AMERICAN UNIVERSITY OF BEIRUT

DOMESTIC ARCHITECTURE AND SOCIAL CHANGE IN THE GRECO-ROMAN NEAR EAST

by
HASSAN EL-HAJJ

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HASSAN EL-HAJJ

Approved by:

Dr. Paul Newson, Assistant Professor Department of History and Archaeology	Advisor Signature: P.G. Newson
Dr. Helga Seeden, Professor Department of History and Archaeology	Member of Committee Signature: Helga Seeden
Dr. Helen Sader, Professor Department of History and Archaeology	Member of Committee Signature: H Sader

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AN ABSTRACT OF THE THESIS OF

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Houses play a major role in building identities. Nowhere is that more visible than in the Roman period where the *domus* played an essential part in shaping the public image of its owner. The organization of households and the use of space within them is a visible reflection of invisible cultural and social ideas. During the Greco-Roman period, house designs varied from one area to the other in the Near East hinting at the presence of social and cultural differences between these different regions. My aim is to look at the Greco-Roman housing from Lebanon, more specifically, the region of the colony of *Berytus* (modern day Beirut) and compare those to different domestic houses in the Near East. The arrival of the new colonists to Beirut should be a good starting point when it comes to looking at the changes in domestic architecture. The colonists – veterans of Augustus' army – most certainly had different cultural backgrounds to those already living in Berytus. As a result, their new houses, built on their newly acquired land should reflect those new foreign ideas.

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CHAPTER I

INTRODUCTION

This thesis investigates the concept of housing in the Roman Empire, how ideas were materialized in physical buildings, and most importantly how these physical buildings can reflect social structure and cultural interaction between their inhabitants, as well as between the inhabitants themselves and the 'outside' world. By using case studies from the East and West, I will try to find the differences and similarities in cultural and social behaviours that existed between the people living in those two different areas of the same empire.

Before we start explaining how and why buildings affect social behaviour, it is imperative to discuss a little bit the ideal Roman house according to Vitruvius (Fig. 1), as well as to get some general knowledge of the households that inhabited these houses. The Roman *atrium* house consisted of an *atrium* which was the formal reception room, used mainly for display and surrounded by small *cubicula* along its edges. These small rooms were ideally used as bedrooms due to their increased privacy (Johnson 1957, 75). However, we also know that these small rooms had multiple functions and served as reception rooms for the most prestigious guests who needed to be received in total privacy (Wallace-Hadrill 1994, 58). The *tablinum* was the master's office and study

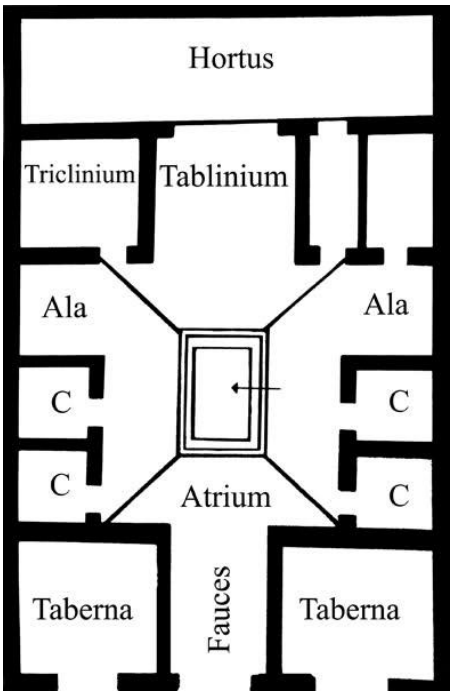

Figure 1 - Example of a Vitruvian Atrium House. Taberna: Small Shop, Fauces: Entrance Hallway, C: Cubiculum (Small room/Bedroom), Ala: Atrium Wing, Hortus: Garden.

room; its central position directly connected to the *atrium* which was the most controlling space in the house, gave the *tablinum* command of the whole house. The *triclinium* on the other hand, ideally considered the dining room can be located anywhere in the house, but was most likely located next to the *atrium* and is considered an important guest reception room (Johnson 1957, 76; 80). Aside from discussing the basic spaces in the Roman house, we should briefly address the Roman household who lived in these spaces.

The Roman household, or *familia*, was made up of all the individuals under the authority of the *pater familias*, i.e. head of the family. These individuals consisted of the wife of the *pater familias*, his unmarried daughters, and his sons. In addition, the wives, unmarried daughters and sons of his married sons were also included in the *familia* as well as more distant relations through the male line. In a wider sense, the word *familia* also included all the clients and slaves of the *pater familias*, as well as those belonging to any male individual under his command (Johnson 1957, 105-106). The authority held by the *pater familias* over his *familia* was called *pater potestas.* This authority gave him absolute power over the household (Dixon 1992, 4). This authority was also materialized in the architecture of the Roman house, especially by the dominating location of the *tablinum* (i.e. workplace of the *pater familias*) that gave him control over everything happening in the domain of the house, since the majority of spaces were easily accessible from that space.

Having discussed the Roman *atrium* house, albeit in brief, as well as the ideal Roman household that inhabited these houses, it is important that we move on to discuss the research focus and objectives, as well as the examples that will be presented in the following chapters.

The research will be focused on the early empire period (late 1st c. BCE –2nd c. CE) since it is during that period that the Romans annexed the Levantine coast. This annexation affected Beirut in a different way than the rest of the region, since the coastal city was elevated, or rather re-founded as a colony around 15-14 BCE by Agrippa, acting in the name of Augustus. This act entitled the settlement of the veterans of two Roman legions, the *Legio V Macedonica* and *Legio VIII Gallica*, in the city (Hall 2004, 47). The arrival of this large number of Roman citizens into the city meant that radical demographical and sociological changes were bound to happen. These changes should technically be reflected in the domestic architecture of this period. This important factor is the main reason why Beirut is the center of my research, since it is one of the rare occasions in the Near East where we can identify and study the houses believed to be inhabited by colonists and their households, which had different social and cultural behaviour than the original inhabitants of the city.

The Roman colony of Berytus is now the modern city of Beirut, the capital of the small Mediterranean country of Lebanon. An extended period of civil war destroyed the majority of the city center. However, once the hostilities ceased a major construction project was set in motion to rebuild the city center. This construction project necessitated the removal of valuable archaeological layers known to exist below the modern rubble. An archaeological call to trowels to save the valuable heritage of the city led to many responses from foreign teams that arrived in Beirut in order to help the local archaeologists in their quest to rescue the remains of the ancient coastal city (Asmar 1996, 7). Large-scale rescue excavations ensued, opening important windows into the life in the Roman colony of Berytus. One of those windows was the BEY-006 plot (Fig. 8), also known as the Beirut Souks excavation, directed by Dr Helga Seeden,

Dr Dominic Perring, and Tim Williams**.** Several houses were uncovered there, with the most important insula being the insula (block of land) of the House of the Fountains. This insula initially contained several houses which developed over different time periods; eventually, these were joined together to form the House of the Fountains which was later destroyed by a major earthquake in 551 CE (Perring, Reynolds, and Thorpe 2003, 214). This excavation yielded several complete house plans on the site of BEY-006, several of which were contemporary with the arrival of the Roman colonists (Perring, Reynolds, and Thorpe 2003, 204). The above factors make Beirut an important source for detecting the changes in social and cultural behaviour upon the arrival of the colonists. A more in-depth look at the history of this important city can be found in Chapter II.

On the other hand, Antioch-on-the-Orontes, certainly eclipsed Beirut in terms of importance in the Roman East. The city was known for its monumental architecture, wide avenues, as well as the location of the Imperial Palace which more often than not served as the headquarters for the Eastern military campaigns. More importantly however, the city was known for the extravagant lifestyle of its inhabitants and was Hellenized, owing to its Greek foundation in 293 BCE (Kondoleon 2000, 3). Nowhere was this more evident than in the houses excavated at Daphne, a small town that acted as a summer retreat for the rich Antiochenes. The rich owners of these houses fashioned themselves opulent residences in a Greco-Roman style, exploiting the great views to the mountains and the shore, as well as harnessing the natural flow of the streams that cut across Daphne. A closer look at the activities that took place in these houses – banqueting and most importantly the symposium (Greek drinking party) – points towards a Greek identity for their inhabitants. On the other hand, the way that the space

is organized in these houses points towards Roman influences as well (Dobbins 2000, 51). The house of Menander and the house of the Drinking Contest in Daphne are both examples of domestic structures that were common throughout the 2nd and the 3rd centuries CE. Both these houses feature some remarkably Hellenistic spatial organization, especially in allocating space that was dedicated to 'Greek activities' such as the symposium, as well as hinting at Roman spatial tradition in their designs. The shortfalls of using the houses of Antioch however is that the walls were either robbed in antiquity, or numerous landslides along the slopes of the mountains caused the building blocks to be distorted; which forced the excavators into making educated guesses when it comes to the accurate plans of the houses, and the placement of doorways (Dobbins 2000, 51).

In Italy, Pompeii is the first city that comes to mind presenting a wealth of well-preserved domestic architectural remains from the 1st c. CE. In 79 CE, the city was buried under a thick layer of ashes from the eruption of Mount Vesuvius, preserving a lot of houses which were later rediscovered, and re-excavated in recent times. The advantage this city presents is that its houses were preserved along with their furniture and useful items, which made it easier to allocate different activities to different rooms giving us a broader understanding of the spatial distribution of activities in the houses; though it is most likely that many rooms had multiple functions (Nevett 2010, 98). Mark Grahame's study, *Reading Space: Social Interaction and Identity in the Houses of Roman Pompeii* (2000) explores the spatial distribution of a large number of Pompeian houses using access analysis, which I include in my research. In addition, the fateful eruption of Mount Vesuvius was contemporary to the Augustan houses of Beirut, which

gives us a good chance to directly check the difference in house designs between Italy and Beirut.

Cosa, a small colony along the Tyrrhenian Sea located around 140km north of Rome presents another example of preserved Italian houses from the West. The colony was founded in 273 BCE on the territory confiscated from the Etruscan city of Vulci. This colony is important in that it provides a glimpse into Roman culture and political organization as they are expressed in the architecture of the town, since this sort of evidence long vanished under the might of the empire's architectural projects (Bruno and Scott 1993, iii). The houses in this colony were constructed in different periods; however, I will focus on the ones that are contemporary to the Eastern counterparts mentioned earlier; i.e. 1st c. BCE to 2nd c. CE. Such houses present a clear and useful example of the interaction between the old and new architectural styles, especially when it comes to plans, decorations and landscaping (Bruno and Scott 1993, 6).

Having collected the data and plans from all the sites presented above, I will proceed to analyse their plans using the 'access analysis' method devised by Bill Hillier and Julienne Hanson in their seminal work *The Social Logic of Space* (1984). Access analysis is a simple method in which each room (in some cases one room is divided into two or more compartments) is assigned one cell represented by a circle. These circles are then connected whenever the house plan

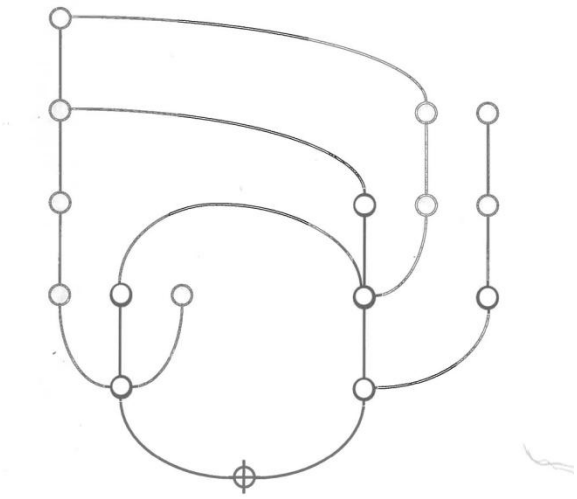

Figure 2 - Example of an Access Map (after Grahame 2000, 33)

allows for permeability, i.e. whenever there's a door or an opening leading from one compartment to the other. This process will result in the creation of what is called an access map (Fig. 2), from which numerous values can be calculated. This whole procedure serves to quantify the process of plan comparison as we transform the data from its map form into numbers, which can be easily compared in an objective manner without having to deal with the material collected in the houses. This is especially useful when looking at houses from Beirut and Antioch where publications regarding finds are rare making it almost impossible to rely on material finds to analyse the cultural and social behaviour of their inhabitants. Access analysis will be explained in more detail in Chapter III.

The application of access analysis on ancient houses in the Near East is not unprecedented, Eyal Regev (2009) applied access analysis on the Khirbet Qumran complex in order to establish its function. Several archaeologists have analysed the finds and remains of the complex and came up with difference conclusions; Golb (1995; cited by Regev 2009) argued that the remains of arrowheads and the presence of towers within the complex indicate that it was a military fort, while Donceel Voûte (1994; cited by Regev 2009) examined the pottery and glass remains and deduced that the complex was in fact a *villa rustica* (countryside villa) due to the richness of the materials recovered. Hirschfeld (1998, 2004; cited by Regev 2009) noticed the similarities between the plan of the Qumran complex and those of Judaean manor houses and deduced that the complex was one of these manor houses. Other archaeologists examined the site and came up with their own different interpretations, Cansdale and Crown (1994; cited by Regev 2009) suggested that the site was used as an inn or a road station along the Roman road while Magen and Peleg (2006, 2007; cited by Regev

2009) suggested that the site was in fact a pottery production center. With numerous interpretations of the same site, each relying on a different set of evidence it was important to approach the site from a quantitative point of view (in other words, more objectively) in order to determine its function. For this, Regev used access analysis in order to determine the spatial characteristics of the site before eventually coming up with the conclusion that it was a center for a religious cult (Regev 2009, 95), more details on this are presented in Chapter III. Regev's study is one of many who use access analysis to deduce social and cultural values from ancient house plans; research using this method is becoming widespread and covering a large chronological and geographical area, for example Sally Foster (1989) applied the same method on ancient Iron Age dwellings in Scotland, while Miranda Stockett (2005) applied the same method on the structures of the Las Canoas, Honduras during Late Classic period (650 – 960 CE).

Applying access analysis on the structures from Beirut and Antioch on one hand, Cosa and Pompeii on the other will allow us to better understand the similarities, and the differences in the cultural and social behaviours of their inhabitants. The houses of Beirut are of course my main interest, assuming that they were inhabited by veterans from Augustus' armies (Perring, Reynolds, and Thorpe 2003, 204) then it would be interesting to see whether these veterans built these houses according to Roman tradition. However, there is still a chance that the houses of Beirut will produce different interaction patterns than the ones in Italy, which would in fact cast doubt over the fact that they were inhabited by Italian veterans. Alternatively this could also mean that the veterans have adapted their life style to fit the local one, or conformed to a mixed style of domestic spatial distribution that incorporated both Roman and

indigenous ones. However, we can only speculate at this stage but the image will become clearer as we conduct the access analysis on the houses in question. In other words, my objective will be to compare the houses of the East with the Roman *atrium* house represented one way or another by the Pompeiian and Cosan houses. This will help us pinpoint similarities and differences in social and cultural behaviours of their inhabitants, which will inform us more about the identity of the inhabitants of the houses of Beirut in question.

But first, we need to start by talking a little bit about Beirut, its history as well as the history of its excavations. This will put all the following work into perspective, giving us an idea about the events that lead to the creation of the colony in the late 1st c. BCE and the subsequent arrival of the Italian veterans, as well as informing us about the nature of the conducted excavations and the results they yielded. Only then can we start discussing the methodology and application of access analysis on the selected houses.

CHAPTER II

BERYTUS

The Phoenician coast stretches from Mount Cassius in the north to Mount Carmel in the south; and right in the middle of that stretch sits the city of Beirut along a small promontory that juts out into the Mediterranean Sea. The modern city stretches over the whole promontory and even reaches towards the lower slopes of Mount Lebanon; however, ancient Beirut covered only a relatively small area on the northern edge of the promontory, known today as Down Town Beirut. Its strategic location attracted the attention of Augustus who re-founded the city as a Roman colony in the late 1st c. CE making it the center of Latin culture in the Near East (Hall 2004, 18). To its west is the Mediterranean Sea which created maritime trade opportunities for the inhabitants of the city and gave them easy access to most of the major centres of the west, especially Rome and later on Constantinople which maintained a relatively close contact with the city's law schools in the early empire (Hall 2004, 15). To the East were the Lebanese Mountains often snow-capped and known to have been dominated by the relatively obscure 'Ituraean Arabs' mentioned by Strabo in his book *Geographica* (XVI, 2, 18). These tribes often raided the bigger coastal cities – including Beirut – from their mountainous hometowns (Millar 1993, 273-4). These mountains, along with the Anti-Lebanon Range hindered the East-West communication routes from Beirut to Damascus; however, several rugged passes allowed communication to the fertile interior and Heliopolis (Baalbek), effectively linking the city to a large trade network that extended all the way inland to cities such as Emesa, Apamea, Edessa, Beroea and others, practically linking Beirut to the Silk Road. The north-south communication routes were less arduous, and most probably had more traffic, especially with the

construction of the Via Mares from Antioch in the north reaching all the way to Jerusalem and Ptolemais in the south. Although this road preceded Roman rule, it was reconstructed in 56 CE under the reign of Nero according to Roman road standards (Hall 2004, 17).

The site of the pre-Hellenistic tell was partially excavated and revealed traces of Neolithic as well as Early and Middle Bronze Age occupation (Curvers and Stuart 1998-99, 21) including some Egyptian inscriptions indicating that the settlement was under the Egyptian sphere of influence (Curvers and Stuart 2005, 202). Other than that, Beirut was mentioned in the Amarna letters dating back to the 14th c. BCE under the name *Biruta* (Perring, Reynolds, and Thorpe 2003, 195). From the little archaeological evidence remaining, as well as the textual references in the Egyptian sources, we can deduce that *Biruta* was nothing more than a small port city, eclipsed by its neighbours to the north and south, Byblos and Tyre respectively. The Ras Shamra cuneiform texts, dating back to the same period, mention Beirut as on several occasions where it appears to be changing hands between the major superpowers of that time – Egyptians, Assyrians, Babylonians and Persians – as they battle to seize control of the strategic Levantine region (Lauffray 1977, 141). The city appears to have completely lost its importance in the 12th c. CE as there is no mention of it at all (Badre 1997, 11).

After the decisive Hellenic victory at Issus in 333 BCE, Beirut fell under the control of the Ptolemaic dynasty for a period that lasted a little bit over a century. In 200 BCE, The Seleucid king Antiochus III the Great defeated the Ptolemaic armies at the battle of Panium, near Banias, ending the Ptolemaic dominance over the Levantine coast and extending the Seleucid dominance to the region. With that, Beirut fell under

the influence of the Seleucid kingdom and came to be known as 'Laodicea in Phoenice' (Lauffray 1977, 141).

The political situation deteriorated early in the 1st c. BCE, with six kings ascending to the throne in a span of twelve years between 96 BCE and 84 BCE. This was followed by a spell under Tigranes, the king of Armenia during which Beirut enjoyed a short-lived independence. In 69 BCE Tigranes retreated leaving the Phoenician coast to its Seleucid kings who ruled for a short while until the arrival of the Roman army led by Pompey in 64 BCE. The arrival of Pompey prevented Syria from becoming a center for banditry, and prevented pirates from using the coastal cities as their base of operation in the Mediterranean restoring security to the sailing crews in the Mediterranean (Sartre 2004, 38-9).

In 42 BCE, Mark Anthony gained control of the Roman East and proceeded in 38-37 BCE to gift Cleopatra the land – including Beirut – that according to Josephus stretched "between the Eleutheros River and Egypt with the exception of Tyre and Sidon" (*Antiquities* 15.95; Hall 2004, 46). However, after the defeat of both Mark Anthony and Cleopatra at Actium in 31 BCE, Octavian, later called Augustus, regained control of the East and proceeded with his policy of establishing colonies which were used to re-settle the discharged soldiers from his legions, as well as act as a defence for the volatile Eastern frontiers (Hall 2004, 46).

The exact date of the foundation of the colony is not known. However, we know that Beirut was not mentioned by Cassius Dio when he recorded Augustus' visit to the Eastern provinces between 22 and 19 BCE which could indicate that either Beirut was not a colony yet, or it was too small to deserve a mention by the historian (Hall

2004, 46-7). The earliest mention of the city dates back to 15-14 BCE in Jerome's *Chronicle* where he refers to Beirut as *Coloniae Berytum* indicating that Beirut was already an established colony by that time. However, a close inspection of the coins from the Beirut excavations reveal that coins dating to times earlier than the supposed foundation dates of 15-14 BCE already have the emblems of Beirut's founding legions, the *V Macedonica* and *VIII Gallica* (Lauffray 1977, 146-7). So it could be possible that these founding legions made their way to Beirut sometime between the battle of Actium in 31 BCE and 27 BCE (Lauffray 1977, 147). With that being said, it is important to emphasize that the 15-14 BCE dating for the foundation of the colony is the one more accepted by many scholars (Pollard 2000, 61).

The transition of Beirut from a Hellenistic city (Late 4th c. BCE – Late 1st c. BCE) to a Roman colony was a smooth one architecturally speaking. No major 're-designing' of the city occurred even though the Roman city center was located slightly off its Hellenistic predecessor. However, excavations in Beirut have shown that several areas of the Hellenistic city were still in use during the Roman period, and a large number of them were rebuilt and re-occupied. For example, larger Roman baths replaced humbler bathing structures from the Hellenistic period in the same location indicating that there was no major overhaul of the city's plan and architecture at the end of the 1st c. BCE (Sartre 2005, 165). The urban environment of the city thrived under Roman control, with generous donations from the Herodian dynasty that embellished the city with porticoes, temples, market places, theatres, and baths amongst other things. In addition, Roman emperors gifted the city with several necessary structures such as aqueducts by Nero and a market place (forum) thought to be dedicated by Vespasian, which helped emphasize the Roman aspect of the previously Hellenized city (Hall 2004,

64-5). Early excavations in the city revealed some of the structures listed in the historical texts. Remains discovered early in the 1900s, first thought to be part of an old church turned out to be the remains of baths dating back to the Byzantine period (Lauffray 1944-45, 26-28). Remains of what Lauffray identified as a large Basilica, possibly dedicated by the Jewish king Agrippa I and his queen Bernice, were uncovered first in 1927, with further excavations that took place in 1946 confirming the find (Lauffray 1944-45, 35-6, 56). Most notably however was the presence of the Roman law schools (still undiscovered) in Beirut which further solidified the city's position and reputation as 'Roman' and/or 'Latin' in the middle of the Hellenized East (Millar 1993, 280). I am not going to list all the buildings dedicated by emperors in the city since this is not the purpose of this research, however, the above examples offer a brief glimpse at the changes that were occurring in the newly founded colony.

Beirut, or to give its full name '*Colonia Iulia Augusta Felix Berytus*' commanded a large territory of land stretching from the seafront to the northern Bekaa valley – including the religious center of Heliopolis – on the other side of Mount Lebanon. The colony had its own administrative council, the *boule* (Hall 2004, 49) (or Ordo – Millar 1993, 278) similar to the one in Rome which was still functional as late as 344 CE, attested by one Latin inscription on a dedicated statue. The colony also minted its own coins, starting prior to 27 BCE as mentioned earlier and continuing as late as 250s CE (Millar 1993, 279). This relatively vast territory was split under the reign of Septimius Severus when Heliopolis was re-founded as a colony in its own right.

Archaeologists, historians, and antiquarians were always interested in the relics of Beirut and tried their best to understand and reconstruct the past city. However, we can distinguish two distinct phases of research. The first one being pre-1991, or pre-

civil war, and the second one being post-1991, in other words after the end of the Lebanese civil war. One of the earliest works on the history of the 'Phoenician' region was conducted by French philosopher, writer, Middle Eastern expert, and orientalist Joseph Ernest Renan. He visited the Levantine coast and documented his findings in his *Mission de Phénicie* (1864). Early In the 20th century, several other scholars such as Collinet (1925) and Du Mesnil du Buisson (1921, 1924-5, and 1926) attempted to plan the ancient city of Beirut, however, it was not until the mid-1940s when the first comprehensive city plan was established by French architect and archaeologist Jean Lauffray (1944-45; Curvers and Stuart 2005, 189). This was not an easy task however; even though many of the ancient cities still occupied today conserve some aspects of their plans, as in Antioch or Aleppo, Beirut was different. Several redesigns, fillings and land clearances during the Arab period have erased – or at least made it extremely difficult – to spot the ancient city plan in the present one (Lauffray 1944-45, 20).

Research into the history and archaeology of Beirut continued up until the start of the Lebanese civil war in 1975, when the security situation prevented further archaeological work. The Directorate of General Antiquities (DGA) resumed work in 1977 but had to halt their activities again in 1983 when hostilities resumed. However, in 1991, after more than 15 years of conflict, the war was over. By then central Beirut was in ruins, including the central district which directly overlays the ancient city. Taking advantage of the unfortunate – maybe fortunate when it comes to archaeological research – situation, the Council for Development and Research (CDR) signed an agreement with UNESCO (The United Nations Educational, Scientific and Cultural Organization) on the 24th of October 1991 to initiate a daring archaeological project to survey, excavate, and restore the historic monuments in the Beirut Central District

(BCD). It was not until November 1993 however that the Lebanese government approved the project which would be directed by the DGA with the assistance of UNESCO (Asmar 1996, 7).

Once all the paper work was finalized, the archaeological project was set in motion. As developers started making plans for a complete make-over for the BCD, fourteen teams of archaeologists – from the DGA, as well as Lebanese and foreign universities and institutions –were faced with the daunting task of rescuing the ruins that lay beneath the now destroyed BCD before they became doomed to oblivion (Curvers and Stuart 2005, 189). The archaeological project was divided into three phases. The first consisted of digging several test trenches in areas of interest. The second phase consisted of expanding the trenches into proper excavation whenever possible, and whenever the results looked promising. The last phase was called the 'rescue phase' in which all the archaeological teams conducted their excavations in parallel with the construction work in the BCD over an area of 90ha divided into 87 sections (Fig. 7) (Asmar 1996, 8).

Since 1993, many of the 87 areas have been excavated, and new ones are constantly being investigated as the BCD continues to be a booming area for urban development. However, publications have so far been rarely completed. With the tight time periods allocated for the rescue excavations, and with new projects constantly popping up with every new development project; archaeologists had to delay the most important aspect of excavations, which is publication of the results. This is due to several factors including in some cases, the lack of funding for publication, the ferocious pace of rescue excavations, and most importantly the constant discovery of new sites in Beirut. In essence, the post-war urban renewal has meant archaeological

teams have rarely had time to carefully study the material before starting to work on a different site in the city. As a result, many sites have been excavated, reintegrated within the modern architecture or refilled to be preserved; but relatively little have been fully published which means a lot of information about ancient Beirut is still hidden from the public.

Throughout these years of excavation, material from a total of ten periods has been identified:

I. Palaeolithic (- 10000 BCE)
II. Pre-pottery Neolithic (10000 – 6000 BCE)
III. Pottery Neolithic (6000 – 4500 BCE)
IV. Chalcolithic (4500 – 3000 BCE)
V. Bronze Age (3000 – 1200 BCE)
VI. Iron Age (1200 – 300 BCE)
VII. Classical (300 BCE – 800 CE)
VIII. Medieval (800 – 1700 CE)
IX. Great reconstruction of Beirut in the 19th century (1840 – 1920 CE)
X. Pre-war Beirut (1920 – 1975 CE)

The Classical period, including both Hellenistic and Roman occupations has been extensively studied in Beirut. However, the archaeological evidence that can be directly related to the beginning of the Roman interference in the city is scarce (Curvers and Stuart 2005, 205).

On the other hand, archaeological evidence attests to the growth of the city during this era: houses, structures, and streets were laid out over the older cemeteries on

the boundaries of the earlier Iron Age settlement, effectively enlarging the size of the city. Two towers, part of the city's Hellenistic fortification system, were also located in the recent digs. One of these towers is believed to have formed part of the citadel on the north eastern side of the occupied city, which was a fortified enclave with separate access to the countryside (Perring, Reynolds, and Thorpe 2003, 201). According to Grainger (1990) this type of structure was very common in Syrian cities during the unstable Seleucid period. We already know from epigraphic sources that Beirut had an agora and a temple dedicated to Astarte during the Hellenistic period; this is further reinforced by the presence of numerous Greek architectural elements such as column capitals and drums reused in the later Roman structures (Lauffray 1977, 142-3). After the Roman colonization, it was believed by some scholars that the forum was built on top of the earlier agora. Several temples would have lined the sides of the forum as was customary in Roman cities. However, none of these structures has been identified with any certainty (Perring, Reynolds, and Thorpe 2003, 201).

From his initial investigation in the 1940s, Lauffray falsely deduced that Beirut was in fact organized according to a grid plan similar to those of Roman military camps, and speculated that the city must have had a large number of public buildings, typical of those cities that were endowed with the *ius Italicum* (honour granted by the emperor to cities giving them the privilege of being virtually on Italian soil). These included a forum, capitol, curia, and several other temples and baths (Lauffray 1977, 148). This claim served to highlight the fact that there was a complete re-planning of the city after the Roman colonization. However, the extensive archaeological works in the BCD proved Lauffray wrong areas (Curvers and Stuart 2005, 206). Rather than a simple grid plan aligned with the Roman forum, with two major axes known as the c*ardo maximus*

and the *decumanus maximus*, the actual plan of the Roman city was more complex. The urban planning of the Roman city was in fact a produce of the superposition of several earlier city plans; culminating in the new Roman plan that was implemented in the newly developed areas (Curvers and Stuart 2005, 206). The archaeological developments described above serve to indicate that the city was indeed expanding and flourishing in the early Roman empire, and in fact transforming from a Hellenized city into a Roman colony upon the arrival of the Italian colonists.

I already discussed, albeit in brief, what we know so far about the plan of the city from the archaeological data, as well as some information about the monumental buildings of Beirut. It is only logical now that I discuss the main topic of this thesis, domestic structures. One of the major challenges facing archaeologists in Beirut is locating the houses used by the Roman veterans. It could be that the colonists' houses filled the empty spaces between the Hellenistic ones, thus creating a more crowded urban landscape in the city as is the case in BEY-006 (Perring, Reynolds, and Thorpe 2003, 207). However, the complicated and often unclear stratigraphy makes it very difficult to establish an accurate timeframe for each of the structures. The arrival of the colonists could have created a merged community of local elites and veterans who lived together in the western promontory of the city, known now as the Souks area, or in more technical terms, BEY-006, 004, 008, 010, and 011. The houses excavated in this area, including the House of the Fountains, are relatively larger than the rest. Some of them have in-house peristyles, mosaics, and so on, suggesting that they were indeed the residence of the wealthier part of the population, especially in the later centuries of Roman Beirut. It could also be that the arrival of the veterans in Beirut opened new economic opportunities for the elites who went on to lavishly decorate the public and

private spaces in Roman style. This follows the trend of the earlier period where the wealthy lived in the south-western part of Beirut, while the eastern end was usually reserved for storage facilities and industrial sectors (Curvers and Stuart 2005, 208).

BEY-006 is one of the main excavation areas that interest us due to the presence of several Augustan houses there. It covers the area locally known as the Souks measuring about 200m by 350m to the north of the Grand Serail Hill, and overlooking the location of the ancient port of Beirut. No previous archaeological excavations have taken place there prior to the BEY-006 AUB project. The area promised considerable rewards when it comes to classical and medieval finds as Roman buildings were discovered to its South and East (Perring, Seeden, Sheehan, and Williams 1996, 176). Work started in June of 1994 with several areas being investigated at once in order to evaluate the potential of the Beirut Souks area for further archaeological studies. As work progressed, more areas were opened and investigated until almost the whole southern section of the Souks area (east/Site 1 and west/Site 2 of the Islamic Sanctuary that remained intact on site) was dug by December 1995 (Perring, Seeden, Sheehan, and Williams 1996, 185). These years of continuous excavation resulted in the discovery of Hellenistic, Roman, as well as Byzantine finds in BEY-006.

