# AN APPLICATION OF DEPTH ANALYSIS ON MIDDLE BRONZE AGE PALACES AT ACEMHÖYÜK, TELL MARDIKH, AND KÜLTEPE

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# ABSTRACT

AN APPLICATION OF DEPTH ANALYSIS
ON MIDDLE BRONZE AGE PALACES
AT ACEMHÖYÜK, TELL MARDIKH, AND KÜLTEPE

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Many MBA buildings have been studied from different points of views and approaches; however, their spatial patterns were scarcely investigated. This thesis aims to assess the usefulness of Depth Analysis, a sub-method of Space Syntax, in the understanding of spatial patterns of MBA palaces. The palaces of key MBA sites, Acemhöyük, Tell Mardikh and Kültepe, were selected for the analysis. In the conclusion it is suggested that Depth Analysis can be a very useful method in understanding the configuration of spaces when there is sufficient available data. An equally successful application of this method lies in the comparative analysis of different buildings.

Keywords: Space Syntax, Depth Analysis, spatial pattern, justified permeability graph, Middle Bronze Age palaces.

# ÖZ

ACEMHÖYÜK, TELL MARDIKH VE KÜLTEPE'DEKİ
ORTA TUNÇ ÇAĞ SARAYLARINDA
DERİNLİK ANALİZİNİN BİR UYGULAMASI

Eren, Güzin

Yüksek Lisans, Yerleşim Arkeolojisi Bölümü

Tez Yöneticisi: Yrd. Doç. Geoffrey D. Summers

Aralık 2010, 146 sayfa

Birçok Orta Tunç Çağ yapısı değişik bakış açısı ve yaklaşımlarla çalışılmış ancak bu yapıların mekansal dokuları nadiren incelenmiştir. Bu tezin amacı, Mekan Dizimi tekniğinin bir alt metodu olan Derinlik Analizinin, Orta Tunç Çağ saraylarındaki mekansal dokuların anlaşılması hususunda yararlılığını sorgulamaktır. Analiz için Orta Tunç Çağ'ın anahtar yerleşimlerinden olan Acemhöyük, Tell Mardikh ve Kültepe'deki saraylar seçilmiştir. Sonuç olarak, mevcut yeterli verinin bulunması halinde, Derinlik Analizinin yapıların mekansal düzenleşiminin anlaşılması adına çok yararlı bir metot olarak karşımıza çıktığı öne sürülmüştür. Metodun bir o kadar başarılı uygulaması da değişik boyuttaki binaların karşılaştırılmasında yatmaktadır.

Anahtar Kelimeler: Mekan Dizimi, Derinlik Analizi, mekansal doku, sıralı geçirgenlik grafiği, Orta Tunç Çağ sarayları.

To My Family

and

Amico Meo Carissimo

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Technical advice from Mustafa Eren and Özün Taner for the production of three-dimensional views is gratefully acknowledged.

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# CHAPTER I

# INTRODUCTION

This thesis assesses the usefulness of the application of Depth Analysis, one of the methods of Space Syntax, in the understanding of the spatial patterns within Middle Bronze Age palaces. Three case studies, the Sarıkaya Palace at Acemhöyük, Palace Q at Tell Mardikh and the Warshama Palace at Kültepe were selected for this study.

**Chapter Two** sets out the aim of the thesis, summarizes Space Syntax and provides reasons for choosing the Middle Bronze Age. Finally the reasons for selecting the case studies are given.

**Chapter Three** describes the methods used: data preparation, data presentation and data analysis. Then the theory of the depth analysis is presented. Finally the application of Depth Analysis is demonstrated using two buildings, one modern and one ancient.

**Chapter Four** describes the case studies. Firstly, overviews of Acemhöyük, Tell Mardikh and Kültepe are given. Secondly, the Sarıkaya Palace, Palace Q and the Warshama Palace are described in detail together with the discussion of the available data for the application of the Depth Analysis.

**Chapter Five** introduces the successive stages of data analysis for each. Data analysis consists of preparation of color-coded plans and isometric views, preparation of justified permeability graphs and, finally, calculations of syntactic properties.

**Chapter Six** presents the results of the Depth Analysis structured in a way that the results for each palace are followed by cross-comparisons.

**Chapter Seven** comprises discussion and concluding remarks.

# CHAPTER II

# AIMS AND SUBJECT

## 2.1. AIMS

Space Syntax is a set of techniques for the analysis of the spatial configurations within urban contexts, as well as within buildings. These methods, each concentrating on different issues, provide invaluable information for the configuration of spaces in relation to their function and the people using them. One of these methods, Depth Analysis, focuses on spatial patterns and permeabilities within buildings.

Depth Analysis has been in use by archaeologists since not long after the set of methods were first generated. Several studies, with different research questions, proved that relationship of the spaces, recurrences of cells, and integration/segregation of units provide insights into the understanding of building traditions of a culture and the influences or differences between cultures. It also provides clues about the people who used those contexts or lived in them. Furthermore, the analysis of structural formations of ancient buildings is essential in the understanding of circulation patterns. Circulation within a building is directed by the spatial formation in which the passages between spaces and location of doorways appear as factors controlling the flow of people. This thesis aims firstly to inquire the usefulness of the method in the search of the spatial patterns within the Middle Bronze Age palaces and, secondly, to explore what kind of information and insights can be derived from the application of this method on Middle Bronze Age palaces.

The choice of the Middle Bronze Age is twofold. Firstly, studies using Space Syntax have covered a wide a range of periods, ranging from Neolithic Period to Mediaeval Ages; but no studies have been conducted for the Middle Bronze Age. The Middle Bronze Age appears as a period of innovations in terms of political and social changes for Anatolia, which can be seen in the introduction of writing, the experience of a new way of life under rule of kings, and the operating of the organized, long-distance Assyrian trade with newly founded institutions. The scene at the beginning of the Middle Bronze Age in north Syria is rather different; here an upheaval after the collapse

of several settlements at the end of the Early Bronze Age is visible, represented by the abandonment of sites in the first centuries of second millennium BCE, which was followed by a regeneration of complex urban polities in the succeeding Middle Bronze Age II.[1]

Secondly, few monumental structures have been analyzed by Space Syntax. The palace of Middle Bronze Age Anatolia was one of the very important institutions for the Assyrian trade. Besides, there are palaces in north Syria, where similar trade was conducted, as attested by a small amount of literary sources. These, however, belong to a different architectural tradition. Thus, the analysis of the circulation patterns within the palaces in Anatolia and north Syria might reflect the physical operation of the trade, and thus provides a means by which to compare the spatial patterns of monumental architecture in different regions.

### 2.2. SUBJECT

Acemhöyük, Tell Mardikh and Kültepe have been chosen for two reasons. Firstly, they are the key sites for the Middle Bronze Age representing two different regions (central Anatolia and North Syria). Secondly, there is sufficient available information from the publications of excavations.


*Figure 2.1. Locations of the case studies.*

[1] For a detailed explanation see Akkermans and Schwartz 2003.

### 2.2.1. Selected Sites and their Significance

The Middle Bronze Age of Central Anatolia was characterized by small kingdoms ruled by dynastic royalty. Prolific written evidence attests long-distance overland trade centered on the Old Assyrian capital of Aššur, situated on the west bank of the Tigris River in northern Mesopotamia.[2] There are indications that this organized trade may have its roots in the Early Bronze Age.[3] Aššur acted as the hub of this long-distance, institutional, organized and highly profitable trade system which stretched from Afghanistan, Babylon to the Black Sea.[4] Kültepe, located in the middle of central Anatolia, some 1000 km northwest of Aššur, was the redistributive centre at the western end of this trade system. (Figure 2.2.)

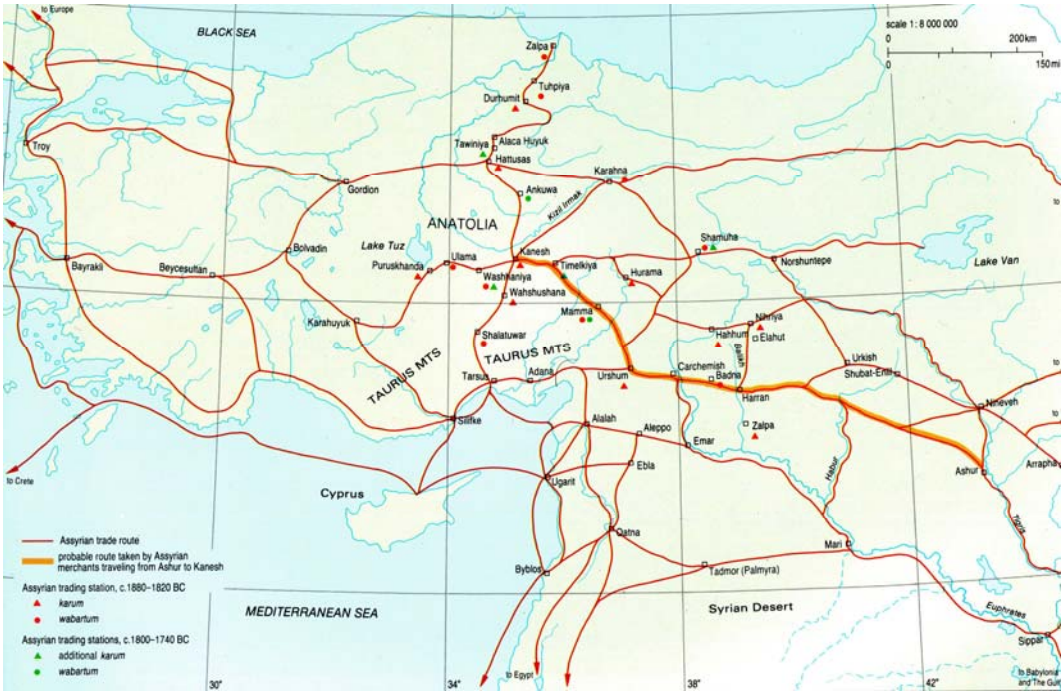


*Figure 2.2. Map of the trade routes in the Middle Bronze Age. (After Roaf 1990, 113.)*

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[2] For the city of Assur see Pedde 2003; Llyod, Müller and Martin 1974, 25; Lloyd and Müller 1986.

[3] Veenhof (2000, 865) reports that according to a legendary tale, the Mesopotamian merchants lived in Burushkhanda (most possibly Acemhöyük), as early as 24th century BCE, in the period of the Sargonic Akkad; adding that the links between Anatolia and Mesopotamia should have continued with the take over of Aššur after the fall of the Third Dynasty of Ur. See also T. Özgüç 1986a, for the relationships of Kültepe with southeastern Anatolia and north Syria in the 3rd millennium BCE.

[4] For the role of Kanesh in trade system T. Özgüç 2005 has an extensive bibliography. However, it is essential to mention the leading studies of Leemans 1960, Larsen 1967, 1976, 1977, Garelli 1963, Orlin 1970, 2000, Veenhof 1972 and 1977 and the new study of Larsen 2000.

Kültepe, literally ash mound, a modern name that reflects the ashy nature of the höyük, was the capital of Kingdom of Kaniš (otherwise Kaneš or Neša). Doubtless the geographic centrality, together with abundant water and fertile land, helps to explain its importance as a "gateway city".[5] The city lies 21 km (a long days march) from the bend in the Kızılırmak (The Red River, the Hittite Marassantiya,[6] and the classical Halys River), the modern province of Kayseri, the Persian Satrapy of Kapakta,[7] and Roman Caesarea Mazaka[8], the provincial capital of Cappadocia. Redirected from Kaniš, the Anatolian system of trade organized by the Assyrian merchants and their Anatolian counterparts stretched northwards to Zalpa, perhaps located at or near Sinop on the Black Sea, and westwards to the Salt Lake and perhaps beyond to Karahöyük, the Middle Bronze Age precursor to Konya.

Acemhöyük is located on the southeast of the Salt Lake, 18 km northwest of modern Aksaray on the fertile central Anatolian plain, close to Melendiz Çay. Acemhöyük is the westernmost Assyrian trading colony, thus far located; however, the ancient name is still a matter of debate. The seals and bullae from Acemhöyük are of special importance in shedding light onto the western wing of this trade system in Anatolia.

A small number of documents from Kaniš attest similar trade with north Syria; particularly Tell Mardikh.[9] Tell Mardikh, a key site, is located about 60 km south of Aleppo on the dry farming lands of north Syria[10]. The site is identified with ancient Ebla by the discovery of a headless royal statue, having a cuneiform inscription.[11]

Thus, the choice of Acemhöyük, Tell Mardikh and Kültepe for the analysis is based on their importance in the two regions of Anatolia and north Syria during the Middle Bronze Age.

### 2.2.2. Overview of Excavations at the Selected Sites

Acemhöyük has been extensively excavated since the first excavations were started in 1962 by Nimet Özgüç of Ankara University.[12] Özgüç published annual excavation

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5 Burghardt 1971, 269-73; Hirth 1978, 37-9.
6 In Gurney (2003, 122) and Bryce (2005, 44) states Marassantiya was used as the name for Kızılırmak in the Hittite Period.
7 Der Kleine Pauly 1979, 114.
8 French 1998, 22; Mitford 2000, 989.
9 Bilgiç 1992.
10 Akkermans and Schwartz 2003, 235.
11 Matthiae 1984, 19.
12 N. Özgüç 1966, 3.

reports in *Belleten*, while her publications of the seals and bullae from Acemhöyük and Kültepe remained the principal resources. (Figure 2.3.)

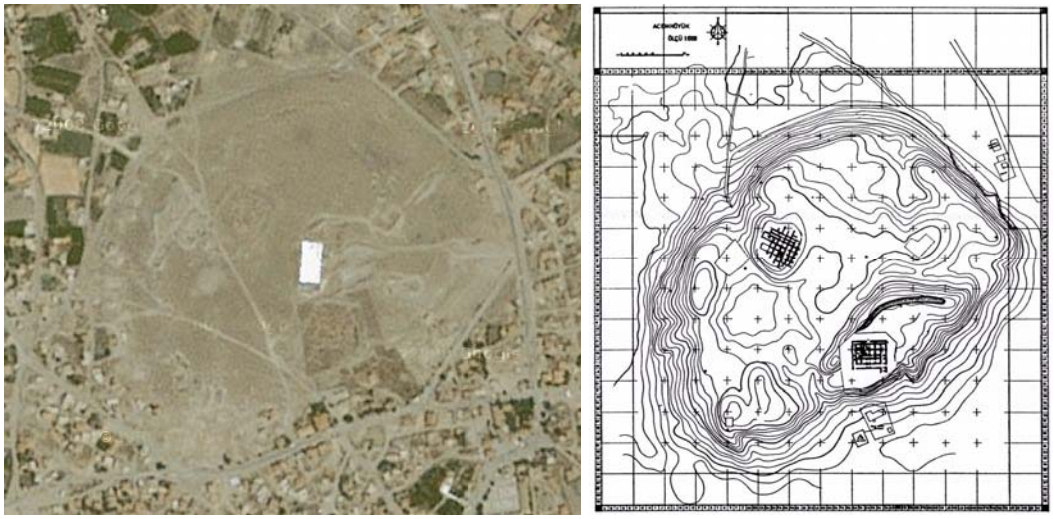

*Figure 2.3. Aerial view and plan of the mound of Acemhöyük. (After N. Özgüç 1980a.)*

Aliye Öztan, also from Ankara University took over the directorship in 1989. The results from Öztan's continuing excavations can be followed in the *Annual Symposium for the Results of Excavations, Surveys and Archaeometry in Turkey*. The two palaces in Acemhöyük were excavated in different years. The palace on the southern part of the mound, the Sarıkaya Palace, has been excavated in the early years of the expedition, between 1962 and 1972, whereas the palace on the northwest of the mound, the Hatipler Palace in 1974.

