro San Isidro. To further examine the low-density nature and Cerro San Isidro's'

role in this system, it is useful to consider a comparative framework of low-density urban features. Fletcher (2009) characterizes low-density urbanism as sites in opposition to the compact, high-density settlements more typically considered urban in Childean form. Through these low-density urban settlements, urban centers moved outward into rural areas, producing a patchwork of residential houses and argo-pastrol areas (Chapman and Gaydarska 2017). Chapman and Gaydarksa (2017), who consider global perspectives of low-density urbanism, highlight a few characteristics that they argue are common amongst examples of low-density urbanism. The first example is the importance of major building projects (Chapman and Gaydarksa 2017, 290). Cerro San Isidro would have required labour mobilization for the construction of the mound; the anthropogenic terracing which produces the shape of Cerro San Isidro would have required labour in the construction and maintenance of the settlement. As reviewed in Chapter 2, based on a ratio of total construction materials of Cerro San Isidro and the number of people working, Ikehara (2015, 177) notes Cerro San Isidro would have required 11821.8 labour investment days (person-days). If half of the population of the supra-local community during 400-150 B.C. invested their time, it would average 6 days a year of labour (Ikehara 2015, 177).

Another characteristic presented by Chapman and Gaydarksa (2017, 290) highlights the presence of modular planning practices based on kinship, where individuals are linked together under a greater household leader. I argue in Section 3.2 that these are equivalent to supra-household communities. As I will demonstrate further below, supra-household communities were present at Cerro San Isidro, and these were modular in nature, as they were associated with individual architectural platforms and within these platforms, architecture appears to follow similar planning practices. Thus, Cerro San Isidro meets this feature of low-density urbanism.

In summary, the features identified at Cerro San Isidro, in combination with the research of the Moro Pocket, support my argument that it is part of a low-density urban network. The dispersed settlement pattern, with a central focus surrounded by hamlets, reflects a common characteristic of both Andean urbanism (Makowski 2023) and low-density urbanism (Fletcher 2011; Fletcher 2019). The presence of a ceremonial function at Cerro San Isidro is clear with the huanca stone and offerings, confirming Makowski's example of Andean urbanism. While the site does not feature large ceremonial architecture, like a plaza, the scattered megalithic sites in the surrounding area suggest that communal rituals may have taken place within the broader landscape, also confirming one of Makowski's examples. When turning to literature specific to low-density urbanism, Cerro San Isidro exhibits major labour mobilization and has the presence of modular supra-household communities, supporting Chapman and Gaydarska's (2017) characteristics of low-density urbanism. Combined, these characteristics reinforce the argument that Cerro San Isidro represents low-density urbanism.

As I argue in Section 3.1, I define urban spaces as having integrated, multi-scalar organizations, which are created, maintained and supported within the settlement and approach urbanism not only for what they represent materially, while understanding material variability, but for what they enable socially. For the kinds of bonds forged and maintained in these spaces. The coordination required for labour-intensive construction, the presence of ceremonial activities and the organization of supra-household communities all point to the presence of integrated, multi-scalar relationships which would foster an identity specific to the settlement. My argument would benefit from future research that more closely examines the relationships between Cerro San Isidro and other settlements within the Moro Pocket. A deeper understanding of these inter-

settlement connections would allow for a more complete assessment of the scale and integration of this low-density urban network.

5.4 Supra-household Communities

Since I have highlighted the urban nature of Cerro San Isidro, it is important to consider how cities have some form of supra-household communities (Smith 2010a), settlements that often exhibit these forms of organization (Smith et al. 2015). Supra-household communities seem to be a widespread and perhaps universal feature of urban life that exists throughout time and space, including low-density urban systems (Smith 2010a). Arnauld et al. (2004, 77) produced a map of house clusters in a low-density urban settlement of La Joyanca and interpreted these house clusters as neighbourhoods. Smith (2011) similarly argues that the house clusters found in Mayan low-density urban settlements, such as the Aztec *calpulli* and modern Tzotzil house cluster, as well as two African urban clusters, the Nupe city of Bida and Addis Ababa in Ethiopia, have neighbourhoods with similar social relationships, activities and conditions which characterize neighbourhoods in high-density cities. Since supra-household communities are arguable innate features of urban life, it can be expected that these forms of communities would also exist at Cerro San Isidro.

As highlighted in Chapter 3, I define supra-household communities as multi-household phenomena which occur between the settlement and household level. In order to identify these communities, I draw on three characteristics established in scholarly literature (see Section 3.2): 1) spatial clustering, 2) physical distinctiveness, and 3) the presence of multiple households. While I contend the most important part of these spaces is the social processes that occur within them, they need to be in close contact to facilitate shared experiences and practices, which implies close households or spatial clustering. Many scholars have used spatial clustering as a

defining characteristic of supra-household communities, given that clustering allows for increased interactions. Recently, Hutson (2016, 73) developed a four-part approach to document supra-household communities, which includes spatial clustering. Spatial clustering is based on the principle that people in closer proximity interact more frequently (Feinman and Nicholas 2012; Peterson and Drennan 2005). As demonstrated previously (5.1), architecture at Cerro San Isidro is spatially clustered on architectural platforms. By having households clustered in such a way, there is increased interaction between those living within the same platform than between them. These social interactions would maintain and create the social processes and constructions that form supra-household communities.

Moving to the second criterion, many scholars (Glass 1948; Keith 2003; Smith 2010a) argue that supra-household communities have spatial distinctiveness, where the communities are clearly differentiated from others in space, which can appear as trenches, gaps between houses, or water channels. At Cerro San Isidro, this kind of spatial distinction is especially visible in the way steep slopes divide architectural clusters. These natural topographic features create pronounced boundaries between residential groupings, boundaries that would have been both physically apparent and socially meaningful. They were likely visible not only to the people living within the clusters but also to those outside them, reinforcing the social separations and affiliations embedded in the built environment. Steep slopes physically define the spatial clusters of architecture at Cerro San Isidro.

Now that we've established both spatial clustering and physical distinctiveness, the next question is whether multiple households actually lived within these spaces. Community occupancy is a key part of how scholars define supra-household communities (see Section 3.2; Hutson 2016; Smith 2010a). To explore household populations on the platforms, I estimated each

platform's population through the process defined in 5.1.1. I project the same floor-to-wall ratio across the area of each platform, following the same 4m² to 6m² per person range. The calculations produced a range of population estimates for each platform, as seen in Figure 5.16. The populations for the platforms range from 12 to 369 people. The population estimates for the four platforms under study are highlighted in Table 5.1.

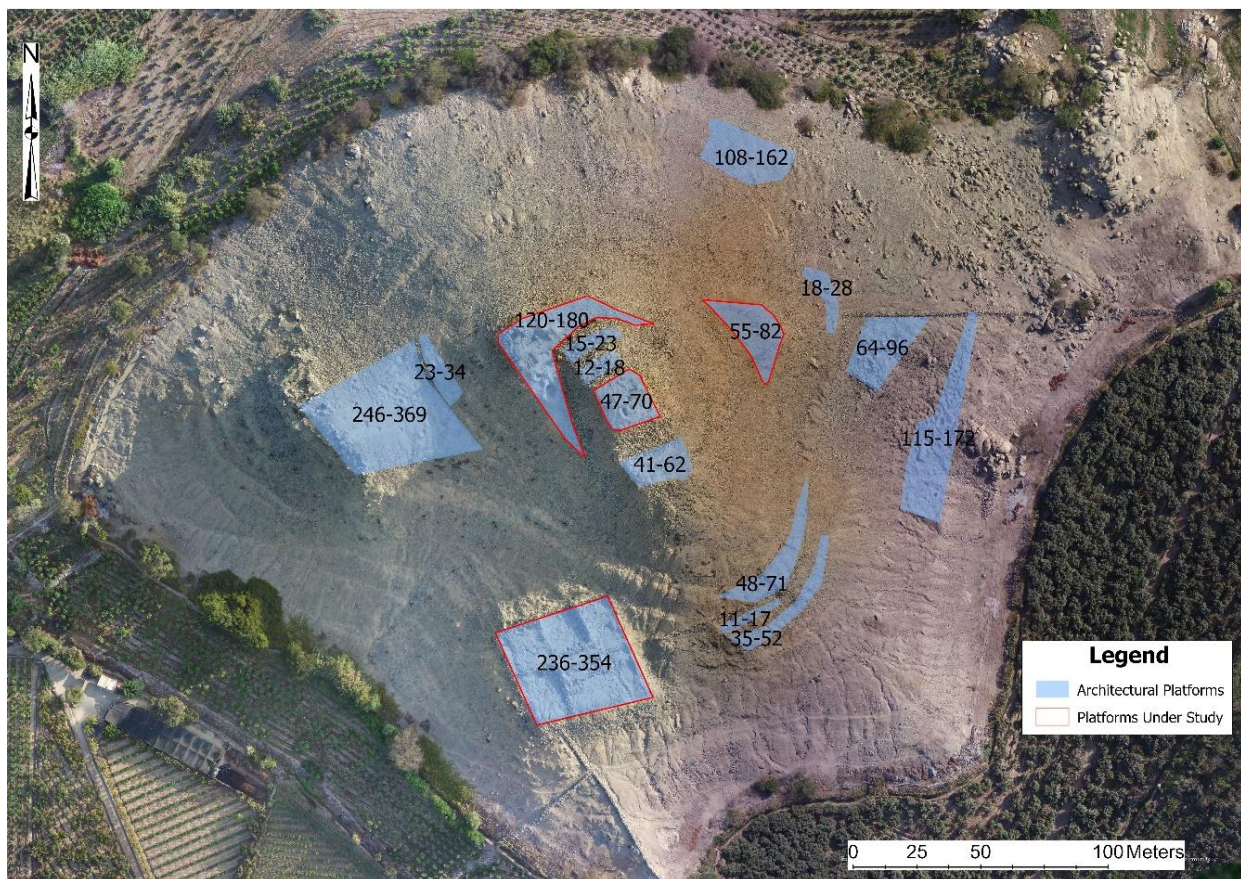


Figure 5.16: Population estimates of the architectural platforms at Cerro San Isidro, calculated by projecting the floor-to-wall ratio across each platform's area. Estimates are based on a standard range of 4–6 m² per person, creating a population range by platform

Table 5.1: Population estimates for the architectural platforms analyzed in this study.

Architectural Platform	75.08% of Area	Population Estimate 4m ² /Person	Population Estimate 6m ² /Person
Upper	282	70	74
Eastern	330	82	55
Northern	719	180	120
Southwestern	1415	354	236

The relationship between the number of occupants within a house structure has been the focus of great discussion. Wilson (1987,78) conducted population estimates in the Lower Santa Valley, next to Nepeña Valley, and estimated 5 persons per structure, based on the work of Haviland (1972) and Naroll (1962). In the Nepeña Valley, Chicoine and Whitten (2019), working at the site of Caylán, took a different approach when they considered the presence of multiple families within domestic compounds. They use a ratio of 4–6 square meters per person to estimate the number of residents in domestic compounds and argue that structures such as Compound-E were home to between 28 and 42 people. On that basis, they suggest that several families co-resided within a single compound. Using their estimates as a comparative model, I apply the 10-person household value to the platforms at Cerro San Isidro. Based on this upper estimate, each platform with populations from 12-369 people would have accommodated more than a single household, supporting the interpretation that these architectural spaces were designed for multiple families.

Through this section, I have highlighted three key criteria established by various scholars to identify supra-household communications at Cerro San Isidro 1) Spatial clustering: The clustering of architecture within platforms indicates a physical closeness which would promote shared activities and experiences amongst residents, 2) Physical distinctiveness: The architectural

platforms themselves, delineated by steep slopes, provide a clear physical distinction between clusters, and 3) Presences of Multiple Households: Population estimates conducted for each platform indicate a range of occupants varying from 12 to 369 people. Even by assuming a larger nuclear family structure of up to 10 individuals, these estimates still suggest that each platform houses more than a single household, supporting the notion of multiple households cohabiting in these spaces. Together, these three lines of evidence provide a strong basis for interpreting the architectural platforms at Cerro San Isidro as supra-household communities.

5.5 Interpretations and Conclusions

In returning to my research question, *in what ways does a map of Cerro San Isidro align with or differ from previous descriptions of the settlement*, the morphological analysis of Cerro San Isidro presented here suggests that early descriptions (Ikehara 2015; Daggett 1984) of the settlement as a natural mound modified through anthropogenic terraces and architectural features are accurate. However, my morphological assessment of the site diverges regarding the presence of a plaza on what I refer to as the Western Architectural Platform. As I noted above, the GPR data, contextualized with test pit excavation material, suggest that during the Early Horizon, this platform was likely residential in nature and not an open plaza. Moreover, both the estimated population and overall extent of the settlement appear to be significantly greater than previously suggested. While Hugo Ikehara estimated a maximum population of 391 people during the Early Horizon, my analysis places the population between approximately 1,130 and 1,695 individuals. Additionally, data from GPR and pedestrian surveys indicate that the site may have extended over at least 50 hectares.

Turning to my next question—*which morphological attributes suggest Cerro San Isidro is an early urban settlement*—the evidence presented above highlights several key spatial and

structural features that align with both Andean frameworks of urbanism and broader definitions of low-density urbanism. Cerro San Isidro's position within a dispersed but integrated settlement system, as argued by Ikehara (2015), supports its role as a population center in a low-density urban network. The ceremonial component of the site, evidenced by the huanca stone and associated offerings, aligns with Makowski's (2023) recognition of Andean ceremonial centers as urban. The presence of public ceremonial architecture dispersed across the surrounding landscape further supports Makowski's (2023) framework. Additionally, the community-based modular organization at the site, with the presence of supra-household communities, reflects another key aspect of low-density urbanism (Chapman and Gaydarska 2017). Finally, the large-scale anthropogenic terracing reflects the kind of labour mobilization associated with low-density urbanism (Chapman and Gaydarska 2017). Combined, these features point to Cerro San Isidro as part of a low-density urban settlement, characterized by integrated, multi-scalar organization.

These physical traits did more than just define the form of the settlement, but they supported and enabled the kinds of social relationships that I argue are central to making a place urban. Reflecting on my discussion of urbanism as a process (see Section 3.1), where cooperation and shared identity are formed, we must consider how these elements serve as evidence of urban actions, where the infrastructure and organization reveal the dynamic actions through which urban life was created and maintained. For example, large-scale terracing and infrastructure required labour mobilization, which necessitated coordination and cooperation across the settlement. The large-scale terracing and infrastructure would have required not only a surplus of labour but also coordination capable of organizing people beyond the household level, indicating a form of collective organization and possibly the presence of leadership to spearhead this

organization. The labour mobilization indicates that collaboration among residents at Cerro San Isidro was necessary for maintaining the settlement.

Additionally, through the labour mobilization, it may have reinforced shared goals and contributed to communal identity. Similarly, the modular community organization reflects both internal community organization and integration within the settlement, due to consistencies in structural orientations. Modular community-based organization reflects a patterned social process where the communities negotiated spatial norms, but also likely maintain a community-level identity. The modular community organization at Cerro San Isidro points to an active social strategy that enables and maintains a complex, multi-scalar organization. Such morphological characteristics of Cerro San Isidro reflect urban processes as they actively shaped the conditions for a shared urban identity, a core component of urbanism.

Finally, *what morphological characteristics of the settlement suggest the presence of supra-household communities?* The analysis of the spatial components of Cerro San Isidro reveals spatial clustering, physical distinctness, and indications of multiple households residing on the architectural platforms. The population distribution and architectural organization strongly suggest the presence of supra-household communities at Cerro San Isidro. The architectural platforms are the physical arenas that would foster shared experiences and practices, informing about the social identities of the residents. Inhabitants of supra-household communities are connected, but the degree of shared identity varies from one community to another. Similarly, the nature of shared identity may vary between communities; while the physical space may cause increased interactions, it is the process of shared experiences and activities that form and maintain the social bonds and inform social identities. Moving forward, I aim to investigate the

social processes occurring within these spaces and how they would contribute to forging collective identities.

In conclusion, Cerro San Isidro is a terraced settlement organized into supra-household communities and served as a population center within a low-density urban system. Now that we have a clear layout of the settlement, it is important to assess how much of this map and the associated population estimates can be attributed to the Early Horizon occupation of the site. Additionally, now that we have the physical basis for supra-household communities, it is important to contextualize these communities in terms of social differentiation and the kinds of activities they were involved in, to speak more meaningfully about how people experienced this space.

6 The Rhythm of Life at Cerro San Isidro: Space, Time, and Social Stratification

This thesis examines the occupation and lived experiences at Cerro San Isidro during a critical period in the region's history – the Early Horizon, marked by geopolitical turmoil, social flux, and shifting settlement patterns. As reviewed in Chapter 2, the Early Horizon started with the shift from Cupisnique influence and the emergence of the Chavín culture, a time of geopolitical turmoil that increased with the eventual collapse of the Chavín tradition around ~500 BCE. During this time, Cerro San Isidro emerged as a focal point within the Moro Pocket, reflecting a significant choice by its inhabitants – to coalesce in a shared settlement, unlike the dispersed settlements seen elsewhere across the north coast during this time (Burger 1992; Millaire 2020; Topic and Topic 1997; Wilson 1988). This decision to settle together, possibly in response to external pressures or emerging opportunities of urban life, invites questions on the social, economic, and social dynamics that defined Cerro San Isidro as a distinct urban entity.

To assess the lived experiences of those inhabiting Cerro San Isidro and processes of cooperation and cohesion, we must situate the inhabitants both in their temporal and environmental contexts. Though my focus remains on the Early Horizon, this was only one phase of an extensive occupation spanning over a thousand years. Thus, any archaeological mapping and analysis must carefully navigate this multi-layered history, attempting to reflect a settlement specific to the Early Horizon while acknowledging the enduring legacy of its long occupation.

In Chapter 2, I introduced Cerro San Isidro's chronological framework, and in Chapter 5, I presented a foundational map highlighting key spatial zones. Here, I build on that groundwork, examining specifically the Early Horizon (EH) occupation at Cerro San Isidro and questioning how confident we can be in our reconstructions of Early Horizon lifeway. Such a map, in turn,

helps me address some key questions: *What was the nature of life for the Early Horizon populations? Was there a consistent occupation across the four supra-household communities?*

While the previous chapter documented the mapping of Cerro San Isidro through the integration of GPR, excavation, and drone imagery, this chapter evaluates the map's accuracy in representing the settlement's occupation during the EH and providing more social context to each supra-household community.

Remote sensing techniques, while invaluable, often yield images that obscure the kinds of temporal changes that define urban spaces (Bailey 2007). This chapter tackles this challenge by employing a multi-faceted approach: integrating distinctive ceramic styles and architectural features helps us identify areas that were occupied continuously during the EH, while radiocarbon dating offers a temporal anchor to illuminate the settlement's early development phases. This will help construct a coherent picture of life at Cerro San Isidro during the EH and determine if the map created in Chapter 3 (Figure 4.17) represents an accurate visualization of life during the EH.

Landscapes carry distinct meanings shaped by social status, economic roles, and power relations (Kosiba and Bauer 2012) (see Section 3.4). As such, it is important to consider the specific social and economic context of each supra-household community at Cerro San Isidro. Providing this contextual information enables us to better understand the diversity of experiences within the settlement and to recognize how variations in social hierarchy, access to resources, and community roles may have influenced each community's relationship with the landscape. In this way, the chapter not only examines materiality but also factors that may have influenced how people experienced their environment. Understanding these distinctions helps reconstruct a

more comprehensive picture of daily life across the different communities within Cerro San Isidro.

One key line of inquiry within this chapter is assessing the social status of the four supra-household communities, as I ask: *Does the ceramic data from these four communities indicate these were elite collectives?* Previous surface surveys (Ikehara 2015) suggested that Cerro San Isidro was a population center for elite individuals, but the ceramic assemblages from each community offer an opportunity to test this hypothesis in finer detail. Determining the social status of the supra-household communities is critical in considering how the community members may perceive their space.

Additionally, I ask *What was the distribution of ceramic types? Did it appear as if each community was involved in similar activities based on types and styles of ceramic vessels? Or did the communities perhaps participate in different tasks?* This question is relevant to the project because it allows for an in-depth analysis of the material culture that can reveal the daily practices and specialized roles of different communities within Cerro San Isidro. By examining ceramic distribution based on functions, we can identify whether supra-household communities engaged in shared activities, such as food preparation or storage, suggesting cooperative or communal patterns, or whether they undertook distinct tasks, indicating specialization or social differentiation. This line of inquiry contributes to understanding the social and economic organization at Cerro San Isidro, shedding light on how various community members interacted with their environment and each other and ultimately providing insight into how activities may have influenced the residents' experience of space.

Through this chapter, I create a time-sensitive map that represents the spatial distribution of people at Cerro San Isidro during the EH. I also assess the potential activities and social

stratification of the supra-household communities, allowing me to more effectively investigate how they experienced their space in later chapters. This chapter, therefore, provides a foundation for examining how space and materiality at Cerro San Isidro were lived, constructed, and reimagined by its inhabitants.

6.1 Temporal and Spatial Context of Cerro San Isidro

Urban spaces can undergo rapid transformation, often preserving layers of evidence of social, political and architectural change, making them valuable for archaeological research. Most remote sensing methods, however, cannot capture these temporal changes or distinguish structures from different periods. As such, the final map outputted from these methods presents as a palimpsest of architectural constructions and human occupations, that is, the accumulation of archaeological material from different ages or life spans within a single context (Bailey 2007). This produces an urban grid that was never experienced by inhabitants. This project focuses on assessing the Early Horizon of this settlement, so I focused on mapping this occupation through a combination of ceramic styles and radiocarbon dating.

Out of the 28 excavated units, 26 exhibit evidence of EH architectural styles, as shown in Figure 6.1. In addition to architectural features, the EH can also be recognized by a distinct set of ceramic styles, which are detailed in Section 4.1.4.2. Among the 28 excavated units, 23 also display EH ceramic styles. Appendix C summarizes the key ceramic findings from these units, highlighting all strata that contain more than 50% ceramic materials characteristic of the EH. The distribution of these areas is illustrated in Figure 6.2. The presence of these features underscores the temporal affiliation of each area within the settlement.

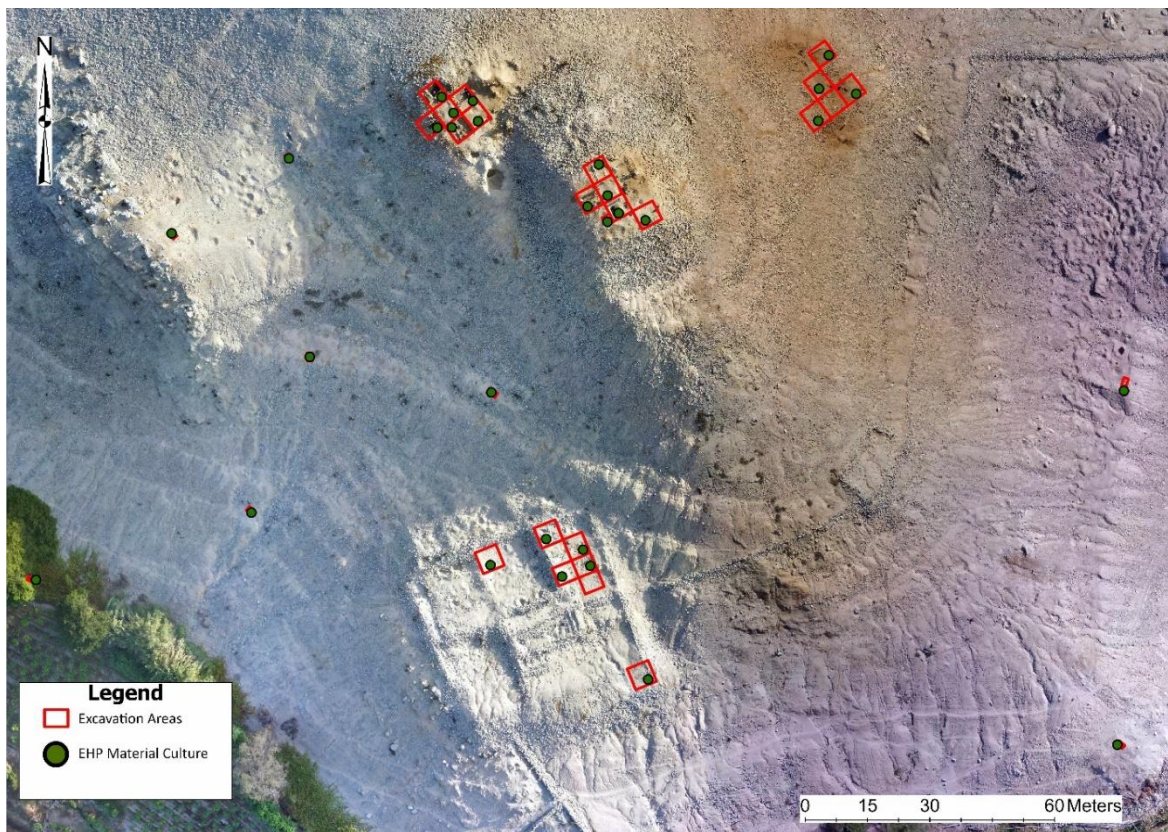


Figure 6.2: Distribution of EHP material culture in excavation and test pits.

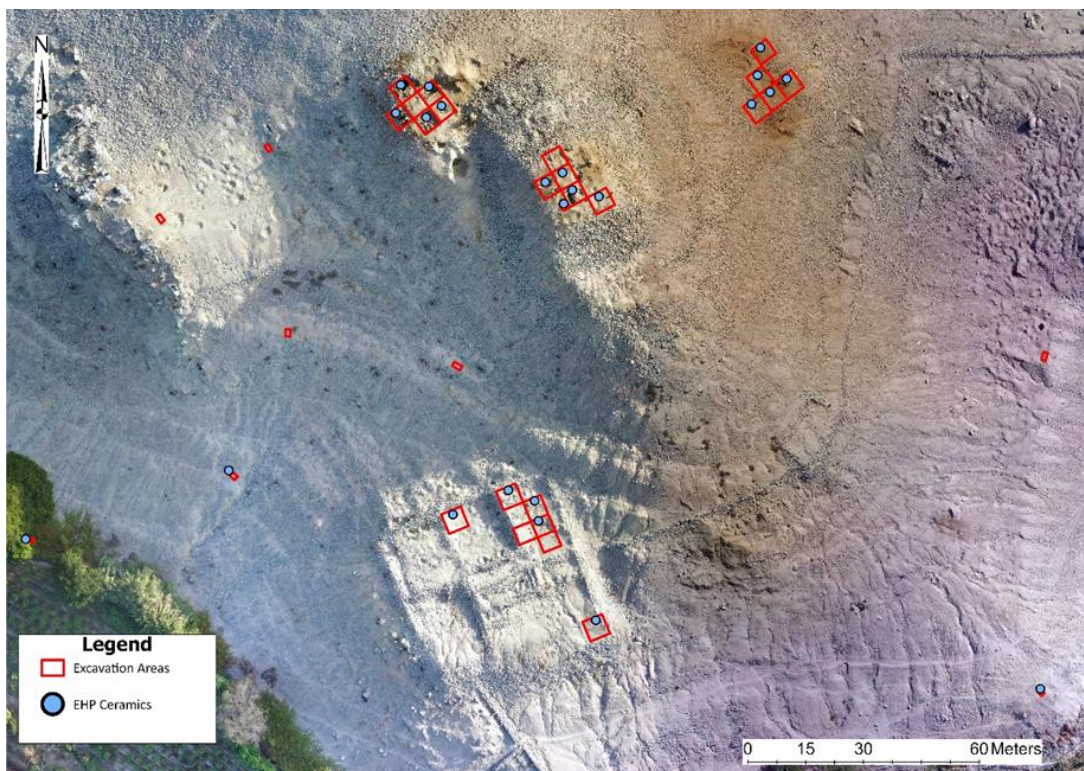


Figure 6.1: Distribution of EHP ceramic artifacts.

To further refine the temporal framework of Cerro San Isidro, radiocarbon samples were collected across a site in the supra-household communities and generally throughout the urban space, so we can have a better idea of the contemporaneity of different parts of the settlement. As discussed in Section 4.1.4.3, forty-eight radiocarbon samples from varying archaeological contexts were sent for AMS dating. The distribution of the dates, based on chronological phases, is shown in Figure 6.3. While more radiocarbon dates from additional parts of the settlement are needed, this figure provides an idea of the changing occupation distribution through time. Focusing on the EH, of these 48 samples, 14 date to the EH (Figure 6.3a). The radiocarbon dates proved a robust chronological framework that supports the EH occupation of the settlement.

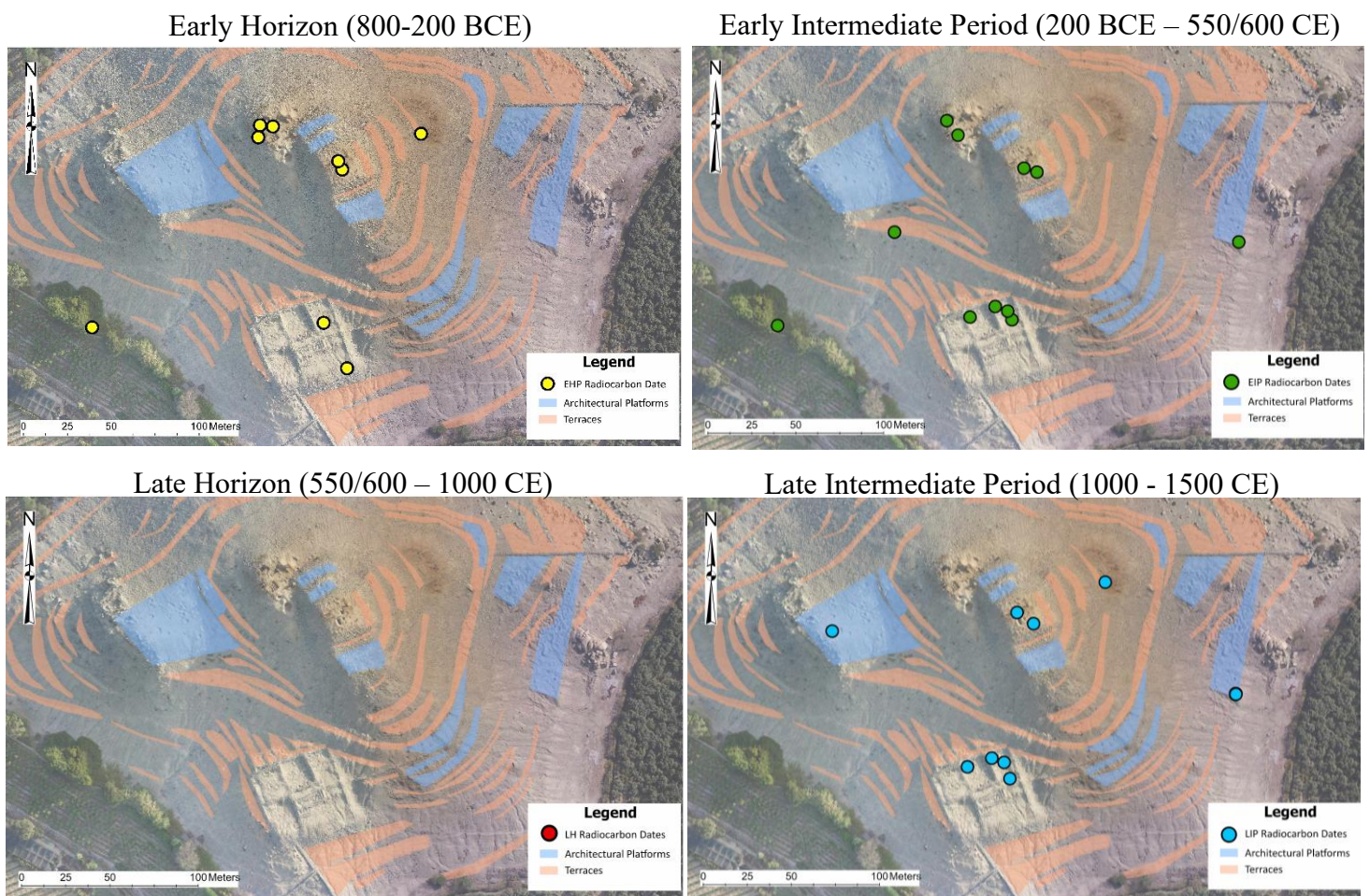


Figure 6.3: Distribution of radiocarbon dates by period.