Large areas of the site have been excavated down to bedrock, which proved in most cases that the earliest levels of occupation in this area of Beirut was in fact the Hellenistic period, more accurately the 2nd c. BCE. Several houses and rooms were excavated in that area showing signs of three reconstruction layers; these buildings consisted of several rooms each with an attached shop facing the street (Perring, Reynolds, and Thorpe 2003, 202). In addition, several thoroughfares were located forming what looked like an irregular orthogonal grid. However, it looks like the later

developments (Roman/Byzantine) in BEY-006 took place within a topographic framework that has been established during the Hellenistic period (Perring, Seeden, Sheehan, and Williams 1996, 190).

The Roman period remains verified that the urban topography of the earlier Hellenistic period was unchanged at the time of the foundation of the colony. After discovering three construction layers dating back to the Hellenistic period, a fourth one was found dating back to the Augustan period based on coin and ceramic evidence (Perring, Seeden, Sheehan, and Williams 1996, 191). This construction layer featured new construction techniques, as well as a more widespread use of mortared building foundations. Several buildings dating to the Roman period were also discovered; the 'Domus' House on Site 1 and House of the Fountains (and its smaller predecessors from the early empire) on Site 2 (Perring, Seeden, Sheehan, and Williams 1996, 193); both provide evidence for housing during the Roman period and a critical piece of information for this research and will be discussed at a later stage of this research.

Having described Beirut's history as well as the history of its excavation, more importantly BEY-006, we come to the conclusion that the city did indeed develop into a proper Roman colony in the early empire due to the numerous attested construction projects; however, we also realize that the state of preservation is not always optimal, and that many of the excavations were in fact rescue excavations that lack publication leaving us with a truncated record of the city's archaeology. However, as mentioned earlier, several complete plans of the houses in BEY-006 are recorded (Fig. 9) and can be studied using access analysis which is the main topic of the next chapter.

CHAPTER III

METHODOLOGY

Before setting out to explain the methodology that will be used to reach my objectives in this thesis, I feel that it is important to clearly define what a building is. To most people buildings seem to act mainly as a 'passive' backdrop to their daily lives, providing a setting for all the action that occurs inside them, nothing more. In fact, this simplistic perception of buildings extends to academic circles as well, with scholars from various disciplines, including archaeology, regarding these structures as merely 'theatres' in which the 'drama' of daily social life is played out (Grahame 2000, 1). However, this does not portray the complete picture. In fact, in its most basic definition, a building is an artefact created to order space. In other terms, its primary function is the transformation of the empty space into an orderly pattern. This ordering of space is in fact directly related to the ordering of the relations between the individuals moving in that building (Hiller and Hanson 1984, 1). By simply regarding buildings as 'theatres' we will be putting too much weight on their physical attributes and neglecting the key 'space ordering' purpose they were built to fulfil.

Now that we have established the primary role of buildings, it is essential to look at the implications of defining houses in such a manner. A building's ability to create space gives it a social aspect since ordering space means ordering social relations between the users, or inhabitants, of the building. This signifies that buildings carry within them social meanings, i.e. we can recognize a society from the spatial organization of these structures. This characteristic social feature is what differentiates buildings from the other artefacts. It is also what makes studying them more difficult,

since quantifying and understanding spatial organization is a complicated task (Hillier and Hanson 1984, 2).

In fact, many thinkers have already discussed the notion that buildings have the power to shape societies. Michel Foucault, in his study of prison designs (1977; Grahame 2000, 2) contemplates how the design of certain buildings, a prison in this case, can act upon the personality of the individuals living in them. Although his main point focuses on public buildings, we can still extrapolate his conclusions and apply them to private buildings. Thomas Markus (1993; Grahame 2000, 2) on the other hand focuses on the new building designs that emerged after the industrial revolution, and how the changes from the earlier building are not only the result of the availability of new material and technology, but the results of the creation of a new type of society, an industrial one that needed a new type of space management in order to function.

A more recent example regarding the power that spatial organization has on the daily lives of its inhabitant is showcased in the new housing estates and high rise towers of the 1960s and 1970s. The new designs isolated individuals from each other, breaking the tradition of mutual networks that prevailed prior to the construction of these buildings, resulting in an increased crime rate leading to social breakdown. The inability of the population to adapt to the new built environment means that space has powers to shape society, since the spatial organization of the new buildings were at odds with the social habits of the people who were meant to live in them (Coleman 1985; Grahame 2000, 2).

Having recognized the power that buildings have on the social aspect of human life, the next step is to try and understand how it works. According to Grahame (2000),

architecturally divided spaces have a common characteristic with written texts. Both are the outcome of human action and both of them document that action. Logically, there must be a way to decipher them in a similar fashion. Deciphering a text requires prior knowledge of the language it was written in, the same thing applies to deciphering spatial organization. In order to do that, we have to determine the 'language' it was written in, and then 'read' it. By comparing speech and writing on the one side, social interactions and architecture on the other, we can see that both speech and social interactions are transient events, i.e. they are both lost once the action is completed, however, writing and architecture are both used to document the prior transient events, be it in texts or in the form of architectural structures respectively. Having defined the spatial equivalents to writing and language, we still have to define the equivalent of reading, which Grahame (2000, 3) neatly describes as the act of social movement through architectural space. Just as we learn how to understand the contents of a text by reading it, we learn to negotiate space by moving through it. So if space is read through movement, then we must find a way to recreate the possibilities of motion through space; one such method is *access analysis.*

The first step of quantifying the spatial organization of buildings through *access analysis* is looking at the interior permeability of buildings, i.e. the arrangement of rooms and location of doorways that allow movement from one space to another inside the structure, permeability itself indicates the possibility of spatial movement between two spaces in the building. In order to represent the variation in internal layout and permeability in a simple way, Hillier and Hanson (1984) devised a system where each space is represented by a circle, with usually one circle marked with an 'X' sign representing the exterior, usually the point of view of the carrier. The carrier is the space

from which the access map is being viewed, which in our case is the exterior, or in other words, the stranger's point of view. So the carrier will always be a space located just outside the boundaries of the building. These circles are connected together by a simple line wherever the architectural designs permits permeability (Fig. 2) (Hillier and Hanson 1984, 14-5).

Before moving forward with the explanation, it is imperative to clarify what a 'cell' means since it is a crucial part of the analytical process. Cells are basically bounded space; in simpler terms, they are rooms or hallways inside a building, bounded by a physical feature. However, this definition leaves some grey areas that need to be clearly examined before we can move on. For example, should long hallways that snake around a house be considered one single space, even though two individuals standing at each end of the hallway cannot interact with each other? The same goes for 'L' shaped rooms where individuals standing on the northern side of the 'L' shape are not in a position to interact with someone standing on the eastern tip of the room (Fig. 3). According to Grahame (2000, 31), using the rule of convexity, we can shed light on some of these grey areas. Convex spaces are defined as spaces where if we are to draw a tangent line between any two points in it, the line will not cross any of the space's boundaries (Grahame 2000, 31). The convexity rule then stipulates that we should divide each large space into the minimum number of convex spaces that can fit into it. However, in some delicate cases, cases where strictly applying the convexity rule will result in the creation of such small

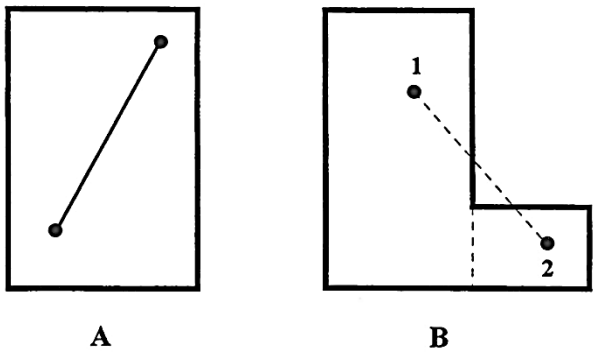

Figure 3 - A: Convex Space / B: Non-Convex Space (after Grahame 2000, 31)

spaces that are not practically significant in reality, then the researcher is free to choose between using the convexity law or not as this will not affect the result of the analysis (Grahame 2000, 32).

Having defined all the cells that compose a building, and created the access map, preferably a justified map where all the cells that are located at the same depth value (number of connections between two different cells) from the carrier (the exterior) are represented along the same horizontal level (Hillier and Hanson 1984, 149). The justification of the access map is not imperative, but it is favourable as it allows us to better understand the nature of the relationship between the different rooms inside the buildings, as well as the relationship between the interior and the exterior of the building in an easier manner. The access map also allows us to visually check whether the spaces are distributed or non-distributed. Distributed spaces (with respect to the surrounding cells) are those that have more than one access point leading into them, while non-distributed ones are those that have a single access point. In other words, spatial systems in which control is distributed throughout the system are called distributed, while those that are controlled by one cell or a small number of cells are called non-distributed. The more distributed the system is, the more it favours segregation between its inhabitants; on the other hand, the more non-distributed the system is, the more it favours interaction between its inhabitants (Grahame 2000, 44-5).

The visual inspection of an access map is certainly useful, but a complete quantification of data is needed in order to be able to completely compare and analyse the spatial layout of different buildings. For that we need the help of different control parameters; Relative Asymmetry (RA), Real Relative Asymmetry (RRA), Control Values (X), and depth values are critical to understanding the social aspect of buildings.

The depth value is the simplest of the above; it is the value representing the number of connections between a single cell and the carrier. The control value ‘X’ is used to quantify local relations between cells, since the more connections a cell has, the more it can exert power within the building. Calculating control values follows a simple mathematical equation; each cell has *n* number of neighbouring cells. Each space therefore gives its neighbours a value of 1/*n*; these values are then summed resulting in ‘X’ which is the control value of the cell in question. Cells that have a control value greater than 1 are considered as controlling spaces, those with values lower than 1 are considered as controlled spaces, while spaces with a control value equal to one are considered to be neutral, neither controlling nor controlled (Hillier and Hanson 1984, 109). We should keep in mind that this value only reflects local measures as it only takes into effect the internal neighbours of the cell in question. Relative Asymmetry (RA) on the other hand reflects the global relation between a cell and its environment. These sorts of global relations depend on accessibility, which is defined by the number of boundaries that have to be crossed – on average – between the exterior and the selected cell. Logically, the larger the number of cells there are, the less accessible a cell becomes, and vice-versa (Grahame 2000, 34). However, simply counting the boundaries is not an effective method, especially when it comes to large and complex buildings, this is why Hillier and Hanson (1984, 108) developed the Relative Asymmetry (RA) value that can help us understand the level of accessibility between different cells of a single building. To calculate the RA value of a certain cell, for this example let us call this cell ‘A’, we need to establish the Mean Depth (MD) of the system from the point of view of A. The first step for calculating MD is to assign depth values to all the other cells of the system from A’s point of view, i.e. cells that are one step away from A get a

value of 1, those at a distance of two steps get a value of 2, and so on until all the cells are assigned values. The depth values are then summed up and divided by the total number of cells in the system minus 1 (which is cell A) to give us the Mean Depth. The mathematical formula is as follows: $\boldsymbol{MD} = \frac{\sum \boldsymbol{d_k}}{\boldsymbol{k-1}}$ where $\sum \boldsymbol{d_k}$ is the sum of the depth values (d) from A's point of view in a system that contains (k) cells. The next step is to use the MD value in the RA equation which is: RA= $\frac{\boldsymbol{2\,(MD-1)}}{\boldsymbol{k-2}}$. Relative Asymmetry (RA) values will always vary between 0 and 1. A high score, i.e. a value approaching 1, indicates that the chosen cell has low accessibility, while a lower RA value indicates that the cell is very accessible (Hiller and Hanson 1984, 108). It is important however to calculate the RA values for all the cells before jumping to any conclusion, because by comparison, a cell with a relatively low RA of 0.3 can still be non-accessible if the rest of the cells turn up values that are much lower. You might have noticed the presence of (k) – number of cells in the system – in the RA's denominator, which means that the larger the system becomes the lower RA values we will get. This can become misleading when comparing buildings of different sizes. Let us take for example a comparison between a small and a large building. The RA values of the former will tend to be generally higher than the latter since the (k) value of the small building is lower. At first sight this signifies that generally rooms in the smaller building are less accessible than in the larger building, which is not logical since smaller buildings have fewer boundaries, thus cells should be more accessible. So what that means is that RA values are only useful when comparing buildings of the same size; however, this is almost never the case in real life. To counteract this issue, Hillier and Hanson (1984) came up with a method to adjust the RA value for different building sizes; this is what they called the Real Relative Asymmetry (RRA). To calculate the RRA, we simply have

to divide the RA value by what Hillier and Hanson call a 'D-value'. Hillier and Hanson provided a table with the 'D-values' of buildings with (k) values ranging from 1 to 300; i.e. we can just pick the 'D-values' from the provided table (Table 12) plot it in the following equation to retrieve the $RRA = \frac{RA}{D-value}$ (Hillier and Hanson 1984, 110-2). While RA values are restricted between 0 and 1, RRA values can be any number between 0 and infinity, the higher the number, the more inaccessible the cell becomes.

To better understand the analytical process explained above, I feel that it is important to support it with a simple example. A justified access map is represented in (Fig. 4). Calculating the control values of point X we get the following: Control value =

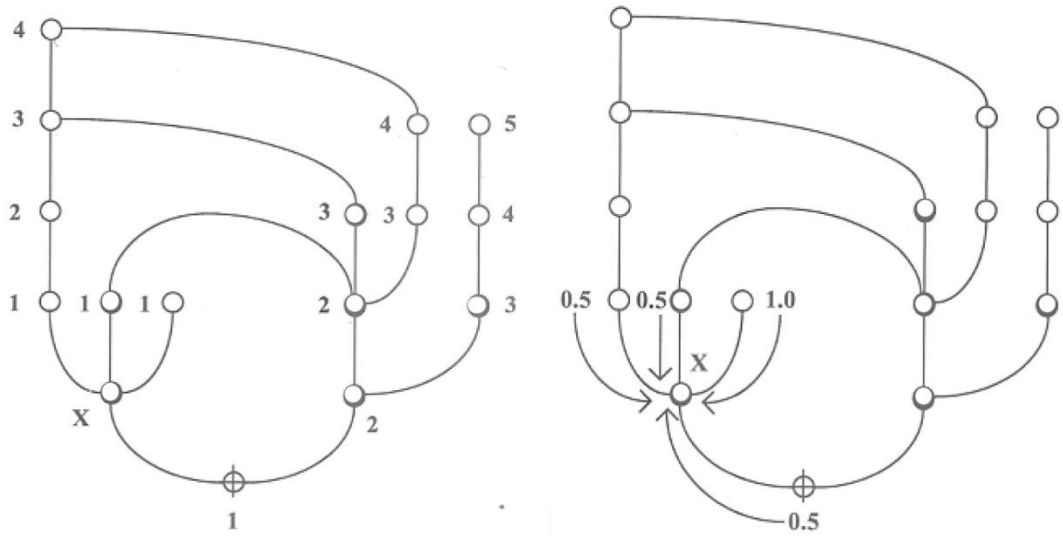

Figure 4 - Right: control values for X/ Left: Number of boundaries from X (after Grahame 2000, 34)

1 + 0.5 + 0.5 + 0.5 = 2.5. This means that space X is a controlling space. Calculating the RA is a bit more complicated; as mentioned earlier, we start by calculating the MD; Fig. 4 shows the assigned depth values of all the cells from X's point of view. Adding them together gives us: $\sum d_k = (1x4) + (2x3) + (3x4) + (4X3) + (5x1) = \mathbf{39}$. Knowing that (k) = 16, we plot $\sum d_k$ in the MD equation, which gives us: MD = $\frac{39}{16-1} = 2.6$. The last step of the procedure is to insert the value of MD in the RA

equation, which yields: RA $= \frac{2\,(2.6-1)}{16-2} = 0.23$. The last thing we have to do is to calculate the RRA; we simply pick up the D-value corresponding to k=16 from (Table 12), which is 0.251, and we divide the RA by this number giving us: RRA $= \frac{0.23}{0.251} = 0.92$. This process is to be repeated for the rest of the cells until we can create a complete table with all the values representing the different cells; only then we will be able to make comparisons and begin to understand how the spaces are divided within the structure.

Having calculated the important value shown above, we should now move to explaining the significance ascribed to these values. According to Grahame (2000, 35), RRA and control values "provide an insight into the syntactical structure of the building". By understanding these we can begin to reconstruct the ideas that ancient people had about organizing space. In addition, accessibility, which is in itself determined by the RRA and control values, is perfect an indicator for the presence-availability index which shows how available residents of certain cells are for social interactions. In addition, the depth value from the exterior is the clearest, and simplest, way to determine the level of accessibility of a building to strangers. By calculating the above mentioned values, access analysis provides us with a method that enables us to recreate the likely routes of social interactions inside buildings, between the inhabitants themselves, and between the inhabitants and strangers. Thus it provides us with a method that enables us to read space, decipher it, and deduce the most likely social ideas that helped create it (Grahame 2000, 36).

Once we have subjected all the assigned houses in this research to access analysis (tables and maps are shown in the Appendix) it is time to actually use the

results to come up with some social patterns out of the numbers we got. Perhaps the most important information we can get from the access map data is the interaction potential of each of the house's spaces which can then be examined on three different levels: Global, Local and from the point of view of a stranger (External).

Interaction potential on a global level is best described by the RRA values. We need to understand the distribution of these RRA values in the different spaces of the house in order to get an idea of how the house's interaction pattern is distributed. To do so, it is best to create a table where we can arrange the cells according to their RRA values, from lowest to highest. This gives us a look at the most integrating spaces (i.e. those with the smallest RRA values) and the most segregated spaces (i.e. those with the largest RRA values) (Grahame 2000, 59). According to Grahame, we should assign the first third of the spaces, according to their values, as highly interactive domains, the middle third, moderate interaction, and the last third low interaction. When comparing control values and RRA values it might seem that they both describe the same thing. If a space has a large number of neighbours, then this implies that it is highly accessible. This is very common in buildings where a single space dominates the global order; however as building layouts become more complex, it is possible to have a space that is locally accessible, but globally inaccessible; hence the need to measure both before making any conclusions about the spatial order of the selected building (Grahame 2000, 35).

To measure the local level of interaction (i.e. between the inhabitants of the house) we need to refer to the control values (X). In this case we need to arrange the spaces from the ones having the highest control value to the one with the lowest; or in other words, we need to arrange the spaces from the one with the most control to the

space that has the least control. The next step would be to organize them into high, moderate and low interaction spaces. In order to do that we need to start adding the control values of each space, in rank order, while calculating the cumulative percentage of control values. The spaces that contribute to the first 33.3% of the cumulative control are considered to be spaces of high interaction; those which contribute to bringing the cumulative control to over 66.6% are considered spaces of moderate interaction; and finally, the spaces contributing to the last third are considered low interaction spaces (Grahame 2000, 59-60).

Finally, the third interaction potential level is the external one, the one viewed from a stranger's point of view. This is important because it allows us to clearly understand the areas where visitors were allowed to 'roam freely' versus the areas that were most likely strictly reserved for the inhabitant of the house. In order to establish the areas of high, moderate and low interaction from the point of view of a stranger entering the house, we should arrange the cells according to their depth from the exterior (i.e. the minimum number of connections one has to cross in order to reach that space starting from the exterior) from the lowest to the highest number. Then all we have to do is to get the largest value for the depth from the exterior, and divide it by three. The first third has a high interaction zone with the exterior, the second third is moderate, and the last third has a low interaction zone (Grahame 2000, 60). The spaces of high interaction are the zones where most likely the normal visitor was welcomed and allowed to roam freely, those of moderate interaction could be spaces where an intimate guest would be allowed access, while those of low interaction are almost always beyond the reach of visitors and considered private spaces for the inhabitants of the house. The above zones will be plotted on maps of each of the houses to make the

analysis and comparison easier; zones of high interaction will be represented in red, zones of moderate interaction will be orange, and zones of low interaction will be in yellow. Once we have the interaction maps, we can deduce two types of identities in houses, the individual and the household identity which are inversely proportional. As the individual identity gets stronger, the household one gets weaker and vice versa. Strong individual identities are characterized by their small, inaccessible rooms that favour structured encounters between the inhabitants of the house (two individuals have to plan their encounter before it can happen). On the other hand, a strong household identity is characterized by the presence of large open spaces that favour unstructured encounters (random) between the inhabitants, strengthening the communal feeling in the household. Almost all the houses will present a mixture between individual and household identities; although in most cases, one of the two prevails (Grahame 2000, 75)

To better understand the practical use of access analysis, it is imperative to present a real application example of the method. For that we look at the study conducted by Eyal Regev (2009) of Bar-Ilan University concerning the layout and the spatial organization of Khirbet Qumran in the West Bank, Israel/Palestine. The nature of the Khirbet Qumran ruins are hotly debated; it has been long claimed that the site was the dwelling place of the Qumran community accredited with authoring the Dead Sea Scrolls found hidden in the nearby caves. De Vaux (1973; Regev 2009, 85) stated that Khirbet Qumran had several distinctive characteristics that made its association with a religious community all the more plausible; characteristics such as large dining halls that were probably used for ceremonial use, the absence of female burials from the cemetery, and the presence of animal bones placed in vessels and buried in the ground

as part of ritual meals (Regev 2009, 85). De Vaux's theory has been recently criticized by several archaeologists, who believe that his interpretation of Khirbet Qumran as a religious sect site is primarily linked to the discovery of the Dead Sea Scrolls in the nearby mountains. They state that any interpretation of the remains should not be affected by the presence of these scrolls, and maintain that any interpretation of the remains without considering the scrolls would yield a simpler, different interpretation (Hirschfield 2004, 5-6; Regev 2009).

Recent re-interpretations of Khirbet Qumran has led some archaeologists to claim that the site was a military fortress (Golb 1995, 12-41, 280-85; Regev 2009, 85), *villa rustica* (Donceel Voûte 1994; Regev 2009, 85), an inn or a road station along the way to Jerusalem (Cansdale and Crown 1994), a pottery production center (Peleg 2006, 2007; Regev 2009, 85), and finally Hirschfed (1998, 2004; Regev 2009, 85) compared the site to other Judaean manor houses in the region.

Regev (2009) examined the site plan using access analysis then compared the results to other plans of Judaean manor houses, other cultic centres, as well as comparing them to the social characteristics of sects in general before finally comparing the results to the social boundaries and organization of the Yahad community which allegedly inhabited the region (Regev 2009, 86).

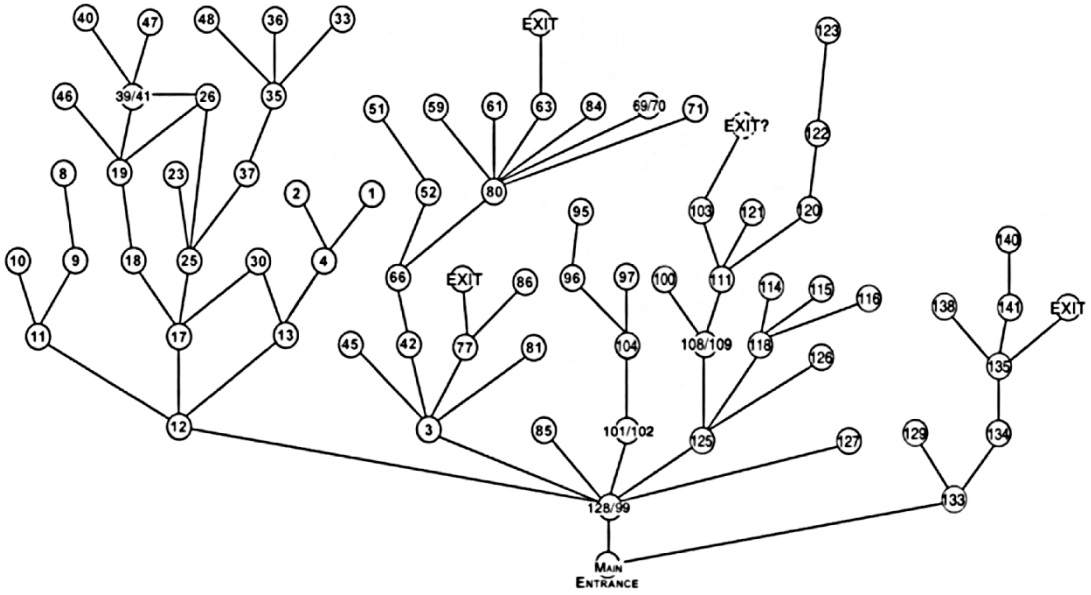

Figure 5 - Qumran access map (after Regev 2009, 88)

Fig. 5 represents the justified access map of Khirbet Qumran, with the carrier located at the main entrance of the complex and representing the boundary between the interior and the exterior. From the access map we can distinguish three main 'wings', or sections in the building. The eastern section starts with cell 12, the central section with cell 3, and the eastern section with cell 125; in addition, there is a small section to the extreme east of the map starting with cell 133 (Regev 2009, 88). All three cells are located at the same depth from the carrier, which is 2; and all of them are controlling spaces as indicated by their control values being all above 1 (cell 12 = 1.05; cell 3 = 2.97; cell 125 = 1.72). Within these different sections we have smaller, minimally connected spaces pointing to a highly structured complex where one has to cross a large number of borders in order to reach most of the spaces (apart from the presence of kilns in cells 64-66, there is no apparent reason for this sort of segregation). The prevalent structural division in Khirbet Qumran corresponds to what Hillier and Hanson (1984, 20) define as transpatial solidarity; where the system is divided into several quarters

with minimal connections, as well as strongly controlled boundaries (as demonstrated by the controlling spaces 12, 3, and 125 that control access to the three large wings). This model gives us a glimpse into the social behaviour of the inhabitants of Khirbet Qumran, which attests to social segregation between the inhabitants (different wings controlled by a single cell) as well as between the inhabitants and the outside world (large number of boundaries mean large depth values). According to Hillier and Hanson (1984, 145), this is characteristic of ritualization; i.e. the pattern represents a differentiation between different spaces, as attested by the different branches at Khirbet Qumran, which usually indicates separation between different classes of people, or different types of activities; for example, mundane, everyday activities on the one hand, and ritual activities on the other (Regev 2009, 91).

Quantitatively speaking, it is important to compare the values generated by the Khirbet Qumran access map with those of other Judaean manor houses, since Hirschfeld (1998; 2004, 211-30; Regev 2009, 91) argued that their layouts are similar. Fig. 6 shows one of these manor houses. It is clear that the manor houses lacked the structural organization, or segregation that was apparent in Khirbet Qumran. However, to prove this theory quantitatively we need to calculate the Mean Depth (MD) values of Khirbet Qumran and the different manor houses, and compare the results. MD is calculated by the method demonstrated in earlier sections of this chapter according to the following formula $\boldsymbol{MD} = \frac{\sum \boldsymbol{d_k}}{\boldsymbol{k-1}}$. This showed that the MD of Khirbet Qumran has the highest value at 4.983, while other manor houses all yield smaller numbers, with the

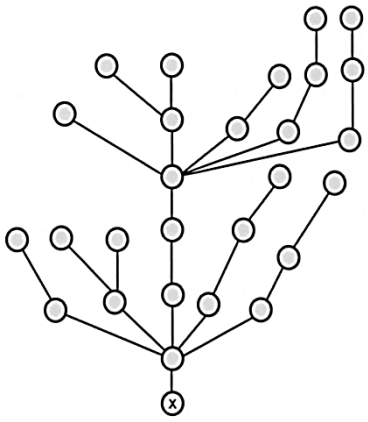

Figure 6 – Access Map of a Manor house (after Regev 2009, 89)

highest of these being that of Hilkaya's palace at 4.321 (Regev 2009, 92). This high MD value demonstrates that Khirbet Qumran has strong boundary restrictions, as well as a highly divided internal space; in other words, this means that the inhabitants of Khirbet Qumran were highly segregated and pretty much separated from the outside world. Regev (2009) then moves on to compare his finds with general characteristics of sects in general, highlighting the fact that sects more often than not tend to be segregated from the outside world using spatial separation (i.e. living in isolated colonies for example). In addition, the strong internal separation within Khirbet Qumran, according to Regev cannot simply be explained by functional needs, but rather, the separation must have been separating the realm of the ordinary and that of the ritual (Regev 2009, 93).

The conclusions derived from access analysis can then be compared to the information we already know from the scrolls about the Yahad community. The Yahad were a sect that separated themselves from the outside world, whose inhabitants were considered to be sinful (Regev 2009, 94). In addition, the Yahad sect was a very hierarchical one where members were ranked according to their descent, as well as according to their knowledge of the Holy Scripture, thus access to certain parts of their complexes must have been restricted to 'novice' members (Regev 2009, 94). These characteristics fit well with the spatial division of Khirbet Qumran which emphasizes spatial separation, hierarchy as well as ritualization.

Using access analysis in this case has proved that the spatial organization of Khirbet Qumran features several characteristics of a sect community. The most prominent being that of strong social boundaries attested by the high Mean Depth (MD) value recorded; a strong internal hierarchy is also attested by the fact that several large

unconnected sections are in the compound that could have been used to separate the normal from ritual activities, as well as to separate the different classes of people inhabiting the compound. These two characteristics help ritualize Khirbet Qumran, indicating that most likely its inhabitants subscribed to a sectarian ideology (Regev 2009, 95). This however still does not prove that the Yahad community actually inhabited Khirbet Qumran; instead what this proves is that a community with social and cultural values similar to the Yahad community lived on that site. In order to prove that the Yahad community lived in Khirbet Qumran one must explore additional elements of the archaeological assemblage from the site and not just the structure's plan. However, this example highlights the practical uses of access analysis, and how it can help give us a deeper understanding of spatial organisation in order to understand the social and cultural behaviours of the inhabitants of the structures in question.

One of the most serious obstacles that we can encounter when applying access analysis to ancient structures is the incompleteness of the archaeological record; this manifests itself clearly in cases where the upper floors are missing. One can try and reconstruct the internal spatial division of the upper floor by extrapolating from some of the surviving examples, but this would damage the accuracy of the data, which is crucial in access analysis (Grahame 2000, 41). The best we can do is to subject only the ground floors (which we have complete plans of) to access analysis while keeping the upper floors out of the equation. This is not ideal, but feasible since we can consider the ground floor as a 'subsystem' of the whole house. Hillier and Hanson (1984, 82-142; Grahame 2000, 42) have shown that it is perfectly acceptable to subject a subsystem to access analysis. In the case of Roman atrium houses, we can see that the upper floors could not have mirrored the plans of the ground house due to the fact that the *atrium*

and the courtyards were not roofed, which leaves little space for the upper stories which must have been composed of few small and tight spaces, meaning that not a lot of critical information is missing from our analysis. The distortion in the data will only occur at the edge of the system where the stairwells lead upstairs. In addition, the fact that in the examples we are dealing with we only have one stairwell per house means that the upper stories were not well integrated with the ground floors which indicates that studying the ground floors in isolation would not influence the results greatly (Grahame 2000, 42).