The excavations at Tell Mardikh were begun by M. Liverani and P. Matthiae of the University of Rome in 1964. The first campaign was between 1964 and 1973, focusing on the Middle Bronze I-II city. The second campaign held between 1974 and 1977 was important for uncovering the Palace G and its fabulous royal archive, dating to the Early Bronze Age. Palace Q in the west lower city and the royal necropolis dating back to Middle Bronze Age are unearthed during the third campaign which was conducted between 1978 and 1982. The other Middle Bronze Age palace (Palace P-the Northern Palace) has been identified in 1986.[13] Finally the Archaic Palace of Ebla, which

[13] Matthiae 1984, 19.

represents the transition period between the Early Bronze Age IV and Middle Bronze I, is unearthed between 1993 and 1996.[14] (Figure 2.4.)


*Figure 2.4. Aerial view and plan of the site of Tell Mardikh/Ebla. (After Matthiae, 2006.)*

After the first known visit to Kültepe in 1881 by Pinches, the site has been excavated by several scholars. In 1893 Chantre made soundings in the eastern part of the lower city and partially on the mound. He published his results in *Mission en Cappadoce* (Paris 1898). The 1906 excavations by H. Wrinkler are unpublished. In the same year Grothe began two years of research and the results are published in *Meine Vorderasien Expedition in 1906-1907*. In 1925 Hrozný excavated on the mound and lower city. Hrozný bought from the villagers some 1000 tablets from which it was later understood that the lower city was the *karum* of Kanesh. Hrozný's work was published in 1927, in a series of articles titled *Rapport Préliminaire sur les Fouilles Tchécoslovaques du Kültepe*.[15] Hrozný, with an addition to his major contributions to archaeology by deciphering the Hittite language, revealed the importance of the tablets of Kültepe but he has also been criticized for his destruction of the site.[16]

[14] Matthiae 2006, 87.
[15] Şahin 2007, 154-6; see also T. Özgüç 2005, 8-9.
[16] T. Özgüç 1999, 2-3.

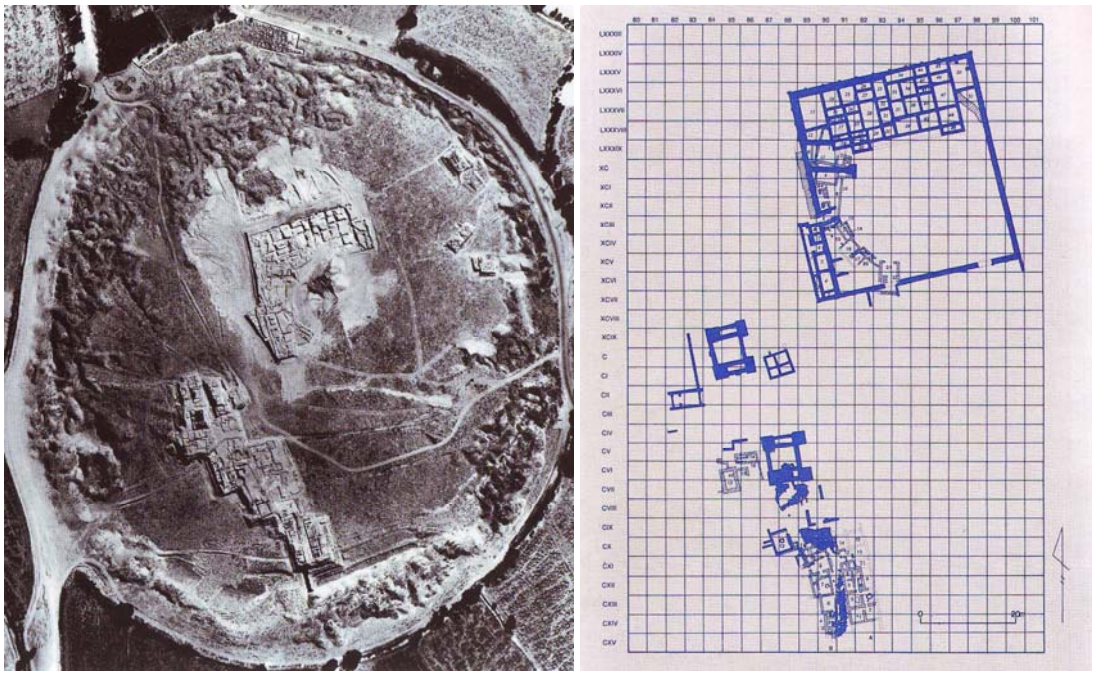

*Figure 2.5. Aerial view and the plan of the mound of Kültepe/Kaniš. (After T. Özgüç 2005.)*

Systematic excavations were started by the Türk Tarih Kurumu (Turkish Historical Society), under the direction of Tahsin Özgüç in 1948 and continued until now.[17] (Figure 2.5.) The palaces of Kültepe were excavated from 1958 to 1962. Özgüç bequeathed several valuable publications about Kaniš. Fikri Kulakoğlu from Ankara University, the present Director, is conducting innovative research and site conservation which includes new work on the mound.

The available information from the sites of Acemhöyük, Tell Mardikh and Kültepe is sufficient to allow the application of depth analysis.

All of these central-political trading centers include palaces in their landscapes, which was the final reason for the selection.

[17] Şahin 2007, 156.

# CHAPTER III

# METHODS

## 3.1. DATA PREPARATION

The basic information comprises the palace plans and available archaeological data. The main sources for the plans are the preliminary reports, as well as books and articles directly related to the palaces. As a first step, the plans were gathered together from the available sources. The Acemhöyük Sarıkaya Palace plan was extracted from two sources, N. Özgüç (1980a) and Öztan (1991). For Palace Q at Tell Mardikh the preliminary report published by Matthiae in 1983 was used together with the two articles by Matthiae (1997c and 1984) which contain the reconstructed block plan and an isometric drawing of the palace, and an article by Marchetti (1999) including the reconstructed block plan, with the extended northeast wing. For Kültepe-Warshama Palace, T. Özgüç's (1999) "T*he Palaces and Temples of Kültepe-Kaniš/Neša*" was used. Both the stone-by-stone plan and the block plan are available in this book.

## 3.2. DATA PRESENTATION

Each plan was scanned at 1200 DPI. Each image was then resized so that every plan was at a scale of 1/1000. The advantage of re-scaling is that it allows one to have an at-first-sight impression for comparison. Another advantage is that it permits superimposition of the plans. These superimposed plans are both the plan of what was excavated and the reconstructed block plan of Tell Mardikh Palace Q, and the stone-by-stone plan and the block plan of the Warshama Palace at Kültepe.

In the subsequent stage the plans were digitized, using AutoCAD. When digitizing, the first principle was to differentiate between the excavated brickwork, the foundations and the reconstructed walls.

Secondly, it was essential to locate and show the doorways. The location of doorways is shown (where known) on the published plans. At the Warshama Palace, however, no doorways existed in the preserved walling of the palace basement. In the digitized versions of the plans, where the information of the doorways is absent the walls are drawn continuously, as if none were located.

In the final stage isometric views of the palaces were drawn from the digitized plans. These views were created by placing one corner of the palace on a 120° chart and adding the dimensions to expand the drawings. These drawings were helpful in visualizing the circulation systems in three dimensions. These digitized plans and the isometric views formed the base for data analysis

### 3.3. DATA ANALYSIS

Data analysis comprises an explanation of Space Syntax, and of its component, Depth Analysis. This is followed by the application of the method to two case studies.

#### 3.3.1. Space Syntax

Space Syntax can be identified as "a class of techniques and methods which is used for analyzing any kind of spatial configurations within built environments, as well as for creating healthier urban areas and more functional buildings in relation to human activities." The idea of Space Syntax originates from the theories and methods that were published in "*Space Syntax*"[18] and "*The Social Logic of Space.*"[19] Soon after these publications, Hillier and Hanson's space syntax idea started to be widely used and subsequently the entire set of methods took the name "Space Syntax".

The methods of Space Syntax have extensively been a focus of many research questions asked by scholars of several disciplines, such as architecture, urban planning, transportation management, interior design and museology. Yet the advantage of providing a chance to analyze the configuration of spaces, made Space Syntax available for other disciplines, one of which is archaeology. However, the usage of the space syntax methods by archaeologists is relatively new, having a history of about two decades.

The pioneers of applying space syntax in archaeology are Foster, who studied the spatial patterns of Scottish Atlantic Iron Age buildings to understand the social structure[20] and Byrd and Banning, who studied Levantine Neolithic architecture.[21] Byrd and Banning's study puts forward that the syntactic organization of the Neolithic houses might provide an insight to the differing economic status of the households, whereas

[18] Hillier et al 1976.
[19] Hillier and Hanson 1984.
[20] Foster 1989.
[21] Byrd and Banning 1989.

the need of different functions in the structures; and the differing shapes, from circular to rectangular, can point out the social changes.

In the late 1990's the use of Depth analysis in the studies of ancient-built environments and the cultures of the American Southwest reached its peak.[22] Subsequently, the application of Depth Analysis in archaeology became greatly diverse in terms of periods and regions;[23] however, studies in the Ancient Near East and the Aegean, which consists of Smith's study of the architectonics of the Urartian fortresses,[24] Mesopotamian domestic space analysis of Brusasco,[25] Fisher's work on the Late Bronze Age Ashlar structure at Enkomi, Cyprus,[26] and the newly published study of Letesson on the Minoan neopalatial architecture,[27] have remained deficient.

Smith uses depth analysis method by the comparison of the fortresses at Argishtihinili, Erebuni and Teishebai, which represent different periods of Urartu, in order to understand the integration within the institutions. The analyses put forward that in the Imperial Period the fortresses of Argishtihinili and Erebuni show a well integrated and controlled pattern in terms of administration, politics, military and religion, wherein different functions appear as segregated units; and in the Reconstruction Period, the fortress of Teishebai represents a less integrated and less controlled pattern than those of the Imperial Period. As a result Smith suggests that the dissolving of the coalescence within the institutions may well be a representation of the factions of the Urartian state resulting in the political and military descent of the Urartians against the Scythians.

Firstly, it should be said that Smith's study is very successful and pioneering in showing the relationship between the configuration of spaces and functional operation of the Urartian fortresses in the Imperial Period. However, in the Teishebai fortress of

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[22] For American Southwest space syntax studies, see Bustard 1999, Cameron 1999, Cooper 1997, Ferguson 1996, Longacre 2000, Sara-Lafosse 2005, Shapiro 1997, Stone 2000, Van Dyke 1999a, 1999b.

[23] For Mesoamerican space syntax studies, see Robb 2007 and Smith 2010; the application of depth analysis on the M'Zab houses of Berber culture in Algeria can be found in Bellal 2004 and 2007; for a comparative study of Sudanese houses, see Osman and Suliman 1994; for Medieaval architecture, see Fairclough 1992; for the access analysis of the monuments in the Malta Island, see Bonanno et al. 1990; for the synchronous usage of space syntax with geophysical survey, see Morrow 2009 and Benech 2007.

[24] Smith 1999.

[25] Brusasco 2004.

[26] Fisher 2009.

[27] The core of Letesson's study is his PhD thesis submitted to Université Catholique de Louvain, also newly published (2010) in his book *"Du Phenotype au Genotype: Analyse de la Syntax Spatiale en Architecture Minoenne"*, neither of which are available in Turkey. Thus the information for Letesson's study is derived from his 2008 poster on the website.

the Reconstruction Period the lack of data for location of the doorways for the main entrances constrains the capability of the method. In this fortress Smith uses the method in a way that the units are analyzed separately on the same spatial graph and consequently he derives a less interlinked and less integrated pattern. But it should be remembered that the outcome could have been substantially different if the main entrances of the fortress of Teishebai were securely located. Secondly, it should be kept in mind that the archaeological evidence for the function of the structure is as important as the evidence for the location of the doorways. Although the two fortresses of the Imperial Period show a similar pattern of spatial grammar, it could have been impossible to understand that the Erebuni fortress was constructed for a more militaristic purpose than the fortress of Argishtihinili without the literary evidence.

Brusasco's study on the Mesopotamian domestic space has a more theoretical approach. Brusasco first introduces the theories for the construction of the space and its use, then applies depth analysis on two ancient houses in Ur, where the analysis is integrated with the textual evidence in order to derive information for the phases of these houses, together with a house in Baghdad and an African Ashanti residence added for ethnographic parallels to the ancient houses. Finally he compares the domestic spaces in terms of proximity and the control power on the use of space and, explains his results in relation to the theories which he presents at the earlier stages of his article. Brusasco's study is invaluable in the understanding of the domestic space of Ur society through the integrated examination of the spatial, ethnographic and literary evidence.

Fisher's study uses the theories of social reproduction of the past built environments and access analysis method, in the same way as Brusasco. However, Fisher's innovative approach lies in the integration of the above mentioned information with several variables that the access analysis method originally ignores -such as the size of rooms, the characteristics of walls and doorways, the hearth-like features which are thought to have a symbolic meaning, and other features like wells and stairs- on the case study of the Level IIIA Ashlar Building at Enkomi. This study puts forward that some contexts within the building were reserved as spaces where inhabitants and the visitors interacted, and those spaces were successfully represented both by the graphs and by the calculation of the syntactic properties. Fisher concludes that the careful use of this method provides insights to the understanding of the social relations within past built environments through reading the recurrences of the contexts.

Letesson's study focuses on the decipherment of the genotype in the Minoan neopalatial architecture, through the space syntax analysis of the buildings from the several excavated sites in Crete, together with the integration of the proxemics approach. Letesson proposes that the structures in the Minoan neopalatial period show a spatial complexity and segregation whereas the protopalatial period is one of changes which he thinks is associated with different social dynamics.