Table 6.1 presents the detailed radiocarbon results, in combination with the percentage of EH ceramics within the same context of the radiocarbon dates. Excluding two samples that were not found in conjunction with any ceramic materials, the remainder of the samples were found with greater than 50% ceramic materials, distinctive of the EH. The radiocarbon dates provide chronological anchors that support the presence of occupation during the EH. The radiocarbon dates, with associated ceramic materials, also support the contemporaneity of EH-phased ceramics with the EH occupation.

Table 6.1: Radiocarbon results combined with the percentage of EH ceramics within the corresponding context.

Carbon Date	Unit	Strata	Date	Ceramic phase	Context
OxA-40721	HP2	5	340-64 BCE	100% Early Horizon	Offering
AA-116126	UE5D	6	349-66 BCE	86% Early Horizon	Clay layer below complete vessels,
AA-116123	UE1B	4	369-156 BCE	67% Early Horizon	Ash lens
AA-116124	UE1A	4	369-156 BCE	52% Early Horizon	SW corner
AA-116118	UE1C	5-6	380-188 BCE	97% Early Horizon	Charre reeds/cane by foundation of early stone wall
OxA-40728	UE3E	7	382-189 BCE	100% Early Horizon	Hearth
OxA-40730	UE3D-Ampliacion Norte	6-7	384-190 BCE	100% Early Horizon	Fill, early architexutre
OxA-40731	UE3D-Ampliacion Norte	6	389-193 BCE	92% Early Horizon	Fill, early architexutre; phase based on strata 5-6
OxA-40732	UE3D-Ampliacion Norte	6	394-198 BCE	92% Early Horizon	Fill, early architexutre; phase based on strata 5-7
19CSI4-1	HP8	2	471-167 BCE	N/A	Offering
AA-116128	UE2B-Ampliación Este	4-5	399-201 BCE	96.5% Early Horizon	Fill with ash, below floor; phase based on strata 4
AA-116131	UE2C	5-6	716-232 BCE	100% Early Horizon	Charcal with mesodesma offering
AA-116133	UE2C	8-9	751-404 BCE	N/A	Charcok fill below floor, sample could have come from post?
OxA-40734	UE3D-Ampliacion Norte	6	759-416 BCE	100% Early Horizon	On bedrock, based on phase 6-7
OxA-40727	UE3E	7	760-416 BCE	100% Early Horizon	Fill

By integrating ceramic typologies, architectural styles, and radiocarbon dating with the spatial distribution of these finds, we can construct a holistic representation of the site's occupation during the EH. These various datasets are combined in Figure 6.4. The widespread distribution of EH materials and dates suggests that during the EH, the settlement was likely occupied across all or most architectural platforms. It is important to acknowledge that these results are biased towards sampling practices, however, the location of test pits and excavation units occur across the settlement, along the peripheries of the mound, as well as throughout

multiple terraces and architectural platforms that provide a comprehensive and representative picture of the settlement's spatial organization during the EH.

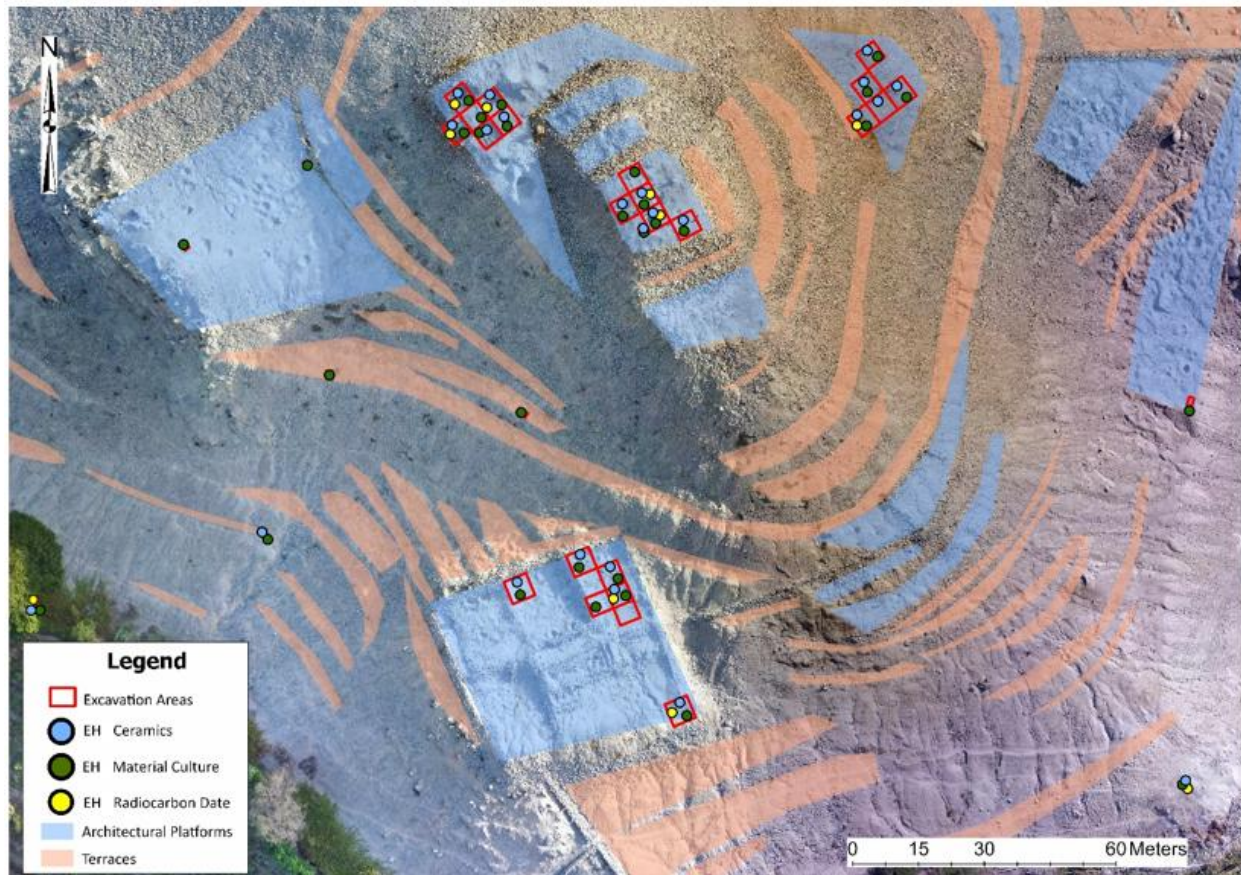


Figure 6.4: Map showing areas with evidence of EH contexts, including material culture, ceramic styles, and radiocarbon dates.

The findings suggest that there was a consistent occupation of the settlement during the Early Horizon. However, this does not necessarily mean that all the architectural features identified in Chapter 3 are fully representative of the EH occupation. Research by Itzamara Ixta Pichardo (2024), focused on the Eastern architectural platform, revealed that while the internal walls likely changed throughout the settlement's occupation, especially in areas that were reoccupied during different phases, the large perimeter walls built during the earliest phase (the EH) remained unchanged over time. The uniform occupation of the settlement during the EH and the consistent use of thicker perimeter walls indicate that the architectural map created from

remote sensing and excavation data provides a good representation of the site-wide occupation of the EH and the general morphology of the space. However, it likely does not provide detailed insights into the internal structures of the occupied spaces during this period. Although a more in-depth analysis of these walls would deepen our understanding of phase-specific occupation, this study only requires a general reconstruction of the settlements' layout and spatial organization during the Early Horizon.

6.2 Activities in Supra-Household Communities

Now that I have established a temporal framework, I shift to consider how life was lived within these spaces, specifically understanding how people may have organized activities within their supra-household community during this time. To explore this, the following section focuses on ceramic functional analysis to investigate activity patterns across the four supra-household communities. Functional analysis of pottery relies on the assumption that pots with similar shapes served similar purposes in both prehistoric and ethnographic contexts, and that these functional associations do not vary significantly across different cultures (Henrickson and McDonald 1983; Pauketat 1987). Consequently, inferences about the function of pottery can be substantiated by both archaeological and ethnographic evidence. The goal of this analysis is to determine the function and relative frequencies of different vessel classes within the supra-household communities at Cerro San Isidro and how these are related to foodways to determine how foodways may have varied between these communities. I use relative frequency—that is, the percentage of each vessel type within the total ceramic assemblage of each given community—as this approach allows me to highlight intercommunity variation in ceramic use within each community's assemblage, rather than simply using raw counts, which differences can influence in sample size or preservation. However, I should preface this analysis by noting I am only

touching the surface of ceramic functional analysis. My goal is to provide a cursory assessment of activities within the supra-household communities in the EH. However, a greater, more detailed analysis would be beneficial in the future.

As I discussed in Section 4.2.2, I categorized the ceramics into five functional groups: cooking, storage, food preparation and serving, food presentation and serving, and specialty items, following the frameworks of Henrickson and McDonald (1983) and Ringberg (2012). The distribution of these categories amongst the four supra-household communities is presented in Table 6.2, and a comparison of the distribution of these categories by architectural platform is illustrated in Figure 6.5. I conducted a chi-square test in R to assess the differences in activity across the different platforms. The test indicates a significant association between the platforms and activity types ($\chi^2(9, N=5732) = 374.04, p < 2.2e-16$). To explore which activity categories were significant, I applied a post hoc analysis, the standardized residuals and p-values for each category by platform are provided in Appendix D, Table D.1. The results indicate that the Northern Platform had significantly fewer cooking vessels ($p < 0.00000$) but storage vessels were significantly over-represented on the Northern Platforms (standardized residual = 8.64, $p < 0.00000$), with 41.7% ($n=784$) of vessels allocated to storage. This suggests the community had a strong focus on resource management and distribution. In addition, the higher than expected amounts of food preparation/serving vessels (standardized residual = 4.54, $p < 0.00001$) with 40.74% ($n=766$) of vessels allocated to this category, could indicate that the community participated in communal feasting or social gatherings. However, food preparation and serving may have happened at the household level within the supra-household community. But in general, the higher proportion may be reflective of an increased emphasis on shared preparation across the households within this supra-household community.

Table 6.2: Distribution of ceramic vessel functional types within the architectural platforms being analyzed.

Functional Category	Vessel Form	Architectural Platform							
		Northern n= %		Upper n= %		Southwestern n= %		Eastern n= %	
Cooking	Olla con cuello	220	11.70%	103	9.47%	277	22.50%	365	23.70%
	Olla en miniatura	1	0.05%	0	0.00%	1	0.08%	1	0.06%
	Olla sin cuello	86	4.57%	172	15.81%	225	18.28%	100	6.49%
	Total	307	16.33%	275	25.28%	503	40.86%	466	30.26%
Food Preparation/ Serving	Colador	22	1.17%	0	0.00%	0	0.00%	0	0.00%
	Rallador	0	0.00%	3	0.28%	4	0.32%	2	0.13%
	Total	22	1.17%	3	0.28%	4	0.32%	2	0.13%
Food Presentation/ Serving	Asa	0	0.00%	0	0.00%	1	0.08%	0	0.00%
	Botella	40	2.13%	75	6.89%	17	1.38%	52	3.38%
	Botella asa estribo	0	0.00%	0	0.00%	1	0.08%	0	0.00%
	Cántaro	44	2.34%	67	6.16%	61	4.96%	133	8.64%
	Disco	1	0.05%	0	0.00%	1	0.08%	0	0.00%
	Garrafa	0	0.00%	0	0.00%	11	0.89%	0	0.00%
	Individual Cuenco*	130	6.91%	81	7.44%	51	4.14%	30	1.95%
	Paleta	1	0.05%	0	0.00%		0.00%	0	0.00%
	Plato	7	0.37%	4	0.37%	1	0.08%	0	0.00%
	Plato base anular	1	0.05%	0	0.00%	0	0.00%	1	0.06%
	Plato base en pedestal	44	2.34%	0	0.00%	0	0.00%	9	0.58%
	Plato hondo	128	6.81%	43	3.95%	105	8.53%	228	14.81%
	Plato poco hondo	368	19.57%	59	5.42%	208	16.90%	165	10.71%
	Tazón	0	0.00%	0	0.00%	23	1.87%	0	0.00%
	Vaso	0	0.00%	2	0.18%	0	0.00%	0	0.00%
	Vaso tipo "Florero"	2	0.11%	0	0.00%	7	0.57%	0	0.00%
	Total	766	40.74%	331	30.42%	487	39.56%	618	40.13%
Specialty items	Crisol	0	0.00%	0	0.00%	1	0.08%	0	0.00%
	Figurina	0	0.00%	0	0.00%	3	0.24%	1	0.06%
	Regadera	1	0.05%	1	0.09%	0	0.00%	0	0.00%
	Total	1	0.05%	1	0.09%	4	0.32%	1	0.06%
Storage	Cancho	2	0.11%	0	0.00%	0	0.00%	2	0.13%
	Cuenco	493	26.22%	88	8.09%	59	4.79%	114	7.40%
	Cuenco base pedestal		0.00%	0	0.00%	0	0.00%	4	0.26%
	Cuenco carenado	102	5.43%	284	26.10%	70	5.69%	150	9.74%
	Jarra grande	12	0.64%		0.00%	43	3.49%	0	0.00%
	Tinaja	175	9.31%	106	9.74%	59	4.79%	183	11.88%
	Tinaja sin cuello	0	0.00%	0	0.00%	2	0.16%	0	0.00%
	Total	784	41.70%	478	43.93%	233	18.93%	453	29.42%

* Individual serving bowls, based on Henrickson and McDonald (1983:632), typically have orifice diameters of 14cm. All Cuenca bowls with a diameter of 14cm or less were categorized as individual serving bowls.

The Upper Platform, with 43.93% (n=478) of its vessels allocated to storage, suggests that this community may have had a primary role in storage, which may indicate a potential long-term focus on food preservation and supply chain management. However, this is not to suggest a strict division of labour between communities. Rather, the variations in relative frequencies may reflect differences in emphasis or localized roles and activities within the broader framework of supra-household organization. This community has no significant variances in expected amount of cooking and food preparation/serving vessels, but has significantly fewer than expected food presentation/serving vessels (standardized result -5.99, $p < 0.00000$). Taken together, these patterns indicate that the Upper Platform may have been a key

locus of surplus storage while supporting everyday activities and perhaps a reduced role in formal presentation and serving of food.

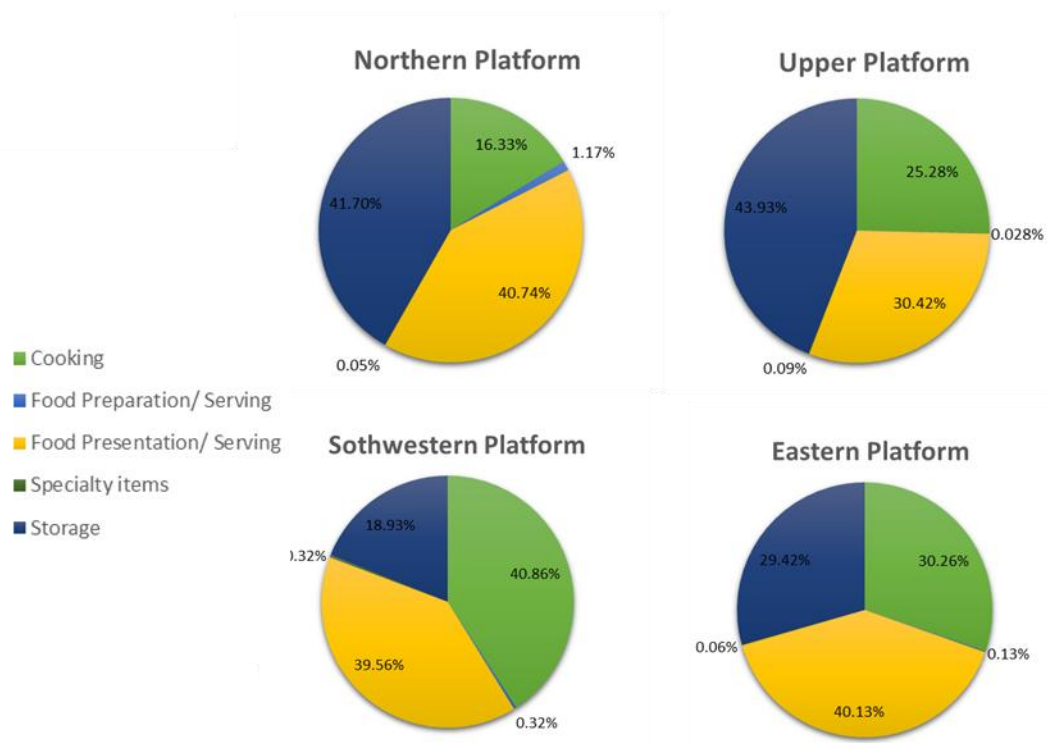


Figure 6.5: Pie charts representing the distribution of ceramic vessel functional types by architectural platform.

The Southwestern Platform has the highest percentage of cooking vessels (40.86%, $n=503$), exhibiting significantly more than expected (standardized residual = 12.39, $p < 0.0000$), indicating a focus on culinary activities, possibly reflecting this community's importance in food supply. This community, however, had a lower storage percentage with significantly less than the expected number of vessels (standardized residual = -12.5, $p < 0.0000$), suggesting that while they took part in cooking, long-term resource management was less of a focus. Lastly, the Eastern Platform has a more balanced distribution of vessel functions with a moderately more than expected amount of cooking vessels (standardized residual = 3.32, $p = 0.014$) and significantly fewer storage vessels (standardized residual = -4.40, $p < 0.0001$). This suggests the community members were equally incorporating both domestic activities and social interactions.

What is notable across all platforms is the high proportion of food presentation/serving vessels compared to other functional categories within each supra-household community; this could indicate that Cerro San Isidro members placed importance on meals and social gatherings, which are central to building social cohesion and fostering relationships. Food presentation may also be indicative of ritualistic practices where feasting and communal consumption were part of ceremonies. But, we also cannot dismiss the fact that food serving dishes are required of everyday eating as well.

In his examination of feasting ceramic ratios, Roddick (2002, Tables 2-3), suggests that in an Andean context, feasting contexts have a higher ratio of serving dishes to cooking and storage. At Cerro San Isidro, the ratios, as presented in Table 6.3, do not lend weight to “pure” feasting contexts, but that does not mean there was no feasting component within each supra-household community. That said, Roddick (2002) also emphasizes the importance of vessel size, noting that large vessels tend to be more closely tied to feasting. However, I was not able to carry out a vessel size analysis here due to time constraints and gaps in the dataset. Future research considering vessel size would be valuable in reassessing this claim and further refining my interpretations of eating practices at Cerro San Isidro.

Table 6.3: Ratio of serving to cooking vessels and storage vessels.

Architectural Platform	Serving: Cooking/Storage
Northern	1:1.42
Upper	1:2.27
Southwestern	1:1.51
Eastern	1:1.48

Another interesting trend is that the Northern and Upper Platforms have the highest percentage of storage vessels, but the lowest percentage of cooking. This could suggest that these two supra-household communities may have been critical economic spaces for the distribution of

food but relied on shared resources or communal cooking. Lastly, there is a general lack of food preparation vessels. However, this absence does not necessarily mean that food preparation activities were not occurring. While these vessels are essential for cooking, the scarcity may be attributed to the fact that most food preparation vessels were undecorated, leading to fewer items being collected. Additionally, many stone tools were also utilized for food processing.

I now move to address the third research question: *Was each community involved in similar activities based on the functions of ceramic vessels? Or did the communities perhaps participate in different tasks?* The ceramic analysis indicates both similarities and distinctions in the activities of the supra-household communities at Cerro San Isidro. While all communities displayed a significant emphasis on food presentation/serving, suggesting the importance of communal meals, the specific functional profiles of ceramic assemblages reveal potential differences in their roles and activities. For instance, the Northern and Upper Platforms' high percentages of storage vessels suggest they played pivotal roles in food resource management and distribution. Whereas the Southwestern Platform, with its high percentage of cooking vessels, may have specialized in culinary activities, potentially serving as a central location for preparing food for both daily consumption and communal feasts. Meanwhile, the Eastern Platform's balanced distribution of vessel functions suggests a more generalized role, with its members equally engaged in domestic food preparation, communal meals, and resource management. Overall, this evidence suggests that while the supra-household communities shared overarching cultural practices, such as communal meals and food management, they also exhibited task specialization.

But we must be aware that this analysis is based solely on diagnostic wares. This selective sampling, combined with the decision not to calculate the minimum number of vessels

(MNV), may inflate the relative counts of certain categories, skewing interpretations of their prevalence and functional significance. While the functional categories provide a useful framework, they may oversimplify the multifunctionality of certain vessels, as ceramics could have served overlapping purposes that blur distinctions between cooking, storage, and serving. Overall, this analysis proves a good entry point to note the likelihood of differential activities between the communities, but future work is needed to confirm these results.

Additionally, it is beneficial to compare the results of vessel functions with those of other coeval settlements within the Nepeña valley to place Cerro San Isidro within a broader context. Caylán, Huambacho, and Samanco are three coastal Early Horizon (~600-200 BC) settlements located in the lower Nepeña Valley (see Section 2.2.2 for a more detailed discussion). These settlements are part of a multi-tiered settlement system, with Caylán as the primary center (Chicoine and Ikehara, 2010, 2014). Comparing the activity distribution between these settlements allows us to contextualize the functional variabilities between Cerro San Isidro and other communities in the region and to determine whether trends at Cerro San Isidro were unique to the settlement or reflected broader regional trends. Sutherland's (2017, Tables 5.2-5.4) dissertation research compared the vessel functions between three coastal settlements, using cooking, storage, and serving categories. To compare with Cerro San Isidro, I merged the cooking and storage categories into a single 'cooking-storage' category and merged food presentation/serving with food preparation/serving into a single 'serving' category. The results of which I present in Table 6.4. The lower valley settlements are dominated by cooking and storage vessels (84-87%), with only 13-15% of their ceramic wares associated with serving. At Cerro San Isidro, across the four architectural platforms, there is a significantly higher proportion of

Table 6.4: Comparison of ceramic vessel functions between Cerro San Isidro and three lower Nepeña Valley coastal settlements (Caylan, Huambacho, Samanco). Data on coastal settlements is derived from Sutherland (2017), Tables 5.2-5.4.

	Cerro San Isidro Architectural Platform (n=5732)								Caylan (n=1,133)		Samanco (n=1,374)		Huambacho (n=1,142)	
	Northern (n=1879)		Upper (n=1087)		Southwestern (n=1227)		Eastern (n=1539)							
	n=	%	n=	%	n=	%	n=	%	n=	%	n=	%	n=	%
Cooking-Storage	1091	58%	753	69%	736	60%	919	60%	960	84.73%	1166	85%	995	87%
Serving	788	42%	334	31%	491	40%	620	40%	173	15.27%	208	15%	147	13%

serving wares (31-42%) compared to cooking-storage vessels (58-69%). Generally, across all settlements, the frequency of cooking-storage ceramics is greater than that of serving ceramics. However, the higher frequency of serving vessels at Cerro San Isidro may reflect a different emphasis on activity, with more emphasis on presentation or perhaps communal consumption at Cerro San Isidro. However, we must keep in mind the variability in data collection between these projects – the Caylán, Huambacho, and Samanco ceramic assemblages only include rim sherds. In contrast, the Cerro San Isidro sample includes rim and decorative ware, thus creating a dataset representative of a broader range of ceramic materials.

Nevertheless, the ratios suggest that at Cerro San Isidro, there was perhaps a comparatively greater emphasis on communal or social activities than in the lower valley settlements. This may be a result of the low-density nature of the Cerro San Isidro urban system, where Cerro San Isidro facilitated more frequent communal activities to maintain cohesion and reinforce communal identity across the settlements within its urban network. Since Caylán, Huambacho, and Samanco are located in the lower valley, further research is needed to compare the ceramics across the Moro Pocket and fully understand this trend.

6.3 Social Stratification

Previous research by Hugo Ikehara (2015) describes Cerro San Isidro as an elite population center, based on the higher-than-average proportion of fine ware ceramic collected from surface survey on and surrounding Cerro San Isidro compared to the other settlements in

the Moro Pocket. In this case, he defines fine ware as highly polished internal and/or external surfaces (Ikehara 2015, 66). This provides a general overview across the settlement; however, to accurately understand how people experienced and perceived their environment, it is essential to examine the power dynamics among the communities within Cerro San Isidro. This subsection focuses on analyzing the ceramic materials from the four supra-household communities to see if the initial hypothesis about Cerro San Isidro holds true when assessed through a more detailed ceramic analysis. Additionally, it aims to determine if there are variations in status between the different communities.

Archaeologists frequently use ceramics as a crucial source of evidence for social status. Hayden and Villeneuve (2010) propose that leaders are willing to accept high risks involved in being leaders, such as violence or economic burdens, because they perceive the potential economic benefits. These benefits are then likely reflected in better living conditions or higher amounts of finer goods, including ceramics. While scholars (Bayman 2002; Costin 2001; Inomata 2001; Trubitt 2000) have highlighted the great variability in the distribution of fine ware ceramics, generally higher proportions of fine ceramic ware are likely to reflect the success of a household or community in positioning itself within a community, rather than received as a gift, trade, or manufactured. Additionally, while some domestic activities occur across social sectors, most domestic activities are likely shaped by the status of individuals, households, or communities (Bermann 1994; Cutright 2009). This includes productive activities, feasting, or the use of exotic items, which can indicate social differentiation within and between communities (Costin and Earle 1989; Vaughn 2004). As suggested by Drennan (1976, 77), fine ware was likely instrumental for ceremonial and social practices, such as feasting. As such, the proportion of fine pottery can be used as a multifaceted indicator of social status and differentiation. For

example, at Cerro Arena, an early urban Salinar site located in the Moche Valley occupied between ~375- 360 cal. BC (Millaire 2020), Curtis Brennan (1978) located a large quantity of fine ceramics in nearly all high-status structures, showing a correlation between elites and fine ceramics on the North Coast.

In Section 4.2.2, I explained how Navarro Vega and I classified all ceramic sherds from strata associated with the EH into two main types: decorated and plain. Additionally, we organized the ceramics into sixteen categories based on decoration types. Within these categories, the artifacts are further divided into various forms. These categories are detailed in Table 4.4 of Section 4.2.2. This section reviews the results of this analysis, along with the function of the vessels, to assess the social status of four supra-household communities.

The first stage of this analysis was assessing decorative versus plainware between each community, which is shown in Table 6.5. I ran a chi-square test in R to assess the differences in decorative versus plainware across the different platforms. The test indicates a significant association between the platforms and decorative/plainware ($\chi^2(3, N=5732) = 276.28, p < 2.2e-16$). To explore which categories were significant, I applied a post hoc analysis; the standardized residuals and p-values for each category by platform are provided in Appendix D, Table D.2. The test indicates highly significant variations across all platforms with *p-values* less than 0.001. The standardized residuals show that decorated wares were significantly overrepresented in the Upper (residual = 9.57) and Northern (residual 9.02) Platforms but underrepresented in the Southwestern (residual = -11.94) and Eastern (residual -6.90) platforms. This distribution highlights a higher degree of decorated ceramics in the Upper and Northern Platforms, with

Table 6.5: Plain and decorated ware by architectural platform.

	Architectural Platform							
	Northern		Upper		Southwestern		Eastern	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Plain Ware	1436	60.0%	730	55.8%	1210	79.9%	1443	73.3%
Decorated Ware	958	40.0%	578	44.2%	305	20.1%	526	26.7%

44.2% (n=578) and 40% (n=958), respectively, and nearly half the amount in the Southwestern and Eastern Platforms, 20.1% (n=305) and 26.7% (n=526). In Ikehara's (2015, 67) survey of the Moro Pocket, he found there was, on average, ~16% fine ware at settlements throughout the pocket between 800 and 150 BCE. If we consider all decorative ware as fine ware, then Cerro San Isidro has a higher degree of fine ware across the settlement than in other areas within the Moro Pocket, which may support the interpretation of Cerro San Isidro as an elite settlement. In addition, the Upper and Northern Platforms have an even higher degree of fine ware, which arguably makes them more prestigious than the Eastern and Southwestern Platforms. However, the elevated quantity of fine ware could also be linked to functional aspects of the site, perhaps as a population center, where there were more formalized gatherings or events in which these decorated wares were being used.

Drennan (1976, 77) suggests that fine ware was crucial for social events such as feasting, which is an important activity for defining elite and leadership members. But, while fine ware vessels often signal elite participation, as I have noted, it is also important to consider that specialized communal consumption using fine ware could also occur in non-elite contexts. As the previous Section (6.2) noted, there is a high amount of food presentation/serving vessels across all architectural platforms. Within this subsection, I consider the percentage of these artifacts, which were also decorated; these results are shown in Table 6.6 and were statistically evaluated with a chi-square test in R to assess the differences in decorative versus plain serving ware across the different platforms. The test indicates a significant association between the platforms and

Table 6.6: Decorated food presentation/serving ceramics by architectural platform.

	Architectural Platform			
	Northern	Upper	Southwestern	Eastern
Total (N=)	766.0	331.0	487.0	618.0
Decoration	269.0	164.0	140.0	193.0
% Decorated	35.12%	49.55%	28.75%	31.23%

decorative/plain serving ware ($\chi^2(3, N=2202) = 43.10, p < 2.342e-09$). To explore which categories were significant, I applied a post hoc analysis; the standardized residuals and p-values Appendix D, Table D.3. The Upper Platform has the highest amount of decorated serving ware, with nearly 50% of their presentation/serving ceramics being decorated. The test indicated the Upper Platform is the only platform with significant differences in the amount of plain and decorated presentation/serving ware ($p = 0.00000$; standardized residuals: +6.12 for decorated and -6.12 for plain). This prevalence could indicate that the Upper Platform held an elite status or leadership role within the settlement, using these vessels as a visual and material representation of their social and political position.