CHAPTER IV

ANALYSIS

Having discussed the application of access analysis in the previous chapter, we now have to move on to present the individual houses that are going to be analysed. As discussed before, examples from Beirut and Antioch in the East, as well as examples from Cosa and Pompeii from the West will be analysed. The application of access analysis on these houses will enable us to develop the interaction potential maps (represented in the Appendix) and subsequently compare the social behaviour of the inhabitants of these structures. This comparison will lead us to better understand whether the inhabitants of the houses in Beirut shared the same social behaviours with those in Italy or not. If so, then there is a high chance that their inhabitants are actually Italian veterans, who would ideally design their new houses to comply with their Italian social lives; if not, then there is a high possibility that these houses were in fact inhabited by the original occupants of the city. However, this matter cannot be truly constrained to two simple options, Italian veterans or indigenous people. The matter is much more complicated than that, and as mentioned in the earlier chapter, access analysis helps us shed some light on some aspects of the nature of the people who inhabited the houses, but a complete study of the archaeological remains of these houses is vital to determine the exact nature of their inhabitants. However, this falls beyond the scope of this research. A further point to take into account is that I will be using published plans as a basis for the analysis, so we have to take into account that some elements of these plans will be based on the excavator's interpretations [see figure 9, 16, 19, 22, 26, 29, 32, 35, and 38].

A. Eastern Houses

1. Houses of Beirut

The main area of Beirut to be investigated in my research will be BEY-006, or better known as the Souks area; a stretch of land extending 200m by 350m on a limestone promontory at the foot of the Grand Serail Hill (Fig. 7). Three specific areas were heavily excavated from the whole site. However, the western part of Area 2 (Fig. 8), containing the insula of the House of the Fountains, produced the most complete sample of Roman archaeology was recovered (Perring, Reynolds, and Thorpe 2003, 196). Continuous excavation on site BEY-006 resulted in the excavation of several houses such as the House of the Fountains and its predecessors in the same insula of Area 2, as well as the first house discovered in Area 1 and name 'Domus'. However, due to the partial preservation the 'Domus' residence, I am not going to include it in my research. Instead, I will be focusing on the House of the Fountains insula which is extensively studied, as well as more completely preserved; at least preserved to a level that allows me to conduct access analysis on the plans of the houses with a certain level of certainty, and minimal guess work when it comes to the location of the doorways.

The insula of the House of the Fountains provides us with the best stratigraphic sequence to study the changes in domestic architecture from the Hellenistic period all the way up to the late Roman Period. The area was first developed in 200 BCE when buildings were laid on both eastern and western side of the insula, while the center part remained an open space. Building 3 occupied the eastern side while remains of two buildings (1 and 2) can be recognized on the western sides of the insula. Building 3 was originally a rectangular building, with large rooms facing the street to its east, believed

to be shops while having small living spaces in the back. This building survived all the way up to the 6th c. when it was destroyed by the 551 CE earthquake (Perring, Reynolds, and Thorpe 2003, 203).

Almost a century and a half after the construction of building 3, the city was incorporated into the Roman Empire, and around 15-14 BCE was transformed into a colony with *deductio.* The influx of veterans of the V Macedonica and VIII Augusta Legions from Augustus' army must have created a high demand for every inch of living space in the city due to the sudden increase in the city's inhabitants. The Hellenistic buildings standing on the western part of the insula were completely destroyed; building 3 on the eastern side was only refurbished while the empty space in the middle was completely used to construct new buildings (buildings 4a, b, c, d, e, and f) (Fig. 9). These new housing structures could have been used to house the new colonists (Perring, Reynolds, and Thorpe 2003, 204). Here I am concerned with three of the new houses, building 4a, 4e, and 4f as they are the most preserved, and we have complete plans of those.

a. Building 4a

Building 4a was flanked by structures from all sides and had no direct access to the streets; its access map is represented in Fig. 10. To its south is building 4d, to the east are both buildings 4e and 4f, to the west is building 4b, while to the north is building 4c which appears to be a row of street facing shops. However, there must have been a way to enter the house from one of the streets. The most probable entrance must have been through one of the shops of building 4c as this was a common practice, as

attested in building 3 (Perring, Reynolds, and Thorpe 2003, 203). For this reason, space 1 in (Fig. 9) is considered to be part of building 4a while technically it is part of building 4c; but we have to consider it a transitional space as people have to cross it in order to enter the house. No other entrance possibilities exist since house 4a is surrounded on all sides by different structures; thus the only possible entrance is from the street through house 4c (Fig. 9).

Having established the entrance point, we move on to look at the plan of the house (Figs 9 and 11). Space 8 (open space) was a courtyard around which the rest of the rooms were built and connected by spaces 2, 3, and 6. Spaces 4 and 5 were most likely for private use and services, while space 7 was most likely the main reception room overlooking the courtyard (Perring, Reynolds, and Thorpe 2003, 206). Locally, it seems that the most interactive and most controlling space was 3 (X=3.33) (Table 1); however, being a transitional space itself means that it served mostly to facilitate gathering in the adjacent rooms, and acted as the house's center of gravity in a similar fashion to space 3 in the Pompeiian house VI-xv-22 (see p.59). The rest of the rooms, as well as the courtyard were considered zones of low interaction (spaces 4, 5, 7, and 8), indicating that the house provided a good level of privacy for its inhabitants locally (between the inhabitants themselves, without the interference of a stranger/visitor). This interaction layout favours controlled relations between inhabitants, where individuals could chose who to interact with within secure and private spaces represented by the low interaction zones. This encourages strong individual identity while weakening the household ones (Grahame 2000, 75). A stronger individual identity represents the fact that each individual has the control to choose who to interact with; this derives from the layout of the structure, as is the case in House 4a. In other words, structured interactions

are needed to guarantee that each individual is allocated a private and intimate space to interact with other inhabitants; this is provided by the presence of small and inaccessible rooms (e.g. spaces 4, 5, and 7). The only highly interactive spaces in these types of houses are usually hallways that due to their nature (narrow and small) cannot foster normal interaction between inhabitants. A weak household identity is the result of the lack of open and relatively large high interactive spaces that enable unstructured encounters (random encounters) between inhabitants; this again will reinforce the sense of individuality in the household.

When it comes to visiting strangers, the house is very much isolated from the external environment by two spaces; the first being space 1 which is a street facing shop, the second space is a corridor (space 2) that connects space 1 to the domain of the inhabitants. Spaces 1 and 2 are 'protecting spaces' that help regulate the flow of strangers into the inhabitants' quarters; this is evident by the fact that none of the spaces inside the house is highly accessible to strangers. Space 7, considered to be the main guest reception room is the only low interaction zone as it is placed in the deepest position possible in the house (Fig. 11). This indicates that the house inhabitants are in a way controlling their visitors who have to be guided, or funnelled through the house to reach the assigned destination, in a similar fashion to the House of the Drinking Contest in Antioch (see p. 46).

b. Building 4e

This house is similar to building 4a in the fact that they are both entered from street shops. Its access map is represented in Fig. 12. This one has two small shops

facing the streets, and entrances from the shops lead to the main spaces of the house (Perring, Reynolds, and Thorpe 2003, 207); spaces 3 and 4. These are the most controlling spaces, with space 4 being the most controlling (X=2.33) followed by space 3 (X=1.25) (Table 2); Local interaction in space 4 is the highest, however, similar to space 3 in building 4a, it is a transitional space and must have been used to facilitate gathering in the adjacent rooms and courtyard. Spaces 5 and 6 both have low local interaction, in other words providing some privacy for the people in them. This pattern of highly interactive transitional spaces surrounded with low interaction spaces favours a strong individual identity over a weaker household identity (Fig. 13).

When it comes to stranger interaction, the two shops (spaces 1 and 2) act as 'protective spaces' to the more secluded and distant interior. They are considered zones of high interaction, however, being shops, one would assume that they were not meant to host guests as they did not provide the settings for that. The most interactive spaces locally are only moderately interactive from a stranger's point of view, meaning that it is not that easy for a stranger to reach the domain of the inhabitant. In addition, we already established that spaces 4 and 6 are the spaces where interaction between the locals are meant to happen despite their low interaction potential, these spaces also have low interaction potential from a stranger's point of view, which means that the house was not welcoming to strangers and it was difficult for them to reach the inhabitant's interaction zones (Fig. 13). In other words, the house's external network was weak due to the presence of spaces 1 and 2, and the internal network was weak due to its weak household identity. The house design is not very welcoming to guests; in fact it is designed to allow the residents to keep their guests under control, giving the inhabitants

the power to choose spaces where guests can venture, while keeping some spaces out of reach.

c. Building 4f

Building 4f is the only one of the group that is not accessed through a shop. However, due to the restriction of space, the entrance is via a long narrow corridor that stretches from the street front to the middle of the insula where the house is located. Its access map is represented in Fig. 14. This house is also a courtyard house since several rooms are set up around an open space (space 6) with space 8 most likely being the main reception area. Locally, the most interactive spaces are 1 and 5, both transitional spaces; or in other words, they are only facilitating contact and gathering in the adjacent rooms (spaces 2, 6, and 8) which provide a certain level of privacy due to their low interaction potential (Table 3). This pattern of architecture provides a setting for controlled encounters between the inhabitants of the house, while limiting random uncontrolled ones; meaning that the house emphasizes the individual identity while downplaying its household one.

On the external level, the house is accessed through a long corridor (space 1), although it is considered as one space its length definitely plays a role in making the house less hospitable to strangers, who have to travel a relatively long distance before reaching the inhabitant's domain. These two spaces (1 and 3) along with space 2 that served as a service room were highly accessible to strangers, but as we just specified, spaces 1 and 3 are only transitional spaces that guide the stranger into the house and act as protective spaces. The most interactive space locally (space 5) has only moderate

stranger interaction, and is also surrounded by low stranger interaction zones (spaces 6, 7, and 8) (Fig. 15). What this means is that the house had a week external network, due to the fact that a stranger needs to cross so many spaces in order to reach the inhabitants domain, which by that stage consists of moderate and low interaction zones.

2. Houses of Antioch

Antioch, the capital of Syria, the most important province in the Eastern Empire also presents several examples of domestic architecture. Although the city was highly hellenised, its elite houses presented several Hellenistic features mixed with some Roman ones.

Although Antioch was excavated for the better part of sixty years, not a lot is known about its houses, due to a combination of excavation techniques in the early 1900s, and high levels of erosion, many of the houses were not accurately planned. Many walls, doors, and other features are purely based on educated guesses of the excavators (Dobbins 2000, 51).

One of the most important examples of Antiochene houses is the House of the Drinking Contest (Fig. 16). Named after one of the mosaics in the *triclinium* representing a drinking contest between Dionysus and Heracles, the house is one rare example of a completely preserved structure which allows us to conduct an access analysis of its plan. The House of the Drinking Contest illustrates one of the important Antiochene house features, which is the direct visual relation between the *triclinium* (Space 8), *portico* (Space 7), and *nymphaeum* (Space 6). The *triclinium* (Space 8) seems to be the most important space in the house; at least when it comes to welcoming guests.

It is lavishly decorated and has a direct view of the *nymphaeum* (Space 6) (Fig. 18). The plan of the house shows that it is aligned around a long corridor (Space 2) which controls access to most of the spaces; this is evident by its high control value of 4.83, the highest in the house **(**Table 4)**.** The corridor gives direct access to six of the house's compartments (Fig. 17) as is shown in its access map; of which are the two spaces 11 and 12, as well as the important *nymphaeum* courtyard (Space 6) and the *portico* (Space 7) that leads into the *triclinium* (Space 8). It is important to note that the *portico* and the *triclinium* (Spaces 7 and 8) are highly connected since the *portico* is decorated with a mosaic carpet with scenes oriented towards the *triclinium* which means that they are meant to be admired by the people reclining in the *triclinium* (Dobbins 2000, 54). Spaces 3, 5, 13 and 14 are thought to be service rooms.

We have already established that the *triclinium* is the most important room of the house; however, it was by no means the center of interaction. Instead, by looking at the interaction maps (Fig. 18), Space 8 has low interaction potential on all levels. Instead the space with the highest interaction potential is the corridor (Space 2); however, since it is a transitional space it is very unlikely that it was the space that incubated all the interactions between the inhabitants. This space was surrounded by a lot of spaces with low local interaction potential (e.g. Spaces 11, 12, and 13). This type of architecture as we discussed earlier encourages controlled interactions. In other words, the inhabitants have a say with whom to interact, and these small spaces were designed to guarantee privacy and intimacy Instead, it seems that the courtyard (Space 6) which has a high global interaction potential was the most likely location of interactions in the house. On the other hand, the *triclinium*, the most important space in

the house has the lowest interaction potential; this means that the room was rarely used in day to day life, and was reserved for the most prestigious guests.

On the external level, space 8 has a low interaction potential with strangers due to its deep position in the house **(**Table 4**),** this means that the most important room was not really accessible to strangers except with the guidance of the residents of the house, which gives total control to the house's residence to choose who gets to access that important space. Space 1 on the other can be considered as a 'protective space'. This passageway helps regulates and protects from the encroachments of strangers into the domain of the inhabitants that is located around space 2. However, even with the presence of this 'protective space', the majority of the house is still considered to be highly accessible to strangers, which means that the external relations were indeed strong, but despite that, the house's plan still gave the inhabitants some control over their guests which is materialized by the deep location of the *triclinium* (space 8).

Having analysed a few examples of the houses in the East, we move on now to look at some selected houses in the West, mainly houses in the cities of Cosa and Pompeii in Italy where complete house plans are more abundantly available. I have limited my analysis to only three houses from the insula of the House of the Fountains in Beirut, and one single house in Antioch primarily due to the scarcity of evidence, and the lack of complete house plans in both sites. As mentioned before, in order for access analysis to be efficient, one requires a complete house plan with the all the access points clearly defined. Otherwise, the integrity of the analysis becomes questionable. For this particular reason, only a limited number of houses were chosen, those which had clear plans outlining the access points, thus enabling us to apply access analysis with a certain level of trust.

B. Houses in the West

1. Houses of Cosa

Cosa was an important republican colony in Italy, founded in 273 BCE in the territory of the Etruscan city of Vulci. Its importance lies in the fact that it provides vital information on the houses and their development from small urban dwellings into atrium houses in the late 1st c BCE and 1st and 2nd centuries CE (Bruno and Scott 1993, iii). We can recognize two categories of Cosan houses, those of the first century BCE and those of the Augustan period.

a. House of the Treasure

The house of the Treasure is one of the houses that was occupied in the 1st c. BCE, and was modified a couple of times throughout its occupation (Fig. 19). It came to be known as the House of the Treasure due to the discovery of a hoard of 2,004 denarii in 1966, carefully buried in a jar beneath the pantry floor which dated the structure to the end of the Republican period (Bruno and Scott 1993, 79). Other finds, more specifically two black glazed vessels – one is the bottom of a locally made plate, the other a pyxis in Campana B – found in the yard of the house have the abbreviation of Q. FVL scratched on their bottoms. These finds tell us that the House of the Treasure is also the House of Quintus Fulvius (Bruno and Scott 1993, 80).

The structure underwent some remodelling work transforming its plan during the 1st c. BCE. The elongated space to the East of the entrance was first of all enlarged

by taking up space from an adjacent court; in addition it was divided into three separate small utility rooms (spaces 8/9/10). The location of a stove in space 8 gives away its function as a kitchen which leads into both spaces 9 and 10. Space 9 is the one closest to the drain system and was used as a bathroom while the small space 10 was used as a pantry. Two small rooms in the back of the house were swept away to expand the main courtyard while two more spaces were joined together to form what was most likely a suite and an adjacent bedroom (space 4). The back courtyard was divided by a wall that gave access into the work yard (space 11) which became the most private space of the house according to the its depth from the exterior (Fig. 21) (Bruno and Scott 1993, 86). The house appears to be divided into two – almost – equal parts; one north western part, while another one occupies the south eastern end of the house. This is most evident while looking at the stranger interaction map (Fig. 21) where the north western parts have higher interaction potential than the more private south eastern areas (Fig. 21). Its access map is represented in Fig. 20.

Looking at the plan of the house, we can see that spaces 2 and 7 are the largest; and incidentally when looking at the local interaction map, the first has a high local interaction potential while the second has a moderate one. But we must not forget to mention the presence of another zone of high interaction, which is space 8 that corresponds to the kitchen (Bruno and Scott 1993, 86); this small space has a high interaction potential as it is very likely that a lot of the activities in the private quarters were centered on food production. The presence of two large open spaces with high and moderate local interaction potentials is in contrast to the houses in the east where the only zones of high local interaction potential are small narrow corridors. These large spaces constantly direct inhabitants towards them and create an environment to bring

people together meaning that the household identity is indeed strong (Grahame 2000, 75). These high interaction spaces were always surrounded by spaces of low interaction (spaces 3, 4, 5, 6, 9, 10, and 11). These spaces were used for more intimate and private meetings between inhabitants; which means that although the house has a strong household identity, its individual identity is not completely overlooked due to the presence of these private spaces. So technically, this house has a strong household identity, as well as a strong individual identity.

When it comes to external connections, we can clearly see that the house is divided into two parts, the north western stranger friendly part, and the north eastern more secluded area. However, at first we have to look at how the strangers and the inhabitants interacted. It is clear that the architecture is deployed to guarantee a somewhat strong relationship between the inhabitants and the strangers, as there is only one 'protective space' between the exterior and the most interactive space locally (space 2 located at a depth of 2 from the exterior (Fig. 20). This means that had an easy access to the domain of the inhabitants indicating that the relation with the exterior was somewhat strong. However, we cannot neglect the fact that space 7, which is the large moderately interactive space (locally) is highly inaccessible by strangers; which highlights the fact that the house is actually divided into two parts, one that can be easily accessed by strangers and thus has a strong external connection, and an inner part that has a weak external connection that was probably the more private area where only really close visitors were allowed/guided in. The house was also characterized by weak internal connection as well.

b. House of the Skeleton

The other house I am analysing at Cosa dates from the first half of the 1st c. BCE, this being the House of the Skeleton. It gets its name from the skeletal remains of a human that were found in one of its cisterns. The body was thrown in the cistern in antiquity after the house fell into disuse. The house went through different phases of construction starting with the simple design of arranging utility spaces - around an *atrium* (Room 2)(Figs. 22 and 24/5), moving to a more intricate design where the *triclinium* (space 8) and the *exedra aestival* (space 7) were reconstructed in different proportions and both opened to a newly added garden. The house plan moved from a central one around the *atrium* towards an axial one (Bruno and Scott 1993, 138). The third phase of the house included the addition of a couple of utility rooms (spaces 16 and 17) as well as an entrance at the back of the garden which radically alters the house's access map (Fig. 23).

Although the house had two entrances (Fig. 22), the one to the north leading to the atrium is considered to be the main one. Since the local interaction map shows that the atrium (space 2) is the most interactive space, while the spaces next to the south entrance have low to moderate interaction potential; this means that the residents of the house are more likely to be present in and around space 2, than around spaces 15, 16, and 17. Having said that, it seems logical that guests would access the house from the place closer to the presence of its residence (i.e. the northern entrance), while the southern entrance was probably used by the house residence themselves or for services. This is also reinforced by the fact that the global map pinpoints that areas to the north of the house are the ones having the highest interactions, while the ones to the south have low interaction potential.

The house is controlled by a single space, the *atrium* (space 2) with a control value of 7.25; this is also the most interactive space on all the levels and is the central feature of the house. Around space 2 scatters the service rooms and other smaller spaces that were used in daily life, along with the *triclinium* (space 8). Clearly, we can see that the most interactive space is the very large, open – *atrium* – and designed to generate interaction in a non-restrictive space between the inhabitants who will be constantly directed towards it whenever they move around the house. The small spaces around the *atrium* (spaces 3, 4, 6, 8, 9, 10, 11, and 12) provide the inhabitants with some secluded space and thus increase the individual identity of the inhabitants. Another major room which is the *tablinum*, space 7, is considered as a moderate interaction space, and was usually used by the house owner as his study area (Johnson 1957, 76-77). Its moderate interaction potential highlights the fact that the head of the family at this house was relatively accessible by the rest of its members, and the *pater familias* was able to keep tabs on the interactions inside the house from his 'office'. So what we can say is that the house had a strong household identity emphasized by the high local interaction potential of its *atrium*, but also has a high individual identity due to the small low interactive spaces around that *atrium* capable of generating private and intimate interactions between the inhabitants. This means that the house has strong household and individual identities.

On the external level, we can clearly see that space 1 represents a small 'protective space' in the form of a small passageway (Fig. 24). However, it directly leads into the *atrium* which we just established is the most locally interactive space of the house, around which are spread a series of spaces of moderate stranger interaction potential. In addition, we have another entrance to the house from the north western

side, which opens up directly onto spaces 16, 17, and 15 (garden) that are highly interactive spaces for strangers. This house is highly accessible to strangers, and due to the ease of access to the inhabitants' domain, we can conclude that it has a strong external network. Only three spaces of low interaction potential (Spaces 4, 8, and 13) exist. The low interaction potential of space 8 is important; this space is a *triclinium*, where traditionally guests would be entertained. However, placing it at a high depth (Fig. 23) and making it a low interaction zone for strangers could be one of the ways for the residents of the house to keep a little bit of control over their visitors; this is reminiscent of the House of the Drinking Contest in Antioch (Fig. 18). This feature repeats itself in the house of the birds as well. In addition, it is most likely that only a select group of guests were allowed into the *triclinium*, while the rest of the regular guests must have only had access to the *atrium* and the *tablinum*. This could be an indication that inhabitants of the house put a lot of importance on the entertainment of their guests, and had a hierarchy of guests.

c. House of the birds

In the Augustan period the town was revitalized with some major construction works taking place during that time. The temple on the arx was rebuilt and the forum was put back in use, the same goes for the forum, new houses emerged along the way leading to the forum indicating the revitalization of the town life. The House of the Birds is one of those houses that were built on top of the remains of several older Republican ones (Bruno and Scott 1993, 161-2). Whenever possible, the new houses would use the foundation, or sometimes the remains of the old Republican houses. The

house of the birds does in fact use several walls of the older republican building block as its outside walls. The access map of the House of the Birds is represented in Fig. 27.

Looking at the plan of the house we can deduce that it was basically divided into two main parts (Fig. 26); a south-western and a north-eastern one with each having its own *atrium*. The north eastern part is composed of relatively larger rooms around an *atrium* (space 25); this is the part closer to the house entrance. The second north western edge of the building is composed of smaller rooms around a relatively small, elongated secondary *atrium* (space 12) and corridor (space 15). It is clear however that the division into two main parts is not a coincidence, but a deliberate act reminiscent of the Pompeiian houses (i.e. House of the Menander) where the structure was divided between family and service areas. In the case of the House of the Birds, the south western section was the service area due to a remarkable lack of decoration and apparent lack of maintenance of floors, whether old or new. This is contrasted in the north eastern section of the house (Bruno and Scott 1993, 184). Checking the plan of the house we can see that a large *atrium* (space 25) leads into the main *tablinum* (space 5). The *atrium* also leads into space 6, to the north east of the tablinum which is believed to be the master bedroom. Space 6 is divided into two – most likely – unseparated parts; the outer one must have been the antechamber while the inner part must have been the bedchamber proper (Bruno and Scott 1993, 173). In addition, other small rooms flank the atrium's entrance (spaces 2 and 3) while a *cubiculium* and an *ala* are located on its south-western side. To the west of the *tablinum* is located a corridor that leads directly to a large *triclinium* (Bruno and Scott 1993, 173). The south western section of the house has a secondary *atrium* (space 12) with an *impluvium* (sunken part in the *atrium* designed to collect rain water) similar to the one in room 25. However, this one is

located to the western edge of the *atrium*, right next to the walls of rooms 24 and 14. This *atrium* led to several small rooms (rooms 13, 14, 20, 21, 22, 23, 24, and 26) as well as to the kitchen (room 14) which by itself led into the bathroom (space 18 and 19) (Bruno and Scott 1993, 181-4).

Let us start by looking at the north eastern section of the house first. On the local level, it is clearly obvious that the most dominant and interactive space is the *atrium* (space 25) itself (Table 5). This is the largest space in the house, being surrounded by smaller compartments, it encourages interaction and draws the inhabitants to meet in that space; thus encouraging encounters that bring people together, and solidifying the household identity. The north western part of the house is centred on an elongated secondary *atrium* and a corridor; however, the secondary *atrium* is also reminiscent of a corridor with an added *impluvium*; in other words, both the secondary *atrium* (space 12) and the corridor (space 15) are not really meant to generate and foster encounters between the inhabitants, but are there to help the inhabitants circulate between the other low interaction rooms scattered around these two spaces. It is in these low interaction rooms (spaces 13, 14, 16, 17, 20, 21, 22, 23, 26, and 27) that the inhabitants most likely met in the private and secure settings, reinforcing the individual identity of the inhabitants (Fig. 28). With that being said, we can deduce that the house had a strong household identity in its more public area; the north eastern part, and a stronger individual identity in its north western part.

On the external level, we can clearly see the major separation of the house in two, with zones of high interaction concentrated in the north eastern parts of the house and zones of low interaction, or in other words, where visitors/strangers were not allowed to access easily without the guidance of a resident in the other part. We know

that the house is entered from one main entrance leading to space 1, which is the only 'protective space' preventing strangers from reaching the primary *atrium* (space 25) – the most interactive area locally. All of the small spaces around the primary *atrium*, including the *tablinum* (space 5) and the *triclinium* (space 9) are moderately accessible to strangers, which means that this section of the house is relatively welcoming. On the other hand, as we move to the north western section, we see that all the small spaces lining up the secondary *atrium* and the corridor have low interaction potential and as a result were out of reach of strangers. It is interesting however to note that the *triclinium*; usually isolated in the previous house examples is moderately accessible in this house; this can be due to the fact that the inhabitants already control a large chunk of the house (the north western part) and thus do not need to emphasize their control when it comes to the *triclinium* (Fig. 28). The house has a strong external connection due to the fact that its main atrium is easily accessible from the exterior; but its internal regions are more secluded from the exterior and thus constitute a zone of weak external connection; this further highlights the fact that the house is really divided into two.

This house shows a clear separation of private and public sections as was demonstrated above; however, it is also interesting to notice that the guest facilities (*triclinium* and *tablinum*) fall within the moderate interaction zone rather than the low interaction zone; which makes it easier for the guest to reach those spaces. This might be an indication that guest entertainment was more important, or at that the house owners expected more guests?! This is important because it is a change from the earlier designs where the guest rooms were mostly located in low interaction zones.

2. Houses of Pompeii

When studying Roman houses, it is almost imperative that we include Pompeii. The city was buried under the ashes of Mount Vesuvius on the 24th of August 79 CE which preserved its architecture making it the most complete example of Roman urbanism to survive until today (Descoeudres 2007, 18). However, in this study we will include only a couple of houses from Pompeii that cover the wide array of designs present in the settlement. This is important in order to have a balanced house pool of traditional early Roman Italian houses to which we can compare the houses of the East to (non-courtyard houses, single courtyard houses, double courtyard houses).

The non-courtyard houses are usually the smallest and characterized by a corridor that allows circulation to several rooms that are laid around it. For this purpose, I am going to use Building VI-xv-22 (Fig. 29). Single courtyard houses are relatively larger and are usually controlled by the *atrium* that had a central location giving it an interaction potential higher than the rest of the house's spaces. This type of house is very common, so two examples will be used. The first being VI-xv-9 (Fig. 32) and the second one the slightly larger VI-vii-4-6 (Fig. 35). The last category consists of double courtyard houses, from which we will take one example. These houses are very large, and thus have multiple controlling areas; only one example of these houses will be used in my research, house VI ii-17-20 (Fig. 38).

a. House VI-xv-22

House VI-xv-22 is one of the non-courtyard houses of Pompeii – its access map represented in Fig. 30 – and could be compared to some of the houses in the East. The house is centred on a long corridor (composed of 3 spaces: 1, 3, and 6); space 3

however is the most controlling space in the house, and as a consequence is considered the most interactive space locally. However, being a transitional space (corridor) it is unlikely that interactions were centred in this space per se, but instead space 3 would have facilitated gathering in the adjacent rooms, and acted as the house's center of gravity (Grahame 2000, 61). This means that spaces 2, 4, and 6 were the location of more controlled encounters between the inhabitants despite their low local interaction potential (Table 10).

Externally, we can see that in this case there is no 'protective space', but the doorway leads directly into parts of the main corridor, which means that the house has a really strong external network. Due to its size, most of the rooms are also accessible to strangers (except space 7) (Fig. 31).

b. House VI-xv-9 and House VI-vii-4-6

Both Houses VI-xv-9 (Fig. 32) and VI-vii-4-6 (Fig. 35) are single courtyard houses from Pompeii and they both share a similar plan (even though they are not of the same size), as well as closely similar interaction potential maps; for that reason I have decided to discuss both of these cases at the same time to avoid repetition. Figure 32 represents the access map of house VI-xv-9 while Fig. 35 represents the access map of house VI-vii-4-6.

On the local level, the *atrium* (space 2/VI-xv-9 and space 4/VI-vii-4-9) is the only space with high local interaction potential (Tables 11-13). As already mentioned in the previous examples, the *atrium* covers a rather spacious area and the house's inhabitants will be drawn to it due to its accessibility. This will ensure that they will

encounter other inhabitants in that space; the frequency of these interactions in the *atrium* will help generate a collective identity, or in other words a strong household identity. Around these two *atria* are located several rooms with low local interaction potential. These are the spaces that can generate structured or predictable patterns of interaction where inhabitants can choose who to interact with within a secluded and private setting of these small spaces (Figures 34 and 37). These rooms highlight the individual identity of the house.

On the external level, both of the houses have a relatively strong external network with only one 'protective space' separating the *atria* from the exterior (space 1 in both houses). This means that strangers had an easy access into the house and its components with only a small part deep in the house considered off limits (space 8/VI-xv-9 and spaces 16, 17, and 18/VI-vii-4-9). These spaces were relatively small and most likely used as service spaces which might indicate their low level of stranger interaction since visitors are meant to go around the service areas. The fact that most of the rooms around the *atria* in both houses are highly or moderately interactive means that the houses were both open to the public, and expected to have guests and visitors penetrating their perimeter on a regular basis (Fig. 34 and 37). This means that both houses have a strong external connection.

c. House VI-ii-17-20

House VI-ii-17-20 represents a different layout (Fig. 38), this time with multiple courtyards instead of a single one. A quick look at the access map (Fig. 39) shows that the house is divided into two branches controlled by two main spaces, 2 and

18, which are logically the two courtyards. Space 2 however is the most controlling overall (X=8.16) and represents the main *atrium* while space 18 (X=3.58) represents the secondary *atrium* (Tables 14 and 15). The fact that space 18 has a moderate interaction potential locally compared to a high interaction potential for space 2 means that the area around the secondary *atrium* must have been more private while the spaces around the primary *atrium* were more public. Around both *atria* cluster a series of service rooms, as well as *triclinia* (spaces 6 around the main *atrium* and 'possibly' 21 around the secondary one) while a narrow corridor (spaces 7 and 16) connects both parts of the house together. Since the house has two entrances, then strangers have two access points to the house; looking at the stranger interaction map shows that the areas adjacent to the entrances (i.e. 1 and 2 on one hand, and 22 and 18 on the other) all have high interaction potential. The narrow spaces (1 and 22) are used as buffers before allowing the guests to enter the main reception area (Fig. 40). However, we can say that the entrance closest to space 2 was the main entrance since it is located closest to the area with the highest local interaction potential; while the entrance closest to the space 18 can be considered as a secondary entrance used by the residence of the house and close guests.