### 3.3.2. Theory of Depth Analysis

One Space Syntax method is "Depth Analysis," also known as Gamma Analysis, Permeability Analysis or, widely, as Access Analysis. The analysis is founded on the idea that the way in which social relations express themselves in space is through spatial configuration. Hillier et al. defines configuration as:

> "… the relation between two spaces taking into account the third, and at most, as the relations among spaces in a complex taking into account all other spaces in the complex."[28]

Depth Analysis is specifically used to search for the spatial configurations of a structure in relation to the function of the cells and the living individuals of the structure, who can be divided into "inhabitants" and "visitors".[29] This analysis helps to plot out the syntactic relations of spaces as a spatial graph. Consequently the circulation pattern in the structure allows a reading of the symmetry/asymmetry and distributedness/non-distributedness of the structure. These are then used for understanding how each space is associated with the rest of the spaces in the building in terms of function, accessibility and privacy.

Before introducing the application of Depth Analysis, it would be useful to explain the basic terminology. The main concepts, depth and permeability, together with the syntactic/configurational parameters – symmetric/asymmetric and distributed/non-distributed – will be introduced below, since they will extensively be used throughout the thesis.

The analysis structures upon the concept of "Depth". Literally, Depth has two meanings: first is "the distance downwards from the top surface or the distance between the upper and lower surfaces of something, such as a river or a hole" and second is, "the

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[28] Hillier et al. 1987, 363.

[29] Hillier and Hanson 1984, 146, points out that the "inhabitant" is the one who uses and controls a certain space, whereas the "visitor" is the one that only uses but doesn't handle the power of controlling the space. For an archaeological application, see the article by Bellal 2007.

distance between the front surface to the back of something, such as a cupboard or a drawer." [30] It is obvious that the first meaning refers to the vertical distance whereas the second to a horizontal one. In this case, the second meaning is more relevant here because the "depth" of a certain space refers to the number of other spaces that have to be passed through in order to reach it.

The other basic term is "Permeability". It is the property of a cell that it allows something to pass through it. The representation of this property in a room will appear as a doorway or entrance. Hillier and Hanson visualize two rooms, one with single entrance (A1) and one with two doorways (B1), and they conceptualize the permeability of these rooms, by using the node for the cell and the line for the permeability. Furthermore, they appoint the terms, "unipermeable point" (A2) for the room with single entrance, whereas "bipermeable point" (B2) for the one with double doorways.[31]

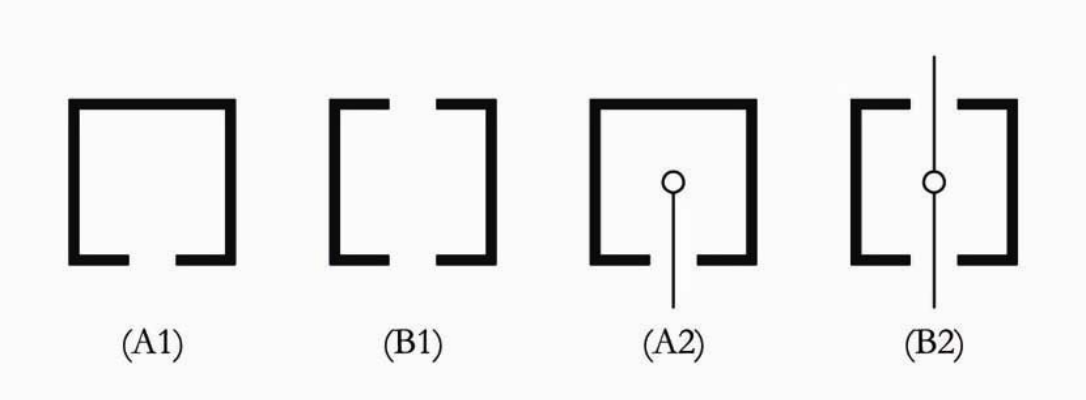


*Figure 3.1. Conceptualization of permeability.*

The explanation of the configurational properties follows the definition of the carrier point. The carrier point, which forms the interface between the interior and exterior spaces, mainly stands outside of the structure and carries the whole circulation. The carrier is plotted out with a cross, in the middle of a circle and always appears with the depth of 0.

The main four terms referring to the syntactic organization are symmetric, asymmetric, distributed, non-distributed. These terms will be explained through the visualized material, derived from Hillier and Hanson.

[30] Collins Cobuild 2003, 378.
[31] Hillier and Hanson 1984, 147.

Two spaces are symmetric if none of the spaces control the flow through the carrier space, and are asymmetric if one of the spaces has the control over other spaces. Starting from a certain space, if one can pass through other spaces and can come back to the starting space without turning back, then these spaces are termed distributed, but if there is no way to reach your starting point other than backtracking these spaces are termed non-distributed. In this case, the rooms 1 and 2 in both (A) and (B) are symmetric, but they are distributed in (A) and non-distributed in (B). The rooms in (C) are neither symmetric nor distributed.

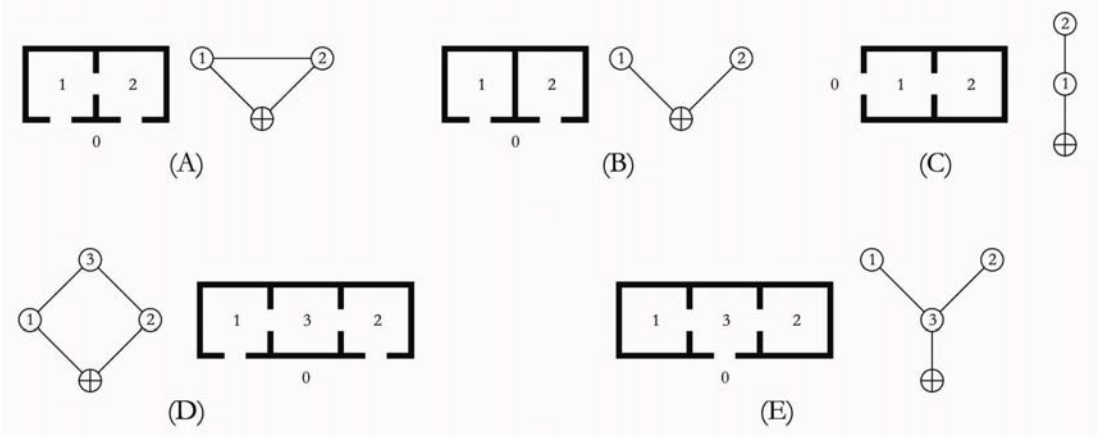


*Figure 3.2. Syntactic organization of spaces. (After Hillier and Hanson 1984, 149.)*

The association of each room to other rooms in (D) and (E) should be explained. In (D) rooms 1 and 2 are symmetric in relation to the carrier space, but since the entrance to room 3 is controlled by rooms 1 and 2 it is asymmetric in relation to the carrier space. Additionally, a ring can be made in this system. Consequently, the configuration in (D) becomes asymmetric but distributed. Contrarily, in (E) rooms 1 and 2 are symmetric with respect to 3 but asymmetric to the carrier space, since room 3 controls the flow through rooms 1 and 2, whereas the system lacking a ring becomes non-distributed. Thus, the configuration of the spaces is asymmetric and non-distributed. [32]

The digestion of these initial elements and syntactical properties are of special importance, in the interpretation of the spatial pattern within a structure together with the preparation of a justified gamma map.

[32] Hillier and Hanson 1984, 94, 148-9.

### 3.3.3. Application of Depth Analysis

The spatial pattern of a structure is read through the justified gamma map, or namely access graph, which I preferred to call the "permeability graph" since it is a spatial graph that shows the permeabilities of the cells. The logic of this spatial graph lies in (1) the demonstration of the flow within the cells, (2) assigning the cells of the same depth to the horizontal row of the same distance from the carrier space, which gives the property of "justification" to the graph,[33] (3) making the configurational properties clearly understandable and (4) allowing one to easily measure these properties.[34] Hillier and Hanson define the procedure as a dissection in which the members of the structure are "sliced" down the middle and "pinned out", so that the internal structure becomes visible.[35] As previously mentioned, the visualization of the permeabilities becomes possible by showing the cells/rooms with nodes and the flow between the cells with lines, which are attached to the nodes. The logic of the graph is, each cell/room with the same depth value –depending on the minimum movements from the carrier space to reach the point– is plotted on a single horizontal row, having the same distance from the carrier. Thus, with each step taken from the carrier space to internal spaces of the structure, the depth rises, and so does the number of the horizontal rows.[36]

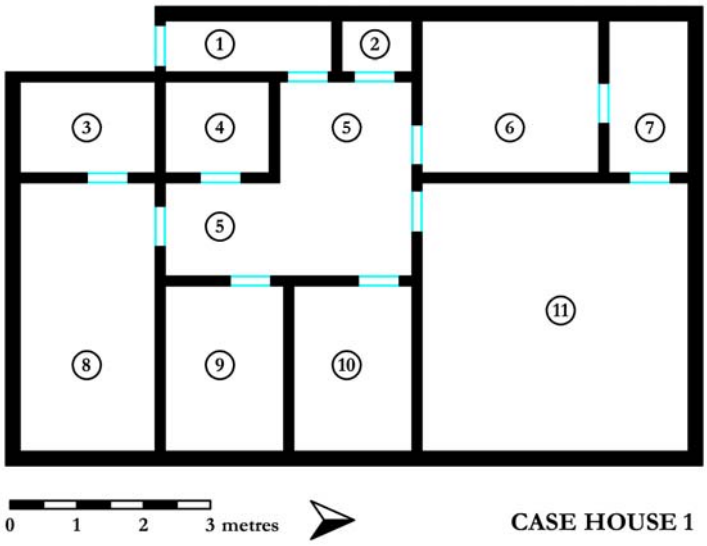


*Figure 3.3. Plan of my apartment in Istanbul, Turkey; Case House 1.*

[33] Fisher 2009, 440.
[34] Hillier and Hanson 1984, 149.
[35] Hillier and Hanson 1984, 149.
[36] Hillier and Hanson 1984, 149.

To present the visual example for the application of the analysis, two case studies are used. First is my apartment in Istanbul, Turkey. This modern house is termed as Case House 1 in this chapter. The other house is an ancient one, the native merchant Šupi-akh-šu's house in Kültepe, Kayseri, Turkey. The ancient house is termed as Case House 2 in this chapter.

The entrance of the Case House 1 is Room 1, which is a small vestibule. The depth value of the vestibule is 1. The next step further from Room 1, takes one into the anteroom, seen as Room 5. So the depth value of the anteroom is equal to 2. Here, it is worth mentioning that the anteroom has a high control over the other rooms, since all the other rooms of the house have their doorways through the anteroom, which acts as the distributive cell of the house. Passing through the anteroom, one can enter the kitchen (Room 6), the bedrooms (Rooms 8, 9 and 10), the living room (Room 11) and the communal bathroom (Rooms 2 and 4). All these cells have the same depth value, equal to 3. The second doorway in the bedroom (Room 8) takes one into the private bathroom (Room 3). Finally for reaching the balcony (Room 7) there appear two doorways, one from the kitchen and one from the living room. The private bathroom and the balcony have equal depth values, equal to 4.

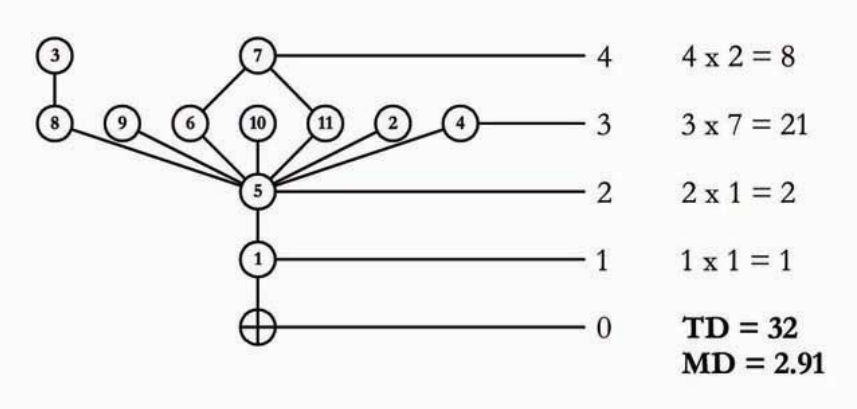


*Figure 3.4. Justified Permeability graph of Case House 1 in Figure 3.3.*

According to these explanations the permeability graph of Case House 1 is prepared first by adding the horizontal rows and the carrier space on the lowest row, row 0. Then, the vestibule, which is shown as Cell 1 and as attached to the carrier space, is placed on Row 1. Subsequently, the anteroom, shown as Cell 5, is drawn on Row 2. A group of rooms, having their access from the anteroom, is shown as present on Row 3,

all attached to Cell 5. Finally Row 4 includes Cell 3 and Cell 7. Cell 3, which represents the private bathroom, is shown attached to Cell 8, the bedroom; whereas Cell 7, which stands for the balcony, is drawn connected to both Cell 6 and Cell 11. Consequently, the permeability graph of Case House 1 would be as in Figure 3.4.

The Case House 2 is the house of the native merchant Šupi-akh-šu (Figure 3.5). Covering an area of 130 $m^2$, this house is one of the largest houses thus far excavated in Kaniš Karum. Case House 2 is formed of three parts. Rooms 1 to 3 constituting the first part of the house, is a later addition of stone to the original mudbrick structure. The second part is formed of Rooms 4 and 5 and the last part is of Rooms 6, 7 and 8. Single entrance to the interior spaces of the house is provided by a two stepped threshold on Room 1, the anteroom that is opened to the street on the north of the building.[37] Room 1 has a depth value of 1.