Research by Chicoine (2008), surveying ceramic material at settlements within the Nepeña Valley, suggests Stamped Circle-and-Dot, Pattern Burnished, and Textile Impressed are fine ware styles distinctive of the EH, examples of which are shown in Figure 6.6. Table 6.7 presents the distribution of ceramic decoration techniques and types by supra-household community. I conducted a chi-square test in R to assess the differences in the three fine ware styles across the different platforms. The test indicates a significant association between the platforms and fine ware ($\chi^2(6, N=822) = 359.73, p < 2.2e-16$). To explore which categories were significant, I applied a post hoc analysis (see results in Appendix D,



Figure 6.6: Examples of Early Horizon fineware styles: A) Patterned Burnished, B) Stamped Circle-and-Dot, and C) Textile Impressed.

Table 6.7: Distribution of Early Horizon (EH) ceramic artifacts by decorative treatment and type, organized by super-household community (Northern, Upper, Southwestern, and Eastern) at Cerro San Isidro.

Decoration		Architectural Platform							
Treatment	Type	Northern		Upper		Southwestern		Eastern	
		n=	%	n=	%	n=	%	n=	%
Appliqué	Red	8	0.33%	1	0.08%	3	0.20%	23	1.17%
	Total	8	0.33%	1	0.08%	3	0.20%	23	1.17%
Burnished	Pattern Burnished	82	3.43%	7	0.54%	59	3.88%	188	9.55%
	Total	82	3.43%	7	0.54%	59	3.88%	188	9.55%
Impressed	Textile	13	0.54%	30	2.30%	10	0.66%	17	0.86%
	Textile (Fine)	19	0.79%	0	0.00%	0	0.00%	0	0.00%
	Textile (Net)	2	0.08%	0	0.00%	0	0.00%	0	0.00%
	Total	34	1.42%	30	2.30%	10	0.66%	17	0.86%
Impressed and Punctate	Paddle Impressed, Quadrangular Punctate	0	0.00%	0	0.00%	2	0.13%	0	0.00%
	Total	0	0.00%	0	0.00%	2	0.13%	0	0.00%
Incised	Banded lozenge	51	2.13%	71	5.43%	18	1.18%	25	1.27%
	Black	2	0.08%	2	0.15%	0	0.00%	3	0.15%
	Post-Fire Scratched	59	2.46%	9	0.69%	25	1.64%	57	2.89%
	Red	73	3.05%	55	4.21%	11	0.72%	26	1.32%
	White	6	0.25%	0	0.00%	0	0.00%	0	0.00%
	Total	191	7.98%	137	10.48%	54	3.55%	111	5.64%
Modeled	Red	0	0.00%	5	0.38%	0	0.00%	0	0.00%
	Total	0	0.00%	5	0.38%	0	0.00%	0	0.00%
Molded	Black	0	0.00%	1	0.08%	0	0.00%	0	0.00%
	Kaolin	0	0.00%	1	0.08%	0	0.00%	0	0.00%
	Red	59	2.46%	0	0.00%	0	0.00%	55	2.79%
	Total	59	2.46%	2	0.15%	0	0.00%	55	2.79%
Painted	Black	6	0.25%	2	0.15%	0	0.00%	1	0.05%
	Green	1	0.04%	6	0.46%	1	0.07%	0	0.00%
	Negative	4	0.17%	0	0.00%	2	0.13%	1	0.05%
	Orange	151	6.31%	1	0.08%	2	0.13%	2	0.10%
	White	8	0.33%	2	0.15%	1	0.07%	1	0.05%
	Orange and White	1	0.04%	0	0.00%	0	0.00%	0	0.00%
	Red	187	7.81%	19	1.45%	0	0.00%	18	0.91%
	Red and Black	1	0.04%	0	0.00%	0	0.00%	0	0.00%
	Red and Orange	46	1.92%	1	0.08%	2	0.13%	4	0.20%
	Red, Orange, and White	5	0.21%	2	0.15%	0	0.00%	0	0.00%
	Red, White, and Black	1	0.04%	0	0.00%	7	0.46%	11	0.56%
	White on Red	63	2.63%	5	0.38%	9	0.59%	25	1.27%
	Total	474	19.78%	38	2.91%	24	1.58%	63	3.20%
Painted and Incised	Red and Black	0	0.00%	1	0.08%	0	0.00%	0	0.00%
	Red and Orange	0	0.00%	0	0.00%	1	0.07%	0	0.00%
	White	0	0.00%	4	0.31%	0	0.00%	0	0.00%
	Total	0	0.00%	5	0.38%	1	0.07%	0	0.00%
Plain	Black	216	9.02%	53	4.06%	13	0.85%	48	2.44%
	Kaolin	85	3.55%	17	1.30%	3	0.20%	27	1.37%
	Red	820	33.88%	636	49.29%	1093	70.59%	1187	59.81%
	Total	1121	46.45%	706	54.65%	1109	71.64%	1262	63.62%
Polished	Black	1	0.04%	0	0.00%	0	0.00%	4	0.20%
	Pattern Polished	7	0.29%	0	0.00%	0	0.00%	0	0.00%
	Red	289	11.88%	32	2.45%	94	6.18%	39	1.98%
	Total	297	12.17%	32	2.45%	94	6.18%	43	2.18%
Press-molded	Black	2	0.08%	0	0.00%	0	0.00%	20	1.02%
	Red	5	0.21%	31	2.37%	90	5.92%	15	0.76%
	Total	7	0.29%	31	2.37%	90	5.92%	35	1.78%
Punctate	Angular Zoned	1	0.04%	1	0.08%	0	0.00%	0	0.00%
	Triangular Zoned Punctate	2	0.08%	19	1.45%	1	0.07%	12	0.61%
	Zoned Punctate	0	0.00%	10	0.77%	1	0.07%	0	0.00%
	Total	3	0.13%	30	2.30%	2	0.13%	12	0.61%
Punctate and Incised	Cylinder Stamped and circular punctate	0	0.00%	0	0.00%	0	0.00%	1	0.05%
	Red	2	0.08%	1	0.08%	0	0.00%	4	0.20%
	Zoned Punctate and incised	0	0.00%	3	0.23%	0	0.00%	0	0.00%
	Total	2	0.08%	4	0.31%	0	0.00%	5	0.25%
Stamped	Circle and Dot	83	3.47%	0	0.00%	0	0.00%	0	0.00%
	Cylinder Stamped	30	1.25%	39	2.98%	11	0.72%	60	3.05%
	Stamped Circle and dot	2	0.08%	240	18.43%	61	4.01%	92	4.67%
	Triangular	1	0.04%	0	0.00%	0	0.00%	0	0.00%
	Total	116	4.85%	279	21.41%	72	4.73%	152	7.72%
Stamped and Incised	Cylinder Stamped	0	0.00%	0	0.00%	1	0.07%	3	0.15%
	Total	0	0.00%	0	0.00%	1	0.07%	3	0.15%

Table D.4). The Eastern Platform has the highest amount of pattern burnished (9.55% of its entire ceramic assemblage) and the residuals show this concentration is significantly higher than expected (residual = 9.84, $p < 0.001$). By contrast, the Upper Platform has the lowest percentage of Patterned Burnished (0.54%) with statistical significance (residual = -15.94, $p < 0.001$). The Upper Platform has the highest amount of Stamped Circle-and-Dot ceramics (18.36%), with a strong significant residual (15.79, $p < 0.000$), while the Eastern and Northern Platforms show significantly less than expected (-7.37 and -10.89, respectively, $p < 0.0000$). Lastly, although a small portion of the overall assemblage (1.42%), the Textile Impressed ceramics have significantly higher than expected concentration in the Northern Platform (standardized residual = 6.64, $p < 0.001$).

These results indicate that fine ware styles were concentrated in different ways across the supra-household communities. The presence of multiple communities with significantly distinct concentrations of fine ware styles suggests that Cerro San Isidro was a relatively wealthy settlement overall, however wealth and status were not centralized but dispersed across different supra-household communities, each demonstrating elite characteristics through ceramic assemblages. The variability in fine ware styles highlights a complex and stratified social landscape where multiple elite groups may have coexisted. That said, interpreting fine ware as a marker of elite status requires caution – not all decorated vessels necessarily indicate elite use, as such items can circulate in non-elite contexts. Without further contextual data, such as consumption contexts and other associated material culture, it is difficult to tie decorated ceramics to elite individuals definitively. So, here I use these tentatively to support the argument made by Hugo Ikehara (2015) and provide more context to these communities, but future work is needed to build a more robust picture of social roles and status at Cerro San Isidro.

It is also important to consider that these different styles could reflect supra-household community identity and heritage that they brought into the settlement with them, or an overall aesthetic preference by certain communities. Each supra-household community exhibits a distinctive ceramic technique that stands out relative to the others; the distribution of these techniques can be seen in Figure 6.7. The Upper Platform features stamped ware at 21.35% (n=279), far surpassing the 4.73-7.72% found in other communities. The Northern Platform leads in polished ware at 12.41% (n=297), compared to the 2.18-5.92% seen elsewhere, and has the highest percentage of painted ware at 19.80% (n=474), compared to 1.58-3.20% in other areas. The Southwestern Platform is characterized by an exceptionally high proportion of plain ware,

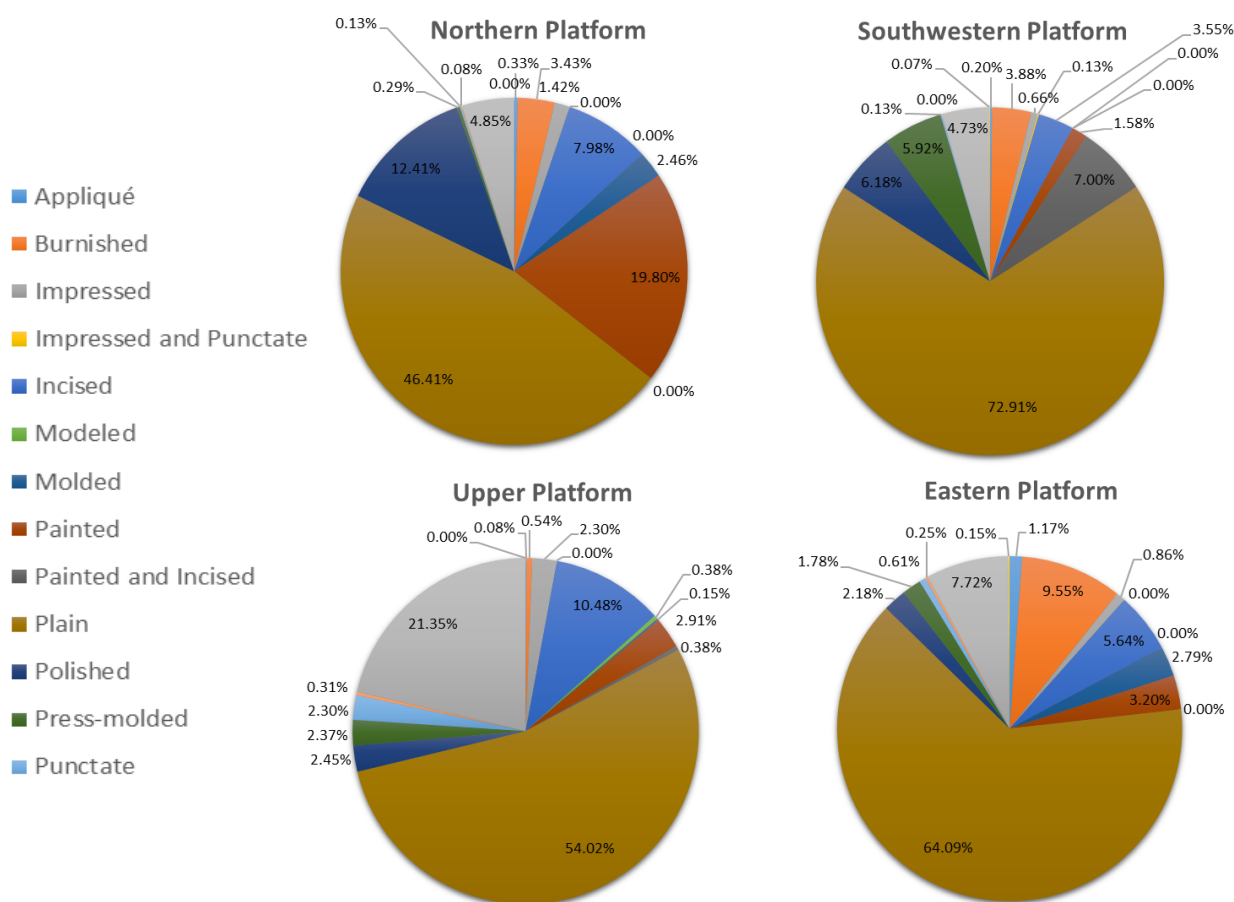


Figure 6.7: Pie charts representing the distribution of ceramic vessel decoration types by architectural platform.

with 72.91% (n=1109), while other communities have 46.83-64.09%. Finally, the Eastern Platform stands out for its burnished ware, which constitutes 9.55% (n=188), compared to just 0.54-3.88% in other regions. The distinct preferences for certain ceramic techniques could be a marker of group identity, signifying the cultural heritage that each community brought with them, or it may indicate localized economic practices, with certain styles being more valued or accessible in different areas of the settlement³. Ultimately, the differences in ceramic assemblages highlight a complex and multifaceted social landscape, where diverse communities maintained unique identities while interacting within the broader socio-political structure of the settlement.

The ceramic data from the four supra-household communities at Cerro San Isidro suggest the presence of high-status individuals, although the level of status varied across the settlement. The distinct concentrations of decorative ware, particularly in the Upper and Northern Platforms, point to a higher degree of wealth and status in these areas compared to the Southwestern and Eastern Platforms. Additionally, the abundance of decorative serving ware, along with the prevalence of Stamped Circle-and-Dot and Textile-Imprinted ceramics, further indicates that the Upper Platform maintained the highest status. Overall, the high distribution of fine ware ceramics across the settlement, in comparison to surrounding areas, underscores the high status nature of the settlement's residents. However, the variability in fine ware proportions across different communities suggests the existence of multiple, varying levels of elite groups within the settlement. The distribution of fineware proportions reflects a continuum of socio-economic variation at Cerro San Isidro, with varying levels of influence. However, the diversity in ceramic

³ This distinction could be tested archaeologically through technical and compositional analysis, which can help determine whether different communities employed distinct production techniques—pointing toward cultural traditions—or whether similar techniques were used across the site, pointing instead to localized access or differential preference for ceramic styles.

styles between the communities could also reflect community identity and heritage, adding another layer of complexity to the socio-political structure of Cerro San Isidro. Therefore, while the ceramic data support the presence of high status individuals within these communities, it also highlights a more nuanced and stratified social landscape.

To contextualize social differentiation at Cerro San Isidro, it is useful to compare this dataset with ceramic assemblages from Caylán, Huambacho, and Samanco, specifically decorated versus plainware. I again reference Caylán, Huambacho, and Samanco ceramic material presented by Sutherland (2017, Figure 5.10), who assessed the frequency of decorated and plain rim sherds at these settlements. Table 6.8 presents a comparison of these two datasets. At Cerro San Isidro, as I noted previously, the distribution of fineware across the four architectural platforms is uneven, with significantly more than expected fineware in the Upper and Northern Platforms. However, on average, the assemblage at Cerro San Isidro comprises 33% fine ware, which starkly contrasts the 3-5% decorated ceramics at the coastal settlements. This suggests, and perhaps confirms, the assumption that Cerro San Isidro is a high-status settlement, particularly in comparison to the lower coastal settlements. But the methodological differences between the projects likely inflate the proportion of decorated ceramics at Cerro San Isidro as diagnostic ceramics, including rim sherds and decorated ware, were collected. In contrast, only rim sherds were considered in Sutherland's (2017) comparison of Caylán, Huambacho, and Samanco ceramic assemblages. This difference in collecting strategies may amplify the number of decorated ceramics at Cerro San Isidro due to the inclusion of decorated body sherds. Even so, the large disparity in frequency of decorated materials is significant

Table 6.8: Comparison of plain and decorated ceramic wares across architectural platforms at Cerro San Isidro and at three lower coastal settlements, Caylán, Samanco, and Huambacho. Comparative data for the coastal settlements are derived from Sutherland (2017), Table 5.10

	Cerro San Isidro Architectural Platform (n=5732)								Caylán (n=1,133)		Samanco (n=1,374)		Huambacho (n=1,142)	
	Northern (n=1879)		Upper (n=1087)		Southwestern (n=1227)		Eastern (n=1539)		n=	%	n=	%	n=	%
Plain ware	1436	60%	730	56%	1210	80%	1443	73%	1098	96.91%	1300	95%	1093	96%
Decorated Ware	958	40%	578	44%	305	20%	526	27%	35	3.09%	74	5%	49	4%

enough that it may not be fully explained by collection strategies alone. Thus, pointing toward the comparatively high status nature of Cerro San Isidro.

6.4 Conclusions

By bringing together ceramic typologies, architectural styles, and radiocarbon dates, I have established a more refined understanding of the temporal framework of Cerro San Isidro, specifically creating an architectural map that is reflective of the EH. By using ceramic styles and radiocarbon dates as chronological anchors, I hypothesize that Cerro San Isidro was consistently occupied across the 16 architectural platforms during the EH. But, as I note in Chapter 2, scholars typically break down the EH into subphases that correlate to significant geopolitical changes occurring in the valley at this time. Future work would benefit from refining this time frame into these smaller intervals to create a clearer picture of how spatial organization changed throughout the EH.

The ceramic analysis reveals variations in vessel types across the supra-household communities, which could suggest preferences in food storage, cooking, and presentation across the communities. In terms of social stratification, the high proportion of fine ware across the four supra-household communities, compared to the broader context of the Moro Pocket during the EH, suggests that the elite status of Cerro San Isidro, as presented by Ikehara (2015), is accurate. However, there was a higher proportion of fine ware ceramics in the Northern and Upper Platforms, and a higher portion of fine serving ware in the Upper Platform, suggesting that there may have been social differentiation within the settlement. In summary, this suggests that during the EH, Cerro San Isidro was likely an elite population center with varying levels of elite communities within the settlement.

7 Viewscape in Focus: Identity Through Visual Experience

Inhabiting an urban settlement is much more than occupying a physical space; it is about the experience of living there, including one's view of the surrounding landscape. Viewscapes or line-of-sight views play a crucial role in how people experience their surroundings (Bernardini et al. 2013; Bongers et al. 2012; Llobera 1996; Rua et al. 2013; Sakaguchi et al. 2010). In Chapter 3, I established that shared spatial experiences—particularly through movement and visibility—were fundamental in fostering social cohesion and community identity within supra-household communities. In this chapter, I shift to visual experience. Visual experiences play a critical role in the construction of identity (Ingold 1993; Johnson 2012; Thomas 1996). In this chapter, I show how shared visual experiences created a sense of collective identity within supra-household communities in early Andean cities like Cerro San Isidro. I investigate the relationship between visibility, community identity, and shared experience by asking three questions:

1. *Do the viewscapes of the four supra-household communities under study at Cerro San Isidro bring into focus specific landmarks, architecture, or spatial configurations, such as mountain peaks, wak'as, water, or resources?* As I show in Section 3.4, Andean communities have a strong connection to the landscape, and the visibility of such features may have shaped their sense of identity and belonging. By assessing which features are more prominent to each community, we can begin to understand how the visibility of landscape elements contributed to location experiences of space and formed communal identities.
2. *How might visibility have constituted power relationships between these supra-household communities?* As I review in Section 3.4, researchers (Foucault 1977; Van Dyke, et al. 2016; Yekutieli 2007) have suggested that unidirectional visibility, that

is, to see but not to be seen, indicates power differentials and highlights the visual dominance of others. By examining whether some communities were visually dominant over others, we can assess how spatial experience shaped ideas of authority and inclusion and ultimately how it contributed to cooperation and identity within and between the supra-household communities. Similarly, in Chapter 6, I note the ceramic assemblage suggests the Upper Platform may have had a higher status than the other supra-household communities; evaluating visual dominance allows us to explore whether visibility supports or contradicts that interpretation.

Visibility refers to structures or landscape features seen from a site or across a landscape. This can include elevated locations within a settlement as well as entire settlements when strategically located on prominent features, such as knolls, hills, or mountains. Visibility analysis has proliferated in archaeology in recent years due to advances in GIS, making visibility modelling accessible through viewshed algorithms, which are widely available to archaeologists and particularly easy to run (Bourgeois 2013; De Montis and Caschili 2012; Domingo et al. 2020; Gillings and Wheatley 2020; Intxaurbe et al. 2022; Kim et al. 2020; Sevenant and Antrop 2007). Similarly, visibility analysis has been particularly prominent throughout the Andes due to the importance of viewsapes to local indigenous peoples, particularly around sacred and powerful spaces, such as mountain peaks and ritual centres (Bray 2015b; Jennings and Swenson 2018).

In the following chapter, I interpret the viewsapes from each supra-household community to draw conclusions on how visibility influenced community cooperation and identity at Cerro San Isidro. As laid out in Section 3.4., I will employ a combination of interpretive, economic and political landscape approaches when interpreting the data. The approaches include

examining how the features influence the lived experiences of communities while also recognizing the economic significance of visibility and exploring how these features may have been shaped by and impacted power dynamics.

7.1 Analysis and Interpretations of Viewscapes at Cerro San Isidro

The results of the viewshed analysis from each supra-household community are presented in Figure 7.1. The results highlight that while many overlap, each community had a different viewscape. To provide an analysis of how visual experience may have fostered a sense of collective identity within each supra-household community, it is necessary to assess the archaeological and landscape features that define each viewscape. Here, I address my research question: *Do the viewsapes of the four supra-household communities under study at Cerro San Isidro emphasize specific landmarks, architecture, or spatial configurations?* I begin by discussing the unique characteristics of each community's viewsapes. This will involve an exploration of natural and anthropogenic elements that may have influenced their visibility experience. I will then consider how these viewsapes may have influenced cooperation and cohesion within the supra-household communities.

Upper Platform

The Upper Platform community is located at the highest point of the settlement with a near-complete view of Moro Pocket (Figure 7.2a). Figure 7.2b shows how the Upper Platform's visibility overlaps with different settlement types that were occupied during the Early Horizon. Every known Early Horizon ceremonial site is visible from this platform. The visibility of these ceremonial centers by the Upper Platform residents suggests they were a vital part of the community's cultural and social structure. It is possible that the first residents of this community made an active decision to select this location to ensure these ritual spaces remained prominent

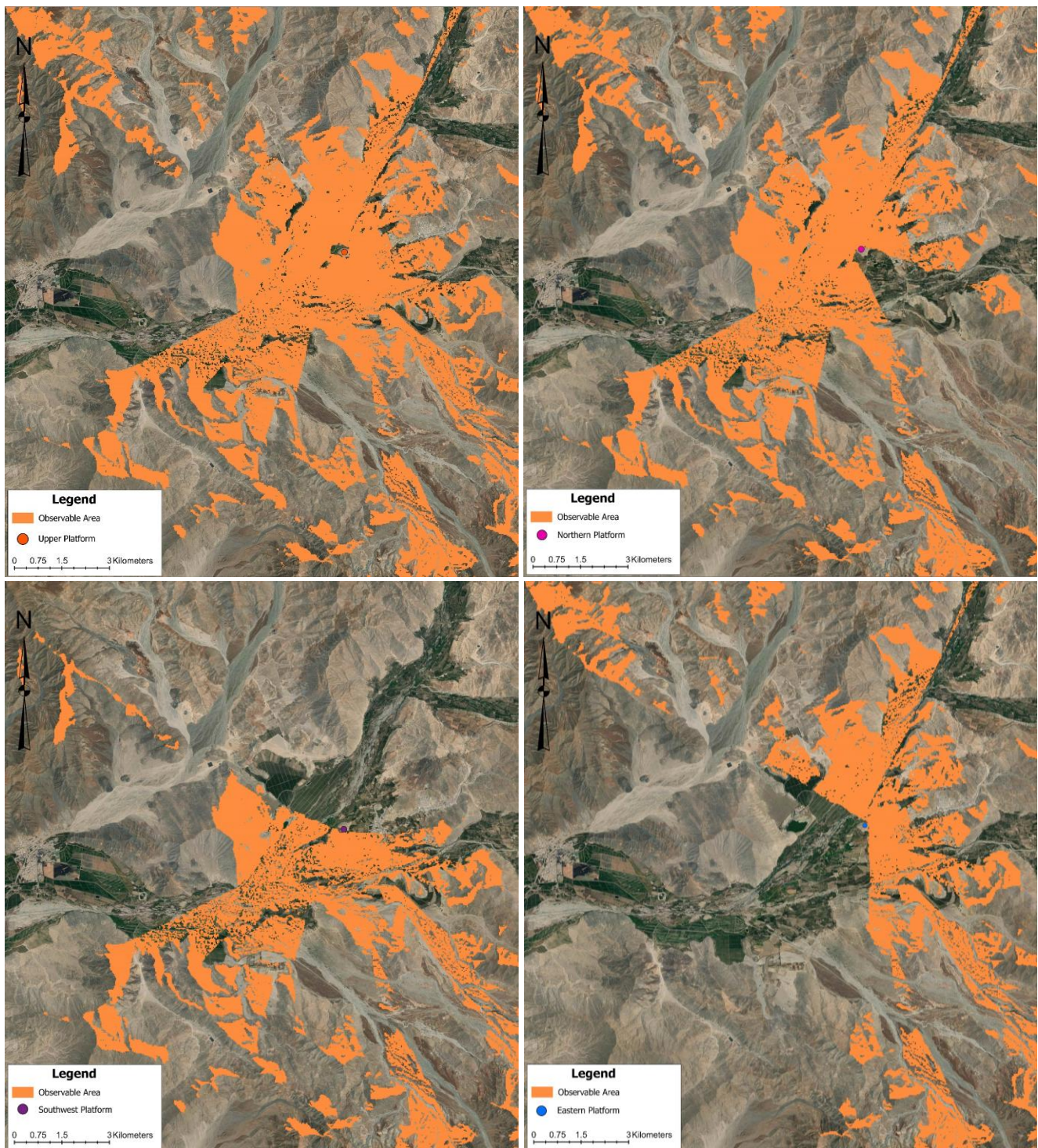


Figure 7.1: Viewsheds from the center point of the four supra-household.

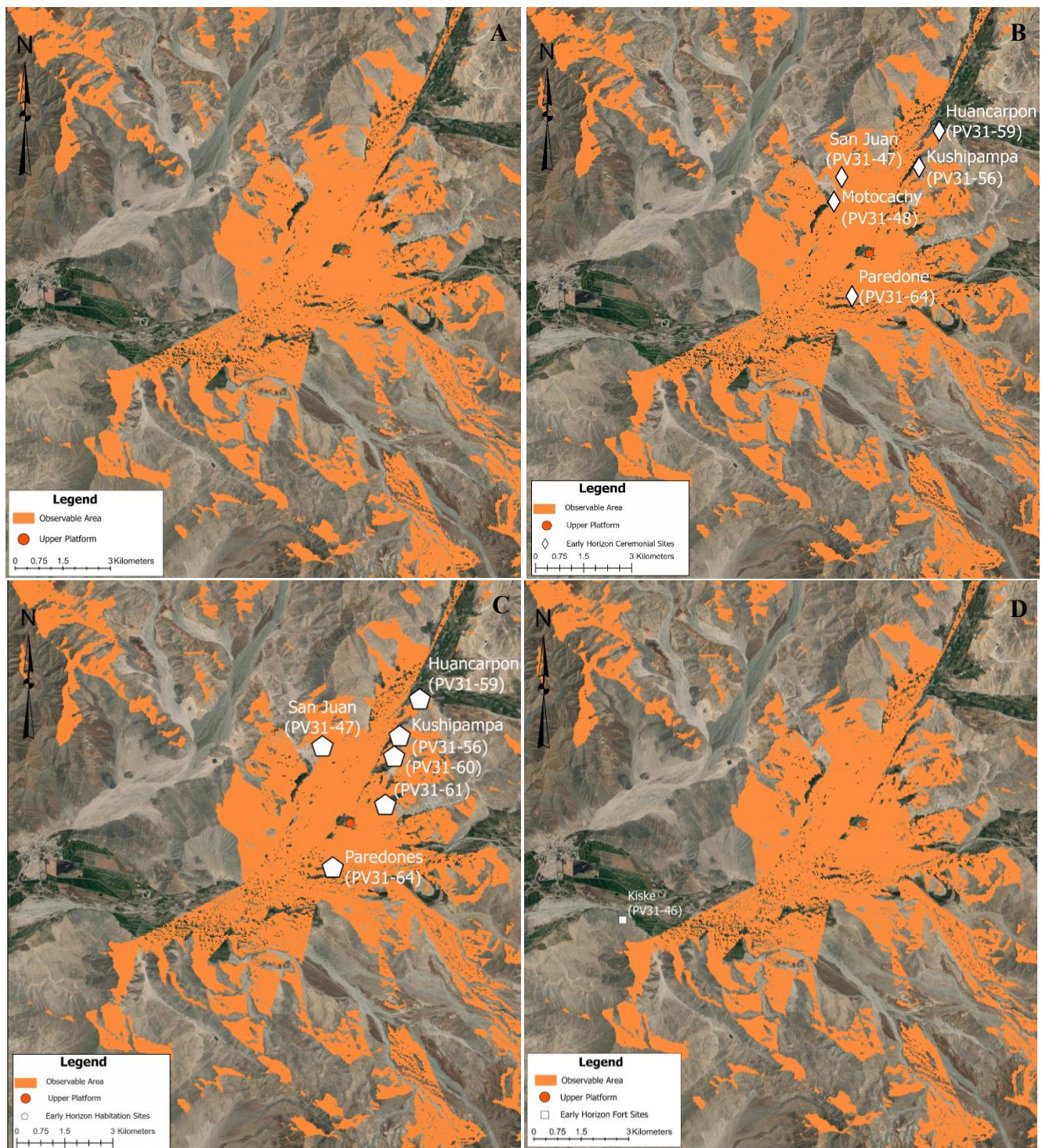


Figure 7.2: Viewshed analysis from the Upper Architectural Platform Supra-Household Community at Cerro San Isidro. A) Base viewshed from the Upper Platform. B) Viewshed showing visibility of EH ceremonial sites. C) Viewshed showing visibility of EH habitation site. D) Viewshed showing visibility of EH fort sites.

and visible; doing so would have emphasized the importance of ritual activities to the community members. The submit location of the Upper Platform may itself have held sacred importance long before residential construction began, and it is possible the huanca stone was set here prior to the ceremonial sanction, which could also influence the choice of settling here.