From the local interaction pattern we can notice that the *atria* were more interactive than the rest of the spaces. Both *atria* (spaces 2 and 18) represent spaces with high local interaction. Due to the size of these interactive spaces, we can be sure that they were the settings from unstructured encounters between the inhabitants who were constantly drawn to them; these encounters will result in enhancing the household identity. The smaller rooms to the side of the *atria* are the settings from structures, controlled encounters where the inhabitants are able to choose who to interact with, thus

enhancing the individual identity of the house. Both *atria* of the house generate the same interaction potential pattern around them (Fig. 40).

On the external level, the house has two entrances. One leading to the main *atrium* and another to the secondary one, in both cases we can locate a single 'protective space' separating the exterior from the *atrium* (spaces 1 and 22). The ease of access to the inhabitant's domain, be it primary or secondary, means that the house has a strong external connection. Most of the private spaces around the *atria* are moderately accessible to strangers; while only a small number of rooms had low stranger interaction potential. Around the primary *atrium* we see that the *tablinum* (space 6) is moderately interactive, which in a way means that it was not very private when it comes to strangers. This could mean that the *tablinum* was indeed the location where the *pater familias* met his ordinary guests while the more private *triclinium* (space 17) was reserved for more important guests who were guided there by the inhabitants themselves. The area around the secondary *atrium* is all moderately accessible due to location close to the secondary entrance (Fig. 40). This is logical however, since the whole area is only accessible by either the inhabitants or special guests who have permission to enter through the secondary door. So there is technically no need to have zones of low interaction around the secondary *atrium*.

CHAPTER V

INTERPRETATION AND CONCLUSION

The previous chapter discussed in detail the plans of the houses, as well as the significance of their spatial distribution based on access analysis. This chapter will follow up on the analyses of the houses in order to better understand the differences and similarities of their spatial designs. My interpretation of the previous chapter results will be presented in a thematic discussion based on the different architectural features of the houses in question.

The first part of the interpretation will focus on the entrances of the houses; this is the first thing that strangers encounter entering the domain of the house, so it seems fitting to start by analysing that part of the house. We should also take into consideration the line of sight from the entrance, which in other words, reveals what can be seen by the outsider before even stepping into the building. It was common in the Vitruvian houses to have a direct line of sight from the doorway all the way into the heart of the residence (Wallace-Hadrill 1994, 44).

Let us start by looking at the houses of Beirut. Buildings 4a and 4e (Fig. 9) are both entered through street facing shops; this mode of entrance means that almost nothing of the house's interior is exposed to the outside. The third house investigated in

Beirut is building 4f (Fig. 9); although this building is not entered from a shop, it still has a long and narrow entranceway with a dead end, in other words, the passers-by in the street cannot see anything inside the house due to the lack of a direct line of sight into the main living quarters. In addition, the presence of two protective spaces in buildings 4a and 4e means that these houses had a really weak external network. The same goes for house 4f, which even though it had only one protective space, its long deep shape makes it a really difficult space to penetrate for strangers, which gives the house a weak external network. The last house investigated in the Eastern part of the empire is the House of the Drinking Contest in Antioch (Fig. 16). This house however presents some differences from the houses of Beirut. With one small protective space, it seems more welcoming towards guests; in addition, a clear line of sight can be seen from the entrance to the most interactive local spaces, as well as all the way to the *triclinium*. This might indicate that a little bit more attention was directed to guests in the House of the Drinking Contest than to guests in Beirut, and would indicate that the inhabitants of the former house valued their public image more than the inhabitants of the houses of Beirut. This should not come as a major surprise to us since the House of the Drinking Contest is considered an elite residence and its inhabitants most likely played an important role in Antiochene public life. In contrast, according to Perring, Reynolds, and Thorpe (2003, 204), the houses of Beirut were most likely occupied by veterans who were not necessarily involved in public affairs in Beirut; at least not during the early empire. However, the results of the access analysis conducted in this research clearly show that the social structure of the houses of Beirut is totally different from the ones in Italy, which would lead us to think that the occupants of these could have been the original inhabitants of Beirut.

In Italy, houses presented a different design when it comes to entrances and accessibility. Starting with the houses of Cosa, we can see that in all three Cosan houses, access to the main local interaction area is through a single small protective space. The Pompeian houses (in this study), with the exception of house VI-xv-22 (Fig. 29), are all *atrium* houses. In all cases the visitors had to cross one single protective space in order to reach the most interactive space locally, the *atrium*. In addition, passers-by could peek into the atrium and sometimes as far as the *tablinum* and *triclinium* from the street, in other words, they had visual access into the most interactive spaces of the houses from the exterior which indicates that the houses were in fact open to strangers. This simple fact indicates that the houses of Italy in question in this research have a stronger external relation than their Eastern counterparts.

We now know that the houses of Beirut were well hidden from the passers-by in the adjacent street; a tradition well documented in Greek houses according to Lisa Nevett (2010, 83) where the interior of the houses were screened off from the public, only intended to be seen by the inhabitants and the guests once they have been invited inside. In Antioch, the House of the Drinking Contest is a little bit more open when it comes to the presence of a clear line of sight from the entrance to the inside of the house. This clear openness of the private domain to the public is present in all of the Italian houses in this study; this indicates that the inhabitants of the house seem to be more affected by the Roman tradition which is more accepting of opening up one's house to the public.

What this openness indicates is that the inhabitants of the houses in the west invested more in public imagery. They were more inclined to project glimpses of their interior decoration towards the outside of the house via a careful spatial layout, and

were generally more welcome to guests. These inhabitants did not consider their houses to be entirely private. Even though there are some private parts in the western houses that cannot be accessed or seen by anyone, we can see that they invested a lot in showcasing their houses to the passers-by, a feature that is missing from the houses of Beirut, and to some extent in the House of the Drinking Contest in Antioch, where the house design clearly did not fulfil this function; instead these houses only showcased their designs to guests who have been already welcomed in, which reinforces the idea that the inhabitants of the houses of Beirut appreciated privacy more than their western counterparts.

A. Guest Reception

When it comes to receiving guests, Wallace-Hadrill (1994, 58) makes it clear that the Vitruvian house design, with the combination of *atrium, tablinum, triclinium,* and *cubiculum* is best suited to serve the needs of the *pater familias*. The guests are received in appropriate rooms according to the level of their importance to the *pater familias*. Normal clients would generally be received together in the *atrium* or in the *tablinum*, more important guests would be received and entertained in smaller groups in the usually highly decorated *triclinium,* and finally the most intimate friends of the *pater familias* would be received in the more private space of a *cubiculum*, which were traditionally believed to be used solely as bedrooms, but recent findings indicates that they could was also be used for other activities (Allison 2004, 11). Having said this, we can try and search for resemblances and differences of this pattern by looking at the stranger interaction maps of the houses in question.

Starting with the houses of Pompeii, we can see this pattern fits the designs of 3 out of the four houses analysed. House VI-xv-22 (Fig. 29) (non-courtyard house) is the only one that does not present a pattern similar to the one described above; its architecture does not include a larger space where people could gather. Instead, its spaces are small, connected all together by one single hallway (consisting of three spaces, space 1, 3, and 6). The lack of large spaces in the house leads us to believe that the owners did not have the intention to receive large groups of guests at a time; instead, the strangers who cross the threshold at the entrance gain access to most of the spaces of the house, since all but space 7 are high to moderately accessible by strangers. Having said this, the owners of the house must have entertained guests in smaller groups, in the small accessible rooms, while the most private space (space 7) could have been used for more intimate meetings, where the inhabitants and the guests are assured privacy.

The Pompeiian houses with courtyards (Houses VI-xv-9, VI-vii-4-6, and VI-ii-17-20 [multiple courtyards]) present a clear pattern that fits with Wallace-Hadrill's interpretation. Houses VI-vx-9 and VI-vii-4-6 (Fig. 32 and 35) both have a single *atrium* which would be ideal to house a large group of visitors together waiting to meet their patron. This *atrium* is always characterized by being a zone of high interaction on the local and external levels, indicating that strangers gained access easily, this is also reinforced by the fact that passers-by had a clear view from the street into the *atrium*. Once in, the guests were initially received in the *atrium*, the more important the guests were the more they were allowed to wander into more private areas of the house where intimacy was secure due to the layout of the house, as well as the smaller size of the rooms which guaranteed the privacy of the encounter. The *tablinum* and *triclinium* in both houses had moderate interaction potential where more important guests would be

allowed, and finally, the *cubicula* around the *atrium* would be the setting for private meetings with more intimate guests; these spaces were the ones with the lowest control values in the house, which ensured that they are the spaces with the lowest local interaction potential (House VI-xv-9/Space3-6: 0.166 – House VI-vii-4-6/Space7-13: 0.0833), and thus ensures the privacy of the meeting. House VI-ii-17-20 (Fig. 38) presents a similar layout in its main *atrium* (space 2) to the ones mentioned above; however, a different layout emerges in its secondary *atrium* (space 18). Space 18 is already accessed through a secondary door that was probably used by the inhabitants and intimate guests but not by the common guest. The secondary nature of space 18 means that the spaces around it were in fact more private, which is showcased by the fact that they are all spaces of low interaction globally. As a conclusion, it means that the people entering through the secondary door step directly into the realm of the private household and would be technically admitted into a more secluded space than all the normal guests who wander through the main entrance into the more interactive space of the main *atrium* that does not provide privacy.

A similar pattern can be detected in the houses of Cosa. The entrances of all three Cosan houses in question (House of the Treasures, House of the Birds, and the House of the Skeleton) (Fig. 19, 26, and 22 respectively) in this research directly lead to a large and open space, capable of admitting guests in large numbers. Around these spaces scatter more secluded spaces, such as space 4 in the House of the Treasures, spaces 3, 6, 9, 10, 11, and 12 in the House of the Skeletons, and spaces 2, 3, 4, 5, 6, and 10 in the House of the Birds. So in other words, the hierarchy of guest reception is preserved in the Cosan houses with the *pater familias* deciding who and where to receive his guests after they enter the house.

In the East however, this is not absolutely clear. The first major difference we can see in the designs of the houses in Beirut and Antioch is the different placing of the open space. In the House of the Drinking Contest (Fig. 16), the open colonnaded space (space 6) is deeper in the house than its counterparts in Italy (at a depth of 3 instead of 2), meaning that strangers did not have such an easy access to it, a fact that is further reinforced by the fact that it has a moderate interaction potential when it comes to strangers while the *atria* in the Italian houses always had high interaction potential. In addition, on the local level, the open space in the House of the Drinking Contest has a low interaction potential as opposed to the open spaces in the Italian houses which were always zones of high local interaction. In the case of the House of the Drinking Contest, we can deduce that the inhabitants of the house were reluctant to allow any stranger into their spaces even though we deduced earlier that they were more accepting of guests than the houses of Beirut. Once guests are in the house, the inhabitants guided them into the receiving areas which were not so accessible from a stranger's point of view. In addition, we know that the *triclinium* (space 8) is one of the deepest spaces in this house, thus only the trusted (and/or worthy) guests were welcomed there according to the inhabitant's wishes.

Although the House of the Drinking Contest presents itself as reserved when it comes to welcoming guests; the houses of Beirut present clearer signs of 'guest exclusion'; or in other words, they were less welcoming to guests and visitors. The open areas in the three houses (4a/space 8, 4e/space 6, and 4f/space 6) are located very deep, and are in all cases highly inaccessible to guests. This is the first sign that these open areas were not used in the same way as the ones in the Italian houses. It is probable that guests were rarely allowed in these open spaces which were considered private; those

who were most likely escorted there by the inhabitants themselves. In addition, the *triclinia* in these houses (4a/space 7, 4e/space 5, and 4f/space 8) are also located deep in zones of low interaction potential both locally and externally, which is not the case in all the Italian houses. The architectural placement of these 'guest appropriate' spaces deep in the house, as well as the difficulty of access into these houses leads us to believe that the inhabitants of these houses perhaps did not have a large clientele of guests, instead, social relations were restricted to small groups of intimate friends who would be welcomed to the deepest spaces of the house due to their intimate relations with the inhabitants.

B. Local Level

Having discussed guest receptions, we move on to the local interactions inside the houses. In Chapter IV we discussed the most interactive spaces of the houses in question, looking back at the results we can see that the most interactive local spaces in the Eastern houses were narrow hallways that connect rooms together, while on the other hand, in the Italian houses, the most interactive local spaces were the *atria* and the open spaces around which cluster smaller more private rooms. The fact that the most interactive spaces locally are situated in different areas in the eastern and western houses indicates a fundamental difference in the social behaviour of their inhabitants.

The plans of the houses in the east are optimized to create a structured pattern of interaction. In the plans of these houses, the most interactive spaces are long and narrow corridors, in other words, non-collective spaces that generate predictable interaction patterns in the small spaces that usually surround them (e.g. Small Spaces 4,

5, 7, and 8 around the non-collective spaces (corridors) 3 and 6 in House 4a in Beirut). So in other words, this architectural pattern enables individuals to socialize with selected others in the confines of the small low interaction rooms where privacy is guaranteed (Grahame 2000, 75). This pattern of architecture is present in all the eastern houses examined in this research since we lack the presence of large highly interactive zones that can enable uncontrolled encounters between the inhabitants. This means that the houses studied in the East emphasized the individual identity of their inhabitants more than their collective ones. On the other hand, we cannot neglect the effects that size has on the interaction patterns in buildings. The sizes of the Beirut houses vary between 6 and 8 spaces, while the one in Antioch is a little bit larger at 14 spaces. These are relatively small houses compared to some of the Italian houses in this research that reach up to 27 spaces (House of the Birds in Cosa). The relative small size of the houses in question helps in creating a weak household identity, since in small houses inhabitants are more prone to meet in uncontrolled spaces from time to time, which creates intimacy which, as was discussed earlier, strengthens the house's household identity (Grahame 2000, 74).

The Italian houses on the other hand present a distinctively different pattern of local interaction. As we have already established in Chapter IV, the spaces with the highest local interaction potential are always large, open areas (except in house VI-xv-22). The inhabitants of these houses will be constantly directed towards these large spaces that generate uncontrolled interactions; in other words, these large spaces increase the collectiveness of the society, which in that case is represented by the inhabitants of the house (Grahame 2000, 75). The increased collectiveness is analogous to a strong household identity. Around these open spaces cluster smaller spaces that

ensure controlled interaction, and thus privacy which increases the individual identity of the household. So in simple terms, the design of the Italian houses ensured both strong individual and collective identities.

C. Conclusion

What started as a search for the similarities between the houses of Italy and those of the colonists in Beirut turned out to generate more fundamental differences than similarities.

The houses of Beirut were designed on the basis of differentiating between public and private life, since we have established that the houses were seemingly not very welcoming of guests, the presence of *triclinia* indicates they probably entertained a small select group of guests. This is directly opposite to the Roman tradition of domestic architecture which promotes the integration of private and public life. In fact, the Roman house, as well as being the center of its owner's public life was at the same time a private space. People were at home not to seek shelter from the public eye as much as to present themselves to the public in the best possible way (Wallace-Hadrill 1988, 46). This is perfectly demonstrated by the exchange between Livius Drusus (*tribunus plebis* in 91 BCE) and his architect in charge of building his house. The architect promised him a house that is "completely private and free from being overlooked by anyone" to which Livius replied "No, you should apply your skills to arranging my house so that whatever I do should be visible to everybody" (Velleius Paterculus ii.14.3; Wallace-Hadrill 1988, 46). This is a fundamental difference as the inhabitant of the houses in Beirut were not in fact interested in entertaining large

number of guests as the design suggests. Instead, the fact that they have a weak external network indicates that the inhabitants of these houses were more interested in entertaining small groups of close guests in their *triclinia*. This means it is possible that the public image of the inhabitants was not a matter of great importance in Beirut as it was in Italy, which leads us to think that the patron/client relation was not prevalent or important enough in Beirut during its early colonial years since this relation relies heavily on public display which is totally absent in Beirut. On the other hand, the houses of Beirut could may well be the houses of the clients and not the patrons, which would mean that they did not need to display themselves to the public in the same manner as a patron; however, a complete study of the material from these houses is needed to better understand the nature of their inhabitants.

We also established that the spatial layout of the houses of Beirut in question promote individual identity on behalf of the household one which, in contrast, is very strong in the Italian houses. This conclusion can be a strong indicator of the presence of a different social order in the families inhabiting the houses in Beirut than those of the houses in Italy. We know that the family is a central element of Roman society; families are led by a *pater familias* who possessed authority over it, an authority known as the *patria potestas* (Dixon 1992, 4). The atrium house is designed in a way to project and strengthen the power of the *pater familias* over the rest of the household from the vantage point of his *tablinum*, which is reflected by the presence of a very strong household identity in these houses. By contrast, in the houses of the East, especially the ones in Beirut the household identity is weak, while the individual identity of the house was very strong; what this means is that the spatial layout of these houses tends to mark out each individual as a separate human being instead of bringing all the inhabitants

together as a household community (Grahame 2000, 74). This leads us to believe that even though we are within the territory of the colony, we have house structures that do not conform to the norm of the Italian houses where the *pater familias* is in control of the movement of the inhabitants and guests alike inside the house (Johnson 1957, 105-106). Instead, in the East individual identity plays a more important role. This means that the control traditionally held by the *pater familias* in the atrium houses is reduced, which leads us to believe that the family structure in the eastern houses, especially the houses of Beirut is different than the one in Italy.

In addition, the *atrium* was the space dedicated to showcasing the family's funerary masks for everyone to see (Hales 2003, 14), as well as being the specific space for performing many of the domestic rituals, such as being the place where the altar for Lucina (Goddess of childbirth) was set up when a baby was born, or where the corpse of a deceased was laid before being marched through the *forum* before being taken to the tomb outside the city boundaries. So the house in general was designed to showcase to the public the *Romanitas* of its inhabitants (Hales 2003, 3-4). The absence of *atria* in the eastern houses, more surprisingly from the ones in Beirut assuming they belong to Roman veterans (Perring, Reynolds, and Thorpe 2003, 204) means that the inhabitants of these houses did not base the design of their homes in order to reflect strict Roman customs. However, this difference in house design might also be due to necessity since open spaces in the city were in short supply, especially with the arrival of the Roman colonists. This might have pushed some people to design their houses in unorthodox ways. However, this does not explain the fact that whenever the houses had courtyards, they were placed in deep, private spaces in clear contrast to the ones in Italy. This leads

us to believe that multiple factors, including social behaviour lead to the design of the Beirut houses the way they are.

Having reached the conclusion of my research, we must address some of the shortcoming of this analysis method, as well as its strong points. This research has taken into account only the plans of the houses, never investigating the material finds from each space. However, based on ancient texts such as Vitruvius' *de architectura* or based on the material finds discovered in them since we already know that spaces had multiple functions. A fact argued by Penelope Allison (2004) investigating the functional use of the rooms in Pompeian households; the same issue was brought up by Lisa Nevett (2010) while investigating the material artifacts of several houses in Pompeii. The exclusion of the material finds from this research would increase its objectivity. In addition, the fact that some buildings might have had upper stories (e.g. House of the Skeletons in Cosa) which are now missing highlights a potential shortcoming of the access analysis method when applied to archaeological remains since it is practically impossible to come across a perfectly complete house structure. However, since my research focuses mainly on the guest reception in the selected houses, essentially a ground floor activity, then the absence of upper floors has minimal to no effect on the result of the access analysis.

Having looked at the houses built in the early empire, around the time of the establishment of the colony of Beirut, we need to reflect on the important questions presented at the start of the research. Were the houses of Beirut actually inhabited by Italian colonists? For the moment we can say that all these houses had Augustan material in their foundation deposits, meaning that they were indeed constructed initially during the Augustan period, in other words around the time of the foundation of

the colony. However, being constructed around the time of the foundation of the colony does not necessarily mean that the houses were inhabited by colonists; but evidence does point out to the fact that they were; for example *opus africanum* which was used in the construction of Hellenistic structures was retained throughout the Augustan period, but was absent from the new courtyard houses (buildings 4a, e, and f) which would suggest a new construction taste for the inhabitants of the new houses (Perring, Reynolds, and Thorpe 2003, 207), but this is not really a definite proof. Access analysis has indeed shown that the cultural and social taste of the inhabitants in Beirut was quite different from the inhabitants of the houses in Italy.

Before starting this research, I was hoping to find some similarities, cultural and social, between the houses in Italy and the colonial houses of Beirut, given that they are both occupied by Italians. However, by the end of this research, the results have proved to be the complete opposite which raises several questions. Were the houses of Beirut in question really occupied by Italian veterans as Perring suggests (Perring, Reynolds, and Thorpe 2003, 204)? Were the veterans Italians, were the inhabitants veterans in the first place? What is the similarity between these houses and the houses of other veterans across the empire? Was this simply the continuation of the Hellenistic housing tradition in Beirut? Obviously, more work needs to be completed regarding these subjects, and a more complete study that includes material culture from all the houses, as well as a wider group of buildings needs to be included in order to come to more solid conclusions. I believe that my research has shown that it is possible to come up with some cultural and social factors from simply looking at the plans of the houses.

Appendix

Building 4a - BEY 006 - Early Roman							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymetry (RRA)	
X0	0.5	MD0	3.375	RA0	0.679	RRA0	2.141
X1	1.5	MD1	2.625	RA1	0.464	RRA1	1.465
X2	0.7	MD2	1.875	RA2	0.25	RRA2	0.789
X3	3.33	MD3	1.5	RA3	0.143	RRA3	0.451
X4	0.2	MD4	2.375	RA4	0.393	RRA4	1.239
X5	0.2	MD5	2.375	RA5	0.393	RRA5	1.239
X6	1.7	MD6	2	RA6	0.286	RRA6	0.901
X7	0.33	MD7	2.875	RA7	0.536	RRA7	1.69
X8	0.53	MD8	2	RA8	0.286	RRA8	0.901

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 3	3.33	3.33	37	1	High
Cell 6	1.7	5.03	55.88888889	2	Moderate
Cell 1	1.5	6.53	72.55555556	3	Moderate
Cell 2	0.7	7.23	80.33333333	4	Low
Cell 8	0.53	7.76	86.22222222	5	Low
Cell 0	0.5	8.26	91.77777778	6	Low
Cell 7	0.33	8.59	95.44444444	7	Low
Cell 4	0.2	8.79	97.66666667	8	Low
Cell 5	0.2	8.99	99.88888889	9	Low

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 3	0.450653447	1	High
Cell 2	0.788643533	2	High
Cell 6	0.901306895	3	High
Cell 8	0.901306895	4	Moderate
Cell 4	1.239296981	5	Moderate
Cell 5	1.239296981	6	Moderate
Cell 1	1.464623704	7	Low
Cell 7	1.689950428	8	Low
Cell 0	2.140603876	9	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	2	High
Cell 3	3	Moderate
Cell 4	4	Moderate
Cell 5	4	Moderate
Cell 6	4	Moderate
Cell 8	4	Moderate
Cell 7	5	Low
Cell 0		

Table 1 - Beirut - House 4a Data

Building 4e - BEY 006 - Early Roman							
Control Values		Mean Depth (MD)		Relative Assymtery (RA)		Real Relative Assymetry (RRA)	
X0	1	MD0	2	RA0	0.4	RRA0	1.176
X1	0.75	MD1	1.66	RA1	0.264	RRA1	0.776
X2	0.83	MD2	1.83	RA2	0.332	RRA2	0.976
X3	1.25	MD3	1.5	RA3	0.2	RRA3	0.588
X4	2.33	MD4	1.33	RA4	0.132	RRA4	0.388
X5	0.25	MD5	2.16	RA5	0.464	RRA5	1.365
X6	0.583	MD6	1.83	RA6	0.332	RRA6	0.976

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 4	2.33	2.33	33.28571429	1	High
Cell 3	1.25	3.58	51.14285714	2	Moderate
Cell 0	1	4.58	65.42857143	3	Moderate
Cell 2	0.83	5.41	77.28571429	4	Low
Cell 1	0.75	6.16	88	5	Low
Cell 6	0.583	6.743	96.32857143	6	Low
Cell 5	0.25	6.993	99.9	7	Low

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 4	0.388235294	1	High
Cell 3	0.588235294	2	High
Cell 1	0.776470588	3	Moderate
Cell 2	0.976470588	4	Moderate
Cell 6	0.976470588	5	Moderate
Cell 0	1.176470588	6	Low
Cell 5	1.364705882	7	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	1	High
Cell 3	2	Moderate
Cell 4	2	Moderate
Cell 5	3	Low
Cell 6	3	Low
Cell 0		

Table 2 - Beirut - House 4e Data

Building 4f - BEY 006 - Early Roman							
Control Values		**Mean Depth (MD)**		**Relative Assymetry (RA)**		**Real Relative Assymetry (RRA)**	
X0	0.33	**MD0**	3.5	**RA0**	0.714	**RRA0**	2.253
X1	2.5	**MD1**	2.62	**RA1**	0.463	**RRA1**	1.46
X2	0.33	**MD2**	3.5	**RA2**	0.714	**RRA2**	2.253
X3	0.83	**MD3**	2.25	**RA3**	0.357	**RRA3**	1.127
X4	0.83	**MD4**	2.12	**RA4**	0.32	**RRA4**	1.009
X5	2	**MD5**	2.25	**RA5**	0.357	**RRA5**	1.127
X6	0.33	**MD6**	3.12	**RA6**	0.606	**RRA6**	1.911
X7	1.33	**MD7**	2.87	**RA7**	0.534	**RRA7**	1.685
X8	0.5	**MD8**	3.75	**RA8**	0.786	**RRA8**	2.479

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 1	2.5	2.5	27.77777778	1	High
Cell 5	2	4.5	50	2	High
Cell 7	1.33	5.83	64.77777778	3	Moderate
Cell 3	0.83	6.66	74	4	Low
Cell 4	0.83	7.49	83.22222222	5	Low
Cell 8	0.5	7.99	88.77777778	6	Low
Cell 0	0.33	8.32	92.44444444	7	Low
Cell 2	0.33	8.65	96.11111111	8	Low
Cell 6	0.33	8.98	99.77777778	9	Low

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 4	1.009463722	1	High
Cell 3	1.126633619	2	High
Cell 5	1.126633619	3	High
Cell 1	1.46011717	4	Moderate
Cell 7	1.685443894	5	Moderate
Cell 6	1.910770617	6	Moderate
Cell 0	2.253267237	7	Low
Cell 2	2.253267237	8	Low
Cell 8	2.478593961	9	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	2	High
Cell 3	2	High
Cell 4	3	Moderate
Cell 5	4	Moderate
Cell 6	5	Low
Cell 7	5	Low
Cell 8	6	Low
Cell 0		

Table 3 - Beirut - House 4f Data

House of the Drinking Contest							
Control Values		**Mean Depth (MD)**		**Relative Assymetry (RA)**		**Real Relative Assymetry (RRA)**	
X0	0.25	MD0	2.92	**RA0**	0.2954	**RRA0**	1.1405
X1	2.64	MD1	2	**RA1**	0.1538	**RRA1**	0.594
X2	4.83	MD2	1.57	**RA2**	0.0877	**RRA2**	0.3386
X3	0.75	MD3	2.71	**RA3**	0.2631	**RRA3**	1.0157
X4	0.83	MD4	2.57	**RA4**	0.2415	**RRA4**	0.9326
X5	0.14	MD5	2.5	**RA5**	0.2308	**RRA5**	0.891
X6	0.89	MD6	2	**RA6**	0.1538	**RRA6**	0.594
X7	1.97	MD7	1.92	**RA7**	0.1415	**RRA7**	0.5465
X8	0.25	MD8	2.85	**RA8**	0.2846	**RRA8**	1.0989
X9	1.25	MD9	2.71	**RA9**	0.2631	**RRA9**	1.0157
X10	0.5	MD10	3.64	**RA10**	0.4062	**RRA10**	1.5682
X11	0.14	MD11	2.5	**RA11**	0.2308	**RRA11**	0.891
X12	0.14	MD12	2.5	**RA12**	0.2308	**RRA12**	0.891
X13	0.14	MD13	2.5	**RA13**	0.2308	**RRA13**	0.891
X14	0.25	MD14	2.92	**RA14**	0.2954	**RRA14**	1.1405

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 2	4.83	4.83	32.2	1	High
Cell 1	2.64	7.47	49.8	2	High
Cell 7	1.97	9.44	62.93333333	3	Moderate
Cell 9	1.25	10.69	71.26666667	4	Moderate
Cell 6	0.89	11.58	77.2	5	Low
Cell 4	0.83	12.41	82.73333333	6	Low
Cell 3	0.75	13.16	87.73333333	7	Low
Cell 10	0.5	13.66	91.06666667	8	Low
Cell 0	0.25	13.91	92.73333333	9	Low
Cell 8	0.25	14.16	94.4	10	Low
Cell 14	0.25	14.41	96.06666667	11	Low
Cell 5	0.14	14.55	97	12	Low
Cell 11	0.14	14.69	97.93333333	13	Low
Cell 12	0.14	14.83	98.86666667	14	Low
Cell 13	0.14	14.97	99.8	15	Low

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 2	0.338580339	1	High
Cell 7	0.546480546	2	High
Cell 1	0.594000594	3	High
Cell 6	0.594000594	4	High
Cell 5	0.891000891	5	Moderate
Cell 11	0.891000891	6	Moderate
Cell 12	0.891000891	7	Moderate
Cell 13	0.891000891	8	Moderate
Cell 4	0.932580933	9	Moderate
Cell 3	1.015741016	10	Low
Cell 9	1.015741016	11	Low
Cell 8	1.098901099	12	Low
Cell 0	1.14048114	13	Low
Cell 14	1.14048114	14	Low
Cell 10	1.568161568	15	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	2	High
Cell 3	2	High
Cell 14	2	High
Cell 4	3	Moderate
Cell 5	3	Moderate
Cell 6	3	Moderate
Cell 7	3	Moderate
Cell 11	3	Moderate
Cell 12	3	Moderate
Cell 13	3	Moderate
Cell 8	4	Low
Cell 9	4	Low
Cell 10	5	Low
Cell 0		

Table 4 - Antioch - House of the Drinking Contest Data

House of the Birds (Augustan Period)							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymetry (RRA)	
X0	0.5	MD0	3.88	RA0	0.22154	RRA0	1.1538
X1	1.11	MD1	2.96	RA1	0.15077	RRA1	0.7853
X2	0.11	MD2	3.03	RA2	0.15615	RRA2	0.8133
X3	0.11	MD3	3.03	RA3	0.15615	RRA3	0.8133
X4	0.11	MD4	3.03	RA4	0.15615	RRA4	0.8133
X5	0.11	MD5	3.03	RA5	0.15615	RRA5	0.8133
X6	0.11	MD6	3.03	RA6	0.15615	RRA6	0.8133
X7		MD7		RA7		RRA7	
X8	2.11	MD8	2.74	RA8	0.13385	RRA8	0.6971
X9	0.33	MD9	3.66	RA9	0.20462	RRA9	1.0657
X10	0.11	MD10	3.03	RA10	0.15615	RRA10	0.8133
X11	0.47	MD11	1.92	RA11	0.07077	RRA11	0.3686
X12	3.83	MD12	2.62	RA12	0.12462	RRA12	0.649
X13	0.2	MD13	3.55	RA13	0.19615	RRA13	1.0216
X14	0.2	MD14	3.55	RA14	0.19615	RRA14	1.0216
X15	4.83	MD15	2.48	RA15	0.11385	RRA15	0.5929
X16	0.66	MD16	3.18	RA16	0.16769	RRA16	0.8734
X17	1	MD17	4.14	RA17	0.24154	RRA17	1.258
X18	1	MD18	3.85	RA18	0.21923	RRA18	1.1418
X19	0.83	MD19	3.44	RA19	0.18769	RRA19	0.9776
X20	0.16	MD20	3.22	RA20	0.17077	RRA20	0.8894
X21	0.16	MD21	3.22	RA21	0.17077	RRA21	0.8894
X22	0.16	MD22	3.22	RA22	0.17077	RRA22	0.8894
X23	0.16	MD23	3.22	RA23	0.17077	RRA23	0.8894
X24	1.2	MD24	3.48	RA24	0.19077	RRA24	0.9936
X25	7.16	MD25	2.11	RA25	0.08538	RRA25	0.4447
X26	0.2	MD26	3.55	RA26	0.19615	RRA26	1.0216
X27	0.5	MD27	4.4	RA27	0.26154	RRA27	1.3622