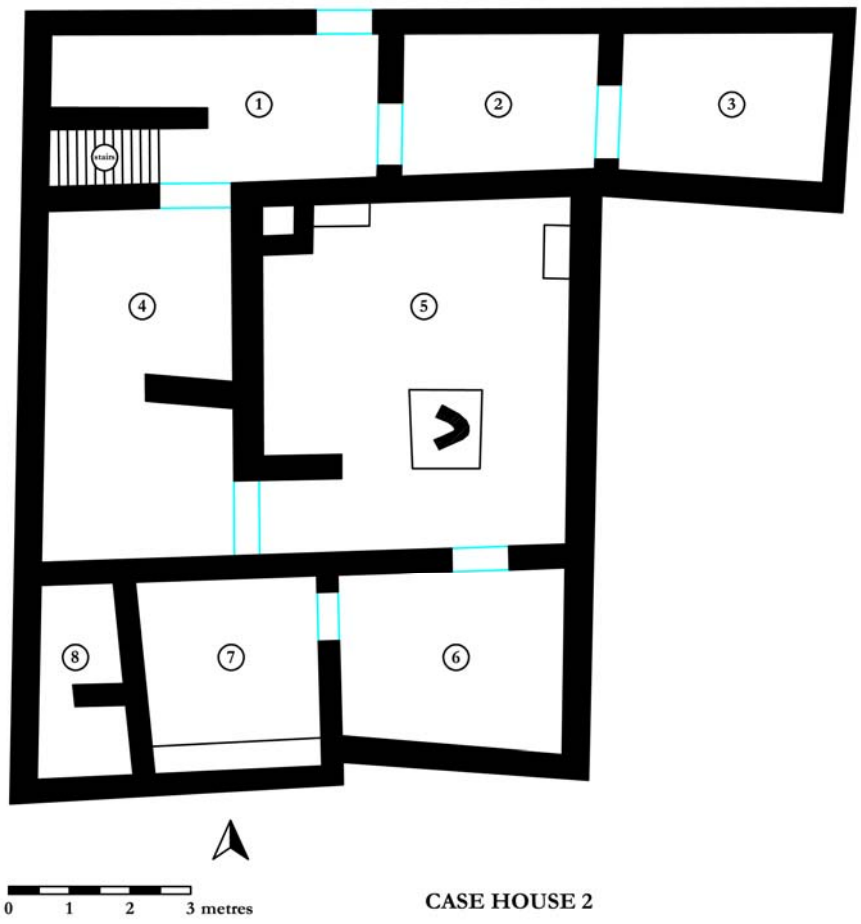


*Figure 3.5. Plan of the merchant Šupi-akh-šu's house; Case House 2. (After T. Özgüç 2005, 58.)*

[37] T. Özgüç 1986b, 9-10.

Room 1 provides access for the staircase that is supported by the partition wall attached to the west wall of the anteroom. The assigned depth value of the staircase is 2. The anteroom leads the way into two units. First, passing through the anteroom, goes into Room 2, the pantry, where several medium sized vessels were found. The doorway on the east wall of the pantry leads the way into Room 3, the oven Room.[38] The depth value of the pantry is 2 whereas taking access from it, the value for the oven Room is 3. These two rooms constitute the first unit. The second unit is entered by Room 4, the store room where several pots were found alongside the walls and in the corners. This room was divided into two by the parapet wall that is attached to the east wall. It is highly possible that this room was the former anteroom, before the addition of the first unit. Assigned depth value of this room is 2. Accessed by Room 4, Room 5 is the main hall. A hearth was exposed close to the center of the room and a silo that is attached to the northwest corner with a mudbrick bench in front of it.[39] The depth value of the hall is equal to 3.

Entered by the main hall, the last part of the house comprises three rooms all of which were reserved for storage. Several provision jars, pots and dishes were uncovered in Room 6. The assigned depth value of this room is 4. One step lower than Room 6 and taking access from it, Room 7 was the store room where a mudbrick bench running along the north wall was found together with large provision jars embodied to the floor. Depth value of Room 7 is equal to 5. The last room of the unit was used as a storage room, as well as an archive room. Because the room is doorless; it is excluded from the analysis; however it has been suggested that this room, having a lower floor, was most possibly accessed from Room 7 by stepladders.[40]

According to these explanations, the preparation of the permeability graph of Case House 2 starts by adding the horizontal rows and the carrier space on the lowest row, Row 0. The anteroom follows the carrier space on the next row, which is visible on the graph as cell 1. Subsequently, Cells 2 and 4 and the staircase all taking access from the anteroom are drawn on Row 2. Following row, Row 3, locates two cells; cell 3 is attached to cell 2 and cell 5 to cell 4. Cell 6 is set on Row 4, linked to cell 5. Finally on Row 5, Cell 7, the last room with a securely located doorway, is placed. Consequently, the permeability graph of Case House 2 is generated in Figure 3.6.

[38] T. Özgüç 2003, 96.
[39] T. Özgüç 2005, 68.
[40] T. Özgüç 1986b, 10.

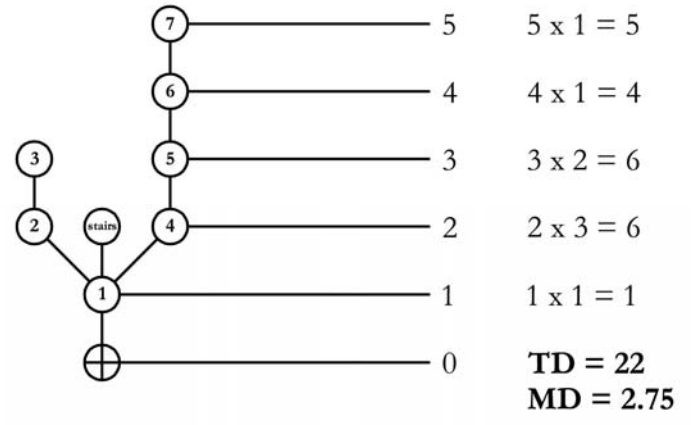


*Figure 3.6. Justified Permeability graph of Case House 2 in Figure 3.5.*

A further step was color-coding. For enhanced visualization the permeabilities are plotted out by lines of different colors, which represent different units, together with directional arrows. This process proved to be useful in correlating the plan with the spatial graph as well as in making the permeability graph more easily readable.

In the subsequent stage, the circulation system of the buildings was plotted on the isometric view. An example of this process is visible below.

The permeability graph is not only a tool for the visual elucidation of the spatial pattern in a structure, but also a tool for the calculation of the values of syntactic properties. Thus here, the method for measuring the Total Depth, Mean Depth, Relative Asymmetry, Real Relative Asymmetry and Relative Ringiness is introduced step by step, by using the case buildings and their permeability graphs.

The depth value of the entire structure, which is known as the *Total Depth* (TD), is obtained by an easy mathematical calculation, by adding the depth values of each cell or by using the sum of the multiplication of each depth value by the number of the cells having that certain value. So, the formula of total depth value is as follows,

$$TD = \sum_{i=1}^{n} D_i$$

or

$$TD = \sum_{x_{1i}=1}^{k} D_{x1} + \sum_{x_{2i}=1}^{l} D_{x2} + \dots + \sum_{x_{ni}=1}^{n} D_{xn}$$

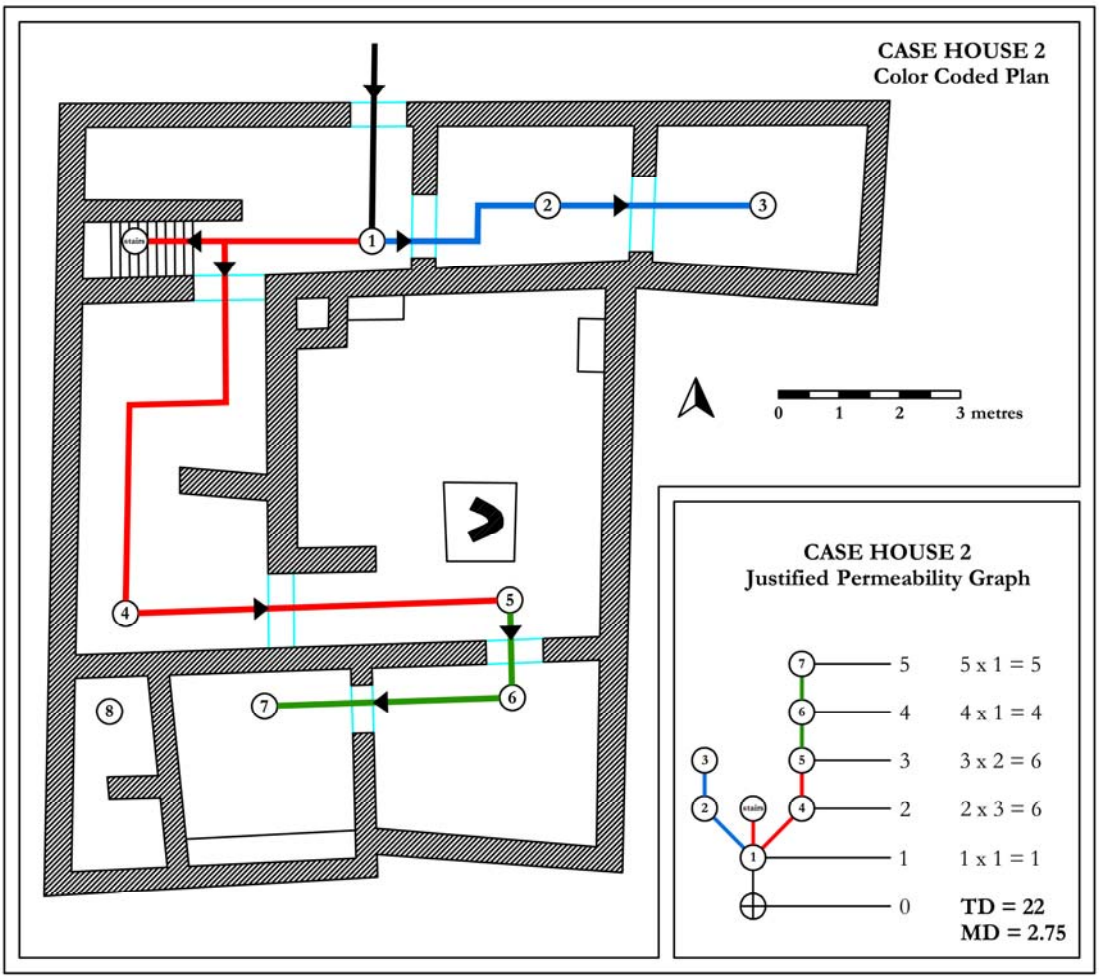


*Figure 3.7. Case house 2, showing the color coded plan and the justified permeability graph.*

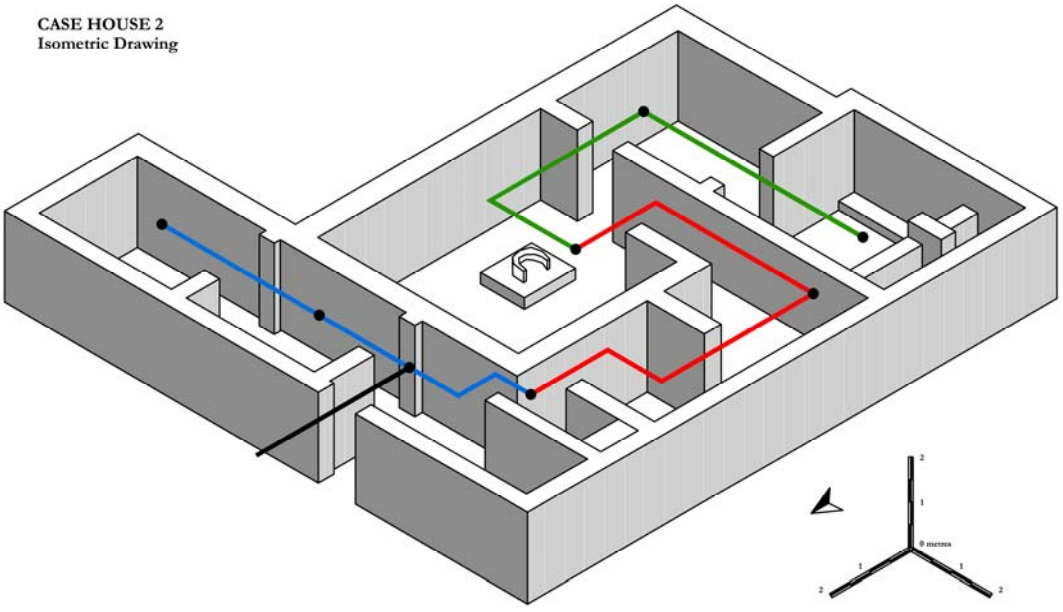


*Figure 3.8. Isometric view of the case house 2, showing the circulation system.*

By using these two formulas, the Total Depth of Case House 1 and 2 can be calculated as in below,

$TD_{CH1} = 1 + 2 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 4 + 4 = 32$

or

$TD_{CH1} = (1x1) + (2x1) + (3x7) + (4x2) = 32,$

and

$TD_{CH2} = 1 + 2 + 2 + 2 + 3 + 3 + 4 + 5 = 22$

or

$TD_{CH2} = (1x1) + (2x3) + (3x2) + (4x1) + (5x1) = 22.$

The *Mean Depth* (MD) of the structure is the basic arithmetic mean of the depth values, which can be calculated by dividing the Total Depth by the number of the cells.[41] The carrier cell stands for an exterior space; hence it is excluded in the count of the number of cells. The mean depth can be formulated as,

$$MD = \frac{TD}{k-1} = \frac{\sum_{i=1}^{n} D_i}{k-1} = \frac{D_1 + D_2 + D_3 + \ldots + D_n}{k-1}$$

where D is depth value, TD is the Total Depth and k is the number of spaces in the system. Thus, the Mean Depth of the Case House 1 and 2 are,

$$MD_{CH1} = \frac{32}{11} = 2.91 \quad \text{and} \quad MD_{CH2} = \frac{22}{8} = 2.75.$$

The syntactic description of a structure is possible through the generation of the permeability graph, but furthermore by the measure of the *Relative Asymmetry* (RA). The calculation of the Relative Asymmetry can tell how deep the structure is, depending upon the relationship of the spaces. Since there are more steps to be taken in a building defined as deep, the structure tends to be more asymmetric. Contrarily, if the building is shallow, the cells are more likely to conglomerate on single rows, which shows that the system has a tendency to be symmetric. The calculation of the Relative asymmetry is possible by the formula,

[41] Hillier and Hanson 1984, 108.

$$RA = \frac{2(MD - 1)}{k - 2}$$

where MD is the Mean Depth and k is the number of spaces.[42] The result of this formula should produce a value between 0 and 1. The more the value approaches to 0, the more the system becomes shallow and the structure symmetric. Whereas, the higher values, closer to 1, represent a deeper system and a more asymmetric structure.[43]

The application of this formula gives the RA value of the Case House 1 and 2 as follows,

$$RA_{CH1} = \frac{2(2.91 - 1)}{12 - 2} = \frac{2 \times 1.91}{10} = 0.382$$

and

$$RA_{CH2} = \frac{2(2.75 - 1)}{9 - 2} = \frac{2 \times 1.75}{7} = 0.50.$$

For this case, it seems likely to say that the spatial pattern of the Case Houses tend to be shallow and symmetric. On the other hand, one should not compare them before the Real Asymmetry values are converted into Real Relative Asymmetry values, since the sizes of these two houses are different. The Relative Asymmetry is only available for single structures. However, the calculations should be synchronized when multiple structures of different sizes are subjects of study. The equalization of the Relative Asymmetry values is necessary for eliminating the highly effective factor: the size. This synchronization of the RA values is possible by another measure which is called Real Relative Asymmetry (RRA). The RRA value of the structure can be obtained by the division of the Relative Asymmetry value with the constant for the number spaces in the system.[44] The constant values for certain amount of spaces are tabulated in Hillier and Hanson 1984, 112-4. There are two different tables; one of them lists the constants for diamond-shaped structures and the other for pyramidal-shaped structures. The shape should not be perceived as a geometrical term; here shape refers to the appearance of the spatial graph. Thus, the equation can be formulated as in below,

[42] Hillier and Hanson 1984, 108.
[43] Hillier and Hanson 1984, 109.
[44] Hillier and Hanson 1984, 110.

$$RRA = \frac{RA}{D_k} \quad \text{or} \quad \frac{RA}{P_k}$$

where k is the number of spaces and $D_k$ and $P_k$ refers to a constant. This constant is available in two different tables. The two tables, one for pyramidal and one for diamond shaped complexes, are available in Hillier and Hanson 1984, 112 and 114. By shape Hillier and Hanson refers to the shape of the spatial graph, not the geometric shape of the complex itself. Therefore, if the spatial graph is a pyramidal one, one should look up the $P_k$ values for k spaces table for the corresponding constant to the number of spaces, to acquire the constant value.[45] Being different from Relative Asymmetry values, Real Relative Asymmetry values are above or below 1 and the more the result is close to 1; the more symmetric the complex appears. Besides that the interpretation is done by the comparison of the RRA values of different complexes.[46]

By applying this formula over the case houses, the Real Relative Asymmetry can be calculated as,[47]

$$RRA_{CH1} = \frac{0.382}{0.135} = 2.829 \quad \text{and} \quad RRA_{CH2} = \frac{0.5}{0.190} = 3.788.$$

Before calculating the Real Relative Asymmetry values of the case houses, it can be foreseen that both of the houses have a tendency to be symmetric, however it was not possible to compare the houses. After the conversion of the RA values into RRA values, it is secure to tell that Case House 1 appears to be more symmetric and shallow than Case House 2.