Additionally, if we assume the EH ceremonial centers located in the Moro Pocket were a form of *Wak'a*, as I note in Section 3.4, the visibility of the centers could be seen as falling under the watching eye of this animate being. The visibility of the ceremonial spaces could also indicate their significance as places of gathering for the community, sites where the community comes together for events. As noted in Chapter 5, there is no clearly visible large open space or plaza that we can date to the Early Horizon on the slopes and platforms at Cerro San Isidro. But the area between Puente Piedra and Cerro San Isidro, today partially covered by modern plantations and intrusive pre-Columbian cemeteries, may have served for public gatherings during the Early Horizon. As such, the ceremonial centers within the landscape may have been important public ritual site for the residents at Cerro San Isidro. Daily visual interaction with the ceremonial centers may have played a crucial role in the formation of the Upper Platform's identity; it served as a point of connection for the people and reinforced their shared beliefs. The community members had a visual relationship to the ceremonial spaces, which would emphasize social, ritual, and ideological connections; the shared daily visual experience of the ceremonial centers creates a sense of belonging and identity for the inhabitants of the Upper Platform community. Similar examples can be found in Bernardini and Peebles (2015), Van Dyke (2011), and Van Dyke et al. (2016).

The Upper Platform residents may have had a significant view of the surrounding mountain peaks, which could have played an important role in their daily lives. The visibility of

these peaks (such as San Juan) may have created a sense of connection and guardianship within the community, as suggested by Bolin (1998) and Isbell (1978) in their studies of Andean highland communities. As I reviewed in Chapter 3, mountain peaks hold deep significance for Andean peoples, and it is possible that this view contributed to both strategic and symbolic considerations. The highland vantage point may have allowed residents to monitor movement into the valley pocket while also fostering a connection to the surrounding landscape.

While Kiske (PV31-46), the fort location at the valley base, is not visible from the Upper Platform (Figure 7.2d), all noted EH habitation sites are visible. The visibility of all habitation sites indicates the strategic importance of the Upper Platform's vantage point for monitoring and surveillance of the residents of the Moro Pocket during the EH. Cerro San Isidro was an important population center for the pocket at this time; the fact that most, if not all, habitation sites were visible from the Upper Platform suggests that the community was well-positioned to keep an eye on the activities of the pocket. While the edges of the Upper Platform were likely visible from below, due to its elevated position, the people atop it may not have been – reinforcing unilateral visibility (see Section 3.4) suggests a power differential between groups (Foucault 1977; Van Dyke et al. 2016). The Upper Platform residents, positioned at an elevated vantage point, would have visual control over the valley below, reinforcing their authority through the act of being seen. Such visual prominence may have contributed to social inequality (Kosiba and Bauer 2012). The visibility from the Upper Platform could serve as a continuous reminder to both the residents and those below of their differential status, shaping their daily experiences within the settlement. Similarly, as shown in Figure 7.3, the Upper Platform has clear visibility of critical water resources (the Nepeña and Loco Rivers) within the Moro Pocket, including vision upward toward the highlands, where the rivers originate. Additionally, if the

ancient road located within this valley was present during the Early Horizon, the Upper Platform also had visibility of the entirety of the road throughout the pocket. The Upper Platform, then, is ideally positioned to monitor both critical resources and the movement of people into and out of the Valley.

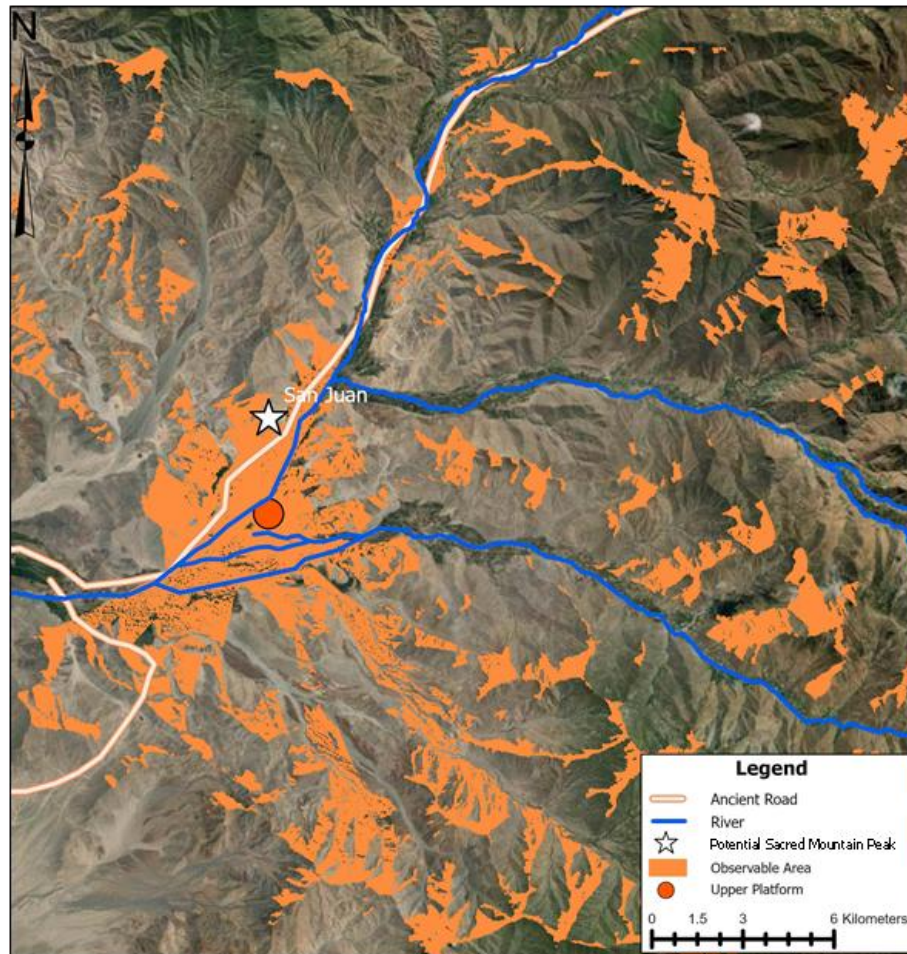


Figure 7.3: Viewscape of landscape features from the Upper Platform Supra-Household Community.

The location of the Upper Platform settlement suggests that its first inhabitants may have selected this site for strategic monitoring and defensive purposes, as well as for its visibility of the surrounding ceremonial spaces. As I discussed in Section 2.2.2, during the Early Horizon, warfare along the coast increased, making elevated, easily defensible positions with broad visibility especially desirable. Over time, the continuous inhabitation of this elevated area may

have contributed to reinforcing a collective sense of power and authority within the valley, as the ability to see and be seen could have shaped social perceptions of authority and status.

Additionally, establishing a settlement atop what was likely an important sacred space—marked by its summit location and the presence of a huanca stone—would have imbued the community with powerful symbolic meaning for its inhabitants.

Northern Platform

The viewscape from the Northern Platform is shown in Figure 7.4a. The viewscape of ceremonial sites within the Moro Pocket, as identified in Figure 7.4b, is identical to that of the Upper Platform. Thus, the decision to inhabit the Northern Platform could have been influenced by the visibility of the ceremonial spaces. Additionally, the visibility of ceremonial spaces would influence the daily experiences of the Northern Platform residents. This viewshed would have enhanced a sense of community identity associated with ritual activities, as the residents would be reminded of their traditions on a daily basis. Similarly, if the megalithic ceremonial centers were considered animate *wak'as*, their visibility could have created deep and intimate relationships between the community members and the *wak'as*. The *wak'as* may have been seen as active participants in the community's daily life, imbuing the space with a sense of cultural and sacred significance. The same phenomenon is possible for mountain peaks; Northern Platform community members' view toward the highlands encompasses multiple mountains. This may have strengthened the community's sense of identity by offering shared visual reference points that held cultural or symbolic significance, reinforcing a collective connection among community members.

The community members had a clear view of the valley opening toward the coast and highlands; however, their view toward the southeast was more restricted. This viewscape may

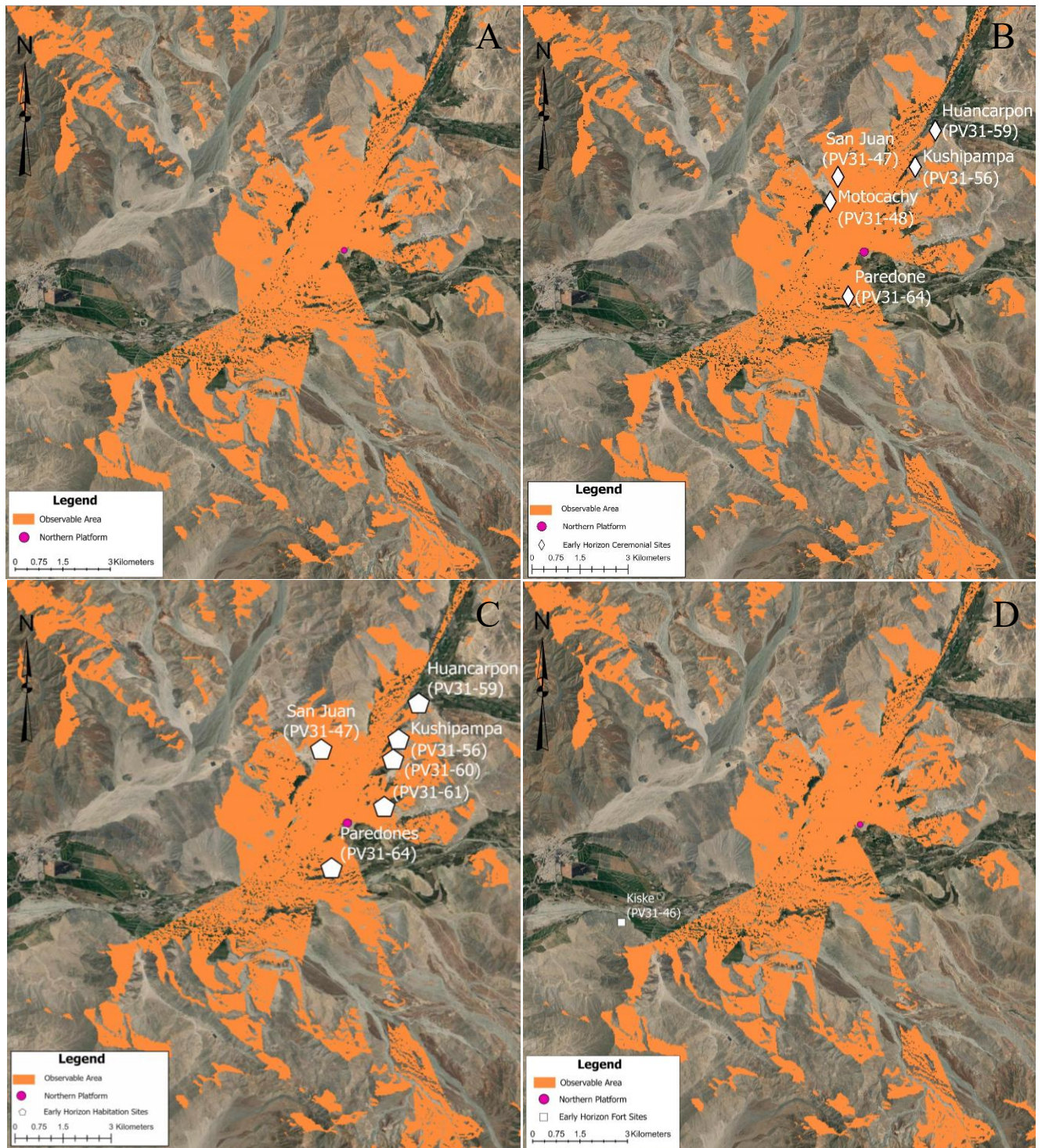


Figure 7.4: Viewshed analysis from the Northern Architectural Platform Supra-Household Community at Cerro San Isidro. A) Base viewshed from the Northern Platform. B) Viewshed showing visibility of EH ceremonial sites. C) Viewshed showing visibility of EH habitation sites. D) Viewshed showing visibility of EH fort sites.

have been significant for security and monitoring, as Ikehara (2022) suggests that threats during the EH came from the north and northwest, potentially skewing the design of visibility towards those directions. Given the proximity of the ancient road and the closest water source (Figure 7.5), the settlement's location may have provided an economic advantage by allowing residents to monitor the movement of people and water into and out of the valley, aligning with economic-based approaches to viewshed analysis (see Section 3.4.1). However, their ability to oversee the entirety of the valley and southern water resources was limited, particularly in comparison to the Upper Platform members, whose position obstructed views toward the southeast. While Northern Platform residents could not see the Upper Platform members directly due to the steep slope, the Upper Platform's presence would have been apparent, potentially influencing social dynamics. The perception of being watched may have shaped behavior, reinforcing power differences between the two groups. From a political landscape perspective, visibility—and the ways in which it structured interactions—may have played a role in shaping relationships between the different platforms across the settlement.

The visual experience of the Northern Platform members may suggest that their location was selected for its defensible visibility, enabling them to monitor movement in and out of the valley, as well as observe sacred spaces. While we cannot definitively say why the Northern Platform settlement was chosen, the daily experience of living in this space likely influenced how its residents engaged with their surroundings. Its location may have provided some economic advantages, such as partial oversight of resources, aligning with economic-based approaches that emphasize settlement placement in relation to resource control (Kosiba and Bauer 2012). The settlement's visibility of ceremonial spaces also suggests an interpretive dimension, where daily interactions with the landscape may have reinforced cultural meanings

and social connections (Chapman 2003; Gaffney et al. 1996). From a political landscape perspective, living in a place with sightlines to ritual centers could have contributed to expressions of authority and belonging, as visibility and movement shape social experiences (Kosiba and Bauer 2012).

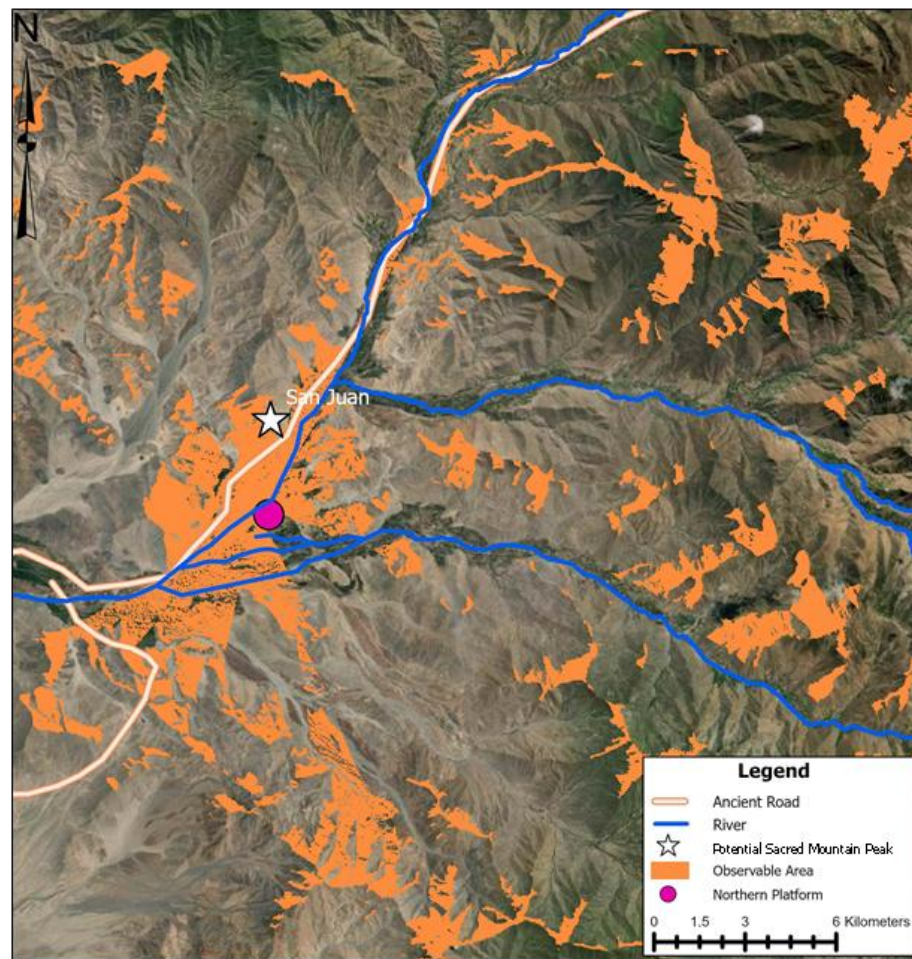


Figure 7.5: Viewscape of landscape from the Northern Platform Supra-Household Community.

Southwestern Platform

The Southwestern Platform is the lowest-positioned supra-household community under study in this project. The most visible structure here is a ~50x50m stone wall enclosure built during the Late Intermediate Period. Vertical excavations revealed that the sector was occupied

as early as the Early Horizon. As shown in Figure 7.6(b), the community members had little visibility of ceremonial centers located in the Moro Pocket; in fact, their viewscape only includes two sites: Paredones and Kiske. Similarly, the view toward the highland and mountain peaks is also restricted. The limited visibility suggests this settlement location may not have been chosen for the visibility of these ceremonial spaces, or perhaps they did not have the same kinds of choices in selecting their locations as other supra-household communities. Alternatively, the community members have a clear line of sight in the direction of the coast, even though the coast itself was not visible, and the convergence of the water directly west of Cerro San Isidro (See figure 7.7).

Water appears to be a great part of this community's daily visibility; this could suggest the importance of water to the community's cultural and social beliefs. Cerro San Isidro was one of the larger population centers in the valley, and it's likely that its earliest residents came from a range of different backgrounds. Places like this often drew people in — urban centers tend to become gathering points for individuals from different backgrounds (Pacífico 2019). The prominence of the rivers and the coastal view from the Southwestern Platform could suggest that the early members of this community viewed water as an important aspect of their belief system. Water could be a reflection of the early members of this community's belief system, indicating that water held significant spiritual or cultural importance. It's possible that the community members originated from the coast, which would explain their preference for a view of the coast over a view of the highland. A view of the highland would provide a better vantage point for monitoring movement and protecting the water source, this could suggest the decision to look toward the coast was reflected in important cultural and social beliefs. Over time, the act of daily engagement with this coastal view may have reinforced a shared group identity, shaping the

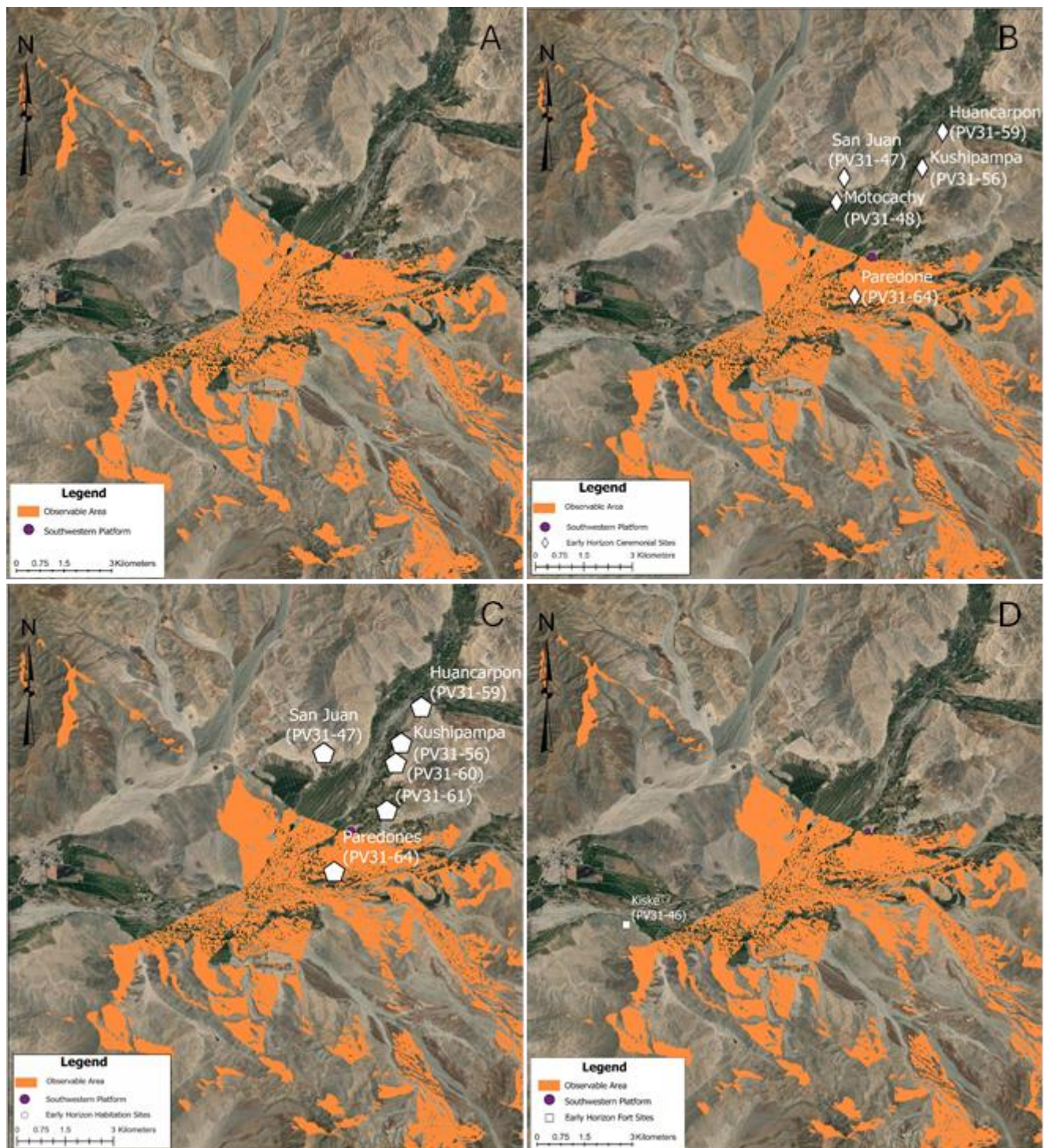


Figure 7.6: Viewshed analysis from the Southwestern Architectural Platform Supra-Household Community at Cerro San Isidro. A) Base viewshed from the Southwestern Platform. B) Viewshed showing visibility of EH ceremonial sites. C) Viewshed showing visibility of EH habitation sites. D) Viewshed showing visibility of EH fort sites.

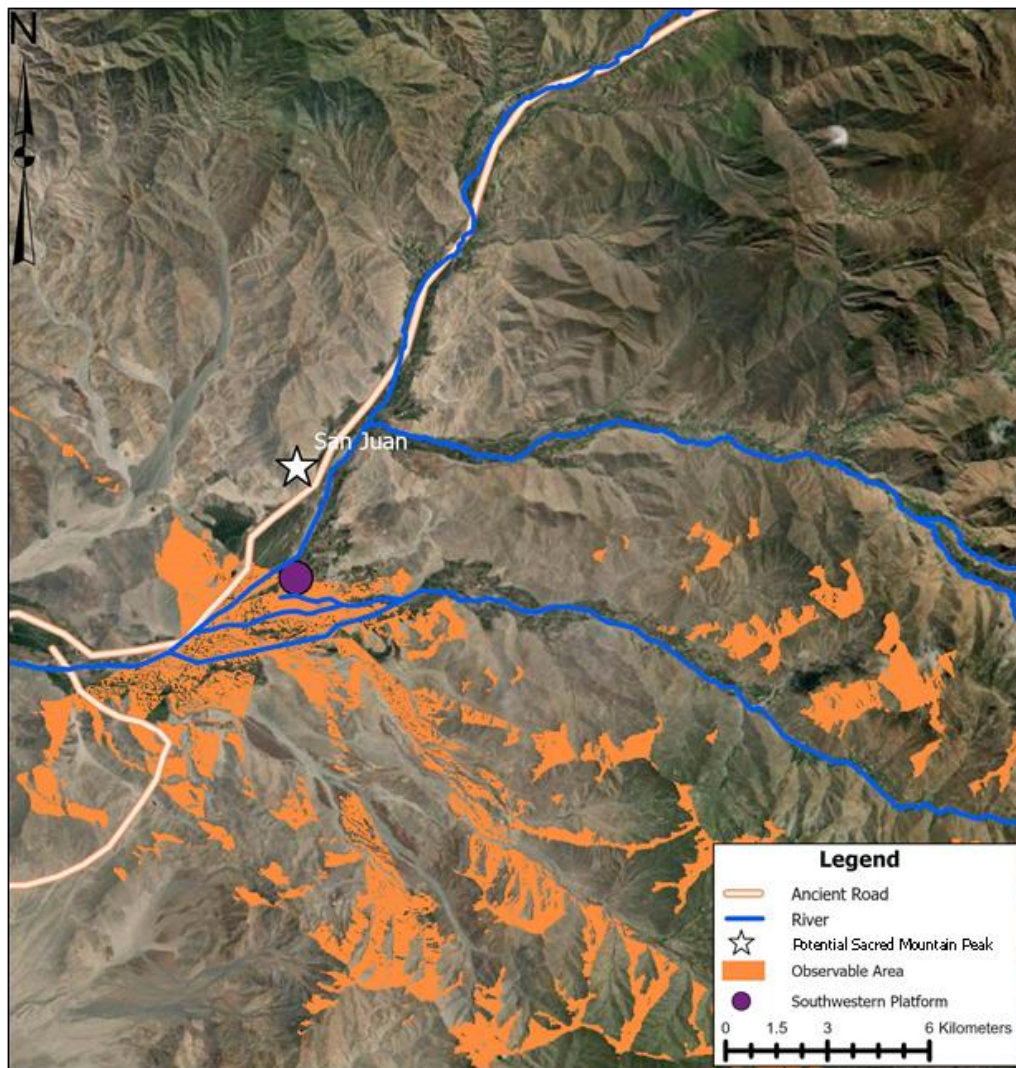


Figure 7.7: Viewscape of the landscape from the Southwestern Platform Supra-Household Community.

ways in which later generations understood their relationship to their environment. The continued occupation of the Southwestern Platform could have further solidified these connections, as later inhabitants inherited and reinterpreted earlier associations with water and the coast. Such an ongoing relationship with the landscape may have influenced not only identity but also the ways in which cooperation and community cohesion were maintained over time.

The Southwestern Platform has a clear view of Puente Piedra (~315m to the west), which once held a temple and was part of the same complex as Cerro San Isidro. From an interpretive perspective, the daily visual encounter with Puente Piedra could have reinforced a sense of

historical continuity and connection to ancestral traditions (Kosiba and Bauer 2012; Tilley 1994). Settlement locations may have been chosen to maximize the visibility of older monuments (Section 3.4), thereby creating a tangible link to the past. A similar process may have been at play with the Southwestern Platform—its position could have been deliberately selected to maintain a visual and symbolic connection to Puente Piedra, reinforcing communal ties to earlier traditions and embedding the past into the lived experience of later inhabitants.

Similarly, the community's residences had an unobstructed view of the low-lying terrain that lay between Cerro San Isidro and Puente Piedra. As noted in Chapter 5, additional residents of Cerro San Isidro may have occupied the low-lying terrain, and the area may have also contained a public plaza. The ability of the Southwestern Platform members to oversee these spaces and their inhabitants visually could have contributed to a sense of influence or authority over the area. However, the community's viewscape toward the northwest is dominated by Cerro San Isidro itself. This spatial positioning may have reinforced a power differential within the settlement. Being in a lower position relative to the rest of Cerro San Isidro could have fostered a sense of subordination or marginalization in relation to higher-elevation communities, who may have been perceived as having greater visual access to key social or ceremonial spaces (Foucault 1977; Van Dyke, et al. 2016; Yekutieli 2007). Spatial hierarchy can be seen at other Andean settlements, such as Chavín de Huantar, where the elevated temple complex served as a central force over the dispersed communities in the lower-lying region (Burger 1992). The visual experience of looking up at the settlement, while also looking down over the fields, may have played a role in shaping the Southwestern Platform community's identity, situating them in an intermediary position between the agricultural landscape and the broader urban network. From a phenomenological perspective, the daily experience of such visual contrast—overseeing certain

areas while being visually enclosed by the larger site—may have reinforced both connections and distinctions between the Southwestern Platform and the rest of Cerro San Isidro.

The limited visibility of ceremonial centers and other settlements within the Moro Pocket suggests that religious or political integration with the broader urban landscape may not have been a primary factor when the community established its location. Instead, perhaps their view of the river convergence, low-lying terrain, and the coast suggests strategic emphasis on maritime or ecological factors. This stands in contrast to other supra-household communities within Cerro San Isidro, whose views may have been strategically aligned with ceremonial or defensive needs. However, the Southwestern Platform location may have been selected for other reasons, such as limited availability of space elsewhere or a lack of other options, meaning that practical constraints may have shaped their position as much as intentional priorities. It is also possible that their location was selected—whether by the community themselves or through broader coordination, perhaps by local authorities—to fulfill specific functions that supported the needs of the wider settlement and its other supra-household communities. So, their position may reflect a complementary role within Cerro San Isidro's internal organization.

While we cannot be certain that the visibility of the river convergence, the coastal entrance, and the low-lying area directly influenced the initial decision to settle on the Southwestern Platform location, the repeated visual engagement with these landscape features likely played an active role in shaping the community's sense of identity (Tilley 1994). Over generations, continual exposure to this visual landscape would have fostered an embodied relationship with the environment, reinforcing a shared understanding of place and belonging. The view of the low-lying terrain, river convergence and coastal orientation may have encouraged distinct forms of social organization and cooperation, differing from communities

with stronger visual ties to ceremonial centers and settlements within the Moro Pocket. From an economic perspective, the viewscape from the Southwestern Platform may have been particularly advantageous for managing water and agricultural resources, especially within the fields between Cerro San Isidro and Puente Piedra. Overall, through daily interactions with the coastal environment, later generations may have reinforced or reinterpreted earlier cultural associations with this viewscape, strengthening their shared identity and collective practices over time.

Eastern Platform

The Eastern Platform community is located on the Eastern face of Cerro San Isidro and is one of the many architectural platforms located on the Eastern face. Due to their position, the viewscape of the community toward the West is blocked by the Cerro San Isidro. Their viewscape of the valley is then limited toward the northeast (Figure 7.8a). However, the community members were still able to see the majority of the EH ceremonial sites, including Kushipampa and San Juan (Figure 7.8b). Similarly, they were able to see all but one habitation site (Figure 7.8c). As with the Upper and Northern Platforms, the Eastern Platform community members would have had daily visual interaction with these ceremonial spaces. Visual interaction with ceremonial spaces would have influenced the members' daily experience and provided a ritual link between the community members and the ceremonial sites. It would have fostered a sense of belonging and spiritual connection among community members, which is essential in creating and reinforcing a community identity.