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 25	7.16	7.16	25.57142857	1	High
Cell 15	4.83	11.99	42.82142857	2	High
Cell 12	3.83	15.82	56.5	3	Moderate
Cell 8	2.11	17.93	64.03571429	4	Moderate
Cell 24	1.2	19.13	68.32142857	5	Moderate
Cell 1	1.11	20.24	72.28571429	6	Low
Cell 17	1	21.24	75.85714286	7	Low
Cell 18	1	22.24	79.42857143	8	Low
Cell 19	0.83	23.07	82.39285714	9	Low
Cell 16	0.66	23.73	84.75	10	Low
Cell 0	0.5	24.23	86.53571429	11	Low
Cell 27	0.5	24.73	88.32142857	12	Low
Cell 11	0.47	25.2	90	13	Low
Cell 9	0.33	25.53	91.17857143	14	Low
Cell 13	0.2	25.73	91.89285714	15	Low
Cell 14	0.2	25.93	92.60714286	16	Low
Cell 26	0.2	26.13	93.32142857	17	Low
Cell 20	0.16	26.29	93.89285714	18	Low
Cell 21	0.16	26.45	94.46428571	19	Low
Cell 22	0.16	26.61	95.03571429	20	Low
Cell 23	0.16	26.77	95.60714286	21	Low
Cell 2	0.11	26.88	96	22	Low
Cell 3	0.11	26.99	96.39285714	23	Low
Cell 4	0.11	27.1	96.78571429	24	Low
Cell 5	0.11	27.21	97.17857143	25	Low
Cell 6	0.11	27.32	97.57142857	26	Low
Cell 10	0.11	27.43	97.96428571	27	Low
Cell 7					

Table 5 - Cosa - House of the Birds Data (a)

		Global	
Space Number	RRA Value	Rank Order	Interaction Potential
Cell 7			
Cell 11	0.368589744	1	High
Cell 25	0.444711538	2	High
Cell 15	0.592948718	3	High
Cell 12	0.649038462	4	High
Cell 8	0.697115385	5	High
Cell 1	0.78525641	6	High
Cell 2	0.813301282	7	Moderate
Cell 3	0.813301282	8	Moderate
Cell 4	0.813301282	9	Moderate
Cell 5	0.813301282	10	Moderate
Cell 6	0.813301282	11	Moderate
Cell 10	0.813301282	12	Moderate
Cell 16	0.873397436	13	Moderate
Cell 20	0.889423077	14	Moderate
Cell 21	0.889423077	15	Moderate
Cell 22	0.889423077	16	Moderate
Cell 23	0.889423077	17	Moderate
Cell 19	0.977564103	18	Moderate
Cell 24	0.993589744	19	Low
Cell 13	1.021634615	20	Low
Cell 14	1.021634615	21	Low
Cell 26	1.021634615	22	Low
Cell 9	1.065705128	23	Low
Cell 18	1.141826923	24	Low
Cell 0 Exterior	1.153846154	25	Low
Cell 17	1.258012821	26	Low
Cell 27	1.362179487	27	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 25	2	High
Cell 2	3	Moderate
Cell 3	3	Moderate
Cell 4	3	Moderate
Cell 5	3	Moderate
Cell 6	3	Moderate
Cell 8	3	Moderate
Cell 10	3	Moderate
Cell 11	3	Moderate
Cell 9	4	Moderate
Cell 12	4	Moderate
Cell 15	4	Moderate
Cell 19	4	Moderate
Cell 13	5	Low
Cell 14	5	Low
Cell 16	5	Low
Cell 18	5	Low
Cell 20	5	Low
Cell 21	5	Low
Cell 22	5	Low
Cell 23	5	Low
Cell 24	5	Low
Cell 26	5	Low
Cell 17	6	Low
Cell 27	6	Low
Cell 7		
Cell 0		

Table 6 - Cosa - House of the Birds Data (b)

House of the Skeleton Period 1.3							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymtery (RRA)	
X0	0.83	MD0	2.76	RA0	0.22	RRA0	0.92827
X1	0.61	MD1	2.23	RA1	0.15375	RRA1	0.64873
X2	7.25	MD2	1.7	RA2	0.0875	RRA2	0.3692
X3	0.11	MD3	2.64	RA3	0.205	RRA3	0.86498
X4	0.5	MD4	3.47	RA4	0.30875	RRA4	1.30274
X5	1.11	MD5	2.52	RA5	0.19	RRA5	0.80169
X6	0.11	MD6	2.64	RA6	0.205	RRA6	0.86498
X7	1.94	MD7	2.05	RA7	0.13125	RRA7	0.5538
X8	0.58	MD8	2.76	RA8	0.22	RRA8	0.92827
X9	0.11	MD9	2.64	RA9	0.205	RRA9	0.86498
X10	0.11	MD10	2.64	RA10	0.205	RRA10	0.86498
X11	0.11	MD11	2.64	RA11	0.205	RRA11	0.86498
X12	0.11	MD12	2.64	RA12	0.205	RRA12	0.86498
X13	0.25	MD13	3	RA13	0.25	RRA13	1.05485
X14	1.25	MD14	2.52	RA14	0.19	RRA14	0.80169
X15	0.66	MD15	3.05	RA15	0.25625	RRA15	1.08122
X16	2	MD16	3.11	RA16	0.26375	RRA16	1.11287
X17	0.33	MD17	4.05	RA17	0.38125	RRA17	1.60865

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 2	7.25	7.25	40.27777778	1	High
Cell 16	2	9.25	51.38888889	2	Moderate
Cell 7	1.94	11.19	62.16666667	3	Moderate
Cell 14	1.25	12.44	69.11111111	4	Moderate
Cell 5	1.11	13.55	75.27777778	5	Moderate
Cell 0	0.83	14.38	79.88888889	6	Low
Cell 15	0.66	15.04	83.55555556	7	Low
Cell 1	0.61	15.65	86.94444444	8	Low
Cell 8	0.58	16.23	90.16666667	9	Low
Cell 4	0.5	16.73	92.94444444	10	Low
Cell 17	0.33	17.06	94.77777778	11	Low
Cell 13	0.25	17.31	96.16666667	12	Low
Cell 3	0.11	17.42	96.77777778	13	Low
Cell 6	0.11	17.53	97.38888889	14	Low
Cell 9	0.11	17.64	98	15	Low
Cell 10	0.11	17.75	98.61111111	16	Low
Cell 11	0.11	17.86	99.22222222	17	Low
Cell 12	0.11	17.97	99.83333333	18	Low

Table 7- Cosa - House of the Skeleton Data (a)

		Global	
Space Number	RRA Value	Rank Order	Interaction Potential
Cell 2	0.369198312	1	High
Cell 7	0.553797468	2	High
Cell 1	0.648734177	3	High
Cell 5	0.801687764	4	High
Cell 14	0.801687764	5	High
Cell 3	0.864978903	6	Moderate
Cell 6	0.864978903	7	Moderate
Cell 9	0.864978903	8	Moderate
Cell 10	0.864978903	9	Moderate
Cell 11	0.864978903	10	Moderate
Cell 12	0.864978903	11	Moderate
Cell 0 Exterior	0.928270042	12	Moderate
Cell 8	0.928270042	13	Moderate
Cell 13	1.054852321	14	Low
Cell 15	1.081223629	15	Low
Cell 16	1.112869198	16	Low
Cell 4	1.302742616	17	Low
Cell 17	1.608649789	18	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 16	1	High
Cell 2	2	High
Cell 15	2	High
Cell 17	2	High
Cell 3	3	Moderate
Cell 5	3	Moderate
Cell 6	3	Moderate
Cell 7	3	Moderate
Cell 9	3	Moderate
Cell 10	3	Moderate
Cell 11	3	Moderate
Cell 12	3	Moderate
Cell 14	3	Moderate
Cell 4	4	Low
Cell 8	4	Low
Cell 13	4	Low
Cell 0		

Table 8 - Cosa - House of the Skeleton Data (b)

House of the Treasure							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymetry (RRA)	
X0	0.5	MD0	3.72	RA0	0.544	RRA0	1.908772
X1	1.25	MD1	2.81	RA1	0.362	RRA1	1.270175
X2	2.83	MD2	2.09	RA2	0.218	RRA2	0.764912
X3	0.25	MD3	3	RA3	0.4	RRA3	1.403509
X4	0.25	MD4	3	RA4	0.4	RRA4	1.403509
X5	1.08	MD5	1.9	RA5	0.18	RRA5	0.631579
X6	0.83	MD6	2.45	RA6	0.29	RRA6	1.017544
X7	1.5	MD7	3.18	RA7	0.436	RRA7	1.529825
X8	2.33	MD8	2.45	RA8	0.29	RRA8	1.017544
X9	0.33	MD9	3.36	RA9	0.472	RRA9	1.65614
X10	0.33	MD10	3.36	RA10	0.472	RRA10	1.65614
X11	0.5	MD11	4.09	RA11	0.618	RRA11	2.168421

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 2	2.83	2.83	23.58333333	1	High
Cell 8	2.33	5.16	43	2	High
Cell 7	1.5	6.66	55.5	3	Moderate
Cell 1	1.25	7.91	65.91666667	4	Moderate
Cell 5	1.08	8.99	74.91666667	5	Low
Cell 6	0.83	9.82	81.83333333	6	Low
Cell 0	0.5	10.32	86	7	Low
Cell 11	0.5	10.82	90.16666667	8	Low
Cell 9	0.33	11.15	92.91666667	9	Low
Cell 10	0.33	11.48	95.66666667	10	Low
Cell 3	0.25	11.73	97.75	11	Low
Cell 4	0.25	11.98	99.83333333	12	Low

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 5	0.631578947	1	High
Cell 2	0.764912281	2	High
Cell 6	1.01754386	3	High
Cell 8	1.01754386	4	High
Cell 1	1.270175439	5	Moderate
Cell 3	1.403508772	6	Moderate
Cell 4	1.403508772	7	Moderate
Cell 7	1.529824561	8	Moderate
Cell 9	1.656140351	9	Low
Cell 10	1.656140351	10	Low
Cell 0	1.90877193	11	Low
Cell 11	2.168421053	12	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	2	High
Cell 3	3	Moderate
Cell 4	3	Moderate
Cell 5	3	Moderate
Cell 6	4	Moderate
Cell 8	4	Moderate
Cell 7	5	Low
Cell 9	5	Low
Cell 10	5	Low
Cell 11	6	Low
Cell 0		

Table 9 - Cosa - House of the Treasure - Data

House VI-xv-22							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymetry (RRA)	
X0	0.33			RA0	0.523	RRA0	1.597
X1	2.25			RA1	0.238	RRA1	0.725
X2	0.33			RA2	0.523	RRA2	1.597
X3	2.83			RA3	0.142	RRA3	0.435
X4	0.25			RA4	0.428	RRA4	1.306
X5	0.25			RA5	0.428	RRA5	1.306
X6	1.25			RA6	0.333	RRA6	1.016
X7	0.5			RA7	0.619	RRA7	1.887

Local					
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 3	2.83	2.83	35.375	1	High
Cell 1	2.25	5.08	63.5	2	Moderate
Cell 6	1.25	6.33	79.125	3	Moderate
Cell 7	0.5	6.83	85.375	4	Low
Cell 0	0.33	7.16	89.5	5	Low
Cell 2	0.33	7.49	93.625	6	Low
Cell 4	0.25	7.74	96.75	7	Low
Cell 5	0.25	7.99	99.875	8	Low

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 3	0.435	1	High
Cell 1	0.725	2	High
Cell 6	1.016	3	Moderate
Cell 4	1.306	4	Moderate
Cell 5	1.306	5	Moderate
Cell 0	1.597	6	Low
Cell 2	1.597	7	Low
Cell 7	1.887	8	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	2	High
Cell 3	2	High
Cell 4	3	Moderate
Cell 5	3	Moderate
Cell 6	3	Moderate
Cell 7	4	Low
Cell 0		

Table 10 - Pompeii - House VI-xv-22 Data

House VI-xv-9							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymetry (RRA)	
X0	0.5			RA0	0.5	RRA0	1.577
X1	1.166			RA1	0.25	RRA1	0.788
X2	5			RA2	0.0714	RRA2	0.225
X3	0.166			RA3	0.321	RRA3	1.014
X4	0.166			RA4	0.321	RRA4	1.014
X5	0.166			RA5	0.321	RRA5	1.014
X6	0.166			RA6	0.321	RRA6	1.014
X7	1.166			RA7	0.25	RRA7	0.788
X8	0.5			RA8	0.25	RRA8	1.577

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 2	5	5	55.55555556	1	High
Cell 1	1.166	6.166	68.51111111	2	Moderate
Cell 7	1.166	7.332	81.46666667	3	Moderate
Cell 0	0.5	7.832	87.02222222	4	Low
Cell 8	0.5	8.332	92.57777778	5	Low
Cell 3	0.166	8.498	94.42222222	6	Low
Cell 4	0.166	8.664	96.26666667	7	Low
Cell 5	0.166	8.83	98.11111111	8	Low
Cell 6	0.166	8.996	99.95555556	9	Low

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 2	0.225	1	High
Cell 1	0.788	2	HIgh
Cell 7	0.788	3	High
Cell 3	1.014	4	Moderate
Cell 4	1.014	5	Moderate
Cell 5	1.014	6	Moderate
Cell 6	1.014	7	Moderate
Cell 0	1.577	8	Low
Cell 8	1.577	9	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	2	High
Cell 3	3	Moderate
Cell 4	3	Moderate
Cell 5	3	Moderate
Cell 6	3	Moderate
Cell 7	3	Moderate
Cell 8	4	Low
Cell 0		

Table 11 - Pompeii - House VI-xv-9 - Data

House VI-vii-4-6							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymetry (RRA)	
X0	1			RA0	0.254	RRA0	1.103
X1	0.583			RA1	0.163	RRA1	0.707
X2	1			RA2	0.254	RRA2	1.103
X3	0.583			RA3	0.163	RRA3	0.707
X4	9.5			RA4	0.071	RRA4	0.311
X5	0.583			RA5	0.176	RRA5	0.763
X6	0.583			RA6	0.176	RRA6	0.763
X7	0.083			RA7	0.183	RRA7	0.792
X8	0.083			RA8	0.183	RRA8	0.792
X9	0.083			RA9	0.183	RRA9	0.792
X10	0.083			RA10	0.183	RRA10	0.792
X11	0.083			RA11	0.183	RRA11	0.792
X12	0.083			RA12	0.183	RRA12	0.792
X13	0.083			RA13	0.183	RRA13	0.792
X14	0.583			RA14	0.13	RRA14	0.565
X15	0.833			RA15	0.202	RRA15	0.877
X16	2.5			RA16	0.287	RRA16	1.244
X17	0.333			RA17	0.398	RRA17	1.725
X18	0.333			RA18	0.398	RRA18	1.725

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 4	9.5	9.5	50	1	High
Cell 16	2.5	12	63.15789474	2	Moderate
Cell 0	1	13	68.42105263	3	Moderate
Cell 2	1	14	73.68421053	4	Low
Cell 15	0.833	14.833	78.06842105	5	Low
Cell 1	0.583	15.416	81.13684211	6	Low
Cell 3	0.583	15.999	84.20526316	7	Low
Cell 5	0.583	16.582	87.27368421	8	Low
Cell 6	0.583	17.165	90.34210526	9	Low
Cell 14	0.583	17.748	93.41052632	10	Low
Cell 17	0.333	18.081	95.16315789	11	Low
Cell 18	0.333	18.414	96.91578947	12	Low
Cell 7	0.083	18.497	97.35263158	13	Low
Cell 8	0.083	18.58	97.78947368	14	Low
Cell 9	0.083	18.663	98.22631579	15	Low
Cell 10	0.083	18.746	98.66315789	16	Low
Cell 11	0.083	18.829	99.1	17	Low
Cell 12	0.083	18.912	99.53684211	18	Low
Cell 13	0.083	18.995	99.97368421	19	Low

Table 12 - Pompeii - House VI-vii-4-6 Data (a)

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 4	0.311	1	High
Cell 14	0.565	2	High
Cell 1	0.707	3	High
Cell 3	0.707	4	High
Cell 5	0.763	5	High
Cell 6	0.763	6	High
Cell 7	0.792	7	Modetate
Cell 8	0.792	8	Modetate
Cell 9	0.792	9	Modetate
Cell 10	0.792	10	Modetate
Cell 11	0.792	11	Modetate
Cell 12	0.792	12	Modetate
Cell 13	0.792	13	Modetate
Cell 15	0.877	14	Low
Cell 0	1.103	15	Low
Cell 2	1.103	16	Low
Cell 16	1.244	17	Low
Cell 17	1.725	18	Low
Cell 18	1.725	19	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 2	1	High
Cell 3	2	High
Cell 4	2	High
Cell 5	3	Moderate
Cell 6	3	Moderate
Cell 7	3	Moderate
Cell 8	3	Moderate
Cell 9	3	Moderate
Cell 10	3	Moderate
Cell 11	3	Moderate
Cell 12	3	Moderate
Cell 13	3	Moderate
Cell 14	3	Moderate
Cell 15	4	Moderate
Cell 16	5	Low
Cell 17	6	Low
Cell 18	6	Low
Cell 0		

Table 13 - Pompeii - House VI-vii-4-6 Data (b)

House VI-ii-17-20							
Control Values		Mean Depth (MD)		Relative Assymetry (RA)		Real Relative Assymetry (RRA)	
X0	0.833			RA0	0.173	RRA0	0.858
X1	0.6			RA1	0.146	RRA1	0.713
X2	8.166			RA2	0.098	RRA2	0.482
X3	0.1			RA3	0.185	RRA3	0.906
X4	0.1			RA4	0.185	RRA4	0.906
X5	0.1			RA5	0.185	RRA5	0.906
X6	0.1			RA6	0.185	RRA6	0.906
X7	0.85			RA7	0.114	RRA7	0.559
X8	0.1			RA8	0.185	RRA8	0.906
X9	0.1			RA9	0.185	RRA9	0.906
X10	0.1			RA10	0.185	RRA10	0.906
X11	2.1			RA11	0.17	RRA11	0.829
X12	0.333			RA12	0.256	RRA12	1.253
X13	0.333			RA13	0.256	RRA13	1.253
X14	0.833			RA14	0.193	RRA14	0.944
X15	0.75			RA15	0.213	RRA15	1.041
X16	2.033			RA16	0.134	RRA16	0.655
X17	0.25			RA17	0.221	RRA17	1.079
X18	3.583			RA18	0.17	RRA18	0.829
X19	0.2			RA19	0.256	RRA19	1.253
X20	0.2			RA20	0.256	RRA20	1.253
X21	0.2			RA21	0.256	RRA21	1.253
X22	1.7			RA22	0.189	RRA22	0.925
X23	0.333			RA23	0.276	RRA23	1.349

		Local			
Space Number	Control Value	Cumulative Total	% Cumulative	Rank Order	Interaction Potential
Cell 2	8.166	8.166	34.025	1	High
Cell 18	3.583	11.749	48.95416667	2	Moderate
Cell 11	2.1	13.849	57.70416667	3	Moderate
Cell 16	2.033	15.882	66.175	4	Moderate
Cell 22	1.7	17.582	73.25833333	5	Low
Cell 7	0.85	18.432	76.8	6	Low
Cell 0	0.833	19.265	80.27083333	7	Low
Cell 14	0.833	20.098	83.74166667	8	Low
Cell 15	0.75	20.848	86.86666667	9	Low
Cell 1	0.6	21.448	89.36666667	10	Low
Cell 12	0.333	21.781	90.75416667	11	Low
Cell 13	0.333	22.114	92.14166667	12	Low
Cell 23	0.333	22.447	93.52916667	13	Low
Cell 17	0.25	22.697	94.57083333	14	Low
Cell 19	0.2	22.897	95.40416667	15	Low
Cell 20	0.2	23.097	96.2375	16	Low
Cell 21	0.2	23.297	97.07083333	17	Low
Cell 3	0.1	23.397	97.4875	18	Low
Cell 4	0.1	23.497	97.90416667	19	Low
Cell 5	0.1	23.597	98.32083333	20	Low
Cell 6	0.1	23.697	98.7375	21	Low
Cell 8	0.1	23.797	99.15416667	22	Low
Cell 9	0.1	23.897	99.57083333	23	Low
Cell 10	0.1	23.997	99.9875	24	Low

Table 14 - Pompeii - House VI-ii-17-20 Data (a)

		Global	
Space Number	RRA value	Rank Order	Interaction Potential
Cell 2	0.482	1	High
Cell 7	0.559	2	High
Cell 16	0.655	3	High
Cell 1	0.713	4	High
Cell 11	0.829	5	High
Cell 18	0.829	6	High
Cell 0	0.858	7	High
Cell 3	0.906	8	Moderate
Cell 4	0.906	9	Moderate
Cell 5	0.906	10	Moderate
Cell 6	0.906	11	Moderate
Cell 8	0.906	12	Moderate
Cell 9	0.906	13	Moderate
Cell 10	0.906	14	Moderate
Cell 22	0.925	15	Moderate
Cell 14	0.944	16	Moderate
Cell 15	1.041	17	Low
Cell 17	1.079	18	Low
Cell 12	1.253	19	Low
Cell 13	1.253	20	Low
Cell 19	1.253	21	Low
Cell 20	1.253	22	Low
Cell 21	1.253	23	Low
Cell 23	1.349	24	Low

	Strangers	
Space Number	Depth from Exterior	Interaction Potential
Cell 1	1	High
Cell 22	1	High
Cell 2	2	High
Cell 18	2	High
Cell 23	2	High
Cell 3	3	Moderate
Cell 4	3	Moderate
Cell 5	3	Moderate
Cell 6	3	Moderate
Cell 7	3	Moderate
Cell 8	3	Moderate
Cell 9	3	Moderate
Cell 10	3	Moderate
Cell 11	3	Moderate
Cell 16	3	Moderate
Cell 19	3	Moderate
Cell 20	3	Moderate
Cell 21	3	Moderate
Cell 12	4	Low
Cell 13	4	Low
Cell 14	4	Low
Cell 15	4	Low
Cell 17	4	Low
Cell 0		

Table 15 - Pompeii - House VI-ii-17-20 Data (b)

1		51	0.132	101	0.084	151	0.063	201	0.051	251	0.044
2		52	0.130	102	0.083	152	0.063	202	0.051	252	0.043
3		53	0.12	103	0.083	153	0.063	203	0.051	253	0.043
4		54	0.127	104	0.082	154	0.062	204	0.051	254	0.043
5	0.352	55	0.126	105	0.082	155	0.062	205	0.051	255	0.043
6	0.349	56	0.124	106	0.081	156	0.062	206	0.050	256	0.043
7	0.34	57	0.123	107	0.081	157	0.061	207	0.050	257	0.043
8	0.328	58	0.121	108	0.080	158	0.061	208	0.050	258	0.043
9	0.317	59	0.120	109	0.080	159	0.061	209	0.050	259	0.043
10	0.306	60	0.119	110	0.079	160	0.061	210	0.050	260	0.042
11	0.295	61	0.117	111	0.079	161	0.060	211	0.050	261	0.042
12	0.285	62	0.116	112	0.078	162	0.060	212	0.049	262	0.042
13	0.276	63	0.115	113	0.078	163	0.060	213	0.049	263	0.042
14	0.267	64	0.114	114	0.077	164	0.060	214	0.049	264	0.042
15	0.259	65	0.113	115	0.077	165	0.059	215	0.049	265	0.042
16	0.251	66	0.112	116	0.076	166	0.059	216	0.049	266	0.048
17	0.244	67	0.111	117	0.076	167	0.259	217	0.049	267	0.042
18	0.237	68	0.109	118	0.075	168	0.059	218	0.048	268	0.041
19	0.231	69	0.108	119	0.075	169	0.058	219	0.048	269	0.041
20	0.225	70	0.107	120	0.074	170	0.058	220	0.048	270	0.041
21	0.22	71	0.106	121	0.074	171	0.058	221	0.048	271	0.041
22	0.214	72	0.105	122	0.074	172	0.058	222	0.048	272	0.041
23	0.209	73	0.104	123	0.073	173	0.057	223	0.048	273	0.041
24	0.205	74	0.104	124	0.073	174	0.057	224	0.047	274	0.041
25	0.200	75	0.103	125	0.072	175	0.057	225	0.047	275	0.041
26	0.196	76	0.102	126	0.072	176	0.057	226	0.047	276	0.041
27	0.192	77	0.101	127	0.072	177	0.056	227	0.047	277	0.040
28	0.188	78	0.100	128	0.071	178	0.056	228	0.047	278	0.040
29	0.184	79	0.099	129	0.071	179	0.056	229	0.047	279	0.040
30	0.181	80	0.098	130	0.070	180	0.056	230	0.046	280	0.040
31	0.178	81	0.097	131	0.070	181	0.055	231	0.046	281	0.040
32	0.174	82	0.097	132	0.070	182	0.055	232	0.046	282	0.040
33	0.171	83	0.096	133	0.069	183	0.055	233	0.046	283	0.040
34	0.168	84	0.095	134	0.069	184	0.055	234	0.046	284	0.040
35	0.166	85	0.094	135	0.068	185	0.055	235	0.046	285	0.040
36	0.163	86	0.094	136	0.068	186	0.054	236	0.046	286	0.039
37	0.160	87	0.093	137	0.068	187	0.054	237	0.045	287	0.039
38	0.158	88	0.092	138	0.067	188	0.054	238	0.045	288	0.039
39	0.155	89	0.091	139	0.067	189	0.054	239	0.045	289	0.039
40	0.153	90	0.091	140	0.067	190	0.054	240	0.045	290	0.039
41	0.151	91	0.09	141	0.066	191	0.053	241	0.045	291	0.039
42	0.148	92	0.089	142	0.066	192	0.053	242	0.045	292	0.039
43	0.146	93	0.089	143	0.066	193	0.053	243	0.045	293	0.039
44	0.144	94	0.088	144	0.065	194	0.053	244	0.044	294	0.039
45	0.142	95	0.087	145	0.065	195	0.053	245	0.044	295	0.039
46	0.140	96	0.087	146	0.065	196	0.052	246	0.044	296	0.038
47	0.139	97	0.086	147	0.064	197	0.052	247	0.044	297	0.038
48	0.137	98	0.086	148	0.064	198	0.052	248	0.044	298	0.038
49	0.135	99	0.085	149	0.064	199	0.052	249	0.044	299	0.038
50	0.133	100	0.084	150	0.064	200	0.052	250	0.044	300	0.038

Table 16 - D-Values, the number of cells in the structure is followed by the appropriate D-Value (after Hillier and Hanson 1984, 112)

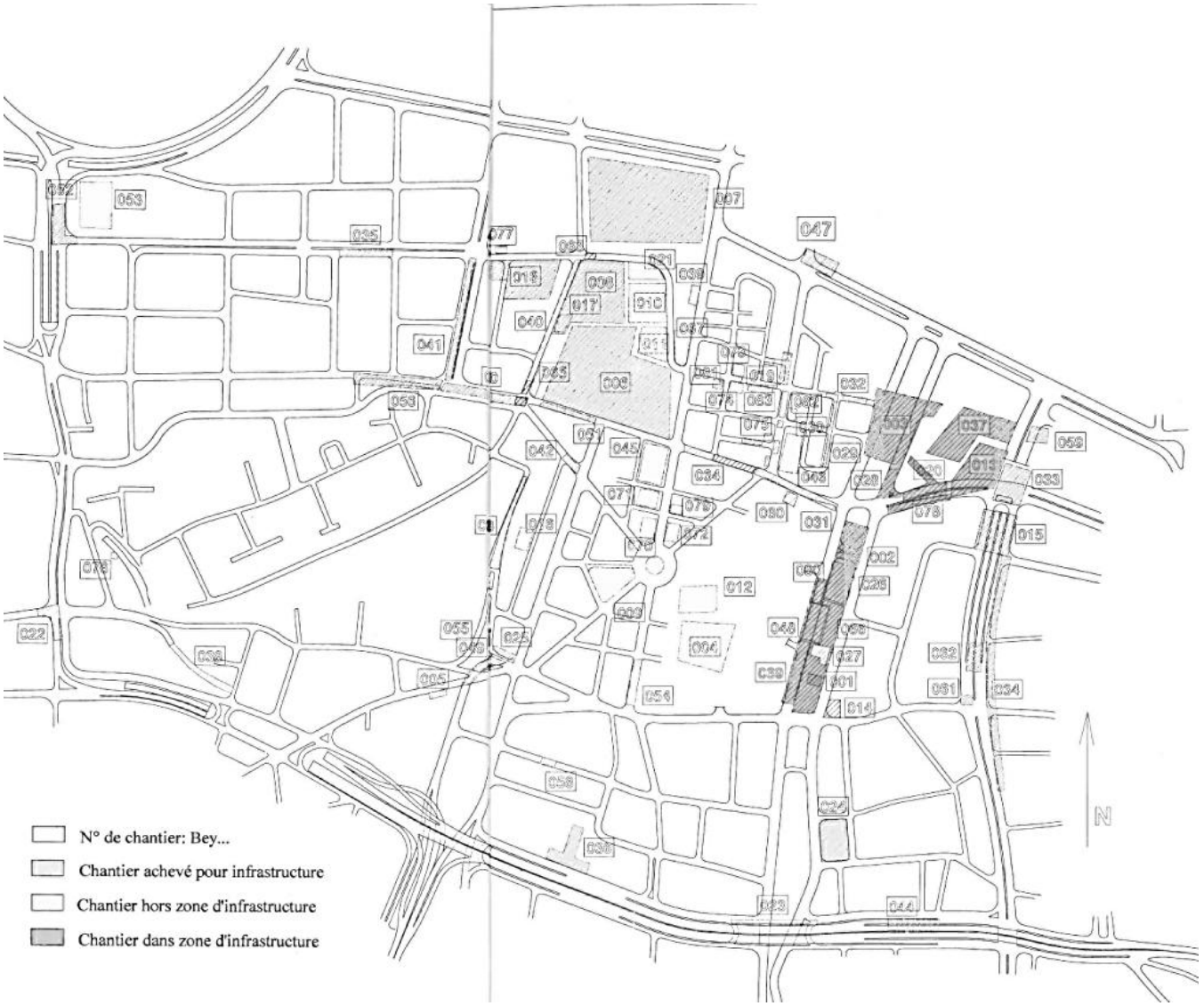

Figure 7 - Map of the different excavation areas in Beirut Central District (after Asmar 1996, 11)