As is obvious from the names, Relative Asymmetry and Real Relative Asymmetry values are used for measuring the symmetry/asymmetry of the building but not for other dimensions. Thus, there is another measure for interpreting the other important syntactic property, distributedness/ non-distributedness. This measure is called Relative Ringiness (RR). Hillier and Hanson defines the appearance of a ring in a structure as, "Since the least number of lines to connect a system of k spaces, and since k-1 points

[45] Hillier and Hanson 1984, 114.
[46] Hillier and Hanson 1984, 113.
[47] For the case houses, the table of pyramidal-shaped complexes is used, since the spatial graph are pyramidal ones. On the pyramidal-shaped complexes table (Hillier and Hanson 1984, 114), the corresponding constant value for 12 spaces is 0.135, whereas for 14 spaces the value is 0.118.

can only give the form of a ringless tree, then any increase in the number of lines will result in forming rings in the complex."[48]

The calculation of the Relative Ringiness gives the measure of how distributed the complex stands and hence the measure of control of the certain spaces that belong to the complex. The measure of Relative Ringiness is available both for the complex and a for certain point. However, the formulas are different. To obtain the Relative Ringiness of a structure, the total number of the distinct rings is divided by the maximum number of planar rings.[49] Thus, this equation can be formulized as in follows.

$$RR_{\text{of a complex}} = \frac{R}{2k - 5}$$

In the formula R represents the number of the number of distinct rings and k does the number of spaces in the system. The rise in the Relative Ringiness value of the complex points out that the building becomes more distributed. If the formula is applied on the case houses, the result will be as in below,

$$RR_{\text{of CH1}} = \frac{1}{(2x12) - 5} \quad \frac{1}{19} = 0.053$$

and

$$RR_{\text{of CH2}} = \frac{0}{(2x8) - 5} = 0.000.$$

However, in order to understand the distributedness of the structure from a certain space, the Relative Ringiness of that space is calculated. This is done by the division of the number of independent rings passing from that point by the total number of spaces.[50] The formula is as below,

$$RR_{\text{of a point}} = \frac{r}{k - 1}$$

where R is the number of rings passing from that point and k is the number of spaces in the system. The calculation of the Relative Ringiness of a point helps to understand,

[48] Hillier and Hanson 1984, 153-4.
[49] Hillier and Hanson 1984, 154.
[50] Hillier and Hanson 1984, 154.

how the rest of the structure is seen from that point, as well as how much integrated or disintegrated that point is from the structure. Thus, the calculation of the relative ringiness becomes especially important on the dispersive hubs, such as the courts in a palace.

As it is seen, gathering, processing and analyzing the data with Space Syntax can reveal good insights to a structure. The application of Space Syntax on the Middle Bronze Age palaces, which will be explained under the Analysis chapter, will follow the course that is explained throughout this chapter.

# CHAPTER IV

# CASE STUDIES

The case studies, comprising the Middle Bronze Age palaces at Acemhöyük, Tell Mardikh and Kültepe will be introduced herein. For each of the site, as in order, firstly the physical appearance of the site and the Middle Bronze Age levels, including the information of the related palace structures that belong to those layers, will be explained. This will be followed by introducing of the palaces, which are the Sarıkaya Palace of Acemhöyük, Palace Q (otherwise Western Palace) of Tell Mardikh and the Warshama Palace of Kültepe. The presentation of the palaces will include the available information for the state of preservation, physical appearance and planning principles of the palaces, as well as the units/functions and the permeabilities within.

## 4.1. ACEMHÖYÜK

The morphology of Acemhöyük, like that of most of other Middle Bronze Age sites, comprises two parts: the mound and the lower city. Exploration of the lower city is limited because the modern village of Yeşilova occupies a large part of the south. The size of the lower city is unknown, but it may have been as large as the mound itself.[51]
The oval shaped mound is 20 m higher than the lower city and it measures 700 m east-west by 650 m north-south. Topographically the mound comprises four low hills with two flat areas between. The two highest hills are Sarıkaya Tepesi on the south and Hatipler Tepesi to the northwest (Figure 3.3).[52]

Occupation extends from the Early Bronze Age[53] to Roman times.[54] The stratification shows a clear break between the Middle Bronze Age and the Hellenistic

[51] N. Özgüç 1966, 3.
[52] Öztan 2003, 39.
[53] The clear explanation of the stratigraphy of Acemhöyük is not available in any of the publications; however, it is known that the early levels (Levels XIII-X) belong to Early Bronze Age and the investigations of the third millennium Acemhöyük can be found in Öztan 1993, 284; N. Özgüç 1982, 990; N. Özgüç 1980b, 620-21; N. Özgüç 1979b, 890; N. Özgüç 1978, 541.
[54] N. Özgüç (1978, 541) states that the Hellenistic and Roman levels are not counted in the stratigraphic sequence. So it should be noted that the numbering of the levels start directly from the Assyrian Trading Colonies Period.

Period. The heyday of the city, in the Assyrian Trading Colonies period, is represented by four levels.[55] Level I, the latest, has been intensely damaged. Level II saw extensive but unsubstantial construction, which followed the severe conflagration of the city. Level III. This level contains several well preserved monumental buildings of Assyrian Trading Colonies period on the mound with domestic structures in the lower city. Level IV, has been scarcely investigated.[56] Exploration in the lower city showed that the stratification is parallel to that on the mound.[57]

On the mound two palaces, one official service building, one monumental building and a few domestic structures have been excavated. Both palaces were erected on low hills after which they were named: the Hatipler Palace at the north and the Sarıkaya Palace to the south. Dendrochronological dating by Kuniholm suggested that the construction of both palaces began in the same year, but after the construction of the Warshama Palace of Kültepe.[58]

Both Acemhöyük palaces are very well preserved, however the only available published plan is of the Sarıkaya Palace.

### 4.1.1. The Sarıkaya Palace

The Sarıkaya Palace is located on the south edge of the mound of Acemhöyük. It is rectangular, measuring 55 m east-west and 45 m north-south,[59] having an area of 2.475 $m^2$.

#### 4.1.1.1. Building Materials

Building materials were stone, mud and timber. Foundations, generally 4 m wide, are of limestone with flattened surfaces. Timber is commonly used within the foundations and the superstructure with wooden beams placed horizontally on the stone foundations. These were the same width as the superstructure. The superstructure was constructed by the careful bonding of different sized mudbricks.[60] (Figure 4.1) The walls rise to a considerable height, the highest measured height of a mudbrick wall is 3.8 m while the width is 1.5 m. Wooden beams are used horizontally at intervals of 2 m and

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[55] N. Özgüç 1966, 4.
[56] N. Özgüç 1966, 4-27.
[57] N. Özgüç 1975, 564.
[58] Kuniholm et al. 2005, 45; Kuniholm and Newton 1989, 279-80.
[59] This size excludes the courtyard. N. Özgüç (1977, 357) states that with the courtyard, the area of the complex would be at least 5470 square meters. By Öztan (1993, 250) it has been suggested that, towards north, the palace continues at least 20 more meters as a courtyard, which makes the total north-south length as wide as 65 m.
[60] N. Özgüç (1966, 9) affirms that the sizes of the mudbricks are, 40x31x14 cm and 33x33x11 cm.

vertically at 0.9 m. Timber is used also with a grid bonding in order to support the earthen floors. There are also stone pavements.[61]

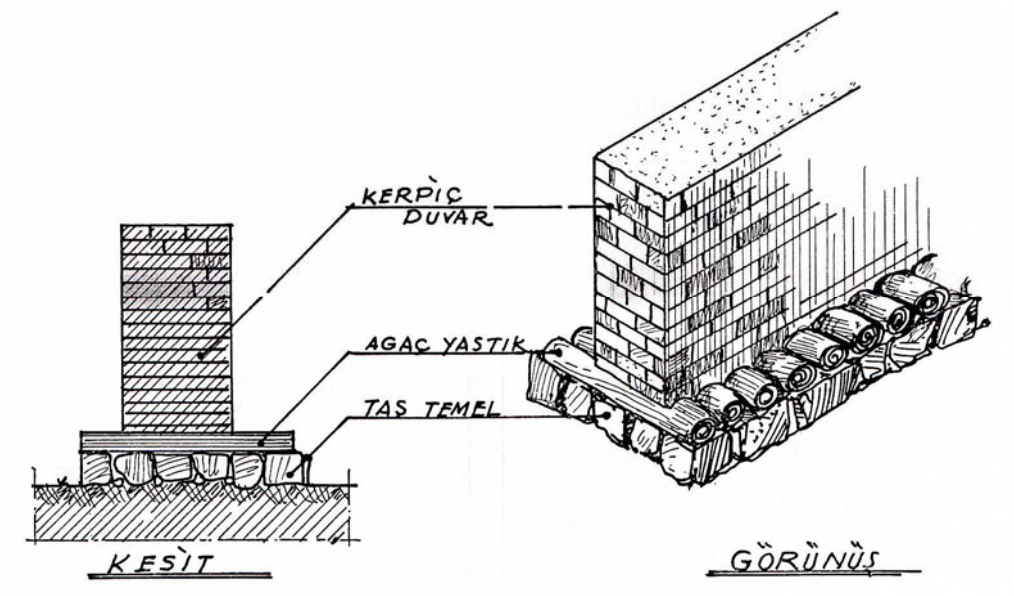


*Figure 4.1. Construction technique of the walls in the Sarıkaya Palace.(After N. Özgüç 1966, 24)*

#### 4.1.1.2. State of Preservation

The palace is one of the very best preserved in the Middle Bronze Age so far unearthed in Anatolia. The superstructure still survives on the north and the central areas,[62] while the foundations on the east and west sides are visible on the ground. The perimeter walls are preserved, permitting an understanding the extent of the palace.
However, in some areas the structure looses its unity. The southern side was subjected to a great deal of erosion, as a result of being close to the southern slopes of the mound.[63] Additionally, Hellenistic foundations penetrate into levels of the Assyrian Trading Colonies period on the southern side of the Sarıkaya Palace.[64] Thus the plan of this part of the palace is substantially reconstructed. This reconstruction basically follows the general layout of the palace with a row of square rooms mirroring the

[61] N. Özgüç 1977, 357-58; N. Özgüç 1966, 9-10.
[62] There has been a considerable amount of conservation on the Sarıkaya Palace, by filling of voids -the locations of the wooden beams that became blank after the incineration of those beams with the conflagration of the palace- by slags, in order to conserve the stability of the walls, for the information see N. Özgüç 1979b, 888; Öztan 1991, 247-8.
[63] N. Özgüç 1982, 989.
[64] N. Özgüç 1982, 989; N. Özgüç 1981, 378-9; N. Özgüç 1972, 431.

existing upper row; however, the southern extent remains entirely unknown. It is highly possible that another courtyard existed on the south side of the palace.

#### 4.1.1.3. Physical Appearance and Planning Principles

The Sarıkaya Palace has at least forty rooms of differing shapes and sizes (Figure 4.2). The inner court is at the center. A group of six larger rooms, each measuring 7 by 7 m, is located on the northeast; and is attached to the inner court by a single room. A line of two long, narrow rooms, one of which is attached to the inner court, is visible in the central area. On the south, two long rows of large, rectangular rooms, measuring 6 by 7 m, can be seen. This compound is thus semi-surrounded by a longitudinal row of long, narrow rooms on the north and a latitudinal row of mostly long, narrow rooms on the west. The planning of the palace follows the rule of the repetition of horizontal rows, from north to south. It is highly reasonable to think that the palace was planned and constructed as a single unified entity.