The Eastern Platform members have a clear, unobstructed view of the highlands and nearby water sources (Figure 7.9). If mountain peaks held similar importance for the Eastern Platform community as they did for other coastal Andean groups, the visibility of the mountain

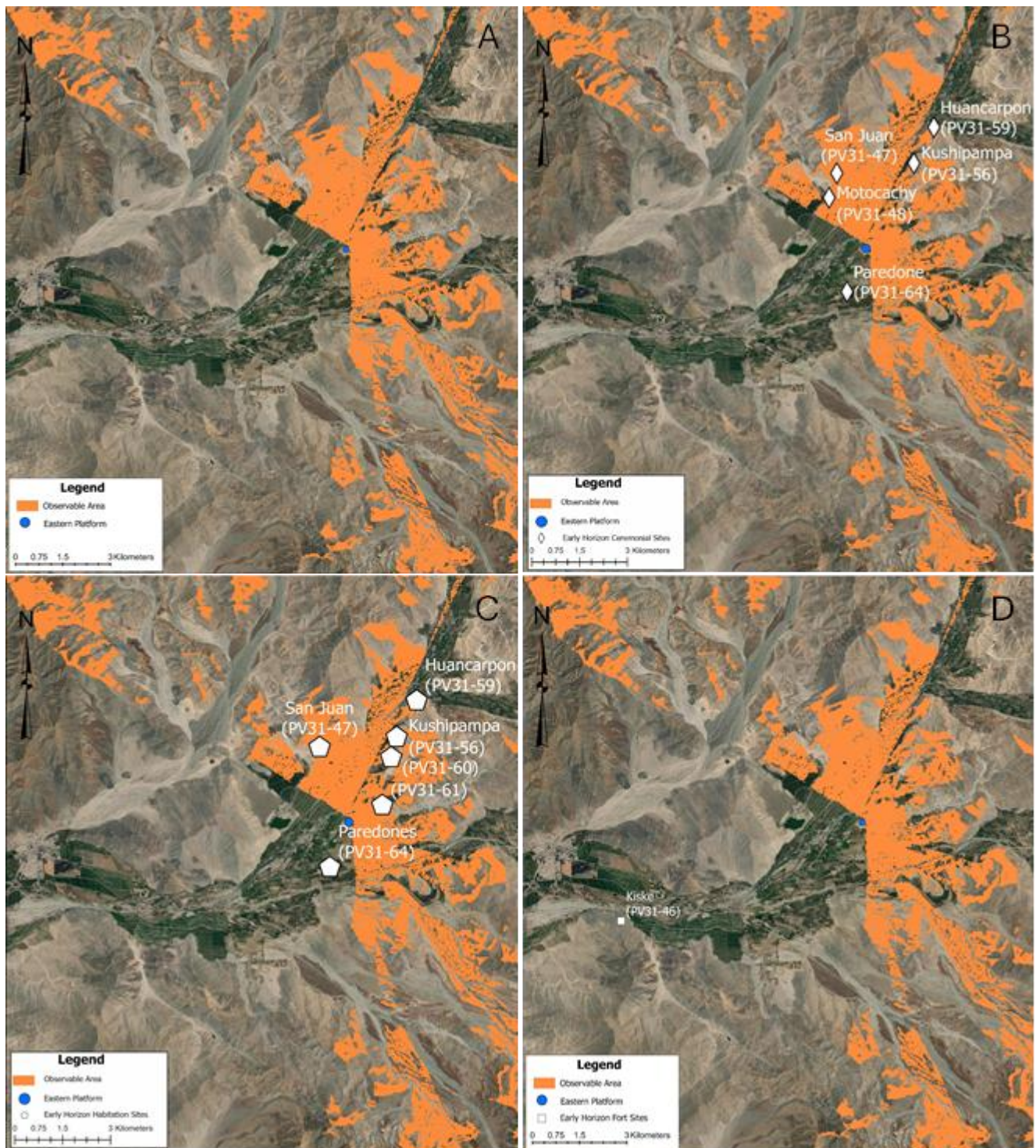


Figure 7.8: Viewshed analysis from the Eastern Architectural Platform Supra-Household Community at Cerro San Isidro. A) Base viewshed from the Eastern Platform. B) Viewshed showing visibility of EH ceremonial sites. C) Viewshed showing visibility of EH habitation sites. D) Viewshed showing visibility of EH fort sites.

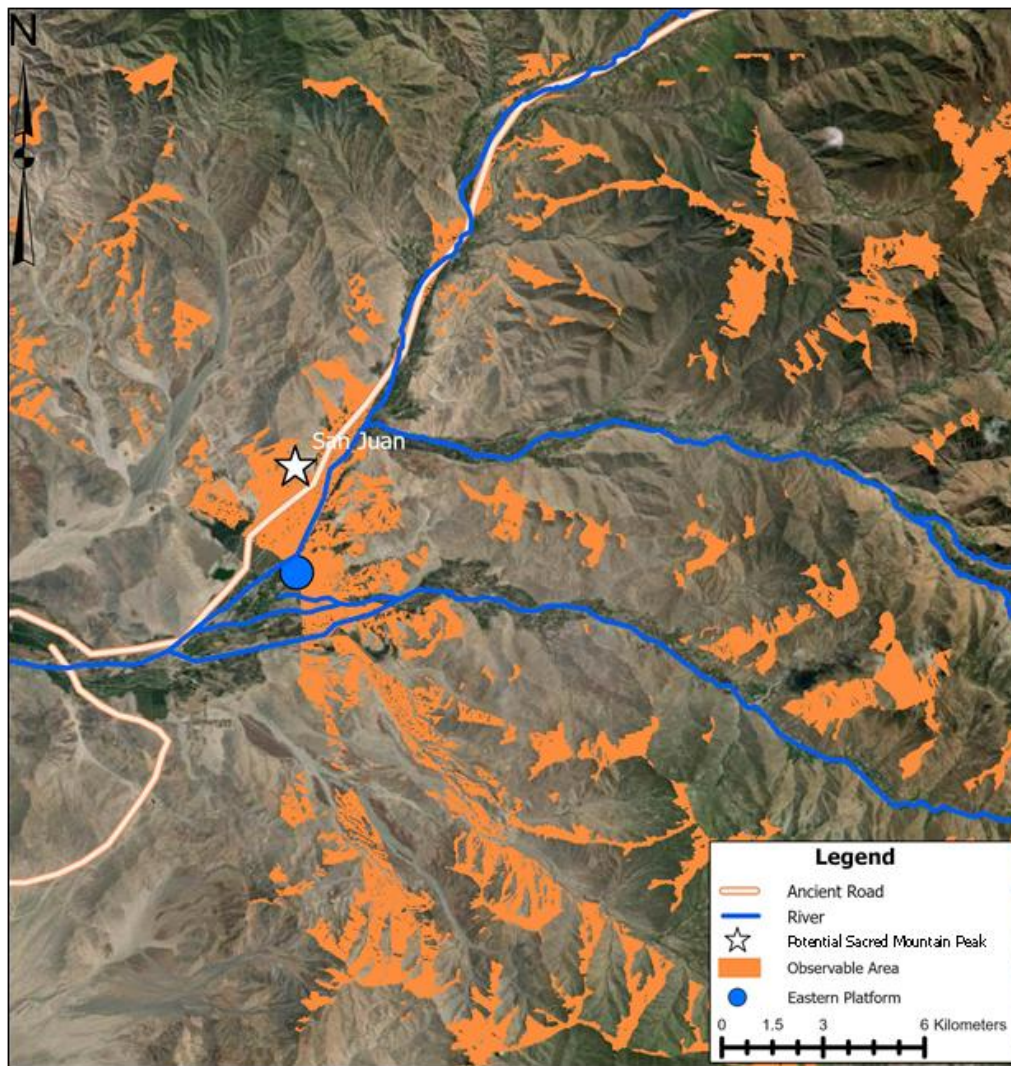


Figure 7.9: Viewscape of the landscape from the Southwestern Platform Supra-Household Community.

peaks may have carried spiritual or cultural significance. The ability to see multiple mountain peaks from their settlement could suggest a connection to these natural features, potentially reflecting a form of reverence or a recognition of their role in shaping the community's environment and resources. Additionally, the view of the highlands may have provided practical insights into the surrounding landscape, particularly regarding access to water sources essential for sustaining daily life. In contrast, the limited visibility toward the coast could indicate that coastal spaces were not as central to their spatial orientation or belief systems—though this remains uncertain. Over time, the daily interaction with the highland viewscape may have

reinforced a collective sense of identity among community members, shaping their relationship with the broader landscape and influencing their social organization and cultural practices.

The visibility of the highlands and valley entrance likely also served strategic and political purposes. The Eastern Platform members had a direct line of sight to the valley pocket's entrance, a position that may have been critical for monitoring movement into the valley. The vantage point would have allowed them to oversee individuals or groups entering from the highlands, potentially enabling early detection of visitors, traders, or potential threats, which, as noted previously, is critical during the EH when threats were coming from the highlands (Ikehara 2022). The control over this visual field may have reinforced a sense of territorial oversight, ensuring security over water sources and cultivated lands. Archaeological studies of defensible landscapes in the Andes (e.g., Topic and Topic 2009) emphasize the role of settlement placement in managing access to critical resources, a pattern that may also be reflected here.

The location of the Eastern Platform settlement suggests that its first inhabitants may have chosen this position both in response to preexisting qualities of the landscape and for its strategic advantages in overseeing the valley entrance and water sources, as well as for its visibility of some ceremonial spaces. However, the continued habitation of residences oriented toward the water origins and movement corridors suggests that this position also conferred political and economic power within an already structured environment. The reduced visibility of ritual centers compared to the Upper and Northern Platforms could imply a distinct role in the local social hierarchy, where their authority was tied more to resource control and territorial oversight than direct ritual participation. Over time, the act of continuously engaging with these sightlines—monitoring movement, overseeing water sources, and observing distant highland

peaks—may have contributed to a shared understanding of their role within the broader social and ecological framework of Cerro San Isidro.

7.2 Viewscape Experience and Community Identity at Cerro San Isidro

The various viewsapes highlight differential experiences between the four supra-household communities in terms of what they viewed from a central vantage point, and how they may have been viewed from external vantage points. In this section, I compare and contrast the viewscape of each community to provide a deeper understanding of the distinctiveness, diversity, and/or shared experiences to address my second research question: *Does the viewscape vary between these communities? How does this difference influence a different sense of identity and how might similarity between viewsapes have served to reinforce a shared identity across the settlement?*

The visual experiences possible at each of the four supra-household communities within Cerro San Isidro would have yielded unique perspectives. Each viewscape encompasses various cultural, social, political, economic, and ritual places that are likely significant to community members. Seeing places in the landscape evokes a sense of belonging, memory, power, and spiritual connection. By sharing similar visual experiences, a sense of group identity was created and reinforced between residents within each supra-household community. Each supra-household community would have had a unique set of vistas, encompassing significant landscape features such as ceremonial centers, waterways, mountains, and valley entrances, that shaped the daily experiences of residents in each supra-household community. Differing viewsheds suggest different landscape features were foregrounded for, and potentially important to, different communities. The highlands, mountain peaks, and ceremonial locations were visually prominent for the Upper, Northern, and Eastern Platforms, and were likely spiritually and socially

significant. The Southwestern Platform has a view towards the bottleneck and river leading to the lower valley, with high visibility of Puente Piedra, places that may also have carried spiritual and social significance.

It is possible that the variability in visual preferences among the communities might reflect their original inhabitants' homelands. As I noted in Section 6.3, the different preferences for ceramic types within the supra-household communities could signify the cultural heritage that community members brought with them when moving into the settlement. Perhaps this is mirrored in the selection of supra-household community locations at Cerro San Isidro. For example, the Southwestern Platform members may have originated from the coast, thus their visual experience pays homage to their ancestors and origins. The coastal view would then provide a connection to the past. On the other hand, residents of the Upper, Northern, and Eastern Platform may have originated from the highlands, given that their views are primarily targeted toward this region. However, this interpretation represents only one possible explanation for the placement and orientation of supra-household communities, and further research would be needed, such as an assessment of crafting traditions, to engage with this explanation more deeply.

The location of the communities may have been dictated by economic considerations rather than ancestral ties. Alternatively, the locations of the communities may have simply been the result of available space at the time of settlement. Since Cerro San Isidro was occupied during a period of population expansion and relocation, people may have settled in areas that were open and suitable for habitation rather than deliberately selecting locations based on views or symbolic ties. A comparative analysis of artifact materials, particularly ceramics, could help clarify the origins of the communities. For example, an increased presence of

highland-style ceramics in the Upper, Northern, and Eastern Platforms compared to more coastal-style artifacts in the Southwestern Platform could support the hypothesis that these groups maintained connections with their respective regions of origin.

While the initial selection of the settlement location remains uncertain, the continued habitation of these spaces—where specific landscape features held visual prominence—likely played a role in shaping community identity and social practices. These features may have gained meaning over generations, beyond their initial selection. What may have originally been chosen for pragmatic reasons—such as access to water, defensibility, or proximity to agricultural fields—could have later taken on deeper social, political, or ritual significance. The visibility of certain features may have reinforced community narratives about ancestry, territorial claims, or connections to broader regional traditions. For instance, residents who continuously viewed the highlands may have developed stronger cultural associations with these regions, incorporating them into their worldview, religious beliefs, or economic strategies. Similarly, those with clear sightlines to the coast might have maintained stronger maritime ties. Further research, including artifact distribution analysis and comparisons of material culture, could help clarify whether these visual relationships were actively maintained as part of community identity.

Another key aspect is a difference in economic control and monitoring; the monitoring of resources, movement of people, and control over resources is a common theme across these four communities. The visibility of strategic points, such as roads, water resources, and fields, indicates shared economic concerns and strategies. However, only one community has a clear view of all resources – the Upper Platform. Other resource visibility varies by community. Similarly, the Upper Platform had a unilinear view of each supra-household community; this one-directional visibility suggests a nonlinear power relationship, where the Upper Platform

might visually dominate or survey the other communities (see Van Dyke et al. 2016 for similar examples). So, while the inhabitants of Cerro San Isidro all enjoyed a degree of power in comparison to the valley pocket, the Upper Platform residents were most likely ritual leaders of the settlement. While the Upper Platform is not visible to other communities, its presence was felt by the other communities; this would have enforced and highlighted the societal position of the Upper Platform residents.

Overall, the Upper Platform community appears to have exhibited a higher level of political dominance, with visibility over all habitation settlements. Furthermore, while the inhabitants of Cerro San Isidro all enjoyed a degree of power in comparison to the valley pocket, the Upper Platform residents were most likely ritual leaders of the settlement, as they enjoyed the greatest visibility of ritual spaces. Cumulatively, this visibility was a daily reminder to community members of their shared position, suggesting their identity was at least partially forged through ritual and political power. The Northern Platform may have had a high level of economic control in terms of landscape visibility. Their view was obstructed by Cerro San Isidro, which may have limited direct oversight of economic activities compared to the Upper Platform. Similarly, the Northern platform community members could see all ceremonial sites within the valley, but not any rituals which were taking place in the Upper Platform. This may have contributed to a sense of disconnection or reinforced exclusion between the communities, potentially shaping the Northern Platform members' relationship with the broader settlement. Still, proximity to the ritual spaces, compared to other communities at Cerro San Isidro, could have perhaps given them more power than other communities, as explored further in the following chapter.

In contrast, the Southwestern Platform community, unlike any other community, had limited visibility of ceremonial and habitation spaces, suggesting that monitoring locals and visibility of ritual spaces were not a key part of their shared experiences. Instead, the community enjoyed a coastal view, potentially indicating a distinct cultural belief system compared to other communities. Lastly, the Eastern platform enjoyed a strong visual connection to most ceremonial centers and was strategically positioned with a clear view of the valley entrance toward the highland. Yet, unlike the Upper and Northern Platforms, residents could not see all ceremonial centers, perhaps indicating less ritual power. Similarly, the view of the valley from the Eastern platform was incomplete, with no visibility toward the south.

The visual experience of the four supra-household communities may have played a significant role in shaping shared identities tied to settlement locations. The continued inhabitation and lived experiences within the supra-household communities likely contributed to group cohesion and distinctions between communities. Over time, the shared interactions may have influenced the development and maintenance of distinct social identities, potentially setting each group apart from others. Such evidence suggests that visual experience could have been an important factor in shaping social relationships and identity. However, as spatial experience is multifaceted, additional factors should be considered to further support these insights or offer complementary perspectives. With this in mind, the next chapter will explore another key dimension of spatial experience—movement.

8 Pathways to Community Identity: Movement and Experience

Movement is a primary aspect of engagement, experience, and being in the world. It is through movement that people truly experience their landscapes. Movement shapes the social fabric of urban communities by facilitating communal activities and interactions amongst group members and between diverse groups of people. Movement serves as a foundational principle in many non-Western ontologies; it constitutes meanings, identities, belongings, and experiences while being a catalyst for disruptions, intersections, and convergences of the meshwork that comprises our world (Baires et al. 2013; Ingold 2000, 219-242; Pauketat 2013, 36-40; Swenson 2024). Landscape and movement are intricately connected; the way we navigate, sense, and engage with both people and places in the world - those routine actions of our daily existence - shape the landscapes that give life meaning (Thomas 2001, 172-181).

The underlying premise of this chapter is that movement embodies the experience which constructs and maintains social identities. The human practice of moving and interacting is entwined with social and historical contexts; this context influences how people construct their lived landscapes (Bourdieu 1977; de Certeau 1984; Gosden 1994). Therefore, groups with different movement experiences may form different senses of belonging and identities. In Chapter 5, I described how the supra-household communities at Cerro San Isidro are geographically separated from one another. This is significant because the variations in elevation and proximity to each other and landscape features varied, shaping different movement experiences for each community. I hypothesize that movement experience is a mechanism that fosters cohesion, cooperation and collective identity. By studying the movement experience of four supra-household communities at Cerro San Isidro, we can gain a deeper understanding of

the social, cultural, and spatial dynamics of life at Cerro San Isidro during the earliest occupation.

I address three aspects of movement, as discussed in Chapter 3—accessibility, social connectivity, and socio-spatial integration. Accessibility refers to the measure of a location's ability to be reached (attractiveness) or the capacity to leave a location (emissiveness) (Comtois and Slack 2006). Access serves as a mechanism of control that influences the social experience of space. Social connectivity refers to who is likely to interact with whom (Richards-Rissetto and Landau 2013). I use these principles to assess connectedness within and between the four supra-household communities at Cerro San Isidro. Lastly, socio-spatial integration refers to how well groups are integrated into the settlement as a whole and how connected they are to all aspects of the settlement, including places, resources, and people. This is a cumulative discussion of both access to resources and spaces, as well as social connectivity. By applying these three aspects of movement to the four supra-household communities under study at Cerro San Isidro, I can address how movement influences the formation of a shared community identity and how different types of movement (e.g., ritual procession, resource acquisition) play a role in this process. I ask:

- 1) *How did variations in access to resources and ritual spaces between the communities at Cerro San Isidro influence the development and differentiation of community identities?*

Research indicates that access serves as a mechanism of socio-spatial integration within a society, but also serves as a mechanism that can guide social experiences (Richards-Rissetto and Landau 2013; Richards-Rissetto 2010). Through experiencing these distinctions, groups forge shared identity through access or restricted access. If accessibility influenced community identities, I would expect to see disparities in

resource access and ritual spaces between groups. For example, limited access to ritual space would forge bonds of exclusivity and power among those with access, whereas it would influence those without access to understand their social position in the settlement, create a sense of exclusion, and mark boundaries between them and other groups.

- 2) *How did social networks and connectivity contribute to the formation and differentiation of group identities at Cerro San Isidro during the Early Horizon?* As reviewed in Section 3.3.2, social connectivity is important to consider, as greater connectivity can facilitate bonds between groups, while a lack of connectivity can further define boundaries between groups. Suppose there are particular communities with a lack of social connectivity; in that case, the lack of connectivity will reinforce social stratification and distinct group identity, which I would expect to see similarly manifested in terms of access to resources, wealth, etc.

I address these questions by synthesizing walking models, as outlined in Chapter 4, to comment on the spatial experience of the people who lived within four supra-household communities at Cerro San Isidro. The goal is to use least-cost analysis to identify a network of movement between these four supra-household communities and their urban landscape. This modelling helps to identify how the lived experience of these communities may have influenced their communal identities.

8.1 Social Differentiation and Spatial Accessibility

As discussed in Chapter 3, accessibility communicates messages that incorporate individuals into social groups, simultaneously delineating the boundaries of that group. By experiencing these distinctions through day-to-day life, groups develop a collective identity

either through inclusive or exclusive access. Shared accessibility likely conveys messages of solidarity and nurtures a collective identity, whereas a lack of access or restricted spaces creates social bonds between those with access and further defines group boundaries. To assess access at Cerro San Isidro, I conduct LCA from each group to important locations within their immediate landscape, including Puente Piedra, the huanca stone (UE2), two different quarries, and the Nepeña River.

The first part of this discussion explores access to resource locations, such as lithic materials from quarries and water from the Nepeña River. Quarries were selected as important resources as the Early Horizon architecture is made from stones, meaning quarries were vital to build, maintain and renovate structures (see Section 4.1.3.1 for a discussion of quarry identification). Water was chosen as it is a critical resource in sustaining life, with Cerro San Isidro residents likely collecting from the Nepeña River to meet their daily needs. While there are other critical resources to consider, such as clay deposits for producing ceramic vessels and agricultural fields for harvesting crops, these were not considered here. Clay deposits would be useful in assessing who was making ceramics or who had access to the materials, but currently, there is no data on the location of these materials. In terms of fields, since the settlement is surrounded by modern agricultural fields, and GPR data indicates the presence of buildings in this low-lying region, it is difficult to say with confidence where past fields were actually located. As such, fields were not included in this assessment.

Figure 8.1. presents the least-cost paths to three different resources – the Nepeña River and two quarries. The process used to create these pathways can be seen in Section 4.2.4. To determine how accessible space is to the supra-household community, I produced a cost/distance measurement from each community to the resource and back. This value represents the difficulty

of the terrain and the distance the individual would have walked. Given that there are two quarries with the same type of rock, located on opposite sides of Cerro San Isidro, I only included the closest quarry to each supra-household community, as community members may not have needed access to both quarries and would likely attend the quarry closest to them. Table 8.1. presents the emissive and attractive cost/distance value for each community and its closest quarry. The results indicate that the members of the Southwestern Platform had the best access to the local quarry, whereas members of the Upper Platform had the least. When considering the position of the supra-household communities, it is clear that the communities higher in elevation had the least access to the quarries.

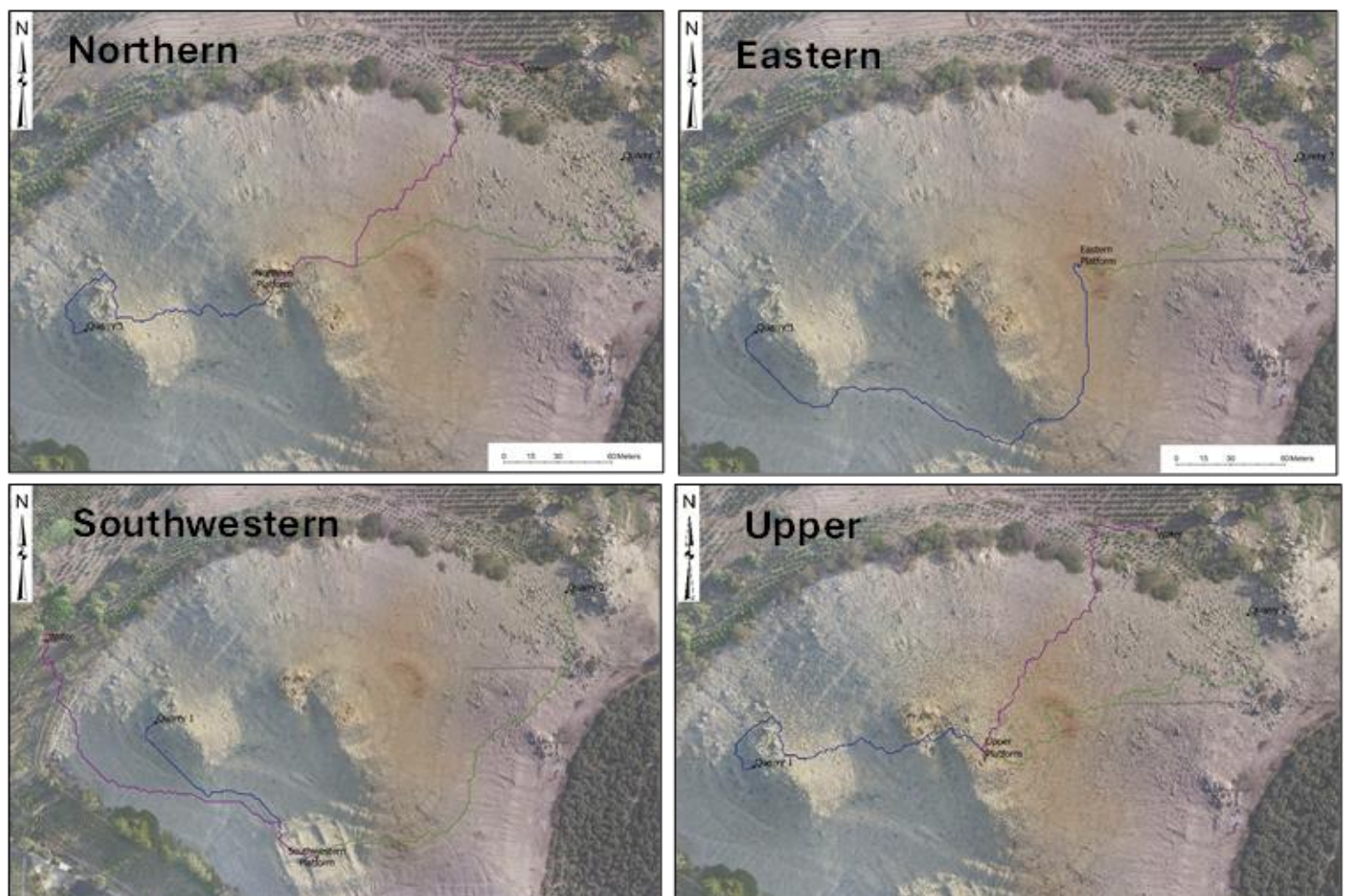


Figure 8.1: LCA from supra-household communities to local quarries and the Nepeña River.

Table 8.1: Emissive and Attractive cost/distance value to a quarry.

<i>Architectural Platform</i>	<i>Cost/Distance Emissive</i>	<i>Cost/Distance Attractive</i>	<i>Combined Cost/Distance</i>
Southwestern	0.84	0.97	1.82
Eastern	0.96	0.95	1.91
Northern	1.29	1.29	2.58
Upper	1.27	1.40	2.67

Table 8.2 presents the emissive and attractive cost/distance value for each supra-household community and the closest water access. Based on the combined attractive and emissive value, the Southwestern Platform, again, has the best access, in terms of difficulty of terrain and distance to cover, to get water, whereas the Northern Platform has the least, but is closely followed by the Upper Platform. The average emissive and attractive cost/distance to both water and quarry is presented in Table 8.3. When considering the totality of resource access, the Southwestern Platform has the best access to all resources considered, with a value of 1.72, followed by the Eastern Platform, with a value of 1.85. On the other hand, the Upper and Northern Platform members had less accessibility to resources, with values of 2.59 and 2.69, respectively.

Table 8.2: Emissive and Attractive cost/distance value to water.

<i>Architectural Platform</i>	<i>Cost/Distance Emissive</i>	<i>Cost/Distance Attractive</i>	<i>Combined Cost/Distance</i>
Southwestern	0.80	0.83	1.63
Eastern	0.88	0.90	1.78
Upper	1.55	0.96	2.51
Northern	1.34	1.45	2.79

Table 8.3: Average emissive and attractive cost/distance value to both resources.

<i>Architectural Platform</i>	<i>Cost/Distance Emissive</i>	<i>Cost/Distance Attractive</i>	<i>Combined Cost/Distance</i>
Southwestern	0.82	0.90	1.72
Eastern	0.92	0.93	1.85
Upper	1.41	1.18	2.59
Northern	1.32	1.37	2.69

These findings indicate the influence of geographical position and terrain difficulty on resource accessibility. Supra-household communities located at higher elevations face greater challenges in accessing both quarry and water resources, suggesting that the Southwestern and Eastern Platforms were more favourably situated in terms of resource procurement. The disparity would influence the social dynamics and economic activities within the supra-household communities.

As I noted above, the concept of accessibility communicates messages of shared access to resources and as such, can forge shared identities and experiences amongst those with access. The Southwestern and Eastern Platforms, with the best overall access to resources, likely formed collective identities within their communities based on their advantageous position and shared experiences collecting resources. The shared access to resources by supra-household community members helped build a sense of solidarity and inclusion among the community. Similarly, the act of collectively gathering and managing these resources fostered a sense of communal identity, as community members engaged in shared activities that reinforced social bonds and mutual cooperation (Bourdieu 1977).

In contrast, the Upper and Northern Platform inhabitants faced more significant challenges accessing resources and may have developed a collective identity which was distinct from those supra-household communities that had greater resource accessibility. The ease or difficulty of access creates a boundary between groups and would have reinforced daily experiences of access disparities, which could lead to stronger bonds among those with similar experiences, further feeding group boundaries (Richards-Rissetto and Landau 2013; Richards-Rissetto 2010). The difficulty in accessing these resources may also suggest disparities in

resource allocation among communities. It is possible that the Southwestern and Upper communities played a role in distributing resources to other areas. As reviewed in Chapter 3, there are examples of supra-household communities in the Andes and other regions where different communities were assigned specific roles and responsibilities. As such, there was likely coordination and interdependence between the communities to sustain life at Cerro San Isidro.

In conjunction with access to resources, I also assessed access to ceremony spaces. There are two ceremonial spaces at Cerro San Isidro, which are considered in this analysis: the Huanca Stone and Puente Piedra. The LCA of the supra-household communities to these locations is present in Figure 8.2. As I describe in Section 2.3.1, an upright stone is situated on the Upper Platform within an EH structure. Chicoine (2024) proposed that this stone is a huanca stone—or a standing stone, believed to be a former human who turned into stone. Historically, they are worshiped as tutelary divinities by community members (Duviols 1977, 1979; Lau 2016, 12). Various colonial accounts (see compendium in Doyle 1988; Estenssoro 2003; Polia 1999; Varón Gabai 1980) suggest these stones were not understood to be representations of ancestors, but rather actual ancestors who had become stone. As I discussed in detail in Section 2.3.1, huanca stones were erected in sacred and typically visually prominent positions, like the tops of mountains and platforms, and are often found with sacred offerings, as is the case at Cerro San Isidro. This is why the stone is likely a huanca stone, making the Upper Platform an important ceremonial space.