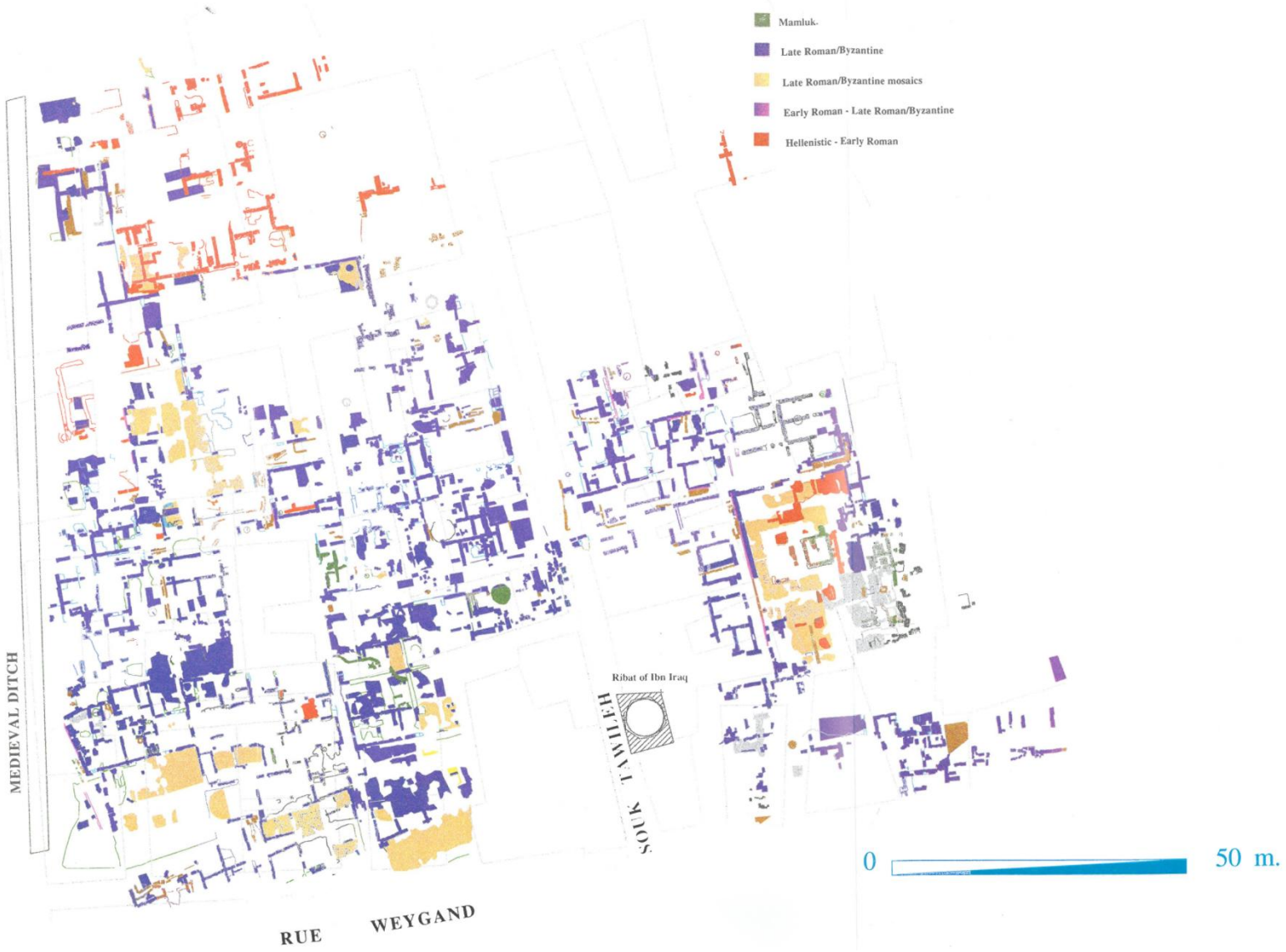

Figure 8 - Map of BEY-006 representing the architecture of different periods (after Perring, Seeden, Sheehan, and Williams 1996, 204)

Figure 9 - Insula of the House of the Fountains towards the end of the 1st c. CE representing Houses 4a, 4e, and 4f (after Perring, Reynolds, and Thorpe 2003, 204)

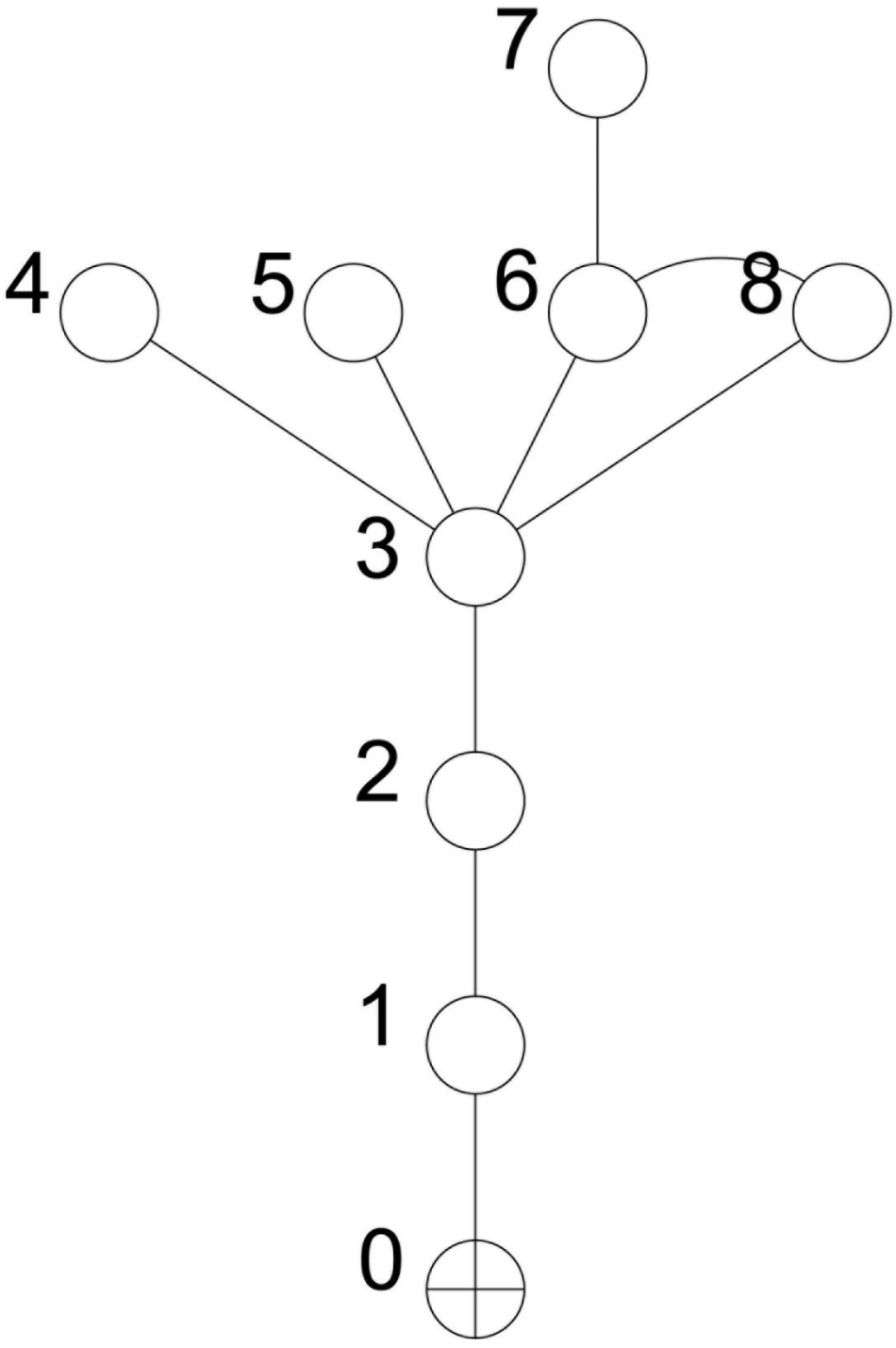

Figure 10 - Access Map - Beirut - House 4a

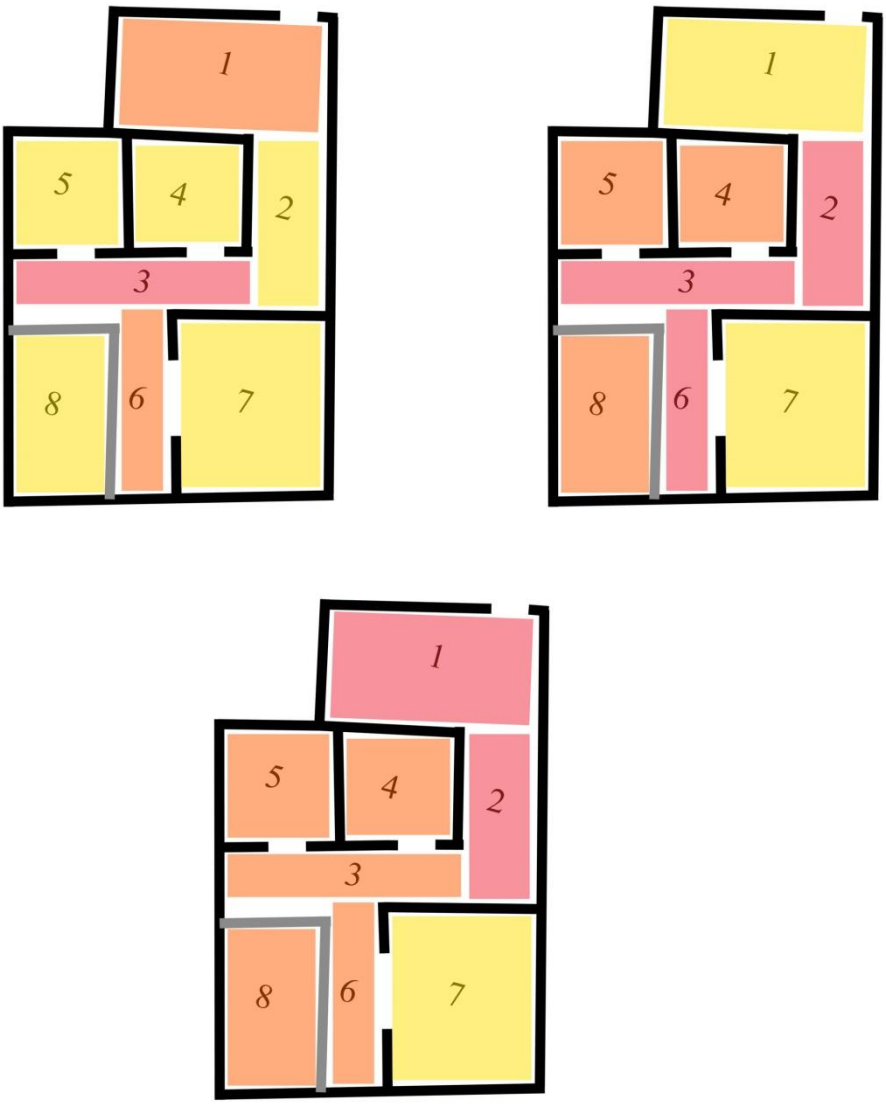

Figure 11 - Beirut 4a - Top Left: Local - Top Right: Global - Bottom: Stranger/External
Red: High interaction – Orange: Moderate interaction – Yellow: Low interaction

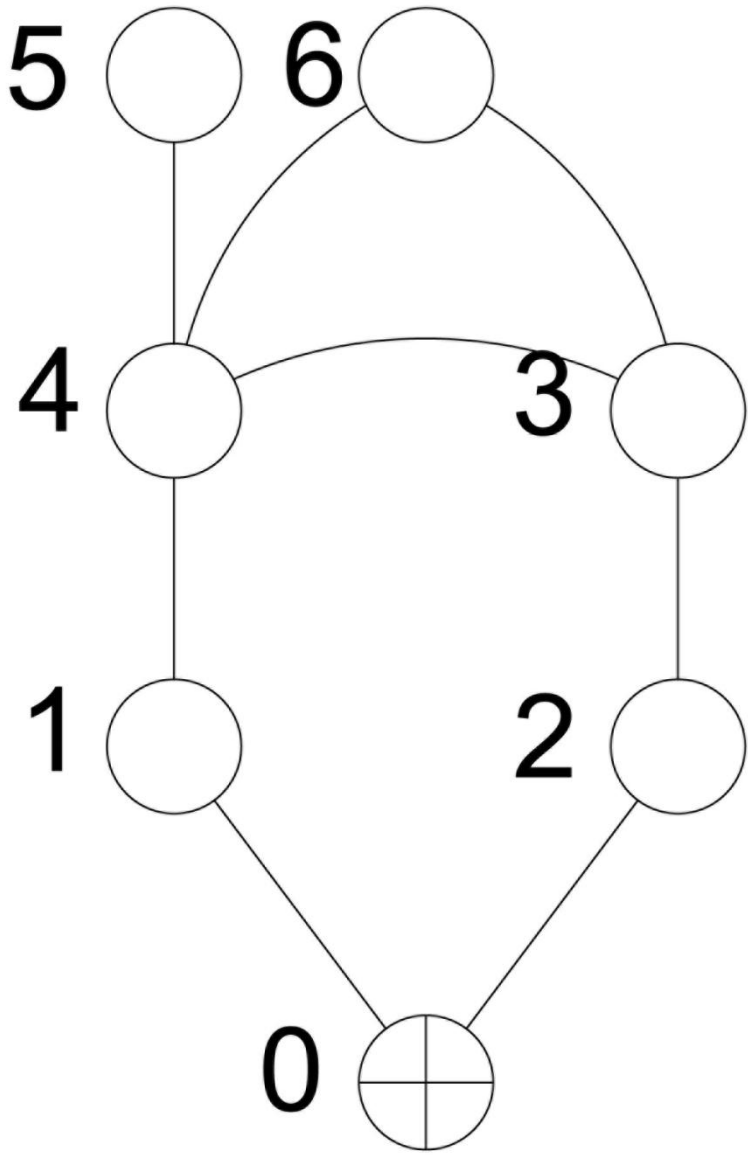

Figure 12 - Access Map - Beirut - House 4e

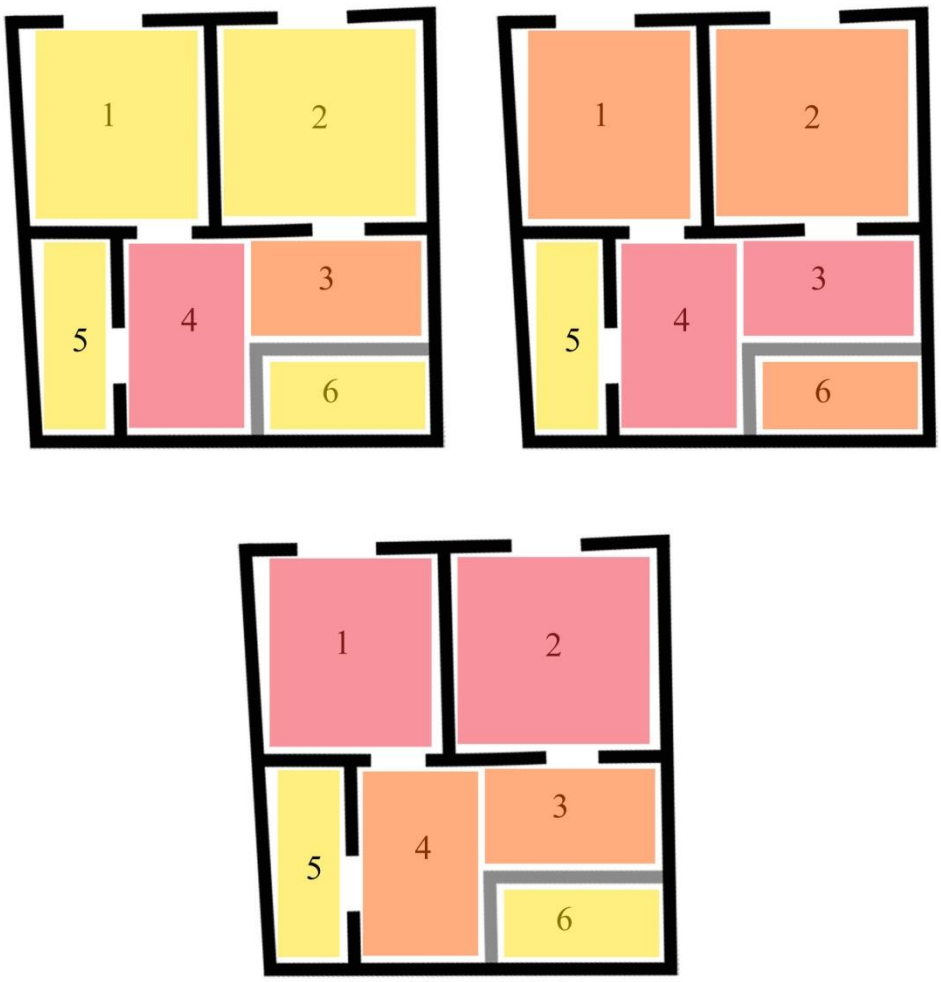

Figure 13 - Beirut 4e - Top Left: Local - Top Right: Global - Bottom: Stranger/External

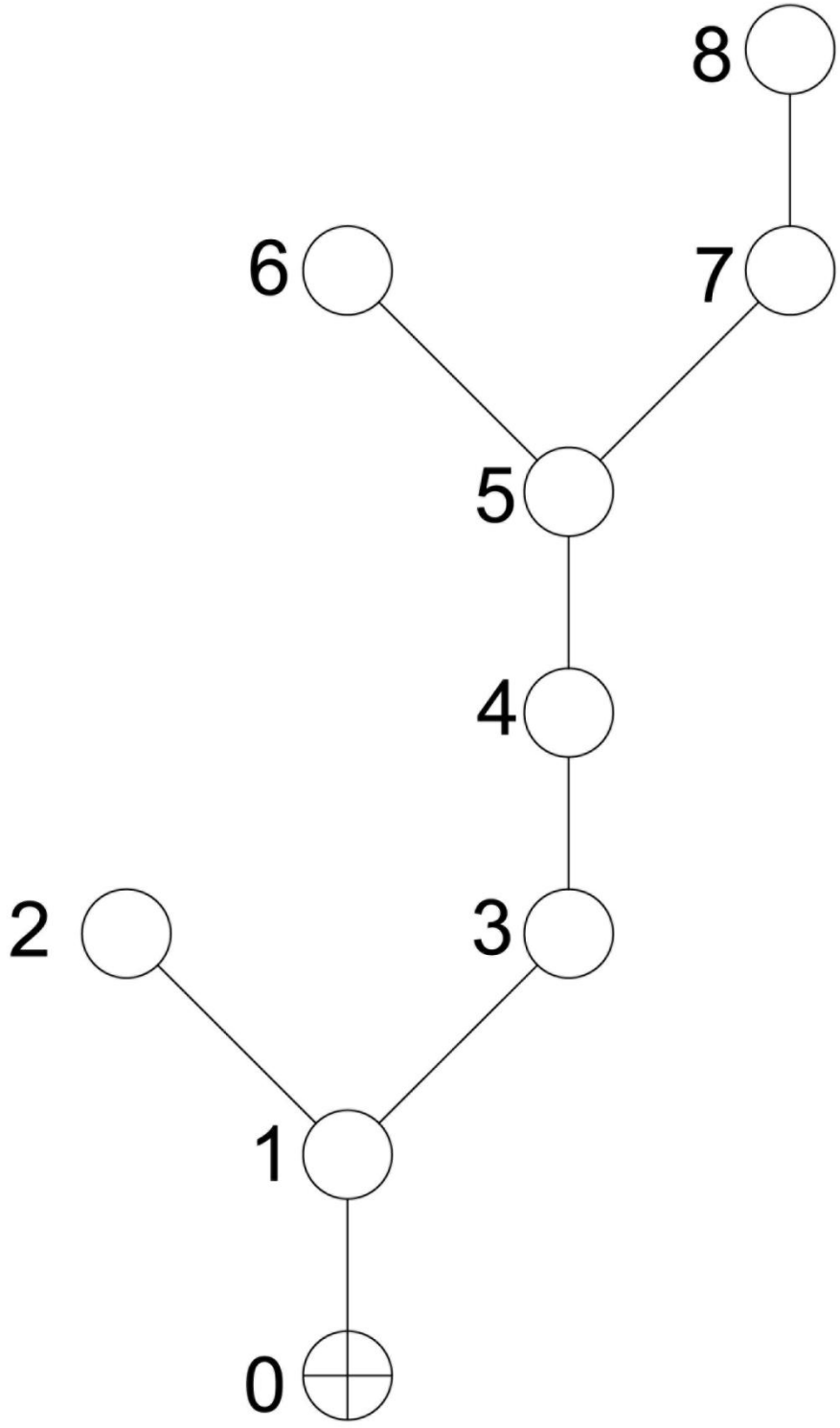

Figure 14 - Access Map - Beirut - House 4f

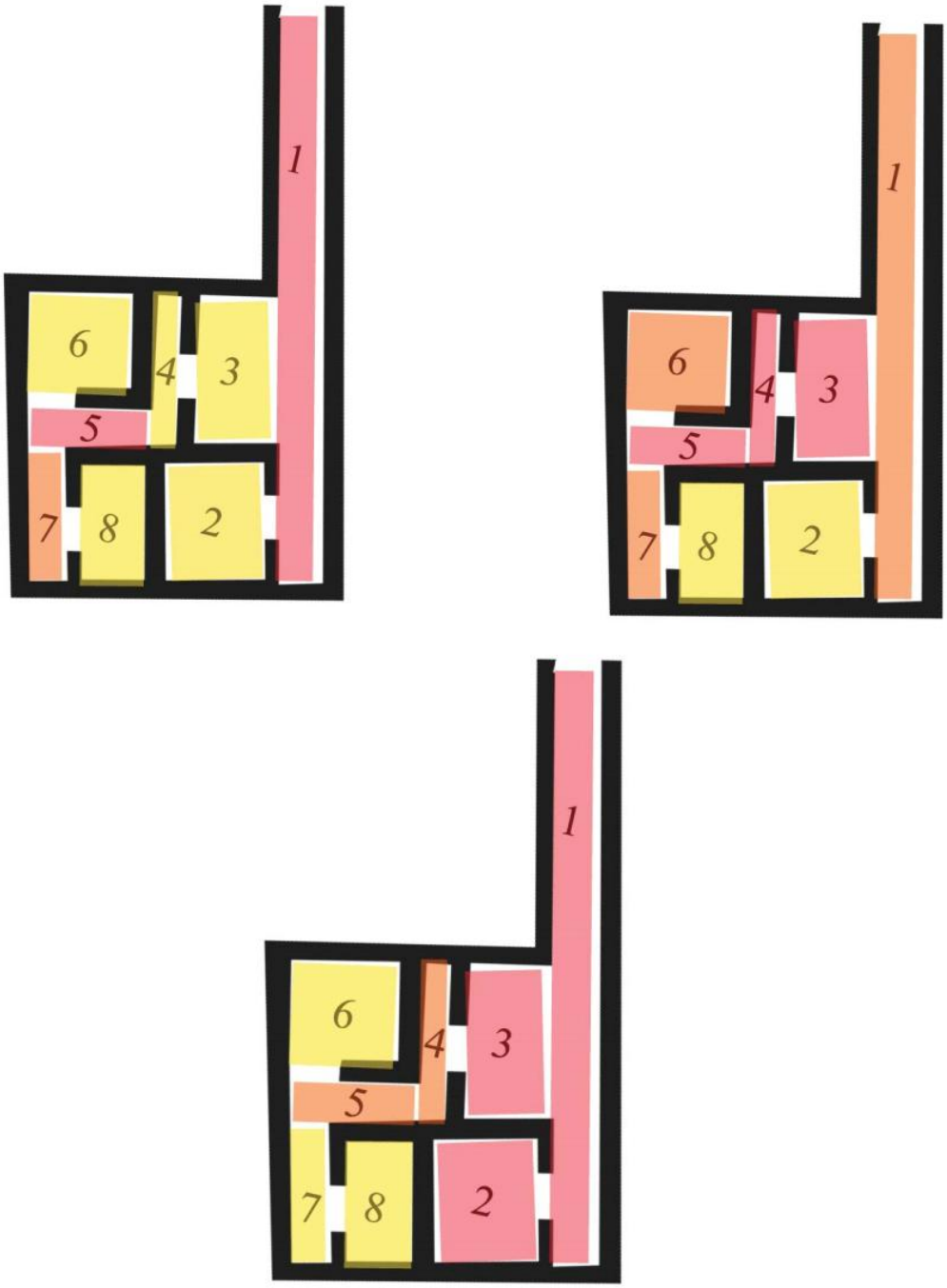

Figure 15 - Beirut 4f - Top Left: Local - Top Right: Global - Bottom: Stranger/External

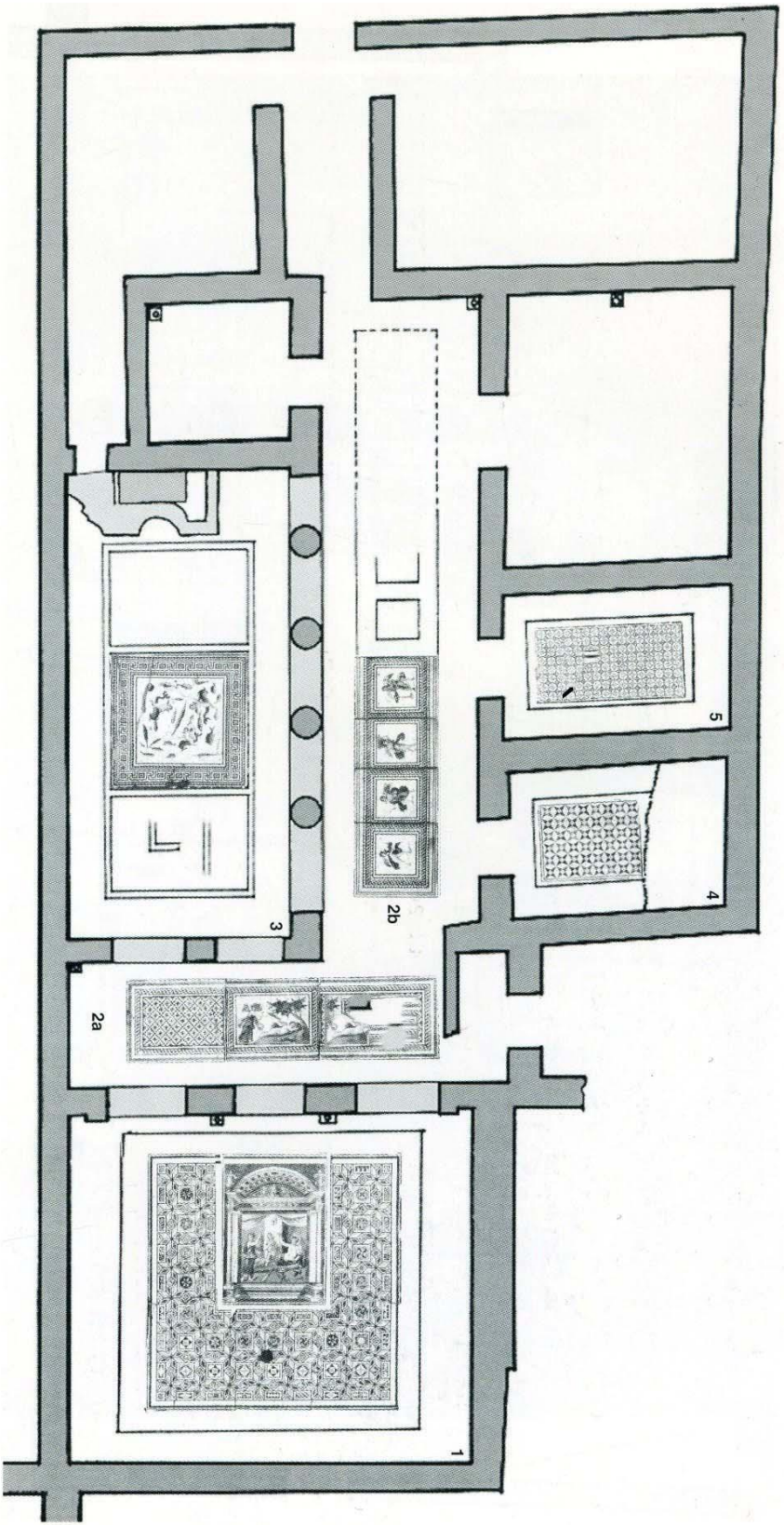

Figure 16 - Antioch - House of the Drinking Contest (after Dobbins 2000, 58)

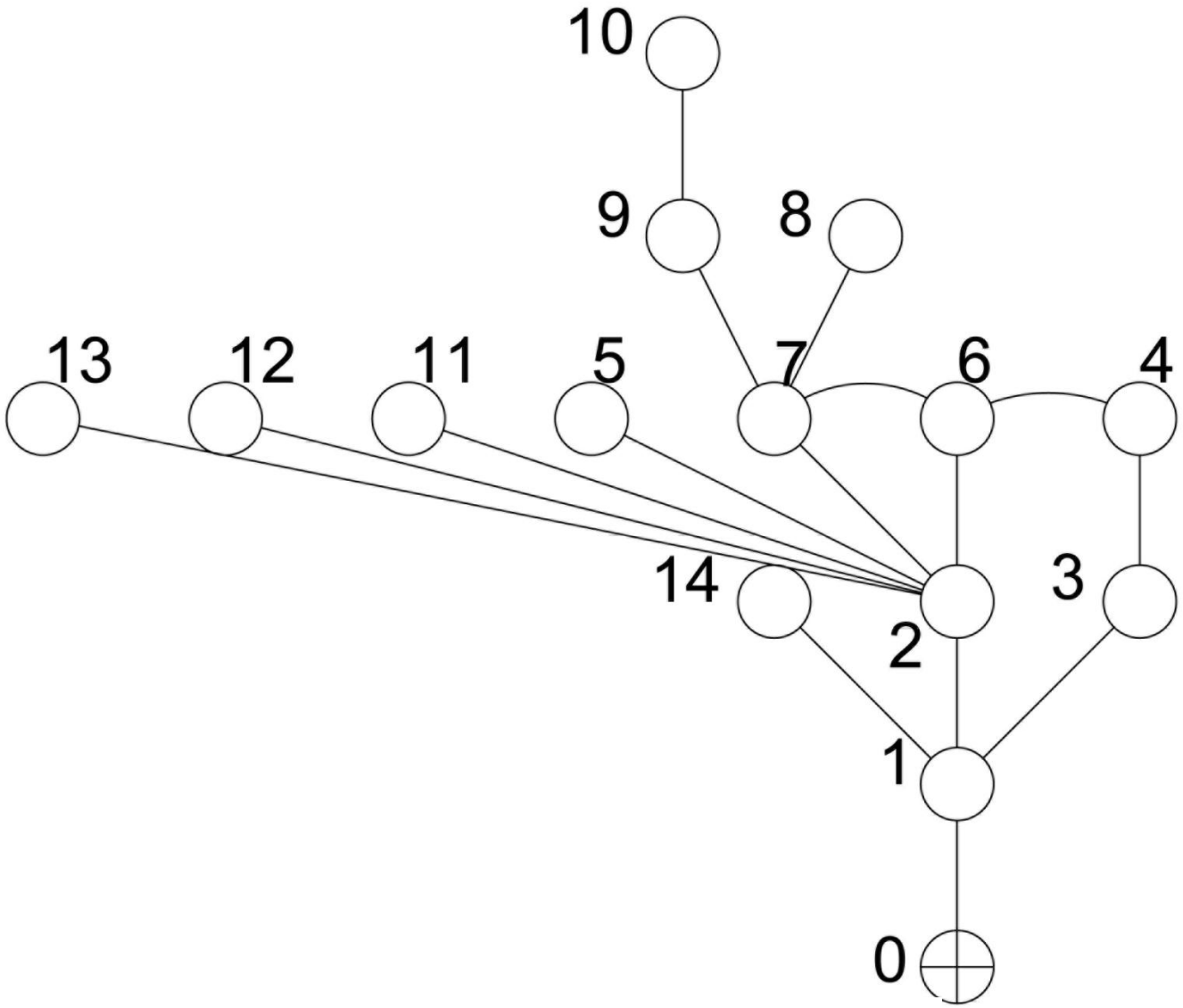

Figure 17 - Access Map - Antioch - House of the Drinking Contest

Figure 18 - House of the Drinking Contest - Top: Local - Middle: Global - Bottom: Stranger/External