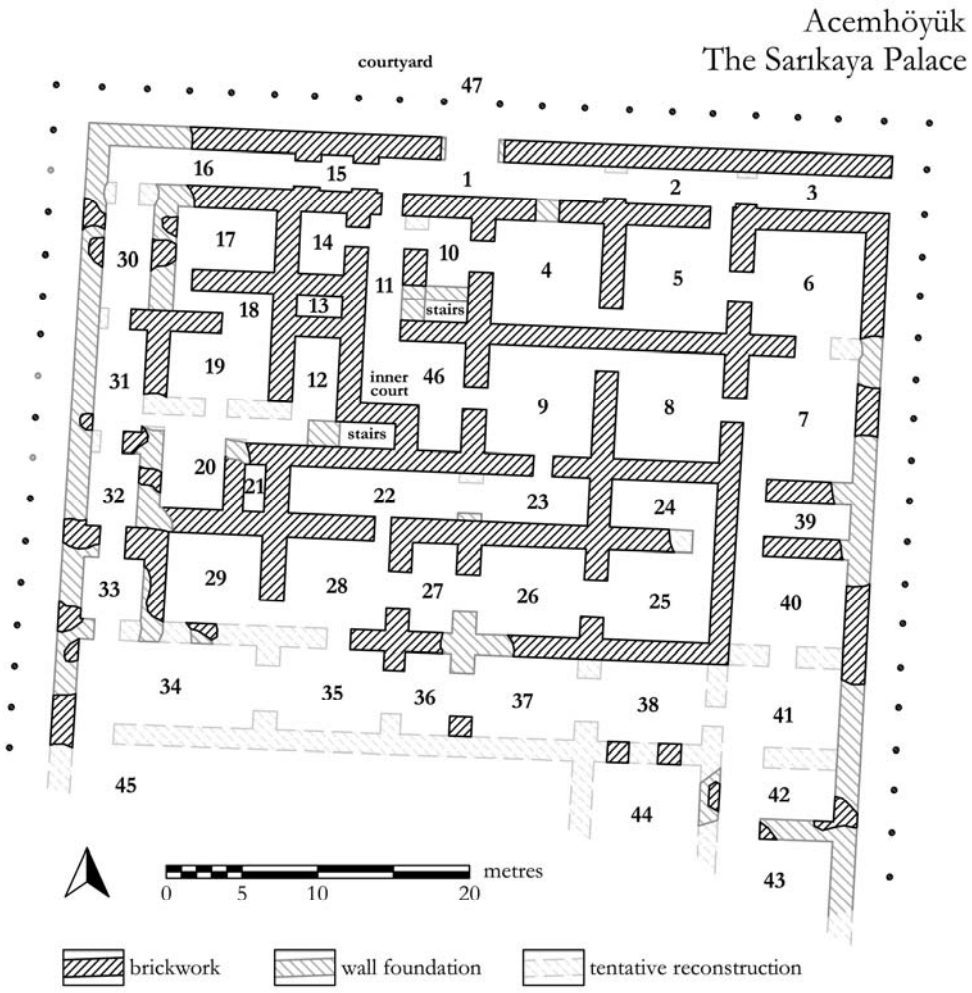


*Figure 4.2. Plan of the Sarıkaya Palace of Acemhöyük (Digitized plan, after Öztan 1991).*

#### 4.1.1.4. Units and Functions of Rooms

It is suggested that the palace comprise a large courtyard on the north and surrounded with porticos which was the main approach. The extent of the courtyard was determined by fragments marble pavement[65] and the portico has been suggested by presence of the unevenly placed marble bases and charred wooden posts surrounding three sides of the palace.[66] Due to the fragmentary evidence of the marble pavement it is difficult to estimate the original size of the courtyard; excavations, however, showed that it extended for at least a further 20 m to the north.[67]

Rooms generally functioned as storage facilities. Entrance was by way of two rooms on the north, Rooms 1 -the vestibule- and 2. A four-wheeled carriage was found in Room 2. Room 3 is one of the very few rooms where inscribed bullae were kept. On the next horizontal row, Room 11, a corridor gave access to Rooms 10, 13, and 14, to the staircase and to the inner court; but it was also a store room where loaf-shaped copper ingots were found. Room 14 also to the west of Room 11, also had copper ingots. Room 13 might have been a light well. Room 17, further to the west, was a storeroom in which an obsidian plate and a dish made of a red stone were unearthed. These plates were found in the debris fallen from the second storey.[68] On the east of Room 11, Room 10 had a few jugs with their attached bullae. Room 4, in which several fragments of ivory artifacts were uncovered, and Room 5 where many loaf-shaped ingots of copper in loaf form were found, were larger storerooms. Farthest east on the row, Room 6 was the bulla room where many bullae was found; the bullae were probably stored on wooden shelves because they were found 1 to 2 m higher than the floor level, one bulla being severely burnt and stuck to the mudbrick wall. On the next row, entered from Room 11, is the central inner court that acted as the spine. It has a reverse L shape, which measures 6.7 m to 7.2 on the longest sides.[69] To the left of the stone paved inner court, was the provision store. This room contained large provision jars embedded in the floor and rows of vases with lids.[70] The next room on the east, Room 8, is another storeroom where a few large jars and vases with lids were found. The most eastern room of the row, Room 7, was used for storing copper ingots. These

[65] Öztan 1991, 250.
[66] N. Özgüç 1980a, 61.
[67] Infra n. 61.
[68] Öztan 1979, 385.
[69] N. Özgüç 1977, 358-59.
[70] N. Özgüç 1966, 10.

ingots were found together with the bullae. To the west of the inner court are Room 12 and the second staircase. Further west, Rooms 19 and 20 were the most important in terms of the luxury goods found. Among these artifacts were vases made of obsidian and crystal quartz, ivory objects, golden appliqués with inlaid lapis lazuli, and wooden game boards. The next row appears on the central south of the palace as a long, narrow row. Room 21, might have been a light well. In Rooms 22, 23 and 24 the bullae bearing the seals impressions of a different people, grouped in each room, were uncovered, together with pottery. On farthest east on this row, Room 39 was similar to Rooms 19 and 20 in terms of finds, where golden nails and ivory objects with golden appliqués were found. The southernmost row consists of Rooms 25, 26, 27, 28, 29, all of which except Room 33, contained bullae and vases with lids. In Room 28 two inscribe bullae were found. Room 33 is important in the recovery of a bath tub.[71] This bath tub presents several figural decorations on its sides, one of which shows the upper storey balcony posts, extending towards the ceiling; possibly illustrating the Sarıkaya Palace that it was contemporaneous with.[72] At the southeast corner, there are three more rooms, Rooms 42 and 43, where groups of scattered bullae were uncovered, related with the damaged state of the southern part and room 38, where weapon types of metal artifacts together with copper ingots were found.[73]

Despite the fact that general use of the rooms of the ground floor in the palace was of storage; it can be put forward that different groups of rooms served as different types of storage facilities. The rooms on the central west (Rooms 12, 17, 19, and 20) were used for storing luxury goods, the northeast and east for metals, the central south (Rooms 22, 23, 24, 25, 26, 27, 28, and 29) for keeping goods that need to be kept in vases/jugs with lids and bullae that bears the impressions of certain elite. Although the bullae were found almost in each room; there was archive type of rooms, (Rooms 6, 42, and 43) where bullae were found as large assemblages.

The palace was of two storeys. This assertion is supported by the presence of thick walls and foundations, the usage of large quantity of timber framework within walls, and the presence of staircases.[74] Though, the concrete evidences for the corpus of the second storey come from the upper floor debris that was found during the

[71] N. Özgüç 1977, 359-60.
[72] N. Özgüç 1979a, 293-94; N. Özgüç 1979b, 889.
[73] N. Özgüç 1977, 359-60.
[74] N. Özgüç 1966, 37.

excavations[75] and from the bathtub, aforementioned. For the Middle Bronze Age palaces it is a widespread belief, that the second storey was reserved as the king's residence; however, in the Sarıkaya Palace there is no secure evidence to support this proposed function of the second storey.

#### 4.1.1.5. Permeabilities

It is previously said that the permeabilities within a structure can be explained by the presence of doorways. For the Sarıkaya Palace permeabilities are first given on the basis secure archaeological evidence for the location of doorways and, secondly, taking into consideration the excavator's reconstructions.

##### 4.1.1.5.1. Based on Secure Archaeological Evidence

The Sarıkaya Palace is approached from north, through the courtyard. From the courtyard, passing through the portico, the wide main door leads into the vestibule, Room 1.[76] The second entrance is on the northeast; the doorway on the east of Room 3 opened onto the portico around the courtyard.[77] Three long, linear chains of interconnected rooms originate from the vestibule.

The Linear Chains: The first chain starts with the corridor, which is entered from the vestibule. The corridor gives access to Room 14, Room 10 and the stairs, as well as leading into the inner court. The doorway on the east of the inner court[78] provides access to the large storage room, Room 9. From Room 9 the way divaricates through two doorways, one to Room 8 and the other to Room 23. The doorway on the west of Room 23 links it with Room 22. Passing through Room 22, Room 28 is reached. In Room 28 securely located doorways are found in the east and west walls, but it is unknown whether this room had a door in the ruinous south wall that would have given access to the southern rooms.[79] The door on the west of the room opened to Room 29,

[75] N. Özgüç 1966, 37; Öztan 1979, 385.
[76] N. Özgüç 1977, 358.
[77] Although N. Özgüç (1972, 431) states that this door was found in situ and intentionally left in place; this doorway was showed as a continuing wall in Öztan's plan of the Sarıkaya Palace (1991, 258). Besides, on site it has been seen that there is a wide gap on the eastern perimeter wall on the northeast corner, where the doorway must have been located. Because the presence of the door is known, the digitized plan is produced with the doorway that links the portico and Room 3.
[78] N. Özgüç 1966, 10.
[79] On the south of Room 28, Room 35 is located. The presence of Room 35 is proved with the floor which was found with large jars. Although it is possible that the missing southern part of Room 28 gave access to this room, this link has not been taken into account in the analysis, due to the fact that the walls of Room 35 is not found in any sides and that the entrance could be from anywhere around this room.

that on the east to Room 27 from which the chain continued through Rooms 26 to 25 and finally 24.[80]

After passing through the vestibule the second chain continues with Room 15. The doorway on the east of Room 15 gives passage to Room 16 and thence Rooms 30,[81] and 31 where the wide gap on the east wall of Room 31 appears as the only possible way to enter the central western unit of the palace; however, neither the presence of a doorway nor the separation between the rooms 19 and 20 is proved.[82] The linear chain continues with the link between Rooms 31 and 32 and finally 33. The doorway on the south of Room 33 opened to the destroyed southern part of the palace.

The third chain, which originates from the vestibule starts with the passage from the vestibule to Room 2. The further step from Room 2 takes one into Room 5, which is opened to two rooms, Room 4 and the bullae room. Room 4 stands on the way that links this chain to the first chain, originating from the vestibule. The bullae room sustains the long and linear chain, by giving access to Room 7 with a large doorway on the south. In Room 7 the way divaricates into two. Through Room 8, this chain joins again with the first chain originating from the vestibule. Room 39, entered from Room 7, is the room sustains the linear chain. Passing through Room 39, Room 40 is reached, which is opened to the partially surviving southeastern part of the palace.[83]

The Loops: The first loop is the double entrance of Room 2, one from the vestibule towards east and one from Room 3 westwards, which both go out to the portico and thence the courtyard.

The second loop is entered from the vestibule, the corridor opens onto three rooms, Room 14, Room 10 and the courtyard; establishing two more loops within the

[80] The passage between the rooms 24 and 25 is problematic, because no mention of a doorway between these rooms appears in N. Özgüç's reports. Besides, N. Özgüç shows a wall foundation, where the door was supposed to be located. On the other hand, Öztan on her up-to-date plan places a door between these rooms. It seems quite reasonable to locate a doorway where Öztan does, because the walls of Room 24 stand to a certain height on all side and there is only a gap on the south wall, which makes the access of Room 24 possible.

[81] The door between Rooms 16 and 30 is not accurately located; however, the shape and sizes of the storage rooms, which are positioned on the east side of the palace, suggests that the door must have taken place on the north of Room 30.

[82] The northwest unit of the palace thus has not been taken into account in the analysis that is applied on the secure archaeological evidence.

[83] Although the presence of the rooms 38, 42 and 43 are proved by the corpus of the floors which were found with the finds on them, they weren't included in the analysis applied on the secure archaeological evidence because neither the southern extent of Room 40, which can be the only room that provides access for the southern rooms, nor the separation between rooms 38, 40 and 42 is clear. Hence, it can be seen that the reconstruction plan of the palace suggests one more room, Room 41, between the Rooms 38, 40 and 42 that links all of these rooms.

palace. Room 14 is not included within the loops. Of these two loops, the first follows the route: Room 10, Room 4, Room 5 Room 2, the vestibule, and back again to the vestibule.

The third loop originates from the corridor and continues to the inner court; the large doorway on the east of the inner court provides access to the large storage room full of provision jars, Room 9, and then to Rooms 8, 7, the bullae room to Room 10, and returning to the corridor.

In the latter two loops are formed taking the corridor as the origin; however it should be remembered that these loops can also be made by taking Room 5 as the origin.

**4.1.1.5.2. Based on the Reconstruction**

In the reconstruction model the permeabilities within the palace mostly stay the same; except the addition of the central western storage unit of the luxury goods and the permeabilities within the southeastern part of the palace. But the significant difference in terms of permeabilities arises from the addition of the row of rooms onto the south of the palace.

The difference in the western unit is that in Room 31, the way divaricates into two, where one of them sustains the long chain and the other opens a new way into the central western storage unit. From Room 31, Room 20 gives access to Rooms 12 and 19. Room 12 leads to the upper storey by way of the stairs. Room 19 begins a chain that passes respectively from Rooms 18 to 17 at the end of this chain. These differences originate from reconstructing a wall on the south Room 40 and the placement of a Room 41 to the south which gives access to Rooms 38 and 42. Room 38 opens into Rooms 37 and 44, while Room 42 leads to Room 43.

In general the addition of the rooms to the south of the palace extends the three chains that originate from the vestibule, and these extensions join on the south, generating two more loops. From Room 28, the first chain goes via Room 35 to 36 and 34. The third chain that originates from the vestibule continues from Room 33 to 34. The two entrances of room 34, one from the first chain and one from the second create a fourth loop. From Room 36, Room 37 is entered, continuing the second chain originating from the vestibule, through the passage between Rooms 38 and 37. Room 37, joining the first and the second chains, adds the fifth loop.

### 4.2. TELL MARDIKH

The site of Tell Mardikh, covering an area of almost 56 ha (approximately 140 acres), comprises two main parts; the acropolis mound and the lower city. The circular acropolis is located in the middle of the city, occupying 3 ha of land, which measures to 150 by 150 m. The mound stands 25 m higher than the lower city,[84] and fortified by a wall, rising to 4.1 m high.[85] The mound is important in bearing the royal palace of the Middle Bronze Age, the Palace E, and the associated temple and residence.

*Figure 4.3. View of the site of Tell Mardikh. (After Matthiae 2008.)*

The lower city measures 1000 m north-south by 700 m east-west. The undulating topography includes two hills, on the south and on northeast rise. Following the natural contours, the oval shape of the lower city is deformed on the north and south edges.[86] The lower city is surrounded by the 2.5 km long, massive fortification walls,[87] rising up 19 to 23 m.[88] (Figure 4.3)

Neither chronology, which is highly depend on pottery horizons, nor will the break versus continuity be discussed here.[89] The Middle Bronze Age of Tell Mardikh is prominent by two levels, Mardikh IIIA and The Middle Bronze Age is divided into two

[84] Pinnock 2001, 26.
[85] Matthiae 1987, 146.
[86] Pinnock 2001, 13-4.
[87] Matthiae 1997c, 3.
[88] Pinnock 2001, 25.
[89] Further information for the stratification of Tell Mardikh, can be found in Matthiae 1977a, 51-8 and Matthiae 1985, 134-9.

levels, Mardikh IIIA and Mardikh IIIB, Middle Bronze I dated c. 2000-1800 BCE and Middle Bronze II, dated c. 1800-1600 BCE. The numerous monumental buildings of the Middle Bronze Age and the high and massive defenses of the city reflect the prosperity and wealth of the city in this period.