The cost distance values are presented in Table 8.4. Given that the stone is at the summit of Cerro San Isidro, the cost to travel to the stone is greater due to the need to traverse steeper slopes. The Upper Platform has a value of 0, since the stone is in this community's platform. Its location within the Upper Platform suggests the Upper Platform members may have been

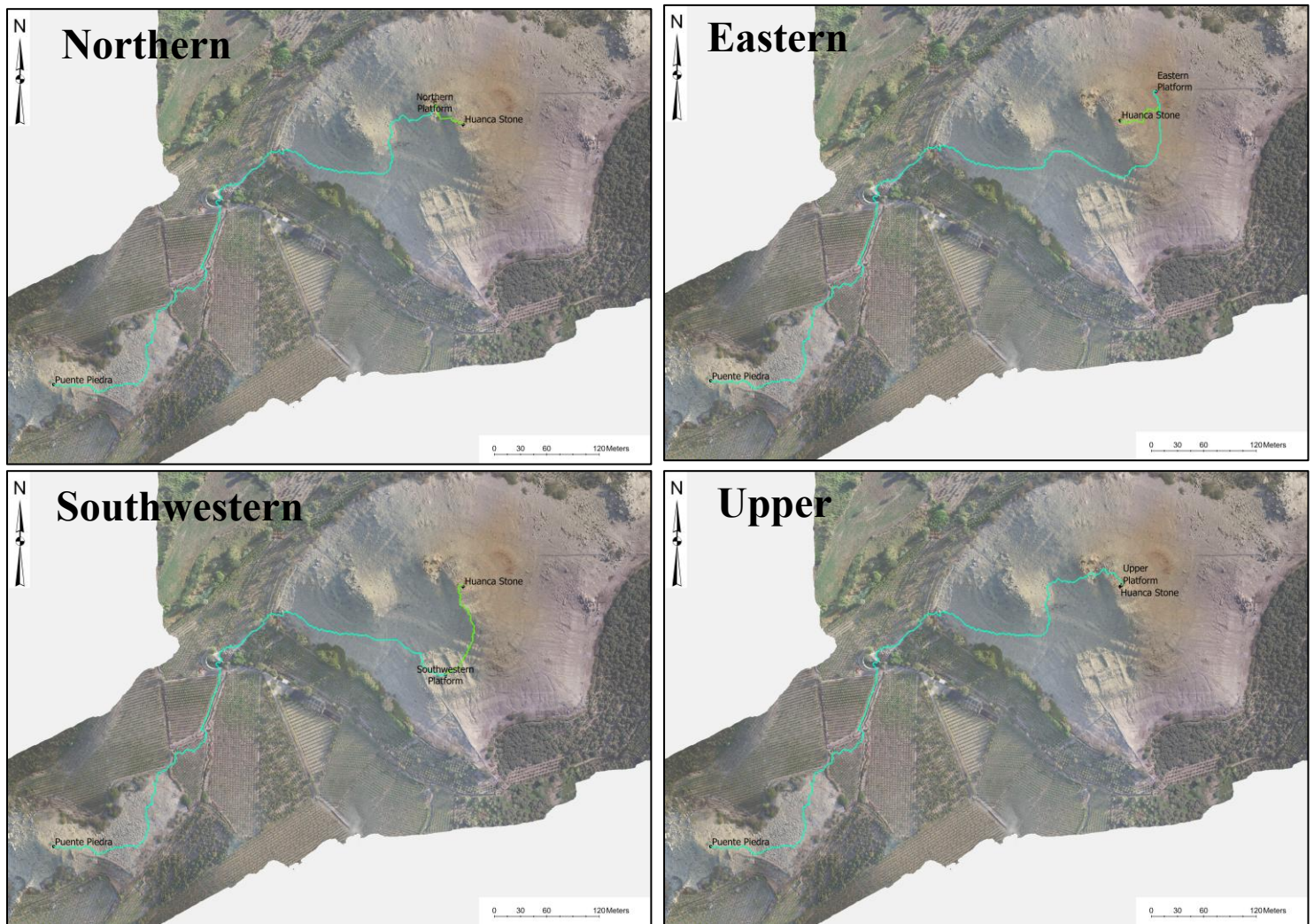


Figure 8.2: LCA from supra-household communities to ceremonial spaces, the Huanca Stone and Puente Piedra.

Table 8.4: Average emissive and attractive cost/distance value to the huanca stone.

<i>Architectural Platform</i>	<i>Cost/Distance Emissive</i>	<i>Cost/Distance Attractive</i>	<i>Combined Cost/Distance</i>
Upper	0.00	0.00	0.00
Northern	0.95	0.89	1.84
Eastern	1.17	1.41	2.58
Southwestern	1.50	1.57	3.07

important spiritual leaders, perhaps guardians of the haunca stone. The Northern Platform has the second most accessibility to the huanca stone, but the Eastern and Southwestern Platform residents have the least access, with values of 2.58 and 3.07, respectively. The differing levels of accessibility suggest that some communities, like the Upper and Northern Platforms, with easier access to ritual spaces, may have developed stronger spiritual connections. However, as noted previously, the close association of the Upper Platform and the haunca stone reinforces a different social identity among the group, one embedded in their daily interaction with the haunca stone as potential guardians or caretakers of the ancestor. Those with more challenging access, such as the Eastern and Southwestern Platforms, might have had less frequent interactions with the stone, but this does not necessarily preclude their participation in ceremonies.

Puente Piedra, as described in more detail in Chapter 2, is an isolated mound ~300 meters from Cerro San Isidro. It is defined by megalithic masonry, featuring a large stone structure at the top of a platform, with access provided through masonry stairs and is believed to be a ceremonial and residential space, constructed during the Early Horizon (Ikehara 2008). Given the close proximity to Cerro San Isidro, this megalithic structure may have been an important ceremonial space for those living at Cerro San Isidro and thus an important space to consider accessibility. Each community has a similar cost/distance value to travel to and from Puente Piedra, with only +/- 0.35 difference, as seen in table 8.5. Similar ease of access could suggest Puente Piedra was a space for equal opportunity to participate in or experience ceremonies, reinforcing a shared experience amongst all communities within Cerro San Isidro.

Table 8.5: Average emissive and attractive cost/distance value to Puente Piedra.

<i>Architectural Platform</i>	<i>Cost/Distance Emissive</i>	<i>Cost/Distance Attractive</i>	<i>Combined Cost/Distance</i>
Southwestern	0.62	0.69	1.31
Eastern	0.68	0.68	1.36
Northern	0.75	0.69	1.44
Upper	0.79	0.87	1.66

Access influences cooperation, cohesion, and social identities, while simultaneously delineating group boundaries (Richards-Rissetto 2010). At Cerro San Isidro, these dynamics are evident in how the different communities experienced access to key resources and ritual space. Here I return to my research question: *How did variations in access to resources and ritual spaces between the communities at Cerro San Isidro influence the development and differentiation of community identities?* My data indicate great disparities in access to resources and some ritual spaces, which influenced the development and differentiation of community identities. In terms of resource access, the Southwestern and Eastern Platforms had the best access to resources, likely fostering a collective identity centred around their shared experiences of resource procurement. The degree of accessibility also suggests they both had more favourable positions in economic activities within the settlement. On the other hand, those inhabiting the Upper Platforms had easy access to the huanca stone, reinforcing their roles as spiritual leaders and potential guardians of the huanca stone. The proximity to the huanca stone would create a collective identity deeply embedded in spiritual practices and identify members as spiritual leaders, distinguishing them from other communities within Cerro San Isidro. The Northern Platform had relatively easier access to the huanca stone, suggesting the community members similarly forged bonds related to spirituality and more regular interactions with the Huaca stone.

By assessing accessibility between the communities, it is clear there are disparities in inclusive and exclusive spaces, which would initiate and/or reinforce different experiences and identities. Having access to particular spaces, such as the Upper Platform with the huanca stone and the Southwestern and Eastern Platforms with resources, likely inculcated inclusive identities based on shared experiences in resource collection or ritual participation. On the other hand, communities with restricted or difficult access, such as the Southwestern and Eastern Platforms, may have formed identities that were reinforced through internal cohesion and differentiation from other groups. The experience of inaccessibility can itself produce shared experience between community members. In addition, accessibility also highlights the potential for varying roles of the communities. The Southwestern and Eastern Platforms' favourable resource access could indicate a role in resource acquisition and distribution, fostering shared experience within the communities for the collection, processing and distribution of resources. On the other hand, the Upper communities intertwined nature with the huanca stone, suggesting a role in spiritual leadership, including their social identity and status within the broader communities. Archaeological research has shown instances in the Andes where supra-household communities have specialized occupations, such as metallurgy, ceramic production, or ritual performance (Blanton and Fargher 2012; Chapdelaine 2001; Manzanilla 2009), which may be the case at Cerro San Isidro. However, further assessment of material culture would be important in determining if there are differential activities between these communities.

8.2 Connectivity between Supra-Household Communities

Social connectivity refers to the connections between people (see chapter 3). Above, I investigated access from the supra-household communities to resources. Here, I consider how deeply the supra-household communities are connected to other supra-household communities.

Interaction between groups provides insight into the daily life and experience of residents within a settlement. Urban spaces are unique due to population density; the closeness of people results in increased interactions. By assessing interactions between supra-household communities, we can establish the degree of socially connectivity of a particular supra-household community. Supra-household communities with greater connectivity likely experience more frequent exchanges, facilitating the sharing of resources, ideas, and cultural practices. This, in turn, fosters stronger social cohesion at the settlement level, as regular interaction helps to build trust, cooperation, and a sense of collective identity. Conversely, supra-household communities with little connectivity may experience isolation, leading to weaker social ties and a diminished sense of collective identity within the settlement as a whole. By understanding these interactions, we can gain insights into how movement promotes socio-spatial integration and how movement may have delineated group boundaries.

As discussed in Chapter 4, I assess the social connectivity of supra-household communities within Cerro San Isidro by calculating how different groups could interact with each other based on the average value of cost/distance of the paths between the different locations. There are 16 architectural platforms at Cerro San Isidro (Figure 8.3), which I hypothesize as supra-household communities (see Section 5.4). These paths are presented in Figure 8.4. The average cost/distance values (emissive, attractive, and combined) are presented in Table 8.6. The Northern Platform has the greatest connectivity to the various communities at Cerro San Isidro. However, this is closely followed by the Southwestern and Eastern Platforms. The greatest outlier is the Upper Platform, with a score of 2.61; this suggests that the Upper

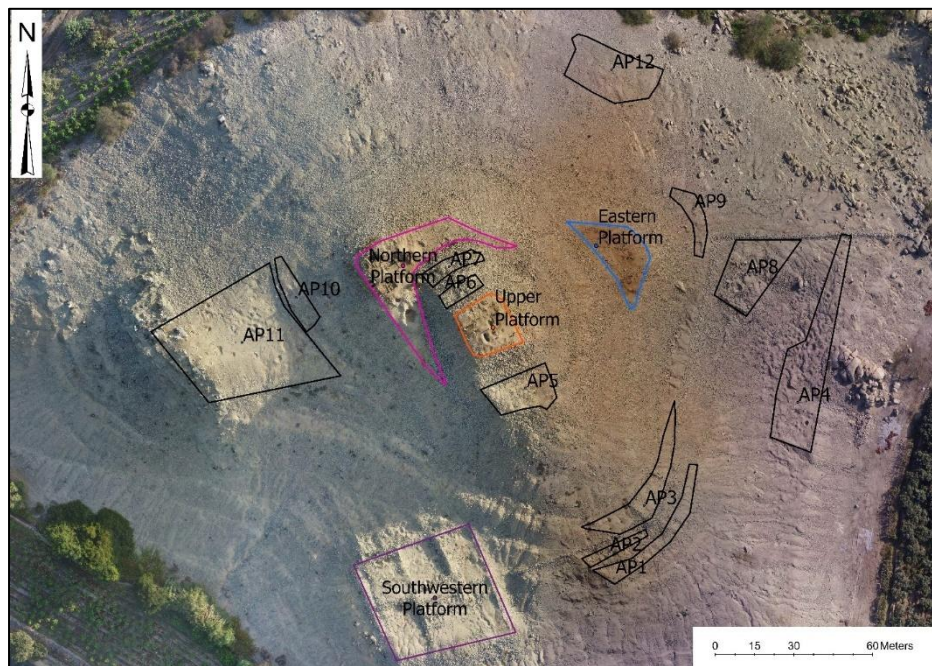


Figure 8.3: Architectural platforms with labels.

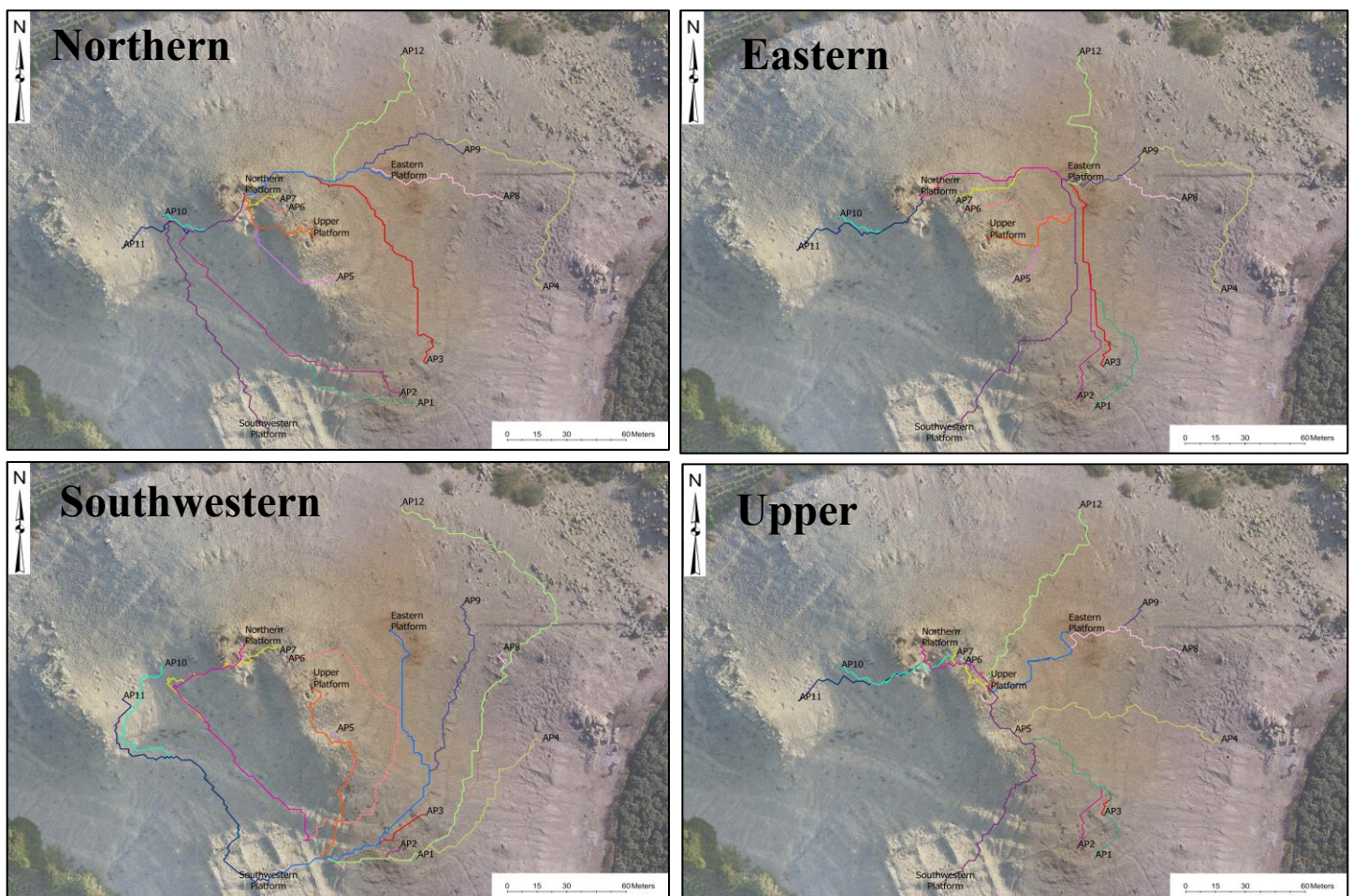


Figure 8.4: Emissive social connectivity of four supra-household communities at Cerro San Isidro, illustrating each community's outward connections to all others within the settlement.

Table 8.6: Average emissive and attractive cost/distance value to all architectural platforms.

<i>Architectural Platform</i>	<i>Cost/Distance Emissive</i>	<i>Cost/Distance Attractive</i>	<i>Combined Cost/Distance</i>
Northern	0.99	0.77	1.76
Southwestern	0.80	1.17	1.98
Eastern	1.05	0.98	2.03
Upper	1.43	1.18	2.61

Platform is the least socially connected within Cerro San Isidro. As I discuss in Section 6.3, the increased fine ware ceramics in the Upper Platform indicate this is a high-status community, with specific access (see above) suggesting spiritual importance.

I argue that differing experiences within the built and natural environment helped shape distinct identities among the supra-household communities at Cerro San Isidro (see Section 3.3). The varying connectivity between the supra-household communities created different experiences, which would influence diverse kinds of identities and relationships. *How did social networks and connectivity contribute to the formation and differentiation of group identities at Cerro San Isidro during the Early Horizon?* The Upper Platforms' lower connectivity suggests that its members had less frequent interaction with other supra-household communities. While the difficulty of interaction does not mean that it did not happen, the limited or less accessible nature of these interactions likely contributed to the formation of a distinct identity, possibly reinforced by their high-status position and spiritual leadership role. Their limited movement and interaction would foster a sense of separation from other community members, thus fostering a distinct sense of community identities, potentially focused on their roles as leaders. The difficulty in interacting could reinforce their members' status and delineate and reinforce community membership. Conversely, the Northern, Southwestern and Eastern Platforms, with higher connectivity, likely experienced more dynamic exchanges between communities. The frequent, or less difficult, interaction would facilitate cooperation between groups, and the sharing of resources and activities, which would make the boundaries between groups less distinct.

Such results suggest that while social connectivity values are higher for the Upper Platform, perhaps social connectivity did not play as great of a role in influencing group identity. The results provide an interesting avenue to discuss more questions, such as which types of interactions, such as social, trade, or ceremonial, were more common between supra-household communities? Were there different kinds of interactions? Or perhaps communities were more likely to interact in a communal space rather than within the confines of their platforms. Another factor to consider is the assumption that higher connectivity directly correlations with stronger social cohesion. This assumption might not always be the case, as strong bonds can also form through shared activities, collective memories, or even responses to external threats. Other social, cultural, political or economic factors could, and most likely do, influence these dynamics.

8.3 Socio-Spatial Integration

As previously mentioned (Section 3.5), I use socio-spatial integration to refer to the combined value of connectivity between communities' places, resources, and people. Socio-spatial integration takes into account the previously discussed access and social connectivity to understand each community's lived experience. In other words, it is the measurement of how easily a place can be reached or is reachable from all other locations within the urban system (Bafna 2003; Ratti 2004; Richards-Rissetto and Landau 2013). Areas which are more easily reached are likely to have more people travel to or through them rather than areas that are more difficult to access (Hillier 1996; Richards-Rissetto 2010). As such, such locations are more integrated within the settlement as a whole. Researchers employing a space-syntax approach (Hillier et al. 1993; Hillier 1996), have demonstrated a direct correlation between accessing locations and socio-spatial integration (See Chapter 4). If a location is more easily accessible, it

suggests a greater level of integration into the settlement's economic and social life. Therefore, the greater movement through or to a place correlates to the overall integration of a supra-household community within the settlement.

I measure integration as the average cost/distance from all locations, including quarries, water, ceremonial spaces, and all supra-household communities, to and from each supra-household community under study in this project (see greater discussion in 4.2.4.1). These calculations are presented in Table 8.7. Based on the premise that places that are more easily accessed will be more integrated in the settlement, the lower the cost/distance value, the higher the integration within the settlement. The Southwestern Platform has the greatest settlement integration with a combined emissive and attractive value of 1.61; however, the Eastern and Northern Platforms follow closely with integration values of 1.88 and 1.93, respectively. With increased integration, the community members would have had greater social interaction and exchange with other communities. This increased connectivity could foster a shared sense of identity and belonging between the community members, potentially blurring the boundaries between each individual community. On the other hand, the Upper Platform is the least integrated, with a combined value of 2.31. This lower integration could relate to social or economic separation, reflecting a degree of isolation from the greater settlement. While the contextual information of the Upper Platform indicates this is likely as a high-status community, the lower integration could suggest the community is more exclusive, with limited interaction

Table 8.7: Social Integration Value

<i>Architectural Platform</i>	<i>Cost/Distance Emissive</i>	<i>Cost/Distance Attractive</i>	<i>Combined Cost/Distance</i>
Southwestern	0.76	0.85	1.61
Eastern	0.96	0.92	1.88
Northern	0.98	0.96	1.93
Upper	1.23	1.09	2.31

and connectivity with the rest of the settlement, potentially reinforcing social divisions between group membership.

The socio-spatial integration values are predicated on the idea that, by assessing movement patterns, we can understand social structures and identity formations at Cerro San Isidro. The socio-spatial integration values suggest that while movement experience makes the definition of some communities clearer, such as the Upper Platform, shared experience and connectivity between communities may muddle the boundaries between groups. Even so, broad socio-spatial integration may reinforce overall settlement identity and cooperation.

8.4 Supra-Household Identity and Experience of Movement

By addressing the movement experience between supra-household communities at Cerro San Isidro to infer how these communities organized their everyday environments, I have highlighted movement as an important mechanism for fostering cohesion, cooperation and collective identity in this early urban settlement. These results suggest that the movement of communities within Cerro San Isidro may have influenced the formation of shared community identity through various types of movements, including accessibility, social connectivity, and socio-spatial integration.

The Southern and Eastern Platforms, though located on opposite sides of the settlement, had similar movement experiences. They both had strong access to resources and high social connectivity, perhaps indicating collective identities form around economic cooperation and shared daily practices. The Upper Platform community was the most spatially isolated, with limited access to resources and low connectivity to other groups. But they held the most direct access to the huanca stone. Finally, the Northern platform has similarly limited access to resources but was better integrated into the settlement with strong connectivity to other

communities and the second-best access to the huanca stone. Perhaps due to the greater isolation of the Upper Platform, the Northern Platform members were important in facilitating and organizing ceremonial activities between the Upper Platform and the rest of the settlement. However, we need to conduct further assessments of material culture and other aspects of their daily experience to expand on these ideas.

Overall, the variations in accessibility, social connectivity and socio-spatial integration at Cerro San Isidro highlight the complex interplay of social organization and community identities. The disparities in access to resources and ritual spaces, combined with different levels of social connectivity and interaction, contributed to different movement experiences between the communities. The reverse was also true: movement significantly shaped the social lives and collective identities within early urban centers.

Through this analysis, several trends emerge. The first is that differences in movement and connectivity between supra-household communities hint at possible functional differences between the communities. Variations in labour between supra-household communities are not uncommon to see, such as at Teotihuacan, where there are long, permanent social ties within supra-household communities based on economic production, initiated by the state (Gómez-Chávez 2012). This is similarly seen in many North Coast Andean settlements, including the compounds of Huacas de Moche, organized by occupational specialization, where the individuals of those occupations lived within the compound they worked in, and farmers lived outside the urban settlement (Blanton and Fargher 2012; Chapdelaine 2001; Manzanilla 2009). Pampa Grande was similarly organized by occupationally specialized compounds; however, unlike Huacas de Moche, where each compound had domestic residences, Pampa Grande workers did not live within the wards but were segregated from them (Shimada 1994, 224). Shared labour

activities would increase interaction and experiences amongst community members, enforcing a sense of identity and community around their labour specialization.

The evidence presented here is currently insufficient to make strong claims regarding labour specialization, but I might cautiously hypothesize that the Southwestern and Eastern Platforms, with increased access to resources and high social connectivity, could have been involved in resource procurement and distribution. Meanwhile, the Upper Platform may have played a central role in ritual activities, particularly in relation to the huanca stone. If community members were to have specialized activities, this would foster cohesion and promote cooperation within communities, fostering shared collective identities. However, this remains speculative, and further research on the other twelve supra-household communities at Cerro San Isidro, as well as material correlates, is required to determine whether these preliminary ideas have any bearing.

Another trend to discuss is that while there are clear disparities in movement experience between groups, some aspects of movement were shared throughout the community. For instance, there appears to be shared access to Puente Piedra as well as relatively equal social connectivity, apart from the Upper Platform. This suggests that while some aspects of movement reinforce supra-household community bonds and boundaries, other aspects perhaps act as a mechanism of cohesion and identity at the settlement level. Movement likely created a sense of community and shared identity, which maintained social cohesion and cooperation within and between communities.

To build on this discussion, there are several additional factors regarding both the analysis and interpretation of the data which should be considered. How can we be sure that lower connectivity or lower cost/distance measures directly lead to distinct identities and lived

experiences? While moments can influence identity and experience, as I have argued throughout this chapter, do these differences seen here accurately reflect real-life differences? In other words, were these differences meaningful to the community members? The settlement core is not a large area. The difference in movement may not be as great a hindrance and, as such, would not have a large impact on the overall lived experience of the community members. For example, while the cost/distance value represents the difference in difficulty and duration of terrain, the difference between 0.7 and 0.85 may not be significant enough to the community members to differentiate access to spaces.

From personal experience moving through the settlement, the difficulty of the terrain does make it more challenging when moving between particular platforms; that being said, if I needed to be somewhere, I would still make the journey regardless of difficulty. Although it is important to be cautious about projecting my own experience onto past inhabitants, I suggest that the results presented here provide valuable discussion points. They highlight notable trends that, while not definitive on their own, become more meaningful when considered in conjunction with other data. For example, integrating visibility analysis can offer a more nuanced understanding of how spatial experiences may have influenced communal and individual identities. Such combined approaches allow for a more robust interpretation of the interplay between spatial organization, movement, and social dynamics within the settlement.

9 Building Bonds: Cohesion and Cooperation at Cerro San Isidro

In this chapter, I synthesize the key findings discussed in this thesis to explore their broader implications for understanding early urbanism, social cohesion, and identity formation at Cerro San Isidro. I have examined how supra-household communities—groups of households with shared social identities—organized their spaces and interactions to foster social cohesion, cooperation, and collective identity within early urban centers. By doing so, the study contributes to broader understandings of urbanization processes in the ancient Andes.

The research questions I addressed throughout this thesis focused on four key areas to explore life in this early urban centre, addressed in Chapters 5-9. In Chapter 5, I examined the spatial organization and urban form of the settlement to understand how the site was structured and what features indicate it was an urban center. I also focused on identifying morphological traits that suggest the presence of supra-household communities. In Chapter 6, I explored the rhythm of life during the Early Horizon, where I questioned the distribution of the occupation of Cerro San Isidro at this time, addressing the social and economic roles of different communities within the settlement. I also investigated where elite individuals lived at Cerro San Isidro, how the communities participated in daily activities, and whether there were distinct patterns of occupation or specialization among them. In Chapter 7, my research questions focused on viewscales by assessing how the views from different parts of the settlement influenced community identity and social dynamics. I considered how visible landmarks of architectural features may have helped to shape the collective identities of the inhabitants and how power dynamics were reflected through visibility. Finally, in Chapter 8, I looked at movement within and between the supra-household communities by questioning how physical movement and

social connectivity may have influenced the formation of shared identities alongside social distinction. I considered access to resources and ritual spaces and their impacts on social stratification and differentiation between communities. Through these four chapters, I provided a deeper understanding of the social, cultural, and spatial dynamics that shaped life within an early urban center.

The purpose of this discussion and conclusion chapter is to review the findings of each set of research questions, then bring them together and critically assess their significance in understanding early urban processes in the Andes. In doing so, I will address how the settlement of Cerro San Isidro, with its unique spatial organization, social dynamics, and integration with the surrounding landscape, challenges traditional definitions of urbanism. By examining the mechanisms of social cohesion and identity formation, I will also explore how these processes contributed to the development of early urban communities in the Nepeña Valley.

9.1 Thematic synthesis of key findings

This section discusses the four primary themes of questions and results that I addressed throughout this dissertation.

9.1.1 Spatial Organization and Urban Form

To assess the spatial and social dynamics that contributed to social cohesion and collective identity formation in Early urban forms, I first investigated the spatial organization of Cerro San Isidro, including assessing the urban nature of the settlement. I asked how a map of Cerro San Isidro aligns with or differs from previous descriptions of the settlement. Additionally, I inquired about which morphological attributes suggest Cerro San Isidro is an early urban

settlement and what specific morphological characteristics indicate the presence of supra-household communities, given their association with urban settlements.

In Chapter 5, I presented the map I created through UAV, GPR, and excavation data. This combined spatial rendering supports descriptions (Ikehara 2015) of the settlement as a natural mound modified through anthropogenic terracing and architectural features. However, I note that the presence of a large public plaza is not supported by this data, at least during the EH. I suggest that perhaps public spaces were present in the field surrounding the settlement, or another nearby ritual center played a key ceremonial role. In addition, I highlight that population estimates suggest the settlement held more people than originally indicated and covered a greater area (See Section 5.1). I argue that Cerro San Isidro meets many criteria for a low-density urban settlement, as laid out in Table 9.1, with evidence of dispersed but connected settlements through the Moro Pocket (Ikehara 2015), ceremonial function of Cerro San Isidro, presence of ceremonial centers in the immediate landscape, community-based modular organization, and labour-intensive construction.

Table 9.1: Features discussed in text that support Cerro San Isidro's classification as a low-density urban settlement within an Andean framework.

Feature	Description
Settlement Dispersion	The settlement is dispersed across the landscape, with a central focus and surrounding hamlets.
Ceremonial Function	The presence of ceremonial features, such as the huanca Stone, suggests that the site played a role in ritual activities.
Public Ceremonial Architecture within Landscape	Dispersed ceremonial architecture across the landscape with EH megalithic ceremonial settlements.
Labour Mobilization	Large-scale labour input is required for construction, such as the construction of terraces, mounds, and other architectural features.
Community-Based Modular Organization	The settlement is organized into supra-household communities with modular planning.

In addition, the spatial organization of Cerro San Isidro, specifically spatial clustering and physical distinctiveness of the architectural platforms, combined with population estimates ranging from 12 to 369 across the 16 architectural platforms, suggests the presence of multiple families and offers compelling evidence for the existence of supra-household communities. The spatial organization of these spaces likely facilitated social cohesion amongst community members within each supra-household, through regular interaction and shared experiences. Cerro San Isidro can then be described as a terraced settlement built atop a natural mound, organized into supra-household communities, and extending into the surrounding low-lying fields, serving as a population center within a low-density urban system.

9.1.2 Rhythm of life at Cerro San Isidro

Another series of questions explored the rhythm of life at Cerro San Isidro, situating its inhabitants within their environment and timeframe, particularly during the Early Horizon. I address the challenge of mapping an urban center with a long occupation and how to represent this specific period accurately. To further contextualize the results of the movement and visibility analysis, I explored the economic status of the various super-household communities, as well as any activities in which the communities may have been participating.

In Chapter 6, I argued that the Early Horizon (EH) occupation at Cerro San Isidro likely extended over most of the architectural platforms. Radiocarbon dating and ceramic analysis indicate that the settlement was occupied consistently across the site during this time. A comparison of ceramic materials from different supra-household communities indicated variations in their daily activities. The Upper and Northern Platforms had a significantly higher amount of storage vessels, which may indicate a focus on surplus resource management and

likely redistribution via feasting and other exchange mechanisms. These patterns may reflect different activities that were priorities across the supra-household communities.

The overall high percentage of fine ware amongst the supra-household communities supports early descriptions of Cerro San Isidro as an elite population center (Ikehara 2015). However, the distribution of ceramic types also revealed that some communities may have held a higher status than others; in particular, the Upper Platform has the highest ratio of decorative serving ware. Overall, high-quality ceramics and differences in vessel types suggest distinctions between communities regarding activities, power, and social status. The spatial clustering and physical distinctiveness of architectural platforms supported the conclusion that Cerro San Isidro was organized into supra-household communities. Social differences between communities would suggest that inhabitants had significant shared experiences within their own group, contributing to the formation of collective identities and may have had different levels of social and economic status across each supra-household community.