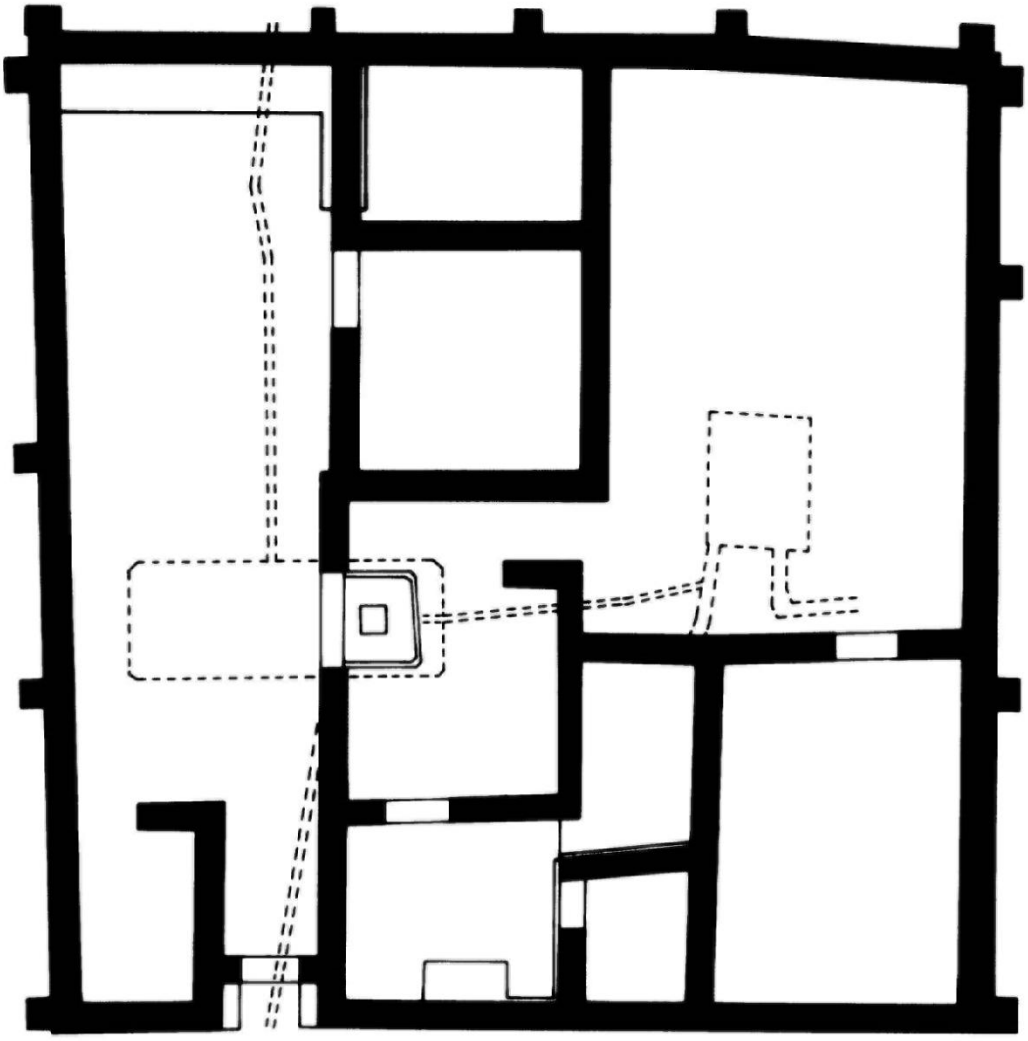

Figure 19 - Cosa - House of the Treasure (after Bruno and Scott 1993, 83)

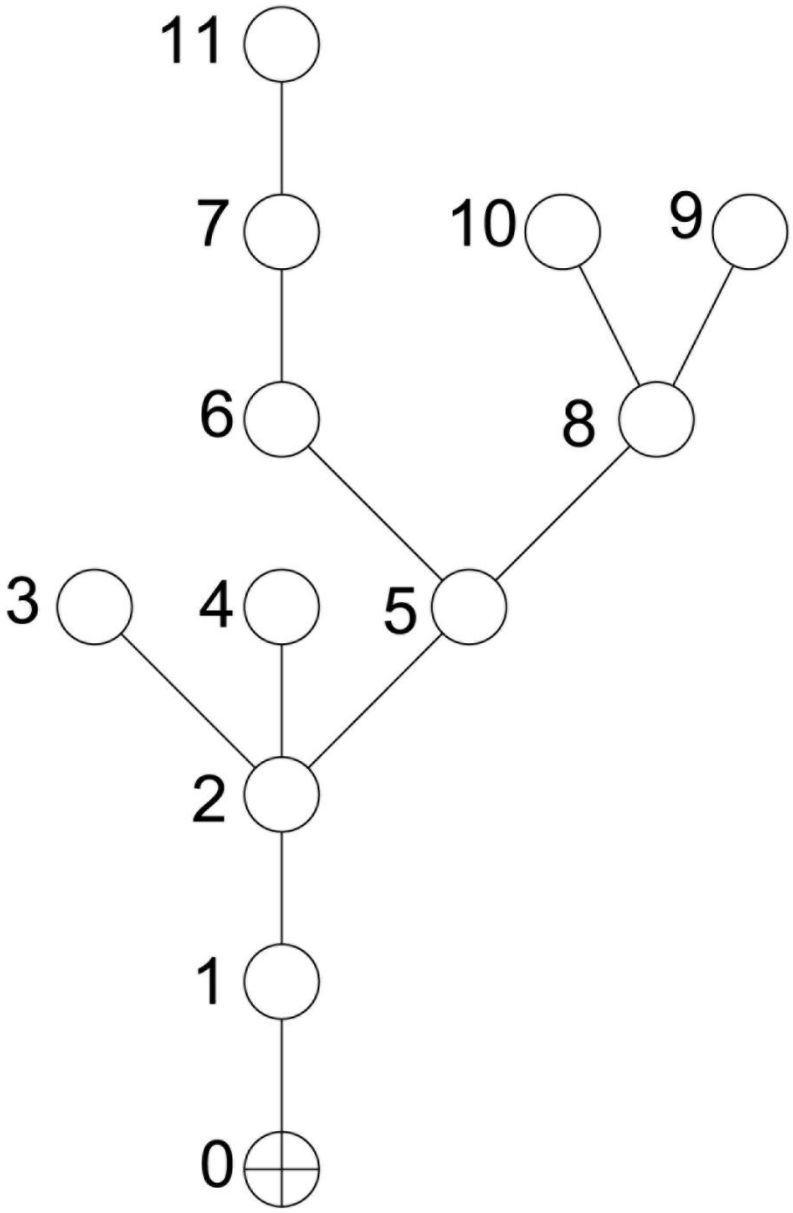

Figure 20 - Access Map - Cosa - House of the Treasure

Figure 21 - House of the Treasure: Top Left- Local - Top Right: Global - Bottom: Stranger/External

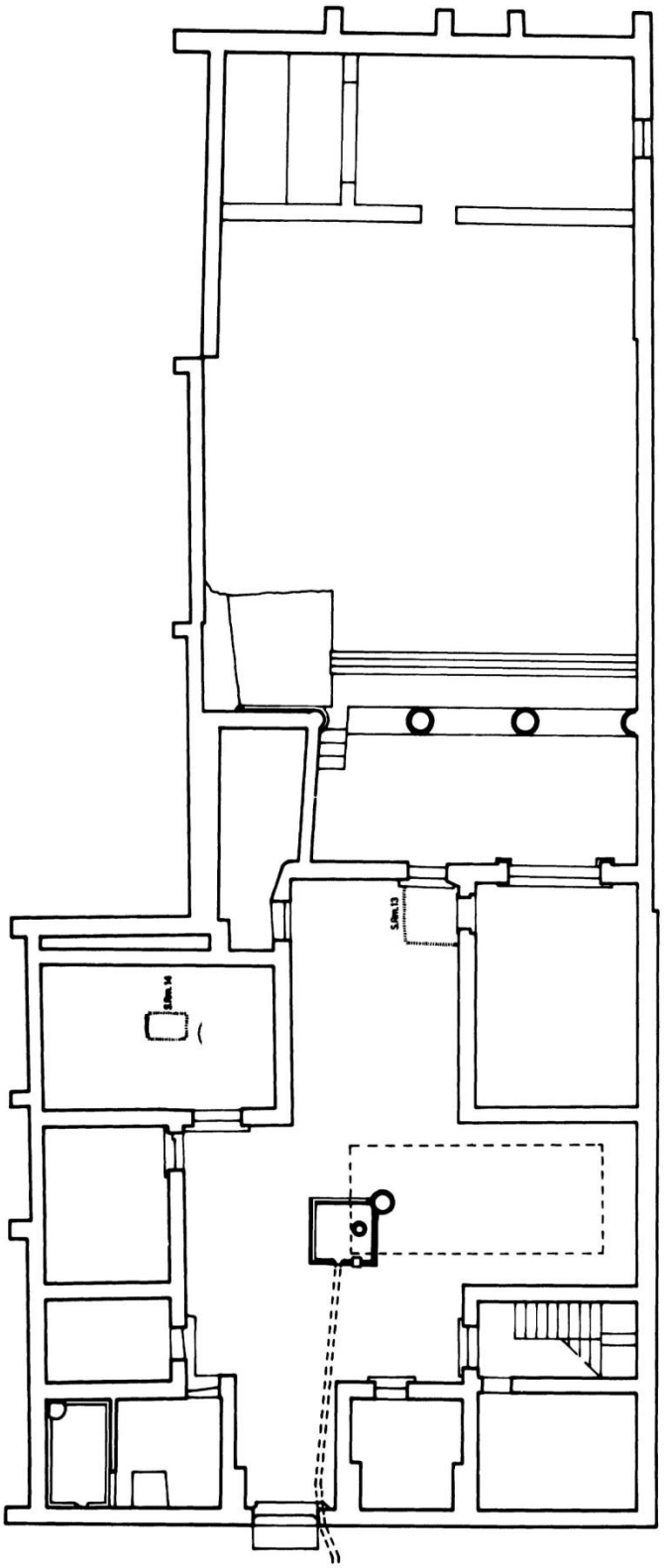

Figure 22 - Cosa - House of the Skeleton (after Bruno and Scott 1993, 108)

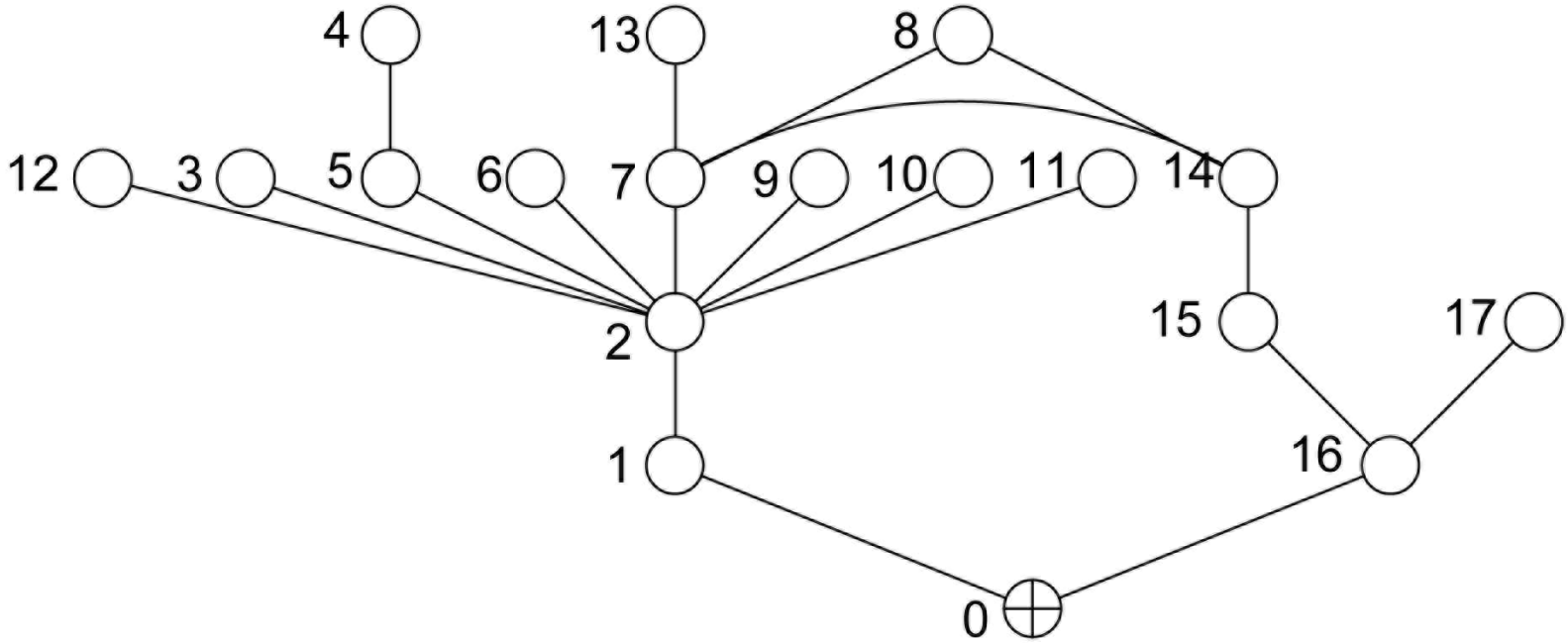

Figure 23 - Access Map - Cosa - House of the Skeleton

Figure 24 - House of the Skeleton - Left: Local - Right: Global

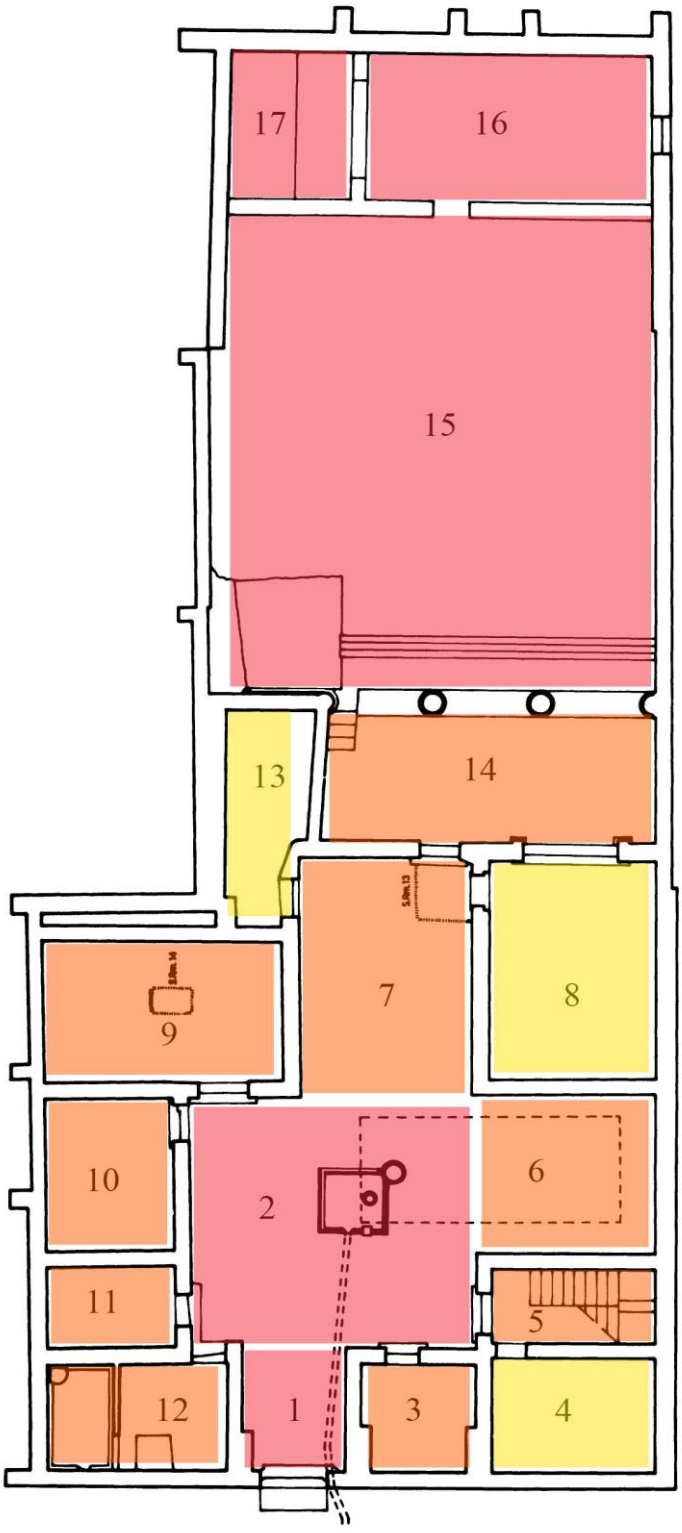

Figure 25 - House of the Skeleton: External/Stranger

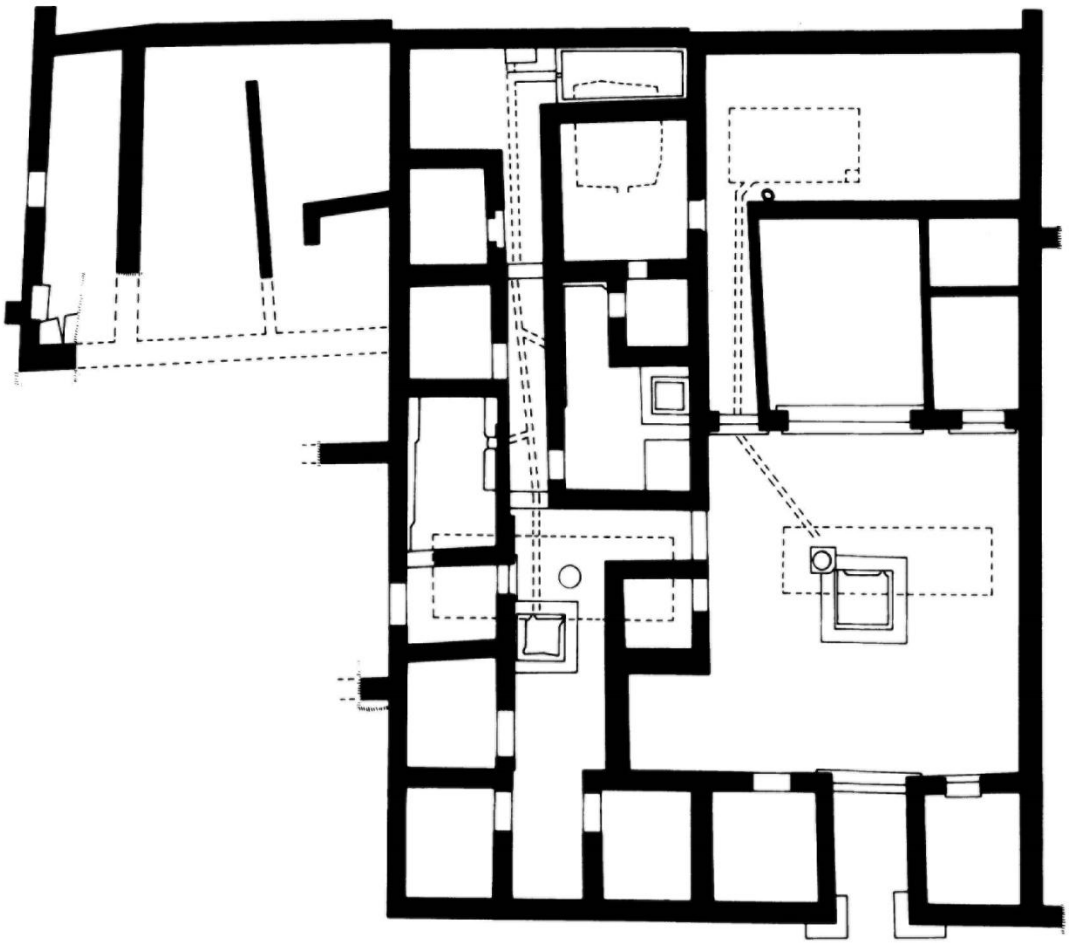

Figure 26 - Cosa - House of the Birds (after Bruno and Scott 1993, 168)

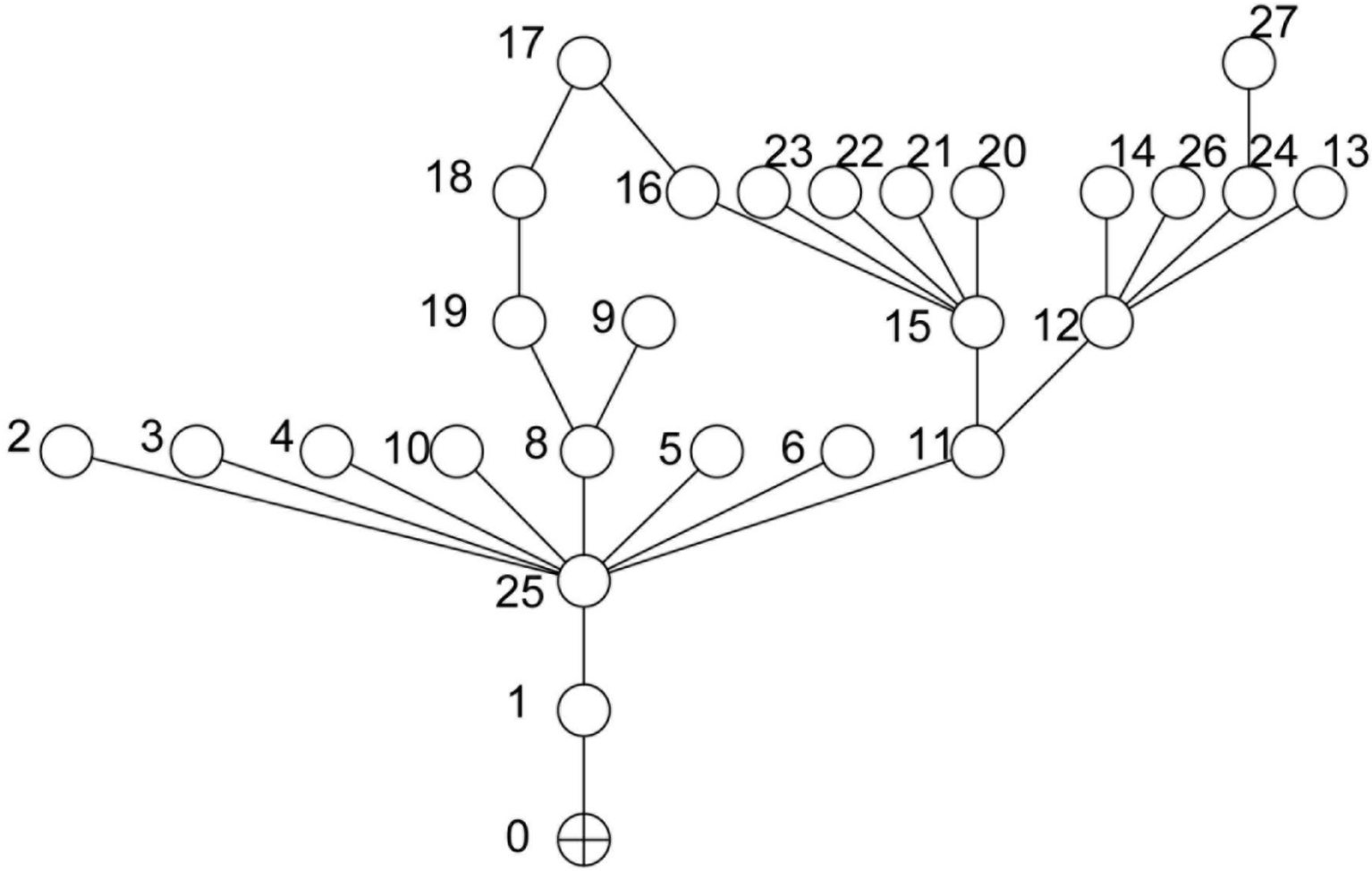

Figure 27 - Access Map - Cosa - House of the Birds

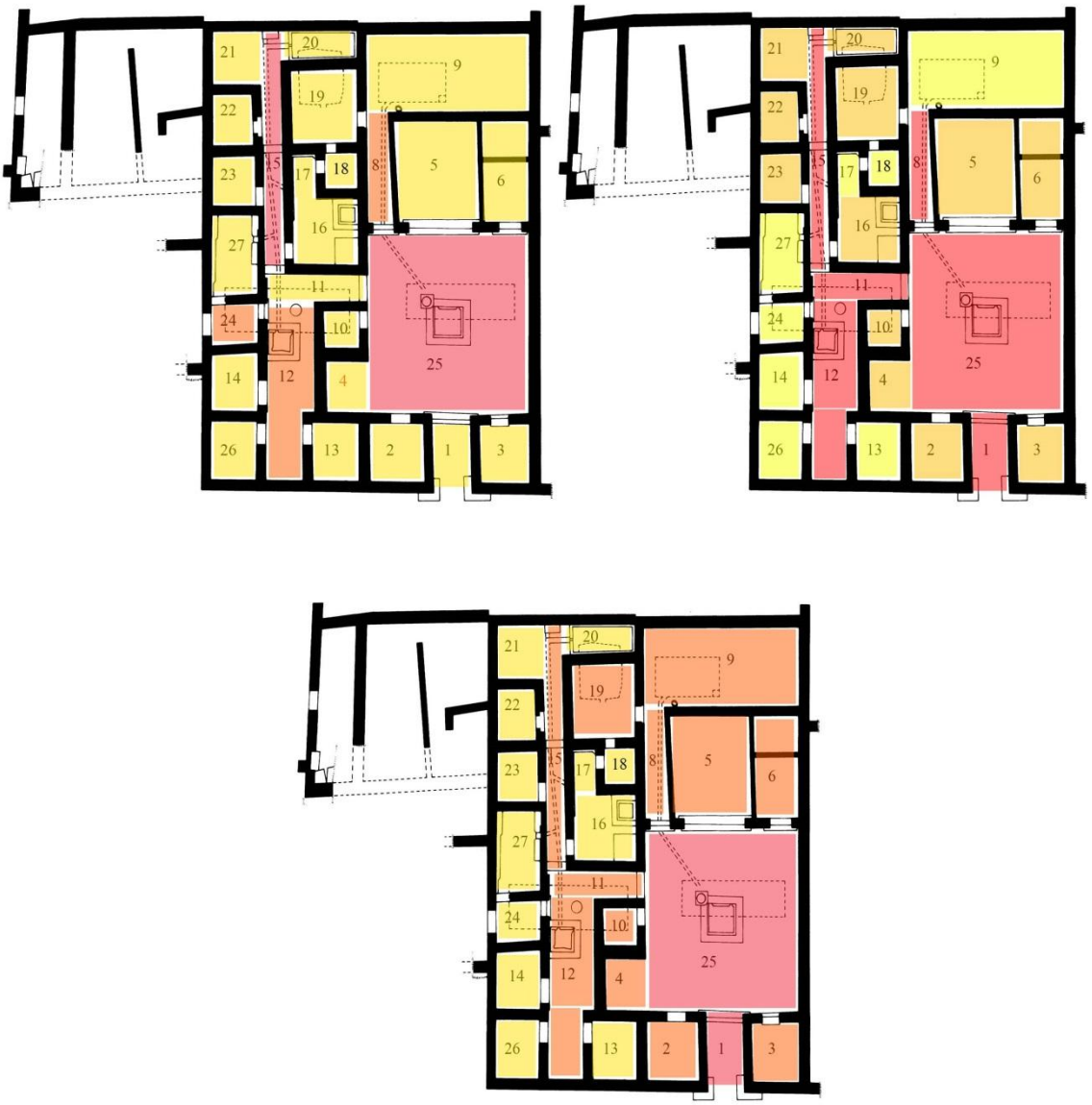

Figure 28 - House of the Birds - Top Left: Local - Top Right: Global - Bottom: Stranger/External

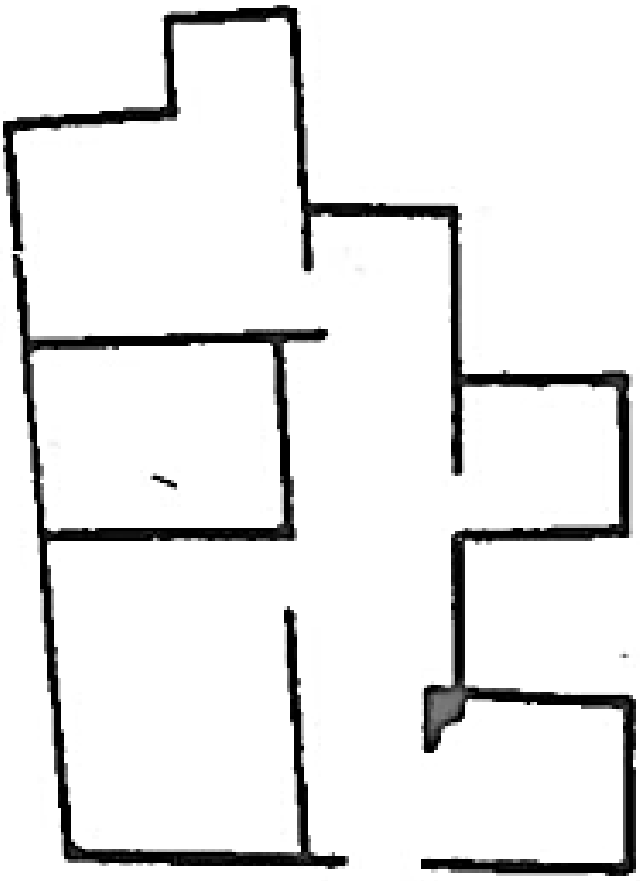

Figure 29 - Pompeii - House VI-xv-22 (after Grahame 2000, 165)