Excavations have revealed several structures of different periods; palaces, temples, shrines, monuments, and residences. Of the six palatial buildings thus far excavated in Tell Mardikh, one palace dates to the Early Bronze Age IV (the Palace G),[90] while an Intermediate Palace (the Archaic Palace),[91] suggested to have been used continuously between the Early Bronze Age IV and Middle Bronze Age I. The last four palaces belong to the Middle Bronze Age (the palace FF,[92] the Palace E,[93] the Palace P[94] and Palace Q[95]). Palace P and Q were built in Middle Bronze Age I while Palace E was founded later. However, all of the palaces were destroyed by the same conflagration, which ends the Middle Bronze Age at Tell Mardikh.[96] These Middle Bronze Age palaces are located in different parts of the site, Palace E on the acropolis mound, Palaces P, Q, and FF in the north, west and south of the lower city respectively.

Of the four MBA palaces there of them are suggested to have these functions almost certain: Palace E was the royal residence; Palace Q was the residence of the prince; and Palace P, related to the sacred area of Ishtar, had a ceremonial function in association with the kingship.[97]

### 4.2.1. Palace Q

Located on the west skirts of the Acropolis mound, maximum measurements of Palace Q are 115 m north-south by 60 to 65 m east-west. It covers an area of almost 7300 $m^2$. In plan the building is an irregular rectangle.[98] Palace Q was first erected in Middle Bronze I. In the second phase, which is thought to coincide with the beginning of Middle Bronze II, floors were renewed. Subsequent phases include such modifications as the sealing of some doorways and restoration of orthostats.[99]

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[90] For the Palace G, see Matthiae 1997c, 1990b, 1987, 1983, 1980, 1979, 1978a, 1978b, 1977b, 1976.
[91] For the Archaic Palace, see Matthiae 2006, 1998, 1995.
[92] For the Palace FF, see Matthiae 2006, 2004.
[93] For the Palace E, see Matthiae 2006, 1997b, 1997c, 1977a.
[94] For the Palace P, see Matthiae 2006, 2002a, 2002b, 1997a, 1997b, 1997c, 1990a, 1990b.
[95] For Palace Q, see Matthiae 2006, 2002a, 2002b, 1997a, 1997b, 1997c, 1990a, 1984, 1983, 1982a, 1982b, 1980, 1977b.
[96] Matthiae 1997b, 387.
[97] Matthiae 1997b, 387.
[98] Matthiae 1984, 19.
[99] Matthiae 1984, 19, 21; Matthiae 1980, 113-14.

#### 4.2.1.1. Building Materials

Building materials used in the construction of the palace are stone, mudbricks and timber. Mud is shaped into bricks of different colors. The mudbricks were carefully bonded with a single color or alternating colors and covered with a special coating.[100] The walls are erected on high and thick stone socles of limestone and basalt. Monolithic slabs of stones, chiefly basalt, were also used in the large thresholds, whereas many monolithic orthostats of basalt were set up in the palace.[101] The presence of timber is only proved by the destruction layer of Palace Q, which became grayish black by the burning of the wooden beams that support the roof.[102] Unlike the Anatolian palaces,[103] timber is only used in the construction of the roof, rather than constituting a framework for the superstructure.

#### 4.2.1.2. State of Preservation

Albeit a series of serious looting and natural processes, especially erosion, that Palace Q went through; it is still one of the most preserved palaces so far excavated within the region. The north and central east part of the building survived, with their stone foundations and thresholds and the upper mudbrick structure, despite the fact that some parts are eroded. To the west and south the floors and fragmentary mudbrick walls and their foundations are only partially preserved, yet adequate to allow the reading of the layout.[104]

The northeast corner of the palace is completely lost, with the razing of the walls down to their foundations and the plundering of the stones for the construction of the Late Roman or Byzantine building.[105] The central part of the building was subjected to serious looting of the foundation stones, where the pits are obviously seen, especially on the central north sector.[106] The western perimeter wall is only preserved with its foundations. Like the northeast part, the south end of the building is completely lost. On the southeast part of the palace two depressions, which are thought to be the holes

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[100] Matthiae (1980, 114-5) states that besides the regular use of brown mudbricks, red and white were alternately used in the north-east wing's walls, so that some of walls had an original geometric decoration. Furthermore, for the reason that the opaque coating of these walls would cover the decoration, Matthiae suggests that the vitrified coating of these walls originally had a glassy texture, which allows transposing the underlying decoration.

[101] Matthiae 1984, 20; Matthiae 1980, 113.

[102] Matthiae 1980, 109.

[103] Naumann 1975, 92-112.

[104] Matthiae 1980, 107-8.

[105] Matthiae 1980, 107-8; Matthiae 1977, 151-2.

[106] Matthiae 1982, 308.

that are formed after the removal of the bases for the piers/columns, were found. A similar hole existed also on the center of the south sector. This part was reconstructed as a courtyard/forecourt that is reached through a colonnaded portico.[107]


*Figure 4.4. Plan of Palace Q of Tell Mardikh.*

#### 4.2.1.3. Physical Appearance and Planning Principles

Palace Q of Tell Mardikh (Figure 4.4) [108] had almost 50 rooms, placed through the principle that groups of four or five interlinked rooms of almost same size, taking access via small inner courts, are orthogonally repeated. The palace thought to have a large forecourt, measuring 30 by 35 m.

[107] Matthiae 1983, 536-37; Matthiae 1982, 311.
[108] Digitized plan, after Matthiae 1997c and Marchetti 1999.

The core of the palace is formed of two groups of rooms. The first, central south group measures to 20 x 18 m, including four accurate rooms. This unit is longitudinally tripartite, with a larger bipartite room in the middle and two narrower latitudinally bipartite, different sized rooms on the sides.[109] The second, the central north group, has six rooms in appearance; however, the number of the rooms included in this group is uncertain, due to the heavily deteriorated state of this part.

The north and east wings of the palace follow a planning principle that the long and narrow rooms are placed orthogonally, abutting to their perimeter wall. Accessed from the large room of 23 x 8 m size, the north wing consists of horizontally juxtaposed four rooms of almost same size, 8 x 3.5 m; with a ramp staircase in the middle. The southeast wing is formed by the longitudinal repetition of the long and narrow rooms that have nearly the same size. By means of juxtaposition, the rooms on the east wing are rather different than those on the north wing, because of taking access from different inner courts. The longer sides of the rectangular rooms on the north wing are laid in the north-south direction and the ones in the east wing are placed in the direction of east-west. It is straightforward that this appearance is a result of abutting the rooms orthogonally to the perimeter walls. Besides, it is not impossible to observe that the clockwise rotating of the north wing would give more or less the same picture with the east wing.

It is impossible to refer to the appearance of the northeast wing, due to the fact that this part is lost to its foundations. However, the west wing, which is only preserved with the foundations of the west perimeter wall and the partial walls on the eastern wall of this wing, extends as long and narrow corridor, surrounding the palace from the west. This appearance is in fact quite similar to what is seen in the Sarıkaya Palace as a corridor like structure, which surrounds the palace from north and west sides, even when it is partitioned to several rooms.

In brief the palace is planned through the basic principle that the planimetric core is in the center of the palace, surrounded by peripheral wings, that are orthogonal to the perimeter walls and separated by semi-peripheral and small inner courts, which provides access to separate wings.

[109] Matthiae, 1984, 19.

The inner courts of Palace Q are rather different from the Mesopotamian Palaces in terms of operation, which can be explained by the lack of distributive hubs that are located in the center of the units in Palace Q.[110]

#### 4.2.1.4. Units and Functions of Rooms

Palace Q shows a clear division of units that have different functions. These functions can be grouped in four: entrance/access, administration, storage and service. The entrance of Palace Q is from a southern courtyard, Room 1. The idea of having a large forecourt has originated from mainly two points. The first of them is the presence of two depressions which are thought to be bases for columns of the portico. The second of them is the contemporaneous parallels.[111] Together with the vestibules and inner court, the courtyard mainly has the function of providing access.

The core of the building, which is divided into two parts as central south and central north, is reserved for administration. The central south part of this unit is thought to serve as the reception suite.[112] The appearance of the reception suite was introduced before; in this section it will be explained in terms of its function. It is necessary to mention that the reception suite of Palace Q is based on the reconstruction of the western two rooms, which are lost to their foundations. Besides, the function of this unit is attested by the reconstructed architectural formation, rather than the archaeological finds within the unit. The tripartite structure of the suite in terms of width locates the larger bipartite room in the middle, and the narrower rooms, which also have two sub-members, on the sides. The central hall in the middle, Room 18, is the throne room. This hall is transparently divided into two by two columns.[113] The northern side of the columns, Room 18a, is the place where the throne stood and the western side of the columns, Room 18b was the audience hall. The east wing of the reception suite acted as a bipartite vestibule. This wing is formed of two rooms, Rooms 14 and 17; which secured the entrance for the throne room. The west wing of the reception suite is also formed of two parts, Rooms 19 and 22, which are devoted to

[110] Matthiae 2002b, 193-4; Matthiae 1997a, 130; Matthiae 1997b, 384-85; Matthiae 1983, 538-40.
[111] Matthiae 1983, 536-7.
[112] Matthiae 1983, 541; Matthiae 1982, 313.
[113] Of the two columns, the eastern one was uncovered during the excavations; see Matthiae 1982, 313, and the western one is reconstructed.

services.[114] Albeit minor differences, the reception suite of Palace Q is more or less the same with what is characteristic to Old Syrian palaces.[115]

The north part of the planimetric core is problematic by means of functional definition, due to the state of preservation of the unit. However, compared to the Palace P, where the administrative unit is linked to the reception suite,[116] and it is mentioned that the central core was used as an administrative unit,[117] it is highly reasonable that the central north part of Palace Q was also reserved for the administrative issues, which are associated with usage by the palace officials.

The west wing is thought to be used as a peripheral wing for the series of small and irregular inner courts, but the heavy looting of the foundations stones in this wing does not allow to reconstruct to entire wing.[118] East and northeast wings are reserved as storage facilities. On the east, rooms 9, 10, 11, and 12 appear as storerooms.[119] Although the northeast part was completely razed to its foundations, the existence of the large number of projectiles in this sector, close to the stairs,[120] made it possible to think that this part was also used as a group of storerooms that are the continuation of the eastern wing.

The best preserved wing, the north part of the palace, is reserved as the food processing unit. Room 46 was giving access to the other service rooms that are Rooms 44, 45, 47 and 48. The function of these rooms was understood by the presence of the low banquette together with sixteen basalt querns and the grinding stones found in situ in Room 44.[121] This wing is also where several large provision jars, two of which bear seal impressions and two tablets were found.[122]

The second storey of the palace was reached by the two staircases on the north; Room 46 and Room 40 and two staircases on the west, Room 15 and Room 23.[123] The

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[114] Matthiae 1990a, 211-12.
[115] Especially see Matthiae (2002b and 1990a) where he explains the formation of the Old Syrian architectural tradition in the first and documents the forms of the reception suites of the Old Syrian palaces in the second.
[116] Matthiae, 1997b, 386.
[117] Matthiae 1997a, 132.
[118] Matthiae 1983, 536; Matthiae 1982, 308.
[119] Matthiae 1982, ; Matthiae 1980, 111-12.
[120] Matthiae 1980, 114-6.
[121] Matthiae 1980, 113.
[122] For the cylinder seal impressions, see Matthiae 1984, 22; for the tablets see Matthiae 1980, 116.
[123] According to Matthiae (1997b, 384) the staircases of Palace Q are characteristic to the building in terms of number, which is attested as at least four.

function of the second storey is interpreted as the residence of the prince;[124] however, there is no mention of any kind of evidence that supports this hypothesis.

#### 4.2.1.5. Permeabilities

As is known, the permeabilities can be explained by the presence of the accurate doorways. However, the explanation of the permeabilities within Palace Q is twofold, first depends on the secure evidence for the location of the doorways, and second on the reconstructed plan of the palace.

##### 4.2.1.5.1. Based on Secure Archaeological Evidence

Palace Q is approached from the south, through a wide empty space, Room 3.[125] This space gives access to the west wing, partially to the east wing and to the semiperipheral wing of the central core. Towards west the corridor, Room 49 is reached. Towards east, the first room entered from Room 3 is Room 10, which provides access to two rooms, Rooms 9 and 11. Finally, towards north the central southern inner court, Room 13, is entered.

The central southern inner court provides access to Room 12 on the east, to the reception suite on the west,[126] and to the central northern inner court, Room 16. After passing through the central southern inner court, the west wing of the reception suite is entered by Room 14.[127] Room 14 provides access for Room 17. The doorway between these rooms was found with niches and stone slabs of the threshold.[128] Room 17, the vestibule of the reception suite, leads the way into the audience hall, Room 18b. Through the columns on the north of the audience hall the true throne room, Room 18a, is reached. The west wing of the reception suite, which is lost down to its foundations, is reconstructed.[129] Therefore there is no evidence for the doorways of this wing.

The central northern inner court is opened to the four ramp staircase on the west and Room 23 on the north. Room 23 gives access to Room 24, as well as a chain of

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[124] Matthiae (2006, 86) suggests that Palace Q was the prince's residence, based on the evidence of the jars that bore the cylinder seal impressions, reading "Son of King Indilimgur/Indilimma."

[125] It should be remembered that, the wide open space is the reconstructed courtyard that is reached after passing through the reconstructed portico.

[126] The explanation of the permeabilities within the reception suite is limited with the secure archaeological evidence for the doorways.

[127] Matthiae 1982, 314.

[128] Matthiae 1990a, 212

[129] Although the foundations are lost, especially on the western side of the reception suite, the presence of Room 22 is known, because of the existence of its floor, which is mentioned in Matthiae 1982, 536.

rooms. After passing through Room 23, the chain first goes into Room 25, which gives passage to Room 27.[130] Room 27 leads the way into the northern lower inner court, Room 35.

Room 35 is the inner court that provides access to two wings, the central north wing and the north wing. The central north wing is entered by Room 34, which has two doorways that go into Room 33a and 33b,[131] and one doorway for the entrance of Room 29. Room 29 is opened to Rooms 26 and 28 on the east and Room 30 [132] on the west. Passing through Room 35, the inner court of the north wing, Room 42, is reached. The upper northern inner court creates two chains. The first chain first goes into Room 41, splits into two, reaching the northeastern staircase and Room 37. By Room 37 the destroyed northeastern part is reached. The second chain starts with the large room, Room 43, which gives access to the food processing unit. Passing through Room 43, Room 46 is entered. The chain splits into three, reaching the northern staircase, Room 47 on the west and Room 45 on the east. Room 47 is opened to Room 48, whereas Room 45 to Room 44. These two rooms form the end of permeabilities within the palace.