9.1.3 Visibility and Experience of Space

I also examined whether the viewsapes of the four supra-household communities at Cerro San Isidro emphasized specific landmarks, architecture, or spatial configurations, such as mountain peaks, *wak'as*, water, or quarries. I addressed how the shared visual experiences of these features may have influenced group identity. Additionally, I considered how the distribution of visibility among the supra-household communities reflected power relationships.

The viewsapes from each of the four supra-household communities revealed that sightlines to significant landmarks, such as mountains or ritual spaces, were likely critical in fostering a sense of shared experience and collective identity. Visibility analysis showed that certain communities, particularly the Upper Platform, had greater visual access to sacred

landmarks, such as mountain peaks and megalithic ceremonial centers (potential *wak'as*). This higher visibility, in conjunction with the presence of an upright stone and high-value offerings, likely reinforced these communities' status as spiritual or ritual leaders, playing a key role in their identity formation. The degree of visibility varied between communities, with some having more control over highly visible and prominent areas. This unequal distribution of visibility likely reflected (and indeed produced) social hierarchies, with elite communities enjoying greater access to visually important spaces, reinforcing their higher status within the settlement. Limited visibility for some groups, particularly those in lower-lying areas, likely contributed to social stratification.

Although shared views of key landmarks across Cerro San Isidro helped unify the residents through a common visual experience, differential access to specific views across communities created a layered experience of identity. At Cerro San Isidro, power, status, and ritual importance could have been partially expressed through the control of visibility.

9.1.4 Movement and Connectivity

To investigate mechanisms which may have shaped community identity and fostered social cohesion, I focused on social networks and connectivity to understand how interactions and relationships within and between communities contributed to a collective sense of identity as a whole, but also to the identities of individual supra-household communities. I asked how social networks and connectivity contributed to forming and differentiating group identities at Cerro San Isidro during the Early Horizon. Additionally, I inquired about how variations in access to resources and ritual spaces between the communities at Cerro San Isidro influenced the development and differentiation of community identities.

Movement at Cerro San Isidro, both within and between communities, played a central role in shaping social identities. Rather than attending ritual or collecting resources, the routine movement helped foster a sense of belonging and collective identity within supra-household communities. Movement facilitated social interactions and reinforced community bonds. Each community had unique movement patterns due to geographical separation, resulting in different social and spatial experiences. Communities with better access to resources or ritual spaces (e.g., Southwestern and Eastern Platforms) likely developed stronger economic and social connectivity. This movement facilitated cooperation and created distinct collective identities, particularly in relation to their role in resource acquisition and distribution. Communities with increased access to ritual spaces, such as the Upper and Northern Platforms, likely held important ceremonial roles. The Upper Platform's proximity to the huanca stone positioned the members as spiritual leaders, which reinforced their isolated identity and social power within the settlement. Movement tied to rituals was crucial for maintaining social cohesion and hierarchical relationships within the broader settlement. The degree of social connectivity between communities varied, influencing their socio-spatial integration. The Northern Platform, despite being well-connected to the settlement, faced challenges in accessing resources. The members' likely role as intermediaries in ceremonial activities helped shape their communal identity, bridging the gap between isolated spiritual leaders (Upper Platform) and other settlement members.

Overall, accessibility, both to resources and ritual spaces, appears to be a significant factor in how communities experienced social stratification. Communities with easier access to key resources or spaces likely experienced increased social cohesion and economic significance,

while those with restricted access (e.g., Upper Platform) perhaps formed identities around exclusivity and ritual power.

9.2 Cerro San Isidro's Supra-Household Communities

This subsection synthesizes the results from the four datasets—spatial organization, material culture, visibility, and movement—to assess each supra-household community individually.

9.2.1 Upper Platform Community

The analysis of lived experience and social organization suggests the members of Upper Platform had a shared collective identity around spiritual leadership and political power. Their elevated position and isolation, both physically and socially, from other communities likely contributed to a sense of exclusivity. Spatial segregation likely reinforced internal bonds within the group and, by making it more difficult to move between the Upper Platform and other parts of the settlement, would further their isolation. The inhabitants' limited interaction with other communities may have increased internal cohesion within the community, while also demarking their exclusivity. In addition, their unique visibility of sacred landmarks, such as the megalith architecture and Apus, underscored their connection to religious practices, which were central to their collective identity (Bray 2015a; Williams and Nash 2006). This is further suggested by the member's immediate access to the haunca stone, which suggests a role as overseers of ritual life but would also enhance collective identity as ritual leaders. Foucault's (1977) ideas regarding the power of visibility support the notion that oversight of the ceremonial landscape allowed the members of the Upper Platform community to maintain and project their influence over the broader settlement, strengthening internal bonds as they collectively managed sacred spaces. In

addition, Van Dyke et al.'s (2016) work on how controlled access to sacred spaces can promote group unity and exclusivity similar supports these claims. The ceramic analysis suggests high-status individuals, due to the presence of a greater amount of fine ware serving dishes than any other community assessed in this study, further supporting the importance of ritual activity and the power of this community.

9.2.2 Northern Platform Community

The Northern Platform community appears to have been a crucial intermediary within the settlement's social and economic hierarchy; its access to resources and ceremonial spaces, and increased access to other communities within the settlement suggest that the members of this group could have acted as intermediaries between the Upper Platform community members and other parts of the settlement. Additionally, this community had the highest amount of storage vessels, which, combined with increased social connectivity, could suggest a role in resource management.

9.2.3 Southwestern Platform Community

The inhabitants of the Southwestern Platform appear to have been relatively more involved in food supply and culinary activities, suggesting bonds were built around inclusion in these activities. The community had minimal views of ceremonial spaces, likely reducing their regular experiential connection to ritual practices. However, these community members had an advantageous position for collecting resources and maintained high social connectivity with all other platforms in the settlement, suggesting that they could have been important resource collectors and distributors. These community members had the highest proportion of cooking vessels, and, unlike other communities, they had the lowest ratio of storage vessels, suggesting

limited engagement in long-term storage. This could indicate that they were more involved in collecting and perhaps distributing these goods to other communities.

9.2.4 Eastern Platform Community

The Eastern Platform community members appear to have lived a balanced life between ritual engagement and economic cooperation. The community members had a balanced distribution of ceramic materials in terms of functionality, but appeared to have a higher preference for pattern-burnished ceramics, a high-value ceramic, compared to other communities. They had an unobstructed view of the highlands and most of the ceremonial centers. In terms of resources, they had good visibility of river origins and increased access to key resources, indicating their everyday involvement in resource and ritual spaces.

9.3 Living Urbanism: Cooperation and Spatial Experience at Cerro San Isidro

This thesis demonstrates that urbanism is not simply monumentality, orthogonal planning, or a dense population, but rather how the settlements support cooperation, enable relationships beyond the household, and create shared social meaning and identity. While I have shown how cooperation and shared identity have been fostered within supra-household communities through shared experience, it is just as important to recognize that urbanism at Cerro San Isidro was also formed through the interactions between these communities. The supra-household communities at Cerro San Isidro were not isolated units but dynamic and interconnected social groups. The urban fabric of Cerro San Isidro was created through the complex relationships between socially distinct, yet mutually dependent groups.

By studying the experience within these communities, there are clear social distinctions between them, at least the four studied here. Drawing on Foucault's (1977) theory of power and visibility, as well as more recent studies on Andean cosmology (Bray 2015), communities with unobstructed views of sacred landmarks likely had greater social or religious prominence, thereby reinforcing a stratified social structure. This connection to sacred spaces fostered not only a shared religious identity but also reinforced power dynamics, where communities with better visibility had privileged access to sacred knowledge and rituals (Janusek 2015b). Furthermore, the concept of unidirectional visibility, where communities could see but not be seen, played a role in social differentiation, particularly in terms of political control and elite status. In the Andes, sacred landmarks such as *wak'as* often served as focal points for collective identity, with visibility of these landmarks emphasizing the spiritual cohesion of supra-household communities (Swenson 2011). At Cerro San Isidro, the supra-household communities have varying visibility of these features, reflecting different power dynamics between the supra-household communities. But in general, the shared visibility of sacred spaces may have created a visual spiritual anchor that promoted unity among these supra-household communities.

Similarly, movement through Cerro San Isidro was integral to fostering social connectivity but also defining social boundaries. Restrictions in movement, particularly in access, played a critical role in reinforcing social hierarchies. The lack of access to the huanca stone may have served to differentiate communities within Cerro San Isidro, reflecting broader Andean patterns where social stratification was expressed spatially (Lehner 2019). Social connectivity patterns further reflected social differences. The Upper Platform community was the most isolated from other communities, perhaps indicating a physical and social boundary between them and the other supra-household communities. Such distinctions in movement

created boundaries that marked social differentiation, further defining Cerro San Isidro's social structure during the Early Horizon period.

However, this analysis has shown that while social distinction is evident between these supra-household communities, so too is interdependence. Through an assessment of experience, the results support the interpretation of Cerro San Isidro as a collaborative settlement, maintained by the efforts of distinct yet socially connected, supra-household communities. While the Upper Platform community appears to have been more spatially and socially isolated, with privileged visibility over sacred landmarks and immediate access to the haunca stone, these factors may indicate a role in overseeing ritual life rather than centralized political control. Their position within the settlement may have been sustained through ongoing interactions with other communities, who likely played crucial roles in maintaining the daily functioning of the settlement. For instance, the Northern Platform community's high ratio of storage vessels and greater connectivity to other sectors could suggest that they facilitated the distribution and communication of resources between different groups.

The Southwestern Platform community, with the highest proportion of cooking vessels and extensive social connectivity, appears to have played an essential role in food production and distribution. Their limited visibility of ceremonial spaces could indicate that they had a more practical, rather than ritual, focus—perhaps contributing to communal feasting or provisioning rituals overseen by other groups. The Eastern Platform community, by contrast, appears to have had a more balanced engagement with both economic and ritual activities. The prevalence of high-value ceramics and increased visibility over sacred and resource-rich landscapes suggests they may have participated in both practical and ceremonial aspects of settlement life.

So, while I have shown that the supra-household communities were socially stratified in some respects, Cerro San Isidro would have relied on the cooperation of its inhabitants for its functioning. The integration of different communities, both socially and economically, would have been necessary for the production, distribution, and consumption of goods, as well as for maintaining shared rituals and practices.

The spatial organization of Cerro San Isidro further demonstrates a high degree of social connectivity and interaction across the settlement, further supporting the cooperative nature of Cerro San Isidro. Pathways, terraces, and architectural arrangements facilitate movement and interaction between the various supra-household communities. While the communities are spatially distinctive, they remain part of a greater network. This is particularly clear with the presence of La Banda, the large roadway that crosses the entirety of Cerro San Isidro (See Section 5.1), connecting the distinct communities. The roadway suggests that cooperation was emphasized through much of the settlement. However, as I have noted, there is one exception to this pattern – the Upper Platform, which was more spatially isolated, indicating members' elevated social role. However, perhaps this physical isolation was not as significant to the inhabitants but instead served as a physical and visual reminder of their distinct identity/role, while still being involved with the larger network of supra-household communities.

In summary, shared experience through the spatial layout, patterns of visibility, and movement pathways at Cerro San Isidro shaped a sense of identity and cooperation within each supra-household community, while also marking social differences between them. Similarly, the daily experiences connected communities across the settlement and encouraged cooperation on a broader scale. Through this focus on experience, we gain insight into daily life at Cerro San Isidro during the Early Horizon and see how these supra-household communities formed the

foundation for the site's social and spatial organization—where cooperation and identity were continuously reproduced through residents' ongoing engagement with their built world.

9.4 Situating Cerro San Isidro in Broader Contexts

In this section, I situate Cerro San Isidro within multiple comparative frameworks to better understand the social, spatial, and organizational characteristics of Early Horizon urbanism. I start by examining the local context, situating the results of my work at Cerro San Isidro and the argument of the Moro Pocket as a low-density urban settlement, with existing research done in the Moro Pocket. I include comparisons with previous surveys and demographic research, while positioning my work within these conversations. I then extend the discussion further toward the coast, comparing the urban character of the Moro Pocket and organization of Cerro San Isidro to other Nepeña valley settlements along the coast, with particular attention to differences in overall urban organization and supra-household community layout. I then broaden the focus to exploring these implications across the Andes and South America, examining other examples of low-density urbanism in the region and how it compares to the Moro Pocket. Here, I engage with the concept of supra-household communities as an analytical lens to assess intermediate-scale units in urban settings, tracking the social mechanisms that form the foundation for cooperation and shared identity across the Andes. Finally, I contextualize Cerro San Isidro globally, situating it within the broader phenomenon of low-density urbanism observed in Mesoamerica, Sri Lanka and Southeast Asia. This section demonstrates how Cerro San Isidro and the Moro Pocket broadly contribute to ongoing debates about the diversity and flexibility of urbanism in the Andes and beyond, highlighting the importance of supra-household communities in assessing daily life and lived realities within urban spaces.

9.4.1 Local Context: The Moro Pocket and Nepeña Valley

This research project builds directly upon and extends previous archaeological research in the Moro Pocket. Research in the pocket has largely been based on surface surveys. Proulx (1985) and Daggett (1984) first recognized the occupation of settlements across the Moro Pocket, and subsequent research by Ikehara (2015) offered the first demographic and spatial reconstructions valley-wide for the Early Horizon. My project builds upon these foundations with high-resolution, site-specific data for Cerro San Isidro, where I integrated multiple mapping methodologies with excavation data. By doing so, I provided a finer-grained reconstruction of the built environment and occupation of the settlement during the Early Horizon. At the local level, this project contributes new empirical data on the internal organization of one of the major demographic centers identified by early survey research and expands on how everyday life was experienced.

As I argue in this dissertation, the patterns of settlement dispersion across the Moro Pocket, the ceremonial function of Cerro San Isidro, the presence of ceremonial architecture across the landscape, and the evidence of labour mobility and community-based modular organization at Cerro San Isidro indicate that the settlements within the Moro Pocket formed a low-density urban system. These features reflect the social and spatial mechanisms necessary to sustain relationships and coordination between dispersed groups, illustrating how the Moro Pocket functioned as an integrated but dispersed urban landscape during the Early Horizon. My dissertation research then extends Ikehara's (2015, 2016) model by emphasizing the urban nature of the Moro Pocket and examining mechanisms that sustained interaction between the dispersed settlements.

Ikehara (2015, 2016) identified a series of supra-local communities, each with a hilltop population center and a series of hamlets and villages scattered across the cultivable land. I

contend that, combined, these supra-local communities represent a low-density urban system. By considering the presence of multiple population centers, indicating a multi-centric form, the Moro Pocket may be better explained as a multi-center low-density urban system where Cerro San Isidro served as one of the demographic anchors and a central node within a broader, integrated settlement system. Ikehara (2015, 2016), Proulx (1985), and Daggett (1984) all note similar ceramic materials and architectural styles across this region, which further suggests an integrated settlement system. However, my dissertation research, while it considers the Moro Pocket as a whole, is primarily focused on the social and spatial organization of Cerro San Isidro. The extent and nature of interaction among the settlements across the Moro Pocket and within Ikehara's (2015) proposed supra-local communities remain uncertain. Additional work is needed to investigate the relationship between these settlements, to have a clearer understanding of the urban system and the potential role of Cerro San Isidro as a demographic anchor.

The Middle Nepeña Valley, and the Moro Pocket specifically, has been described as an intermediary between highland and coastal groups (Lau 2011; Proulx 1982; Vogel 2016). The variability in ceramic types across the supra-household communities at Cerro San Isidro (see section 6.3), in combination with different coastal and highland viewscales (section 7.2), could indicate diverse cultural influences, supporting the integration of the Moro Pocket as an intermediary space. However, further work is needed to explore this belief. Detailed ceramic analyses considering technological and compositional variations would be useful to determine if distinct production techniques, pointing to cultural traditions, were used. Similarly, an assessment of other material culture, including textiles, foodways, etc., would help better understand cross-regional connections and how those may have shaped local experiences of identity.

My research also expands on Ikehara's (2015, 2016) research by including a finer-grained demographic reconstruction at Cerro San Isidro. As I reviewed in this thesis (see Section 5.1.1), Ikehara (2015) used surface ceramic densities reflecting the intensity of use, discard rates, and duration of occupation, to calculate population estimates for the Moro Pocket. He estimated that Cerro San Isidro was the population center for its district, with a population of 391 residents out of the 1358 that resided in small hamlets or villages scattered throughout the cultivable fields within its district (Ikehara 2021). However, around 450 CE, the original district in the Moro Pocket fragmented into over ten smaller supra-local communities. The Cerro San Isidro district decreased in size, but with an overall population boom, the number of people in the Cerro San Isidro supra-local communities expanded to 1214. My dissertation project provides a finer-grained demographic analysis of Cerro San Isidro (see section 5.1.1) for the Early Horizon, which spans both the Late and Final Formative periods employed by Ikehara (Late and Final Formative). By employing a wall-to-floor ratio method based on excavation contexts with an assumed 4-6 people per square meter, I calculated the population of Cerro San Isidro during the Early Horizon to be 1129.6 to 1694.4. While Ikehara (2015) suggests a maximum population of 1,214 people for the entire Cerro San Isidro district, my estimates, focusing only on the Cerro San Isidro settlement itself, fall within and above that range, implying that when the surrounding areas are included, the overall population of the district would have been much higher than suggested by Ikehara.

The discrepancy in population estimates is likely a result of methodology, as the basis of Ikehara's (2015) estimates is surface ceramics and the architectural capacity is mine. Surface ceramic deposits are effective for capturing long-term demographic trends, but they can be conservative if discard practices were uneven or if ceramics did not preserve evenly across the

landscape. Additionally, Ikehara's estimates rely solely on surface material and do not account for buried contexts, which could differ significantly. By contrast, my approach utilizes the architectural capacity of Cerro San Isidro to more effectively estimate the number of people who could reasonably have lived within the built environment at one time, essentially measuring the population in terms of the settlement's architectural capacity.

In addition, through my GPR surveys in conjunction with pedestrian surveys, I have suggested that the areas immediately surrounding Cerro San Isidro were also inhabited. This is further supported by Ikeharas' (2015) surface survey of the pocket, where he suggests a series of hamlets and villages were scattered across the cultivable fields. Considering this increased size, with my higher population estimates for Cerro San Isidro, these findings suggest that the population of the Moro Pocket was much larger than previously thought.

Looking toward the coast, settlement patterns and the social organization of the Early Horizon highlight distinct trajectories between the coastal and middle Nepeña valley yet also indicate some similarities. There has been extensive archaeological work in the lower valley at Caylán, Huambacho, and Samanco (see section 2.2.2), providing detailed documentation on the region's political and social landscape during the Early Horizon. The close stylistic and economic complementarity between the coastal settlement points to evidence of a complex polity (Chicoine et al. 2021). Overall, Chicoine et al. (2021) argue that the archaeological data collected from Caylán, Huambacho (Chicoine 2006), Samanco (Helmer 2015), and Sute Bajo (Cotrina et al. 2003) point to large, supra-kin urban households that may comprise multiple extended families in neighbourhoods.

Both the Lower and Middle Nepeña valley regions exhibit integrated settlement systems during the Early Horizon, but differ in terms of social, organizational, and spatial configuration.

Along the coast, the major centers formed a network with varying-sized but nucleated centers spanning 13km. The settlements were not visible due to the topography and coastal ridges, but similar architecture and spatial organization indicate sociopolitical interaction between the settlements. Their integration was not maintained through visibility or spatial connectivity, but social, ritual, and/or economic interactions. In contrast, the settlement system in the Moro Pocket contains more spatially proximate and visually connected settings within the enclosed pocket, measuring roughly 5 by 7km. Additionally, along the coast, there is a centralized network with Caylán as the dominant urban core and sociopolitical center, whereas the Moro Pocket, according to Ikehara (2015, 2016), contained multiple core centers, indicating a multi-centric organization structure. By situating the Moro Pocket as an urban system, this comparison enables a broader understanding of how different pathways to urbanism developed within the same valley at the same time. In this sense, my dissertation research contributes to reframing Early Horizon urbanism as a spectrum of organizational strategies, in which communities experiencing the same cultural-historical events, such as the collapse of Chavín influence, developed diverse and locally contingent responses.

Turning to a more detailed comparison of Caylán and Cerro San Isidro provides further insight into Early Horizon settlement organization and social dynamics. Scholars (Chicoine and Ikehara 2015; Chicoine et al. 2021; Sutherland 2017) have described Caylán as a central population center in the coastal polity during the Early Horizon. The site covers ~90ha with a core architectural center of 50 ha, comprising more than forty walled compounds interpreted as *cercaduras* or walled neighbourhood compounds, and are hypothesized to present discrete residential and social units (Chicoine et al. 2021; Sutherland 2017). Chicoine and Whitten (2019) estimate a permanent population of ~3000 people, with an estimated 26-42 people per

compound. The settlement organization is comprised of a series of dense architectural clusters, regular compound spacing and the presence of internal plazas or open courts within many *cercaduras*. Huambacho and Samanco have similar organizational features but at smaller scales (Chicoine 2006; Helmer 2015).

Caylán is much larger than Cerro San Isidro, with the core architectural area five times the size of the Cerro San Isidro mound. While Cerro San Isidro likely extends beyond the mound itself (Golay Lausanne et al. 2022; See section 5.1), the core site itself is only 10ha. Focusing on the cores of these settlement systems, Caylán has an estimated density of approximately 1 person per 167m², whereas Cerro San Isidro has approximately 1 person per 69-90m². This suggests that Cerro San Isidro, despite being spread across architectural platforms separated by steep slopes, was more spatially compact than Caylán. In this case, we can consider Cerro San Isidro a high-density node. These differences further highlight the variability in urban organization within the Nepeña Valley during the Early Horizon. To explore how these differences translated to supra-household organization, it is useful to examine the internal structure of supra-household communities across the Nepeña Valley.

Research by Chicoine and Helmer (2019, 2024) compares neighbourhood organization at Samanco and Caylán, highlighting the variability of supra-household communities during the Early Horizon. At Samanco, the settlement was organized through bottom-up interactions with groups establishing compounds following the natural topography of hillside terraces and was structured around communal patios (Chicoine and Helmer 2024). In Caylán, the supra-household communities were more nucleated and internally integrated, with over forty *cercaduras* within a 50ha area. Each *cercadura* contained plazas and evidence of communal feasting (Chicoine and Helmer 2024). The authors (Chicoine and Helmer 2024) conclude that at Samanco, the supra-

household communities were likely tied to group-based activities, whereas at Caylán, the communities were involved in larger, possibly competitive, public feasting events. At Cerro San Isidro, the supra-household communities share some similarities with the coastal Early Horizon examples but also differ in logic and perhaps integrative mechanisms. Like Caylán, the supra-household communities at Cerro San Isidro were bounded units, defined not by enclosed walls as at Caylán, but by steep slopes and architectural terraces. Both Caylán and Samanco's supra-household communities include plazas, which are not seen at Cerro San Isidro. The absence of internal plazas suggests that the way in which the settlements experienced community and fostered cooperation differed across the sites. At Cerro San Isidro, communities appear more residential, where cohesion and identity were likely fostered through shared experiences in routine tasks, such as moving through the settlement, shared visibility, and perhaps even routine domestic tasks, rather than public gatherings or feasting events.

By assessing supra-household communities in these urban settlements, they reveal how cooperation and cohesion occurred within the settlements and make it possible to compare social organization across settlements of different sizes, densities, and settings. The comparisons I reviewed above highlight that while the formation of supra-household communities is a consistent feature of Early Horizon urbanism, the nature of shared experiences varied based on local environmental, architectural, and social conditions. Through this comparison and drawing on my research from this dissertation, we can consider the Moro Pocket as a multi-centric, low-density urban system, within which Cerro San Isidro functioned as one of the principal centers and is characterized by relatively high internal density.

9.4.2 Region Context: The North Coast of Peru and the Andes

Archaeological research on urbanism across the North coast of Peru has highlighted remarkably diverse forms of urbanism. As I reviewed in section 3.2.1, recent scholarship on Andean urbanism, particularly across the north coast, has emphasized that Andean urbanism cannot be reduced to a single form or trajectory; instead, each urban settlement materialized distinct forms that suited its relations with the landscape and people. This reconsideration has recognized various forms of urbanism that are high-density, low-density, or seasonally occupied. Cerro San Isidro fits within and extends this conversation by presenting a form of urbanism that varies from the classic Western ideal; therefore, it is useful to situate the findings of this dissertation within the diversity of north coast urbanism.

Across the region, there is a wide range of urban expressions. These include the compact, high densities forms of the Chan Chan, the capital city of the Chimú Empire, and the Moche cities of Galindo and Pampa Grande, to pilgrimage centers, such as Pachacamac and Chavin de Huántar, which become densely occupied at specific times and remain sparsely occupied or empty at others (Bawden 1982; Chapdelaine 2009; Kolata 1997; Moore 1996, 2003; Shimada 1994; Topic 2009). The organization of Cerro San Isidro has close parallels with the later north coastal settlements, Grupo Gallinazo in the Virú Valley and Greater Sicán in the Lambayeque Valley. Grupo Gallinazo is the proposed capital city of the Virú Polity and dates from ~100 BCE – 700 CE (Millaire and Eastaugh 2011). It comprises over thirty architectural mounds spread across ~40ha with a proposed population of 10,000 to 14,000 residents (Millaire and Eastaugh 2011). Of these thirty mounds, the largest and tallest of the group, Huaca Gallinazo, is believed to be the city core, which features a large public space, a 25m tall civic-ceremonial pyramid, and a large, dense residential sector (Millaire and Eastaugh 2011). The remaining archaeological mounds in this group consist of smaller residential and/or civic ceremonial sites that are

hypothesized to be neighbourhoods of this urban complex (Golay Lausanne 2020). By considering the Moro Pocket as an integrated urban system, parallels emerge with the organization observed at Grupo Gallinazo. In both settlements, a population core, Cerro San Isidro in the Moro Pocket and Huaca Gallinazo at Grupo Gallinazo, is surrounded by a series of related but dispersed settlements located at a visual distance and separated by cultivable land. Both Huaca Gallinazo and Cerro San Isidro have evidence of ceremonial functions, though while a formal plaza is clearly defined at Huaca Gallinazo, such a space remains hypothesized in the low-lying fields for Cerro San Isidro.

Similarly, in the Lambayeque valley, from 900-1100 CE, the Sicán urban settlement flourished (Cervantes 2024). Cervantes (2024) describes the urban settlements as having two components: the Sicán core, a civic-ceremonial center with a series of platforms and pyramidal complexes, and Greater Sicán, a larger region surrounding the core with a series of architectural clusters of different shapes and sizes spread across the cultivable land. Cervantes (2024) describes Sicán as a multi-centric low-density urban settlement with eight demographic districts that represent large social groups, likely focused on elite lineages. This model closely parallels the organization I propose for the Moro Pocket. Based on Ikehara's (2015) research and expanded in this dissertation (see section 9.4.1), I argue that the Moro Pocket can similarly be understood as a multi-centred, low-density urban system composed of at least ten supra-local communities, each with its own demographic social center, such as Cerro San Isidro. Cerro San Isidro, as proposed by Ikehara (2015) and further confirmed in this dissertation, was likely inhabited by elite individuals, mirroring the elite residential and ceremonial character of the core centers within the Sicán system. Lastly, the Sicán system, like Grupo Gallinazo, had a denser core with a series of related settlements dispersed across cultivable fields.

Looking further to the Andes and South America in general, the region similarly exhibits a great diversity in ancient urban settlements and challenges long-standing models of urbanism that treat these spaces as singular, top-down phenomena. In fact, Andean archaeologist Makowski (2023) refers to many common Andean urban characteristics as ‘Anti-Urban’ as they do not fit this classic model of urbanism (see discussion in section 3.4.1). As I showed above, Cerro San Isidro furthers this conversation across the north coast of Peru, but even more so across the Andes and South America more broadly. The presence of large lowland settlements alongside dispersed urban landscapes reinforces variability in urban forms and highlights how scale, density, temporality (seasonal vs. permanent occupation), monumentality, and the balance of administrative, ritual, and residual roles vary significantly across settlements.

There are two clear examples of low-density urbanism in South America, both occurring in the Amazon Basin. In Southern Amazonia, de Souza et al. (2018) document an estimated 1000-1500 fortified village enclosures across an area of $\sim 400,000 \text{ km}^2$, with an estimated population of 500,000 to 1 million during the Late Pre-Columbian times ($\sim \text{Cal AD } 1250\text{--}1500$). The settlements were connected by interfluves and minor tributaries, indicating a network of complex societies representing a form of low-density urbanism (de Souza et al. 2018; Heckenberger et al. 2003; Heckenberger et al. 2008). Similarly, in Llanos de Mojos, Southwest Amazonia, Prümer et al. (2022) assessed a series of interconnected settlements associated with the Casarbe culture ($\sim 500\text{--}1400 \text{ CE}$), which the authors consider an example of low-density urbanism. This settlement system, covering over 500 km^2 , consisted of four to five tiers, with the first tier comprising two large primary centers (147 ha and 315 ha). The authors (Prümer et al. 2022) argue that the two primary centers were connected to a series of additional settlements,

including secondary and tertiary centers, a fourth tier of settlements composed of a range of smaller elevated sites, and perhaps a fifth tier of small hamlets.

Given that we are considering low-density urbanism, it is useful to compare the demographics of these urban systems with those of the Moro Pocket. Looking to the Moro Pocket, it covers a total of $\sim 38 \text{ km}^2$, and using Ikehara's (2015) population estimates, has a peak population of 8,475–12,713 people. The Moro Pocket has a density of 2.2–3.4 people/ha, whereas Southern Amazonia has a density of 0.0125–0.025 people/ha. In this instance, Moro Pocket is much more densely populated compared to the Amazon example. The population index of high-density settlements, although originally created for Mesoamerican contexts (Marcus and Flannery 1996; Sanders et al. 1979) but applied in the Andes (Millaire and Eastaugh 2011), defines high density as 25–50 people/ha. This indicates that both the Moro Pocket and Southern Amazonia examples fall below the accepted high-density threshold. While I avoid the use of values to classify settlement types, they are useful for comparative purposes. In this case, while the Moro Pocket is denser than Southern Amazonia, it still remains considerably less dense than traditional high-density urban centers. However, as I noted before, I do believe the population for the Moro Pocket may be higher than originally anticipated. Nevertheless, its overall density remains low, reinforcing my characterization of the Moro Pocket as a multi-centred, low-density urban system.

These comparisons show that there may be a broader pattern of distributed or low-density urbanism across the north coast and Andes in general, a pattern seen at Cerro San Isidro. In these instances, there is a trend for multi-centred low-density settlement systems seen with Llanos de Mojos in Amazonia, Sicán in north coastal Peru, and perhaps even with the Moro Pocket. More extensive comparative research is needed to trace the variability and continuity of this type of

urbanism, but considering Cerro San Isidro as urban, we are opening the door to these greater comparisons. These cases reveal that Andean urbanism was plural and relational, encompassing a variety of forms that ranged from compact to dispersed and permanent to seasonal populations. Cerro San Isidro broadens our regional conversations on urbanism by inviting us to consider it not as a fixed form but as a series of relational practices through which people collectively experience and make sense of their space.