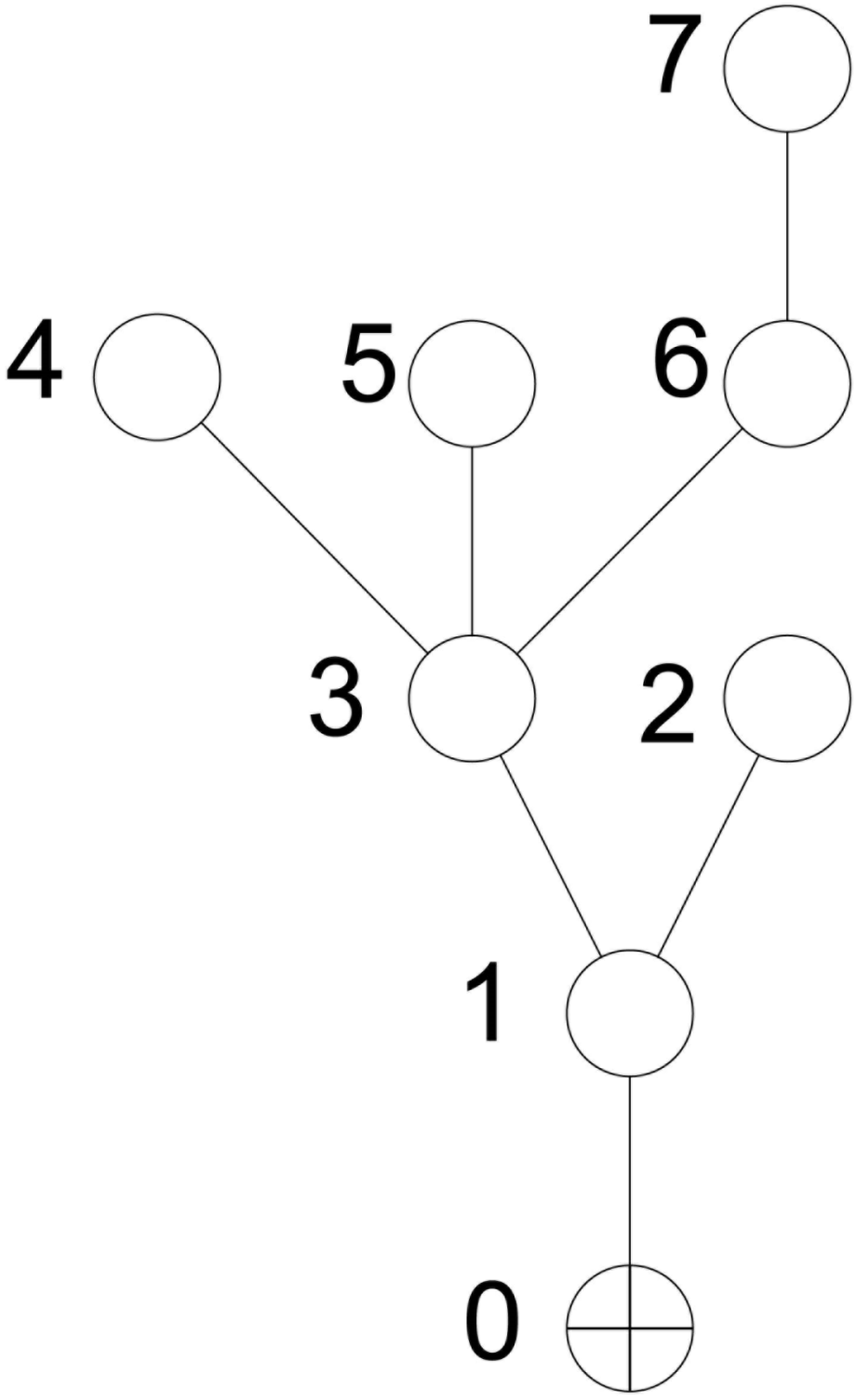

Figure 30 - Access Map - Pompeii - House VI-xv-22

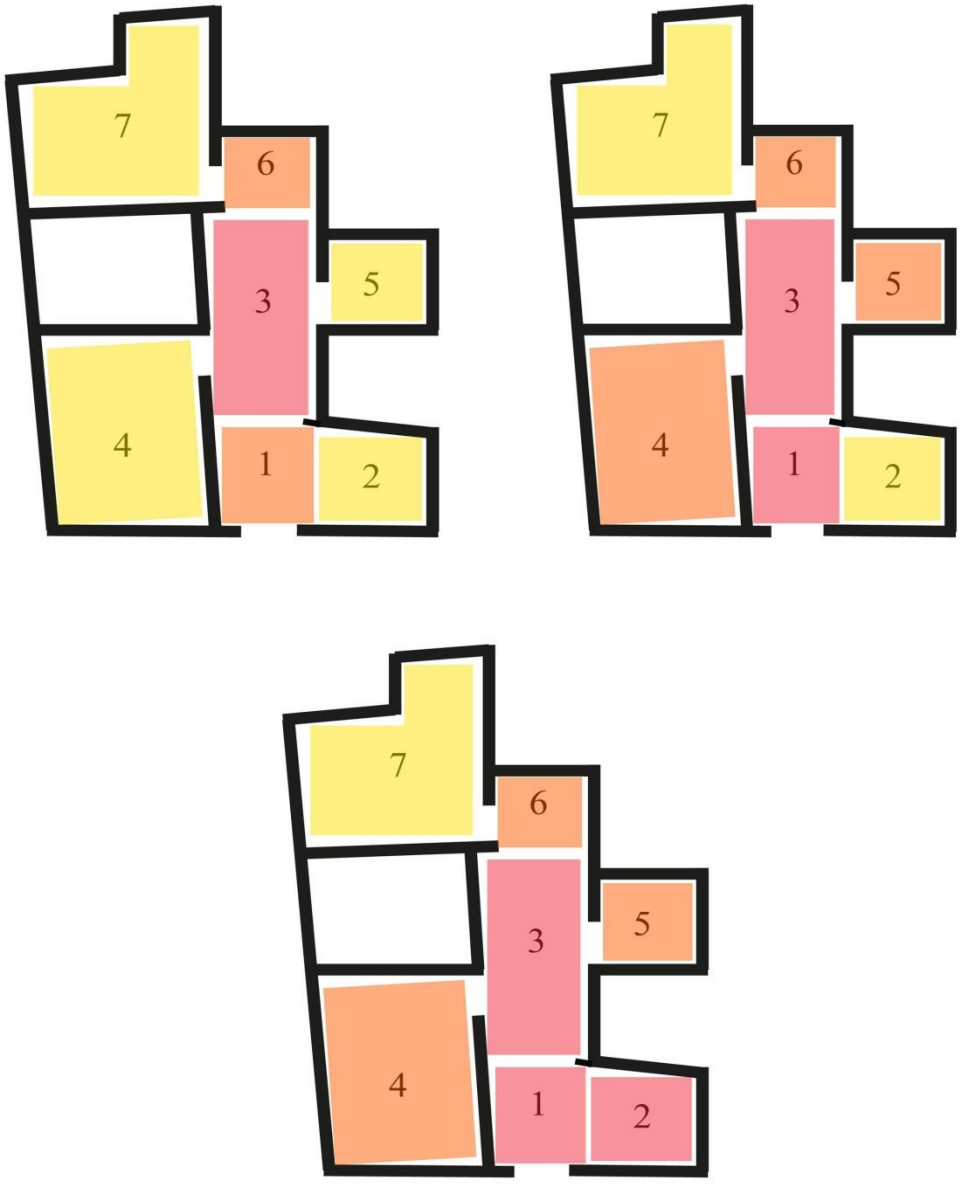

Figure 31 - House VI-xv-22 - Top Left: Local - Top Right: Global - Bottom: Stranger/External

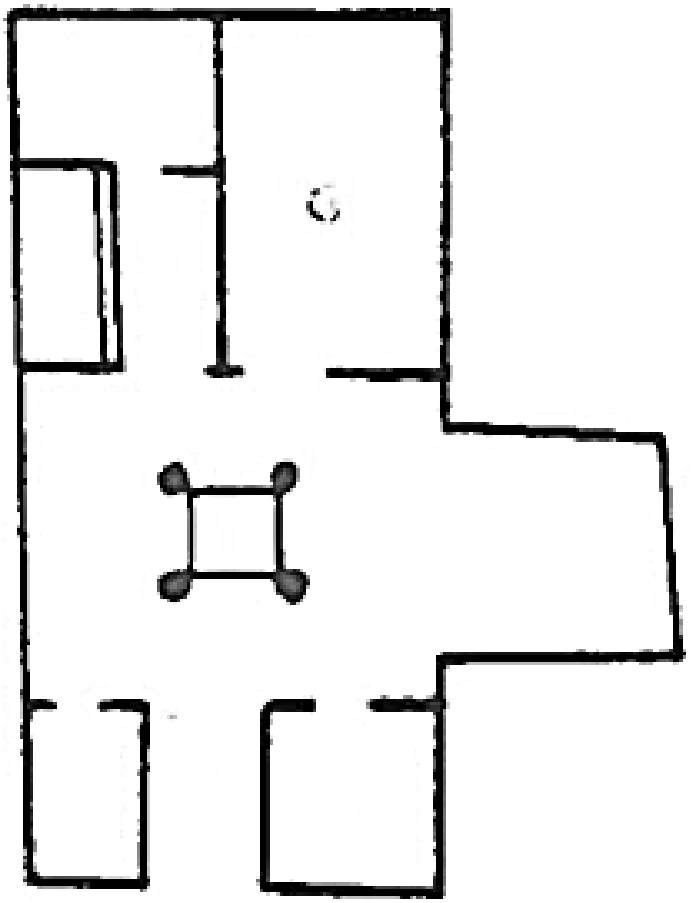

Figure 32 - Pompeii - House xv-9 (after Grahame 2000, 163)

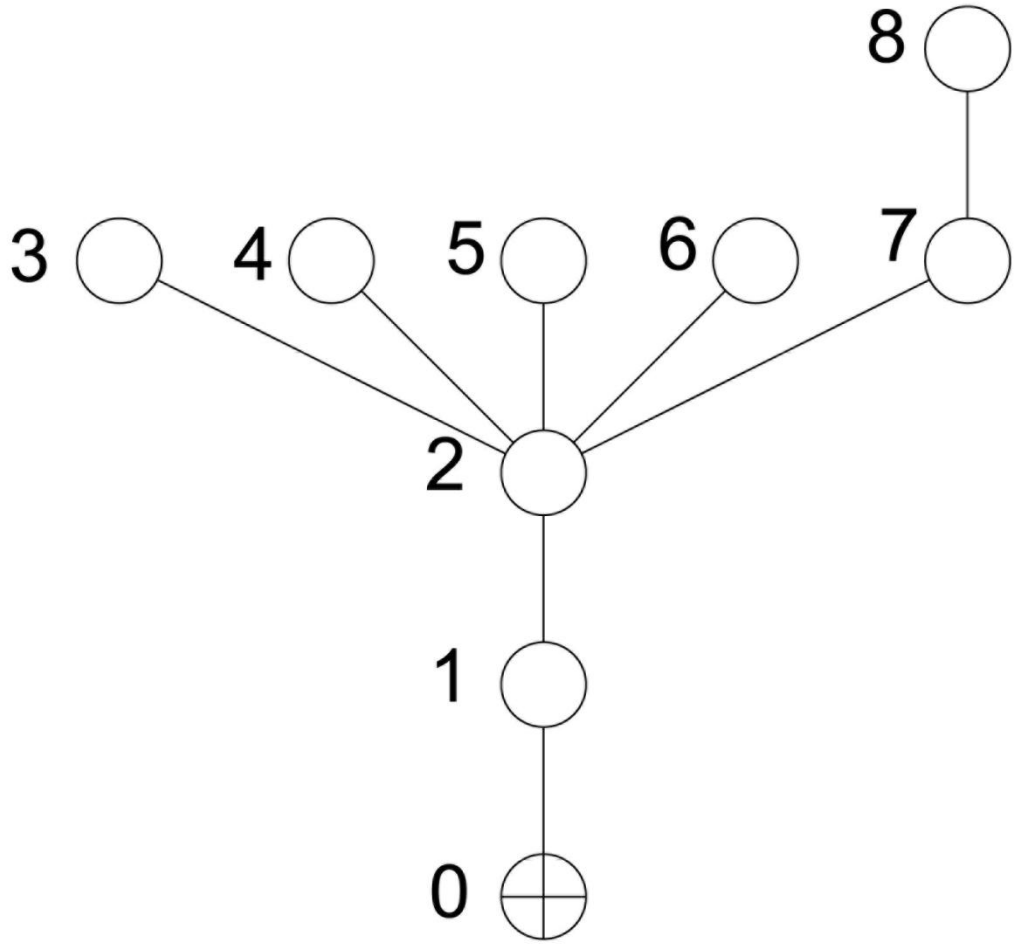

Figure 33 - Access Map - Pompeii - House VI-xv-9

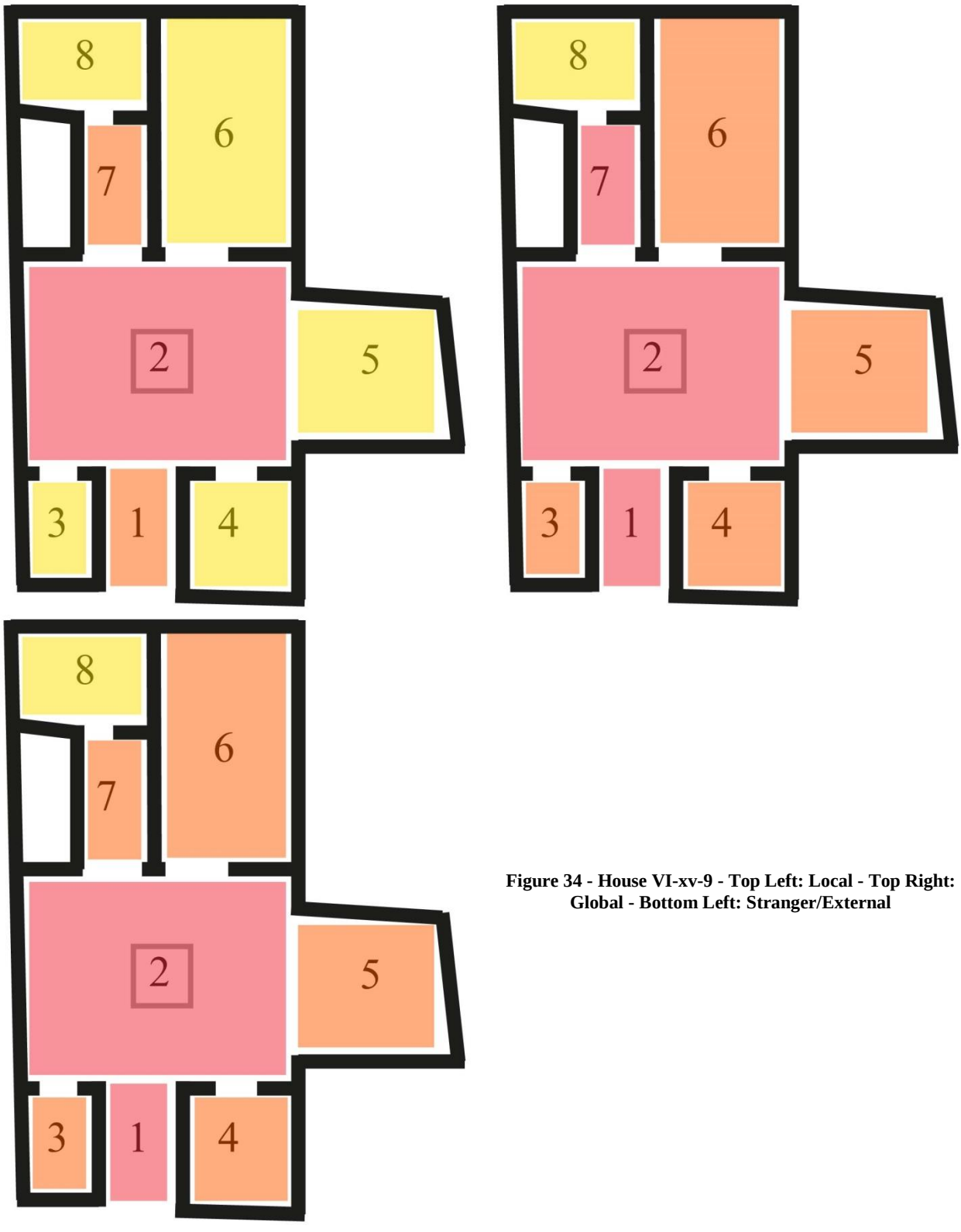

Figure 34 - House VI-xv-9 - Top Left: Local - Top Right: Global - Bottom Left: Stranger/External

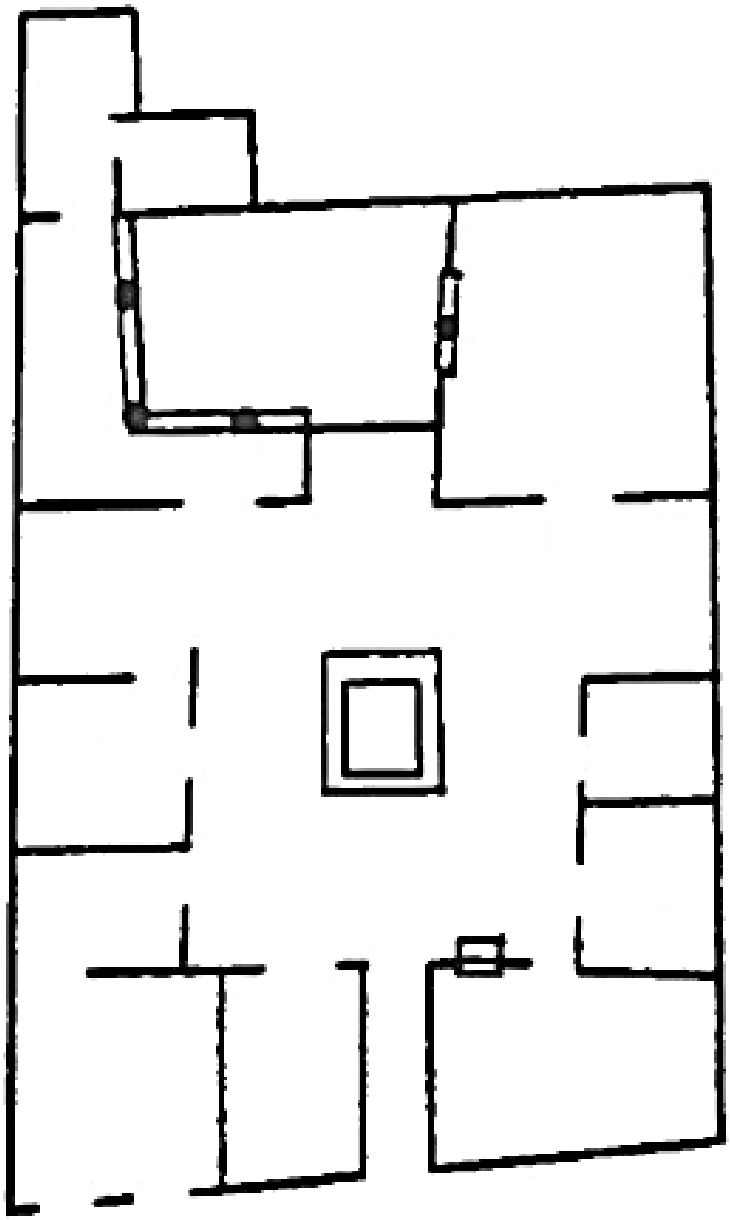

Figure 35 - Pompeii - House VI-vii-4-6 (after Grahame 2000, 126)

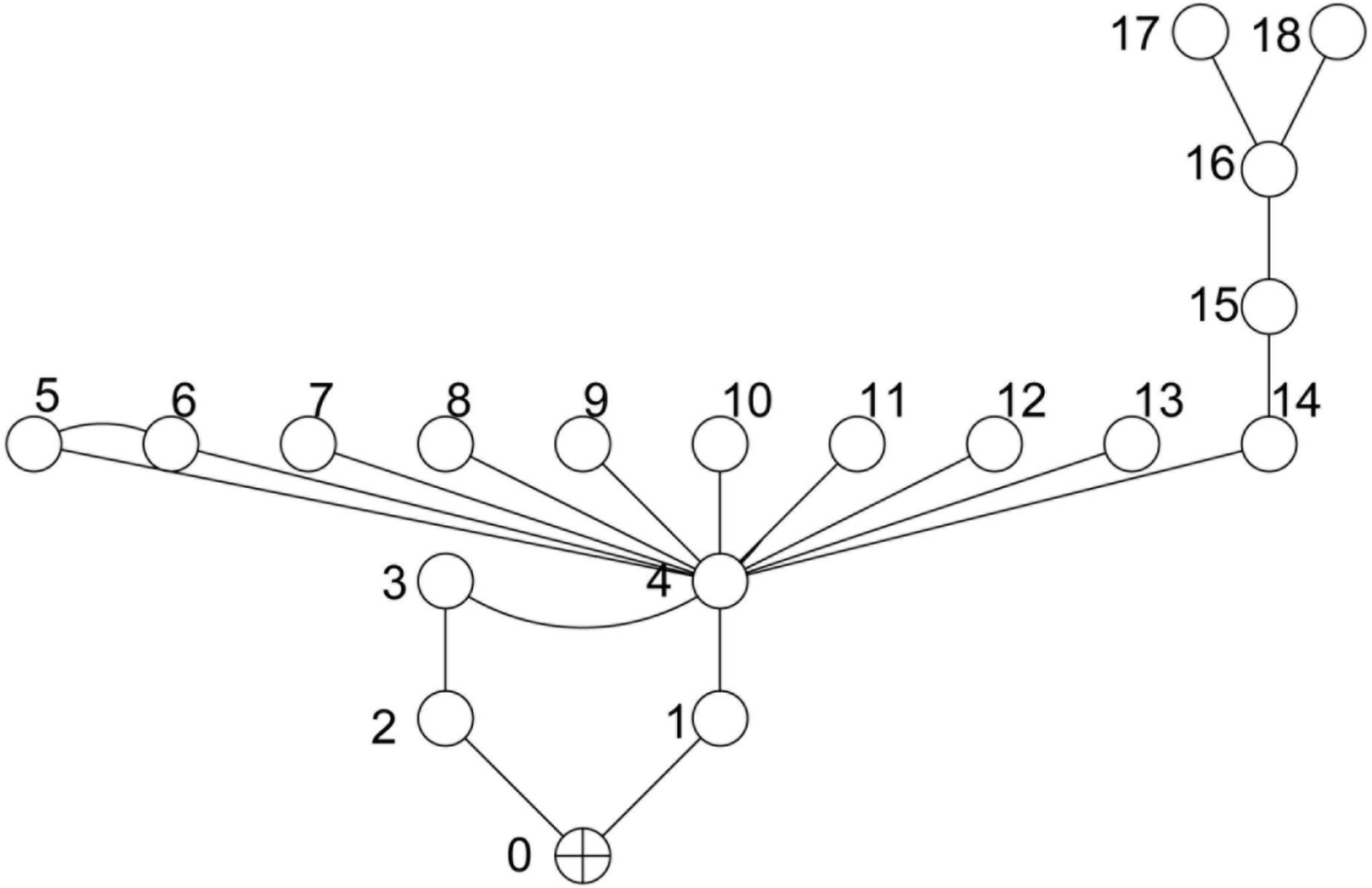

Figure 36 - Access Map - Pompeii - House VI-vii-4-6

Figure 37 - House VI-vii-4-6 - Top Left: Local - Top Right: Global - Bottom: Stranger/External

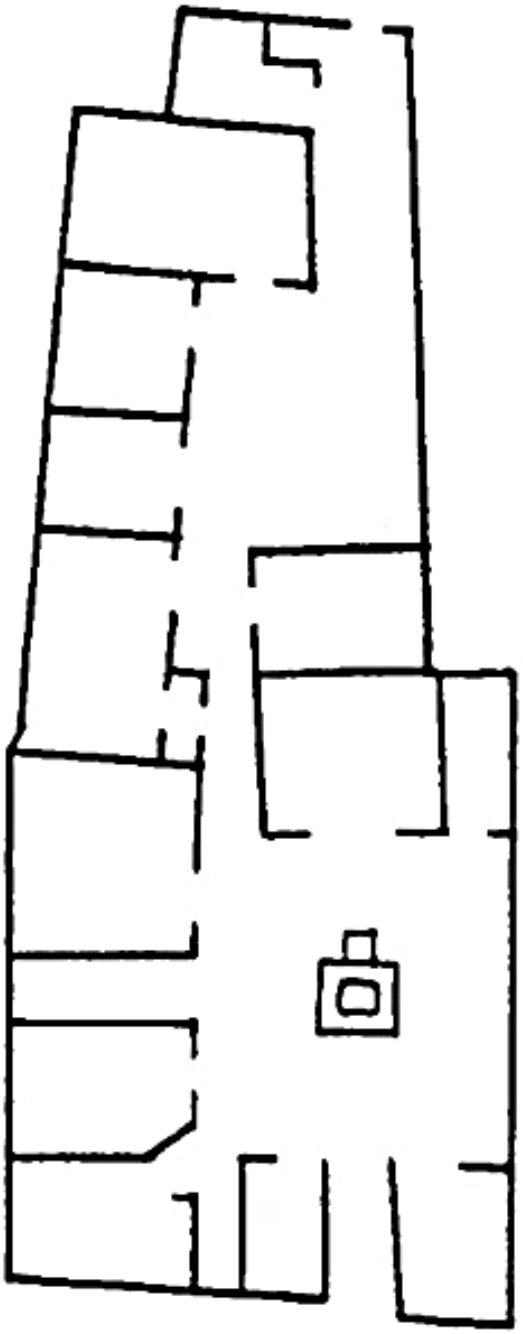

Figure 38 - Pompeii - House VI-ii-17-20 (after Grahame 2000, 109)

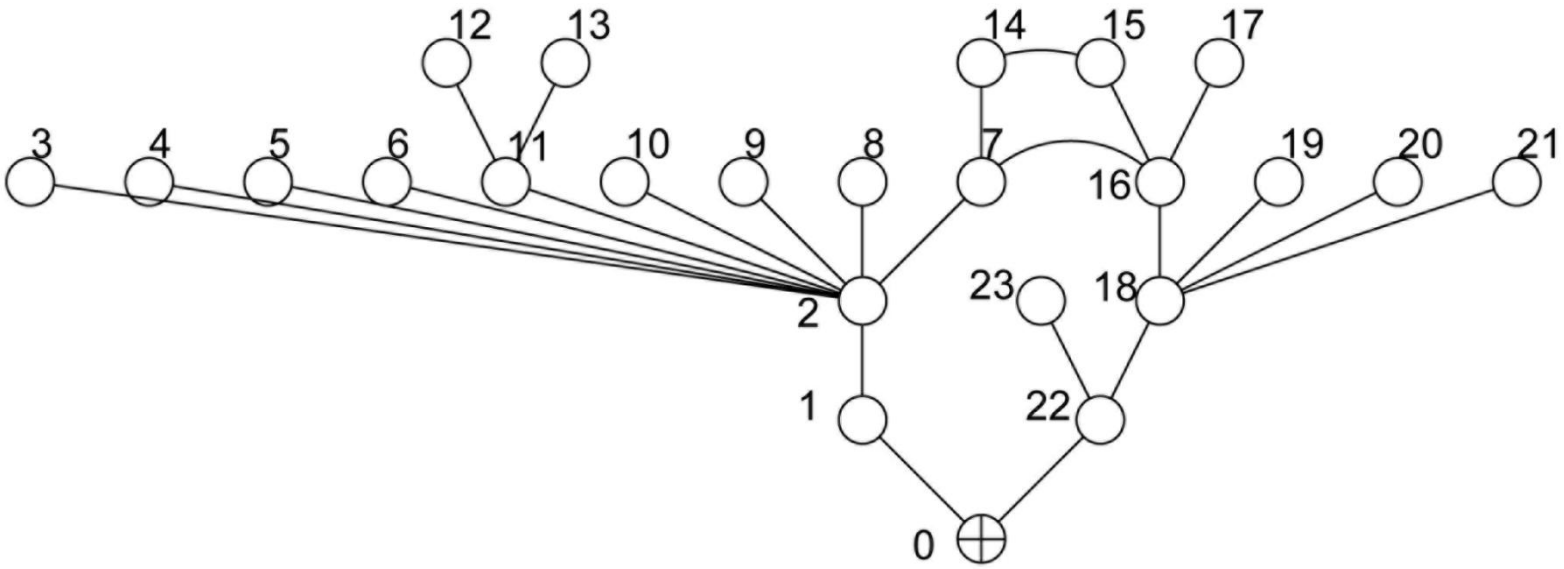

Figure 39 - Access Map - Pompeii - House VI-ii-17-20

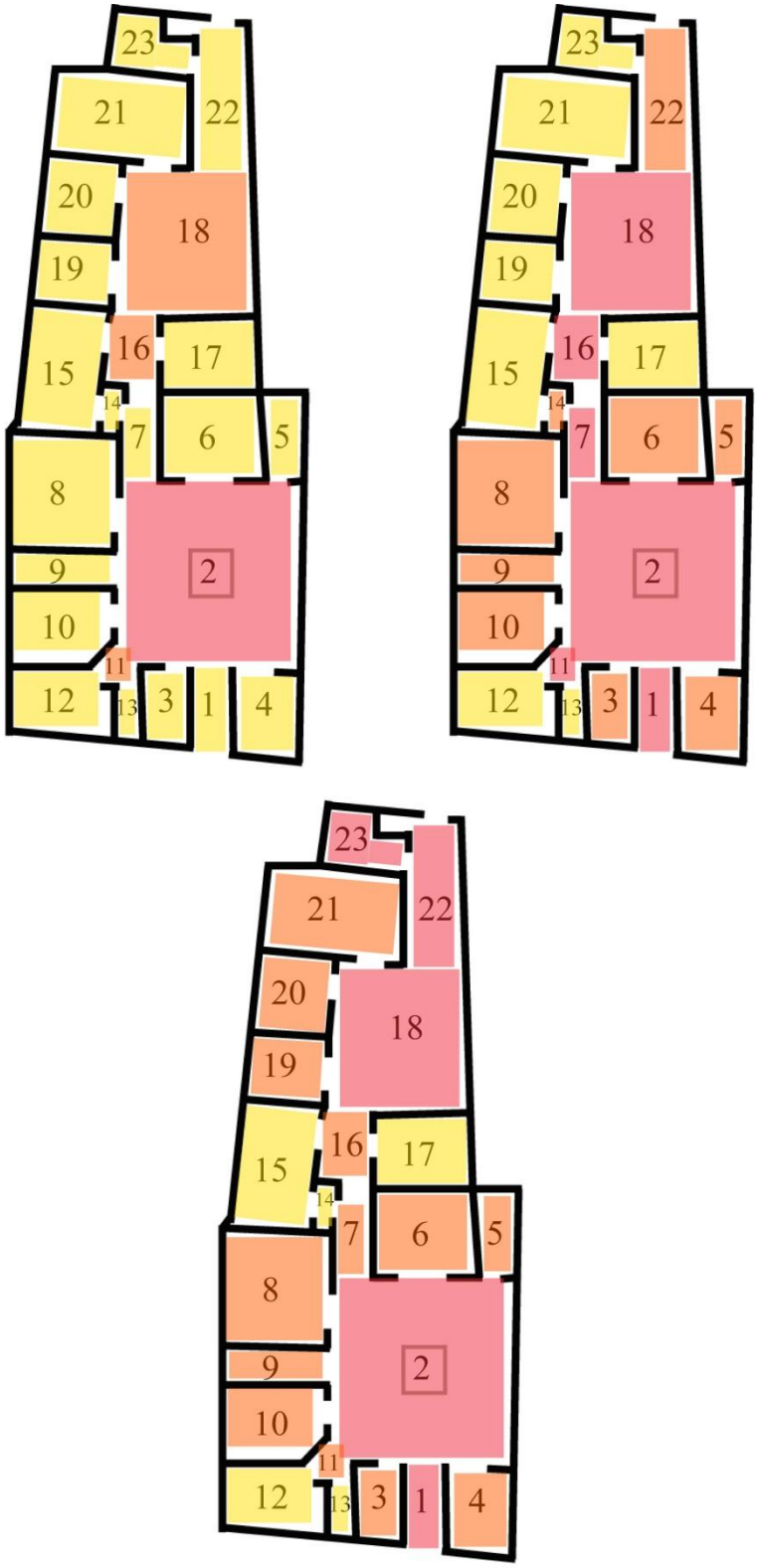

Figure 40 - House VI-ii-17-20 - Top Left: Local - Top Right: Global - Bottom: Stranger/External

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