As I noted throughout this dissertation, the study of intermediate social units, which I refer to as supra-household communities, has been particularly salient worldwide. Archaeological research across the Andes and Mesoamerica in particular has increasingly emphasized that meaningful interactions frequently occur at the intermediate scale, where collectives structure daily life and cooperation (Walden and Cervantes 2024; Hutson 2016; Pacifico and Truex 2019). Parallels can be made with Cervantes and Walden's (2024) edited volume *Neighbourhood and District Integration in the Andes and Mesoamerica*, where the contributors assess how people, spaces and institutions were integrated into a whole. Across the volume, the contributors show how integration was an active social process achieved through cooperation, shared rituals, and management of common spaces.

In the Andes, examples from Sicán, Caylán and Huayuri reveal how intermediate-scale groups anchored urban cooperation. At Sicán, collectives known as Huaca groups used ancestor veneration and commensality to maintain bonds across a multi-centred low-density urban landscape (Cervantes 2024). At Caylán, supra-household communities referred to as patio groups bonded through daily practices and communal living surrounding central patios (Chicoine and Helmer 2024). At Huayuri, Siveroni (2024) suggests that the household collectives are indicative

of minimal ayllus, which were linked by production and rituals and where integrative social and religious activities occurred at the neighbourhood level.

Together, these examples from Sicán, Caylán and Huayuri reveal that integration within supra-household communities throughout the Andes varied in terms of scale, areas of cooperation and organization, but were similar in the sense that experience within these units created shared social realities and fostered cooperation. In each case, the repeated daily experiences and interactions, whether that be collective labour, shared movement, rituals or communal participation, produced a sense of belonging and structured cooperation, reinforcing cohesion at the intermediate scale and throughout the settlement as a whole.

By employing the term ‘supra-household communities’, we can consider and compare a variety of intermediate-scale units while avoiding assumptions on particular urban forms, population thresholds, or administrative features. This allows for a comparison across space and time, highlighting how diverse social and spatial configurations organized daily life and facilitated cooperation. Secondly, using supra-household community as a tool of analysis centers lived experience and cooperation rather than formal hierarchy. It allows for a consideration of the activities and experiences that foster cooperation and social solidarity. Finally, by focusing on supra-household communities, it becomes possible to trace how cooperation and shared identity at the community level can be scaled up to constitute broader forms of urbanism and scaled down to assess how individual households enacted agency. In this sense, supra-household communities offer both an analytical tool and a theoretical bridge linking micro-scale activities and experiences with macro-level urban processes.

9.4.3 Global Perspectives

As I reviewed in section 3.1.2, low-density urbanism has been studied primarily in Mesoamerica (Fletcher 2011; Smith 2011), Sri Lanka (Coningham and Gunawardhana 2011; Gunawardana 1971), and Southeast Asia (Evans et al. 2007; Fletcher 2011; Pottier 2000). Above, I compared the Moro Pocket and Cerro San Isidro to low-density urban areas in the Andes, but it is now particularly relevant to consider low-density urbanism globally.

In Mesoamerica, there are several examples of low-density urbanism, including the settlements of El Mirador, Tikal, Copan, and Caracol (Fletcher 2011). These consist of central monumental cores with large pyramids, roadways, and a residential population scattered across the surrounding land (Fletcher 2011). Among these examples, Tikal and Copan provide particularly clear cases. Tikal covered $\sim 200 \text{ km}^2$ and was occupied from as early as 900-600 BCE to as late as 800-950 CE (López Oliva 2019). The settlement included multiple major temples and masonry-style houses scattered around the centers, but with decreasing density the further from the center (Fletcher 2011; Webster et al. 2007). Tikal also had outlier subcenters outside of the main center (Fletcher 2011). Copan (Classic period, 600-900 CE) covered $\sim 25 \text{ km}^2$, with a large pyramidal center and residential areas of similarly sized houses scattered across the farmland (Webster, Freter, and Gonlin 2000; Fletcher 2011).

In Sri Lanka, Anuradhapura is a well-studied example of low-density urbanism (Bandaranayake 2003; Coningham et al. 2007), dating to $\sim 500 \text{ BCE}$, with a maximum settlement size of 400 km^2 at its peak (Bandaranayake 2003). The settlement consists of a large walled center with surrounding ritual sites that extend up to $\sim 14 \text{ km}$ from the center (Fletcher 2011). The surrounding landscape consists of a network of roadways and domestic houses and numerous occupation loci (Coningham et al. 2007). This layout makes Anuradhapura a multi-foci low-density urban complex.

Lastly, in Southeast Asia, there are a series of low-density urban settlements, starting as early as the first millennium BCE, including Sambor Prei Kuk, Bagan, and Angkor (Fletcher 2011; O'Reilly 2007). Bagan had a large walled enclosure core, containing what is believed to have been once a castle (Hudson 2001). Surrounding the center are numerous Buddhist shrines, dispersed across a total of 80 km², containing interpreted monasteries and domestic materials, likely supporting the serving staff of the monasteries (Hudson 2001).

These cases from Mesoamerica, Sri Lanka, and South Asia demonstrate clear examples of low-density urbanism. What these cases illustrate about low-density urbanism, when considering how Cerro San Isidro and the Moro Pocket relate, is the consistent presence of centralized cores, dispersed residential zones, and integration with agricultural and ritual landscapes. These examples also highlight the diversity of urban forms. Firstly, the diversity is evident in terms of size, which ranges from 25 km² at Copan to 200 km² at Tikal, with Cerro San Isidro falling on the smaller end of this range. Secondly, variability can be seen in terms of centralization. These examples, as well as examples from the Andes that I reviewed previously, reveal that some low-density systems have a single primary center (i.e. Copan, Bagan), whereas others have multiple centers (i.e. Moro Pocket, Sicán), and in some cases, there is a primary center with a series of secondary/sub centers (i.e. Llanos de Mojos, Tikal, Anuradhapura). A more comprehensive comparison of low-density urban forms globally would be beneficial to the field of urban archaeology, but the level of detail required for specific comparisons, such as the density of settlement cores versus residential areas and the organization of domestic spaces, is not yet available. By considering Cerro San Isidro as part of a low-density urban system, we gain valuable comparative insight into the variability of such systems and identify potential trends across these spaces. Future work investigating the urban nature of the Moro Pocket will offer

even more valuable comparative insight and an opportunity to examine how low-density urbanism appears in this region.

9.5 Contributions

I now turn toward the theoretical and methodological contributions of this project, demonstrating how the case of Cerro San Isidro challenges traditional models of urbanism and offers new approaches for understanding low-density urban landscapes and supra-household communities.

9.5.1 Challenging Traditional Western Models of Urbanism

This project has challenged traditional Western-centric models of urbanization by presenting a nuanced understanding of Andean urbanism, specifically within the context of low-density urbanism. Much of the early research on urbanization emphasized large, centralized, high-density settlements, reflective of Western urban models, as primary markers of urbanity (Wirth 1938; Trigger 1972). However, as outlined in my research, these models are inadequate for understanding urban development in the Andes, where spatial organization and social connectivity follow a different trajectory (Makowski 2008; Smith 2010a).

At Cerro San Isidro, I illustrate an empirical case for low-density urbanism, where dispersed populations maintain cohesion through shared experiences within supra-household communities, rather than physical proximity of the inhabitants. This challenges the notion that urbanism must be densely packed to foster collective identity and social structure. The concept of low-density urbanism is crucial for understanding how early Andean settlements operated, due to the proliferation of dispersed settlement organization across the region. Settlements like Cerro San Isidro are bound by shared spatial experiences that integrate dispersed communities into a

unified urban system (Fletcher 2011; Pauketat 2009). My findings align with research in other contexts, such as Cahokia and Angkor, where low-density urbanism emerges as an adaptable form of settlement organization (Evans et al. 2007; Fletcher et al. 2003). This evidence supports the argument that Andean urbanism cannot be defined solely by population density but by how dispersed communities are integrated into a shared social and spatial framework (Swenson 2011; Smith 2016).

Throughout this research, I have highlighted the critical role of supra-household communities in fostering urban development as they not only organized space but also reinforced collective identity and cooperation through shared experiences within those spaces. My research at Cerro San Isidro has shown that shared experiences, specifically through visibility and movement, contributed to cooperation and cohesion within the communities as well as across the settlement, despite the physical separation of the supra-household communities. The findings add to scholarship on Andean urbanism by highlighting that the processes occurring in these spaces—especially the interactions and shared experiences— are essential for connecting individuals within a population center, forming the foundation for urban life. The results support the calls for a re-examination of urban definitions in archaeology (see Section 3.1), particularly when considering urbanism in non-Western contexts. By focusing on high-density, centralized cities as the markers of urbanization, rather than considering what these spaces are doing for their inhabitants, we are leaving out alternative forms of urbanism, such as low-density urbanism. My thesis contributes to a more flexible understanding of urban development by expanding our definitions of urbanism and considering low-density urbanism, which applies in the Andes but also globally, where dispersed urban systems are prevalent (Fletcher 2011; Stoner and Stark 2021). Overall, considering the importance of shared experiences in shaping urban life

and collective identity offers us a new lens through which we can view ancient Andean urbanism.

9.5.2 Methodological Contributions

Throughout this project, I have expanded on archaeological methodologies by integrating spatial analysis, GIS modelling, and material culture to explore the social and spatial organization of urban settlements and specifically supra-household communities. But, more significantly, through emphasizing lived experiences, I contribute to a growing shift in archaeological literature from static settlement plans toward reconstructing the dynamic ways in which people engaged with their built environments. Here, I used these methods to consider what life was like within an early urban settlement for the inhabitants and how their built environment was experienced and imbued with meaning through their daily activities. Additionally, a key contribution of this study is the application of GIS modelling to address social questions about everyday life. By leveraging least-cost analysis and viewsheds, I demonstrate how shared spatial experiences inform community identity and cooperation. I push beyond the conventional use of these applications to show how these methods can be used to address the social and experiential dimensions of past landscapes.

I introduce a new methodology for calculating population estimates across a large settlement where excavations were only conducted on a limited portion of the site. In section 5.1.1., I highlight how I used the average floor-to-wall ratio from across the excavation areas to calculate a population estimate across Cerro San Isidro. This method provides a replicable model for future archaeological research to estimate populations in similar contexts where complete excavations are not possible. Additionally, my methodology for creating an LCA produces a more holistic assessment of anthropological landscape features in the assessment of mobility. By

considering anthropogenic aspects in creating my friction surface, such as including the presence of important ceremonial spaces, I aim to develop a spatial analysis that better accounts for human agency in movement. The replicable modelling I introduce in this dissertation moves beyond traditional approaches that privilege topography alone by incorporating elements that may have shaped the social and symbolic choices of the inhabitants when moving through their built environment.

Another key methodological contribution of this project was the integration of spatial and material data within GIS to create a map not just of space, but also time. Cerro San Isidro was occupied through multiple phases; thus, a single map of this site cannot account for the varying occupations. To account for this diachronic complexity, using GIS, I combine stratigraphic data, architectural features, ceramic material, and radiocarbon dating to reconstruct a map of Cerro San Isidro, which represents only one of these occupational phases, the Early Horizon. I offer a methodological framework to reconstrue the evolving use of urban spaces over time, providing a more nuanced understanding of how urban landscapes were used and shaped by humans through time. This approach has broad applicability for archaeologists seeking to use spatial and material data to decipher layered occupational histories within other settlements.

9.6 Summary

Through this dissertation, I have demonstrated how shared experiences—evaluated through spatial layout, movement, and visibility—were critical in fostering shared identity and cooperation within supra-household communities at Cerro San Isidro, while simultaneously promoting cooperation throughout the entire settlement. Cerro San Isidro was a high-density principal center within a multi-centric low-density urban system, organized by distinct yet

interconnected supra-household communities. The spatial organization of the settlement fostered connections within supra-household communities through increased day-to-day interactions and physical boundaries marking the different communities. The visibility experience played a critical role in shaping hierarchical relationships within the settlement, and the visibility of various ceremonial and landscape features served to share meaning and reinforce collective identity. Movement throughout the settlement further united these supra-household communities, as the inhabitants' movement through space — affected by accessibility, social connection, and settlement integration — reinforced social ties and collective identity within and between the communities, while also sometimes promoting social distinctions.

Ultimately, Cerro San Isidro is a compelling example of the complexity of early urbanism in the Andes. Instead of a top-down plan, it was a settlement that emerged through collaboration within and between supra-household communities, where cohesion was created, reproduced, and negotiated through everyday interactions and shared experiences of the inhabitants. This model of urbanism, rooted in multi-scalar cooperation and shared identity, offers valuable insights into the broader patterns of early urban development in the Andes, highlighting the significance of supra-household communities in shaping daily life in ancient settlements.

9.7 Future Considerations

Based on the findings and experiences I gained throughout this dissertation, I recommend several directions for future research. First, a more detailed study of material culture, including paleoethnobotanical and zooarchaeological remains, along with a more fine-grained ceramic analysis, would deepen our understanding of the activities and interactions within each supra-household community. It would also be valuable to compare these material datasets with the spatial analysis I conducted to see how the patterns align. For example, based on my preliminary

ceramic analysis, as well as visibility and movement studies, I have suggested there were social differences between the upper community and the others. It would be helpful to examine whether the material culture reflects this pattern. Additionally, I have proposed that there may have been differences in activities between the communities—something that could be tested further through variations in material culture.

Future research within the field of archaeology would benefit from revisiting and refining the terminology for multi-household groups. Throughout this dissertation, I employed the term ‘supra-household communities’ as a flexible analytical category and interpretive framework for examining multi-household collectives. Through my assessment of Cerro San Isidro, I found that this terminology and framework provided an effective means of identifying patterns of cooperation and shared spatial organization without imposing predetermined social structures. I was able to explore how households were linked through shared space and experience, while allowing for the possibility that these relationships may have taken different cultural forms. Returning to debates on terminology and the applicability of the term ‘supra-household community’ would benefit the field of archaeology by encouraging scholars to refine the language used to describe multi-household social organizations and, in turn, provide conceptual clarity for cross-cultural comparisons.

Future research at Cerro San Isidro could build on this framework by integrating different lines of evidence, such as compositional analysis of ceramics, the distribution of faunal and malacological remains, and in-depth household analysis, to determine if these groups I identified align more aptly with culturally specific forms of organization, such as *ayllus*, or with broader urban terminology, such districts that could be broken down further to neighbourhoods. Continued work at Cerro San Isidro, alongside broader cross-cultural comparisons, will help

clarify if using this terminology and interpretive framework remains the most productive among the array of terminology used for multi-household collectives, or whether more localized terminology might better reflect the lived realities of ancient Andean communities. Either way, refining this framework has the potential for advancing how archaeologists conceptualize cooperation, identity, and the organization of multi-household collectives.

Additionally, it would be valuable to apply the same analysis to the other 12 architectural platforms at Cerro San Isidro. Expanding the dataset would make it possible to see whether the patterns I observed in the four communities studied here hold true across the rest of the settlement. This would offer a more comprehensive understanding of community organization and roles at Cerro San Isidro, while also giving us the opportunity to further explore and test the patterns identified in this project.

Another avenue for future research is considering how experiences at Cerro San Isidro changed over time. Here, I focused on the EH, but perhaps with more test pits and radiocarbon dating, we could create maps representing the other time periods when Cerro San Isidro was occupied. As Ikehara (2015) notes, there were demographic changes throughout the Moro Pocket following the EH; I would be interested in investigating how these changes affected Cerro San Isidro and how individuals navigated or repurposed the remnants of the earlier built environment. Additionally, it would be beneficial to produce a more precise chronological framework within the EH. Hugo Ikehara (2015) proposes that the EH in the Moro Pocket should be divided into the Late Formative Period (800–500 BCE) and the Final Formative Period (500–200 BCE) due to notable changes in population organization between these periods. It would be useful to see how these changes manifest at Cerro San Isidro and how the changes to the built environment would influence experience within the supra-household communities.

Lastly, it is critical to investigate further Cerro San Isidro's role in a low-density urban system. Throughout this project, I focused on the internal organization of Cerro San Isidro, and while I have considered its context within the Moro Pocket when defining the site as an example of low-density urbanism, a deeper investigation into its relationship with the other settlements in the Moro Pocket is still needed. To confirm my hypothesis of Cerro San Isidro as part of a low-density urban system, it is essential to analyze how it relates socially, economically, and spatially with other contemporary sites in the pocket. It would be useful to extend the LCA methodological approach I applied in this project to other settlements in the valley. Doing so could reveal patterns of connectivity, accessibility, and interaction between settlements, and more generally, provide a more comprehensive assessment of inter-settlement relationships. One limitation I found with the LCA method as applied here is that there was relatively minimal variation in movement between the communities within Cerro San Isidro, likely because the site itself is relatively small. However, when applied to a larger region, there would be more significant differences in movement, which would create greater distinctions to consider. This expanded analysis would not only help refine and improve the methodology but also provide an avenue to investigate further my hypothesis of Cerro San Isidro as a low-density urban system. This would subsequently contribute to a broader conversation about the nature of urbanism in the Andes.

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Appendix A – Least-Cost Analysis

The following 2 pages present the raw data from the least-cost analysis.

Table A.1 Upper Platform LCA

Emissive				Attractive			
To	Distance	Path Cost	Cost/Distance	From	Distance	Path Cost	Cost/Distance
Nepeña River	255.03	395.29	1.55	Nepeña River	423.38	407.14	0.96
Quarry 1	248.13	315.97	1.27	Quarry 1	229.06	320.06	1.40
Quarry 2	317.71	328.4	1.03	Quarry 2	317.71	323.04	1.02
Puente Piedra	865.37	683.64	0.79	Puente Piedra	793.88	690.6	0.87
Hunaca Stone	0	0	0.00	Hunaca Stone	0	0	0.00
Southwestern Platform	156.35	246.6	1.58	Southwestern Platform	167.28	219.68	0.00
Eastern Platform	73.11	106.98	1.46	Eastern Platform	88.59	102.78	1.16
Northern Platform	59.76	56.51	0.95	Northern Platform	62.52	51.78	0.83
AP1	156.41	255.9	1.64	AP1	186.51	210.07	1.13
AP2	143.65	213.12	1.48	AP2	191.77	202.1	1.05
AP3	126.66	181.2	1.43	AP3	161.2	166.82	1.03
AP4	172.14	283.34	1.65	AP4	259.56	279.22	1.08
AP5	33.2	42.41	1.28	AP5	48.39	39.23	0.81
AP6	22.71	19.75	0.87	AP6	27.78	19.25	0.69
AP7	47.25	39.64	0.84	AP7	37.05	38.54	1.04
AP8	142.48	215.62	1.51	AP8	143.58	208.61	1.45
AP9	116.51	174.85	1.50	AP9	146.11	168.97	1.16
AP10	108.32	125.06	1.15	AP10	98.69	121.42	1.23
AP11	138.53	137.01	0.99	AP11	145.35	136.54	0.94
AP12	143.11	255	1.78	AP12	129.89	275.25	2.12

Table A.2 Northern Platform LCA

Emissive				Attractive			
To	Distance	Path Cost	Cost/Distance	From	Distance	Path Cost	Cost/Distance
Nepeña River	266.98	356.83	1.34	Nepeña River	255.39	369.58	1.45
Quarry 1	201.87	260.63	1.29	Quarry 1	201.87	260.63	1.29
Quarry 2	299.38	296.244	1.34	Quarry 2	319.92	297.1	1.45
Puente Piedra	837.66	628.29	0.75	Puente Piedra	744.5	512.12	0.69
Hunaca Stone	53.91	51.21	0.00	Hunaca Stone	63.22	56.55	0.00
Southwestern Platform	203.53	203.8	0.00	Southwestern Platform	171.22	172.13	0.00
Eastern Platform	88.37	80.48	0.99	Eastern Platform	87.34	79.62	0.93
Upper Platform	62.52	51.78	1.00	Upper Platform	59.76	56.51	1.01
AP1	217.75	207.73	0.83	AP1	215.1	200.05	0.95
AP2	205.2	196.15	0.95	AP2	216.51	190.37	0.89
AP3	187.78	172.49	0.95	AP3	186.76	157.62	0.93
AP4	279.43	258.81	0.96	AP4	280.33	255.89	0.88
AP5	81.47	49.74	0.92	AP5	82.96	50.49	0.84
AP6	33.63	34.06	0.93	AP6	36.94	37.15	0.91
AP7	24.83	15.49	0.61	AP7	32.27	16.96	0.61
AP8	162.31	187.86	1.01	AP8	164.17	183.47	1.01
AP9	137.71	146.91	0.62	AP9	148.32	143.03	0.53
AP10	60.08	70.31	1.16	AP10	57.14	72.44	1.12
AP11	93.84	81.67	1.07	AP11	89.62	82.23	0.96
AP12	155.2	216.58	1.17	AP12	166.97	230.91	1.27

Table A.3 Eastern Platform LCA

Emissive				Attractive			
To	Distance	Path Cost	Cost/Distance	From	Distance	Path Cost	Cost/Distance
Nepeña River	337.5	297.2	0.88	Nepeña River	337.5	303.68	0.90
Quarry 1	331.33	286.73	0.87	Quarry 1	332.77	296.21	0.89
Quarry 2	61.28	222.34	0.88	Quarry 2	231.22	219.58	0.90
Puente Piedra	949.11	644.06	0.68	Puente Piedra	956.96	651.11	0.68
Hunaca Stone	88.51	103.32	0.00	Hunaca Stone	76.45	107.56	0.00
Southwestern Platform	186.82	184.09	0.00	Southwestern Platform	212.3	160.79	0.00
Northern Platform	88.03	79.62	3.63	Northern Platform	88.37	80.48	0.95
Upper Platform	88.59	102.78	0.99	Upper Platform	73.11	106.98	0.76
AP1	106.96	141.13	1.16	AP1	160.91	144.13	1.46
AP2	181.5	138.28	1.17	AP2	147.99	134.16	1.41
AP3	147.76	102.53	1.32	AP3	123.93	101.78	0.90
AP4	49.45	184.93	0.76	AP4	191.64	178.38	0.91
AP5	75.34	69.75	0.69	AP5	77.22	73.68	0.82
AP6	68.67	97.4	3.74	AP6	76.47	101.01	0.93
AP7	92.51	93.52	0.93	AP7	82.02	93.89	0.95
AP8	85.04	109.56	1.42	AP8	75.47	105.96	1.32
AP9	200.76	68.79	1.01	AP9	59.63	65.52	1.14
AP10	114.01	149.41	1.29	AP10	143.48	152.43	1.40
AP11	135.81	160.77	0.34	AP11	177.84	162.5	1.10
AP12	153.54	175.08	1.31	AP12	88.05	179.54	1.06

Table A.4 Southwestern Platform LCA

Emissive				Attractive			
To	Distance	Path Cost	Cost/Distance	From	Distance	Path Cost	Cost/Distance
Nepeña River	348.56	277.86	0.80	Nepeña River	361.07	301	0.83
Quarry 1	191.2	161.37	0.84	Quarry 1	186.5	181.61	0.97
Quarry 2	357.41	213.49	0.80	Quarry 2	382.51	235.02	0.83
Puente Piedra	784.54	489.27	0.62	Puente Piedra	744.5	512.12	0.69
Hunaca Stone	146.56	219.88	0.00	Hunaca Stone	157.88	247.13	0.00
Eastern Platform	212.3	160.79	0.00	Eastern Platform	186.5	184.09	0.00
Northern Platform	171.22	172.13	0.60	Northern Platform	205.53	203.8	0.61
Upper Platform	167.28	219.68	0.76	Upper Platform	156.35	246.62	0.99
AP1	85.78	47.08	1.31	AP1	87.43	64.06	1.58
AP2	78.6	41.41	1.50	AP2	78.95	59.19	1.57
AP3	99.32	73.92	0.55	AP3	100.64	94.71	0.73
AP4	199.27	134.04	0.53	AP4	209.03	149.19	0.75
AP5	127.48	181.77	0.74	AP5	84.47	158.75	0.94
AP6	190.65	198.91	0.67	AP6	224.51	239.78	0.71
AP7	201.38	186.23	1.43	AP7	219.8	219.11	1.88
AP8	233.06	127.65	1.04	AP8	226.18	146.04	1.07
AP9	230.34	129.73	0.92	AP9	253.25	144.7	1.00
AP10	199.24	113.29	0.55	AP10	149.06	134.58	0.65
AP11	174.27	101.18	0.56	AP11	155.32	123.15	0.57
AP12	377.82	211.35	0.57	AP12	364.47	228.08	0.90

Appendix B – Wall-to-Floor Ratios by Architectural Platform

Architectural Platform	Unit	Unit area (M²)	Wall area (M²)	% of Wall Area
Northern Platform	1A	25	6.97	27.88%
	1B	25	5.16	20.64%
	1D	25	5.77	23.08%
	1C	25	7.08	28.32%
	1D-AE	25	10.99	43.96%
	Northern Platform Wall Average			28.78%
Upper Platform	2A	25	8.71	34.84%
	2B	25	6.73	26.92%
	2B-AE	25	8.31	33.24%
	2C	25	6.26	25.04%
	2C-AO	5	0	0.00%
	Upper Platform Wall Average			24.01%
Eastern Platform	3E	25	6.03	24.12%
	3D	25	0.35	1.40%
	3D-AN	25	6.72	26.88%
	3B	25	8.44	33.76%
	3A	25	11.62	46.48%
	3F	25	0	0.00%
	3C	25	5.1	20.40%
	Eastern Platform Wall Average			21.86%
Southwestern Platform	5A	25	5.53	22.12%
	5B	25	3.43	13.72%
	5C	25	9.01	36.04%
	5D-AE	25	5.74	22.96%
	5D	25	9.09	36.36%
	Southwestern Platform Wall Average			26.24%
Estimated Wall Coverage (total average)				24.92%
Estimated Floor Coverage				75.08%

Appendix C – Distribution of EHP ceramic artifacts

Architectural Platform	Unit	Strata	Total Count (n=)	Early Horizon Period (%)
Northern				
	1A			
		3	84	63.10%
		3-4	32	56.25%
		4-5	44	52.27%
		6-7	7	85.71%
	1B			
		2	161	52.80%
		3	308	89.94%
		4-5	3	66.67%
		5	7	85.71%
		6	8	87.50%
	1C			
		3-4	96	60.42%
		4-5	144	87.50%
		5-6	99	96.97%
		6-7	1	100.00%
		7	1	100.00%
		8	1	100.00%
		9	1	100.00%
		10	1	100.00%
		11	1	100.00%
	1D			
		3-4	98	65.31%
		5-6	106	87.74%
		6	564	54.43%
		6-7	176	95.45%
		7	36	91.67%
	1D-E			
		4-5	413	66.59%
Upper				
	2B			
		2	246	85.37%
		3	155	96.77%
		3-4	31	83.87%
		4	28	96.43%
	2B-E			
		1-2	31	51.61%
		2	31	74.19%
		3-4	9	55.56%
		4	29	75.86%
		4-5	157	96.82%
		5	3	100.00%
	2C			
		2	172	65.12%
		3	134	82.09%
		3-4	18	83.33%
		5-6	30	100.00%
	2C-O			
		3-4	32	87.50%
		4-5	97	92.78%
		5	16	100.00%
		5-6	16	100.00%
	2D			
		3	42	71.43%
Southwestern				
	3A			
		5	21	95.24%
	3B			
		5	11	90.91%
	3D-N			
		4-5	308	66.23%
		5	613	89.07%
		5-6	327	92.66%
		6-7	30	100.00%
	3E			
		3	2	100.00%
		6	134	54.48%
		7	20	100.00%
	3F			
		5	57	80.70%
Eastern				
	5A			
		5	36	83.33%
		6	31	83.87%
		8	5	80.00%
	5B			
		3	65	60.00%
		4	171	70.18%
	5C			
		4	68	75.00%
		5	6	50.00%
	5D			
		3	205	70.24%
		4	78	52.56%
		5	189	83.60%
		6	552	86.23%
	5D-E			
		2	565	80.00%
Test Excavations				
	HP-2			
		5	2	100.00%
	HP-7			
		2	50	54.00%
	HP-8			
		1	23	56.52%

Appendix D – Chi-Square Test Results on Distribution of Ceramic Artifacts

Table D.1: Standardized residuals and associated p-values from post-hoc chi-square tests examining the distribution of vessel functions across architectural platforms at Cerro San Isidro.

	Architectural Platform							
	Northern (n=1879)		Upper (n=1087)		Southwestern (n=1227)		Eastern (n=1539)	
	Residuals	p values	Residuals	p values	Residuals	p values	Residuals	p values
Cooking	-12.757855	0.000000	-1.45063	1.000000	12.394135	0.000000	3.325307	0.014131
Food preparation/Serving	4.541671	0.000089	-1.322511	1.000000	-1.157345	1.000000	-2.569586	0.162912
Food Presentation/Serving	2.554930	0.169935	-5.997607	0.000000	1.035239	1.000000	1.640885	1.000000
Storage	8.639245	0.000000	7.724297	0.000000	-12.508857	0.000000	-4.406083	0.000168

*The *Specialty Items* category was excluded due to a small

Table D.2: Standardized residuals and associated p-values from post-hoc chi-square tests examining the distribution of decorated and plain ware across architectural platforms at Cerro

	Architectural Platform							
	Northern (n=1879)		Upper (n=1087)		Southwestern (n=1227)		Eastern (n=1539)	
	Residuals	p values	Residuals	p values	Residuals	p values	Residuals	p values
Plain Ware	-9.022910	0.000000	-9.572298	0.000000	11.939285	0.000000	6.897689	0.000000
Decorated Ware	9.022910	0.000000	9.572298	0.000000	-11.939285	0.000000	-6.897689	0.000000

Table D.3: Standardized residuals and associated p-values from post-hoc chi-square tests examining the distribution of decorated and plain serving ware across architectural platforms at Cerro San

	Architectural Platform							
	Northern (n=766)		Upper (n=331)		Southwestern (n=487)		Eastern (n=618)	
	Residuals	p values	Residuals	p values	Residuals	p values	Residuals	p values
Plain Presentation/Serving Ware	-0.238131	1.000000	-6.1165394	0.000000	3.1705949	0.01217	2.1888124	0.228884
Decorated Presentation/Serving Ware	0.238131	1.000000	6.116539	0.000000	-3.1705949	0.012170	-2.1888124	0.228884

Table D.4: Standardized residuals and associated p-values from post-hoc chi-square tests examining the distribution of Early Horizon fine ware styles across architectural platforms at Cerro San

	Architectural Platform							
	Northern (n=118)		Upper (n=277)		Southwestern (n=130)		Eastern (n=297)	
	Residuals	p values	Residuals	p values	Residuals	p values	Residuals	p values
Stamped Circle-and-Dot	-10.891316	0.000000	15.7870579	0.000000	-0.281168	1.000000	-7.3706851	0.000000
Pattern Burnished	6.832469	0.000000	-15.944606	0.000000	1.139699	1.000000	9.836187	0.000000
Textile Impressed	6.637585	0.000000	-0.1564969	1.000000	-1.337947	1.000000	-3.6745908	0.002859