Finally, southeast wing is to be mentioned. Located on the east of the wide open space, this wing of eight rooms was found with its mudbrick walls which had no openings for doorways. Obviously, these rooms were not entered by conventional doorway, but might have been entered by alternative solutions such as stepladders. Thus, they were not included in the analysis, neither for the excavated not for the reconstructed palace.

#### 4.2.1.5.2. Based on the Reconstruction

In the explanation of the permeabilities based on the reconstructed plan, all the permeabilities, which were explained in the previous section, remains the same but

[130] The eastern extent of Room 27 is unknown; hence this part is opened to the deteriorated northeastern wing. But the doorway on the west wall of Room 27 is securely located.

[131] The deteriorated state of this wing represents incomplete evidence for the walls of Room 33. On the isometric reconstruction of the palace, Room 33 (see Matthiae 1984, 21) is shown as two rooms, where the partially preserved wall that is visible as projecting from the west wall, appears as the wall that divides the room into two by joining the west and east wall. (This can be followed from the plan; see Figure 4.4). On the other hand, two doorways that appear on the west wall of Room 34 are securely located. For the reason that the two doorways is definite and there are projecting walls, suggesting the presence of two rooms, the permeabilities are given as if there are two rooms as 33a and 33b.

[132] The southern part of the room 33b is shown with a continuing south wall that extends to the west wall. Besides, no doorways were securely located in the south part of this room. For this reason, no link between Rooms 33 and 30 is taken into account, although there is a wide gap between these rooms.

basically the reconstructed parts of the palace is added. First addition is on the south part; consisting of the portico and the courtyard, and second addition is the two side rooms of the reception suite.

The palace is approached from south and entered from the colonnaded portico, Room 1. From the portico the way divaricates to two; into Room 49, which runs along the western side of the palace and into the courtyard. From the courtyard, the eastern and the semiperipheral central wings are entered. Following the central southern inner court, the reception suite is entered by Room 14. The northern vestibule, Room 17, gives access to the throne room. The throne room is separated into two areas by two columns. The southern side of the columns, Room 18b, is the audience hall as well as northern side Room 18a, is the true throne room. Passing through 18b, the official room, Room 19, is entered and through Room 18a, king's official room is reached.

### 4.3. KÜLTEPE

The morphology of site of Kültepe is formed of two parts: the mound and the lower city (Figure 4.5). The excavations of the lower city yielded in the expose of the Kaniš *karum* (the center of Anatolian trade with Assur, the center of all *karum*s and *wabartum*s in Anatolia), the dwellings and the workshops.

*Figure 4.5. View of the site of Kültepe. (After Larsen 2008, 71)*

The extension of the lower city is yet unknown, due to the fact that no remains of the outer city walls survive; but the extent of the city is assumed to be around 2 km. The excavated part of the lower city is on the north east of the mound. The *karum* of Kaniš was thought to be a cosmopolitan settlement, where the merchants of Assur and the natives of Kültepe, as well as other people from different cities such as Ebla, lived and traded together.[133] Yet according to T. Özgüç, the dwellings of the Assyrians were separate from the other residences, covering an area about 87.500 $m^2$ which formed a small area within the lower city.[134]

*Figure 4.6. View of the mound of Kültepe, showing the monumental buildings and the surrounding Hellenistic and Roman fortification wall. (After T. Özgüç 2005.) Özgüç (1999, 73) states that in the investigated part of the wall, there is evidence for the underlying early fortification wall.*

[133] Veenhof 2000, 861.
[134] T. Özgüç 2005, 8-9.

The other important part of the city of Kültepe is the ring-shaped mound, which has a diameter of 550 m in north-south direction and 500 m in the east-west. The mound is 20 m higher than the lower city, surrounded by a fortification wall. (Figure 4.6) Apart from the fortification wall, there lays an enclosure wall, forming the citadel on the mound. The citadel has a diameter of 130 m, at 5 m above the mound's elevation. The mound is not residential, but monumental.

Occupation, extending from Early Bronze Age to Roman times, is observed by 18 levels on the mound of Kültepe. Of these levels, levels 6 to 10 represent the Assyrian Trading Colonies period when Kanesh was a powerful kingdom in Anatolia.[135] The majority of the architectural remains lies between these levels. It is important to set synchronization between the layers of the mound and the Karum, because the stratification of the mound and the lower city are named differently. The levels 6 to 10 correspond respectively to Karum Ia, Ib, II, III, and IV.[136]

The layers Karum II and Karum Ib are proved to be of great importance in the understanding of the state of Kültepe as well as in shedding light onto the political, economical, and social relations between Anatolia and Mesopotamia in the Assyrian Trading Colonies period by the clay tablets, bearing cuneiform texts.[137]

Two temples, three palaces, one official storage building and one megaron type of a structure are uncovered on the mound. Among the palaces, the Level 8 palace, of whose remains is below the Warshama Palace, is the oldest and dated to Karum II. Labarša is thought to be the king resided in this early palace. [138] The second palace, located on the southern terrace of the mound, is contemporaneous with the old palace. T. Özgüç thinks the terrace palace had been constructed gradually in a way that the construction started during Karum III and the palace took its final shape in Karum II period.[139] Warshama Palace (Level 7) is dated to the Karum Ib, which is very important for the Assyrian Trading Colonies period. The Palace which will be analyzed in this thesis is Warshama Palace.

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[135] T. Özgüç, 1999, 4.

[136] Veenhof (2000, 860-2) assigns the dates for Kanesh karum periods as, Karum IV and III is about 2000 BCE, Karum II is between about 1910 and 1830 BCE and Karum Ib is between about 1810 and 1740 BCE. For a discussion of the Karum Ia and Karum Ib dates, see Veenhof 1998.

[137] T. Özgüç, 1999, 4-5; for more detailed information, see T. Özgüç 2005, 9-12.

[138] For further information, see T. Özgüç 1999, 137.

[139] T. Özgüç 1999, 137.

### 4.3.1. The Warshama Palace

The Warshama Palace[140] is located on the mound of Kültepe, attached to the citadel wall on the north and west directions. The citadel wall is not directly in the center of the mound, but closer to the east side. The citadel wall of the palace measures to 100 m in length on east-west direction 110 m on the north-south, covering an area of more than 1 ha (2.5 acres). Comparing this size to the other contemporaneous palaces, it is possible to define the Warshama Palace as a large one.[141]

#### 4.3.1.1. Building Materials

The building materials, used in the construction of the Warshama Palace, are stone, mud and timber. Stones, which are mostly local andesite, are used for the foundations. The stone socles were constructed of rubble, packed with lightly trimmed large blocks of various dimensions.[142]

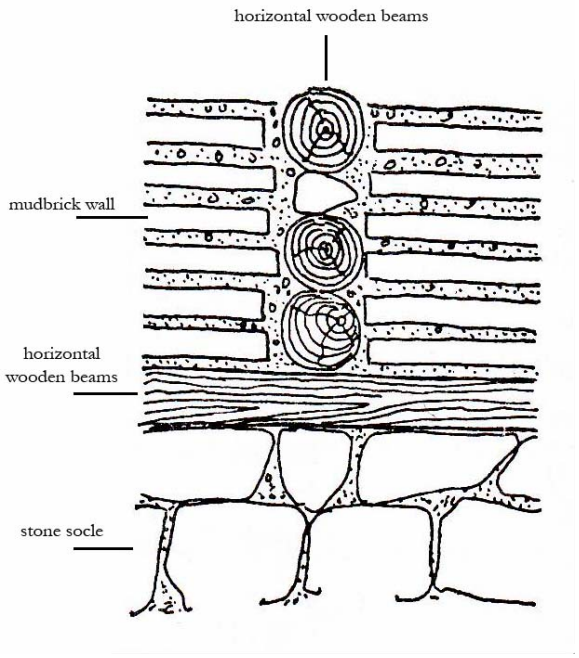


*Figure 4.7. Construction technique of the walls in the Warshama Palace. (After T. Özgüç 1959, 22.)*

[140] T. Özgüç (1999, 135) declares that the name of the palace comes from the letter of Anum-Hirbi (King of Mamma) to Warshama (King of Kanesh) which was found in this palace and the construction can be dated to earlier times, to Inar. Additionally it was used in the times of the later kings Pikthana (the conqueror of Kanesh) and his son Anitta. For the Anum-Hirbi letter see, Balkan 1957.

[141] The old palace of Assur 0.9 ha (measured from the plan published in Pedde 2003), Sarıkaya Palace at Acemhöyük 0,25 ha, Western Palace at Tell Mardikh 0.75 ha, Northern Palace at Tell Mardikh 0.35 ha, Royal Palace at Tell Hariri almost 2 ha (measured from the plan published in Margueron 2000, 888), and second millennium palace at Tell Misrifeh 1.3 ha (measured from the plan, available in Pfälzner 2008, 219).

[142] T. Özgüç 1999, 79; T. Özgüç indicates that these dimensions are 26x82x40 cm, 140x90x56 cm, and 120x80x40 cm.

In some parts the socle rises 2.5 m above the floor level.[143] The width of the socle varies. In the northwest part of the citadel wall, it thickens to 4 m, whereas it is mostly 1.5 m within the interior parts of the structure. Timber is another building material which is quite important in giving information about many aspects, such as the supported upper storey, roofing, dating of the palace, and the violence of the conflagration.

The use of timber is twofold: within the foundations and the superstructure. The wooden beams within the socle are used horizontally and cross horizontally at 1.50 m intervals. On the highest course of the wooden beams, the mudbrick superstructure sits. The bricks of the superstructure are made of mud with inclusions of thin sand and chaff, while mud is used also as mortar. The mudbrick sizes differ as well.[144] The wooden beams within the superstructure used in horizontal, vertical and traversal ways, as a framework (Figure 4.7).[145] The walls are plastered on the outer face with a thickness of 4.5-5 cm, where it can be occasionally found double-coated.[146] No trace of wall paintings is observed.[147]

#### 4.3.1.2. State of Preservation

The preservation of the Warshama Palace is problematic mainly for two reasons. Firstly, based on the weathering of the fragile mudbrick upper structure and the modern random repairs of the foundations, the Warshama Palace lost its unity. Secondly, it should be said that some parts of the palace, especially the central part of the courtyard,[148] south of the north wing and the southwest part, were removed in the early excavations; which results in the partial plotting of the whole structure. Regardless of the preservation, there is one more important issue still needs to be mentioned that in spite of its long history of excavation, the Warshama Palace is not entirely investigated. This fact also prevents us from having the total picture of the palace that survived in the Assyrian Trading Colonies Period. However, the surviving parts are plotted well; even partially allowing the elucidation of the building.

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143 T. Özgüç 2005, 88.
144 T. Özgüç 1999, 80; T. Özgüç states the differing sizes of the mudbricks are 56x11x36.5 and 52x12x36.
145 T. Özgüç 1998, 467, T. Özgüç 1999, 79, T. Özgüç 2005, 88.
146 T. Özgüç 1999, 79.
147 T. Özgüç 1999, 81; the walls of room 34 produce the proof for this, since the walls of this room are still standing to a considerable height with no wall paintings.
148 The central part of the Warshama Palace has been removed by Hrozný, down to the foundations. The report together with the plan of the removed structure can be found in Hrozný 1927.

The north wing, the true surviving part of the palace, is preserved almost entirely with its foundations and partially with the superstructure. The mudbrick walls stand above the footings almost all in the eastern half of the north wing and on the north and western parts of the western half of the north wing. It is essential to underscore the lack of the doorway in this wing. By means of lack, it is not meant no doorways were located, but none existed.[149]

The west wing is very well preserved with its foundations, but almost no superstructure survived in this part. However, this part of the palace is where particular doorways were found, by the presence of the thresholds and door jambs. The south wing does not provide any preserved rooms. Finally the east wing is known to have rooms by the discovery of wall foundations, established 6 m away from the citadel wall, suggesting a possible row of rooms that is attached to the eastern citadel wall[150]; and also proved by the current excavations by Kulakoğlu,[151] but these foundations have never been plotted out in the published plans.

#### 4.3.1.3. Physical Appearance and Planning Principles

The Warshama Palace (Figure 4.8) is attached to the citadel wall, which has buttresses set at 7 m intervals. The citadel wall is square shaped, forming the boundaries of the palace.[152] Inside the citadel wall in the middle, the courtyard of the palace lies. The courtyard of the Warshama Palace is at present void.

The current size of the courtyard is 70x90 m, but it should be remembered that taking into account the non-surviving rooms on the center, south and east wings of the palace, the courtyard would be reduced in size (Figure 4.9). To the north a compound that consists of 42 rooms and measures 100 by 40 m is located. With a few exceptions, the rooms of the north wing are rectangular in shape and have nearly the same

[149] It is vague from T. Özgüç's phrase (1999, 81; "As the entrances of the rooms could not be established, the arrangement of rooms in relation to each other are unknown") that whether there were doorways but they couldn't find them or there were no actual doors in the Warshama Palace. The identification of the ground floor of Warshama is problematic due to the fact that no doorways were located. If the hard earthen surfaces found during the excavations, belonged to the ground floor, logically the doorways should have been found within the stone foundations that rise to 2 m high, which is the only possible way to provide access between rooms that are on the same level. However the lack of the doors raises the hypothesis that the earthen surface level belonged to basement. The basement hypothesis can also be supported by the difference of elevations between the wings. The west and south wings of the Warshama Palace is at least 3m lower than the north wing, where the implementation of a basement becomes possible.

[150] T. Özgüç 1999, 84

[151] The walls were seen on the visit to the site of Kültepe.

[152] T. Özgüç 1999, 79; T. Özgüç 2005, 91.

dimensions. The largest rooms, rooms 13 (11x15 m) and 50 (9.5x14.5 m), are located on the northwest and northeast corners. The second largest rooms are 28 (8x12 m) and 47 (10x11 m), situated in the center of the two halves of the north wing.


*Figure 4.8. Plan of the Warshama Palace of Kültepe.*

At first glance the north wing of Warshama Palace appears as two halves by means of shape (Figure 4.10). The two halves are separated by the axis where the size of the west half of the north wall reduces from 3 m to 2 m in thickness. These halves are about the same size, barring the larger two rooms of the north wing in the middle and the largest two rooms on the sides.

This appearance directly raises the question whether one of the halves was constructed earlier. Yet the archaeological evidence of the bonding of the walls suggests that the north wing was constructed all at once.

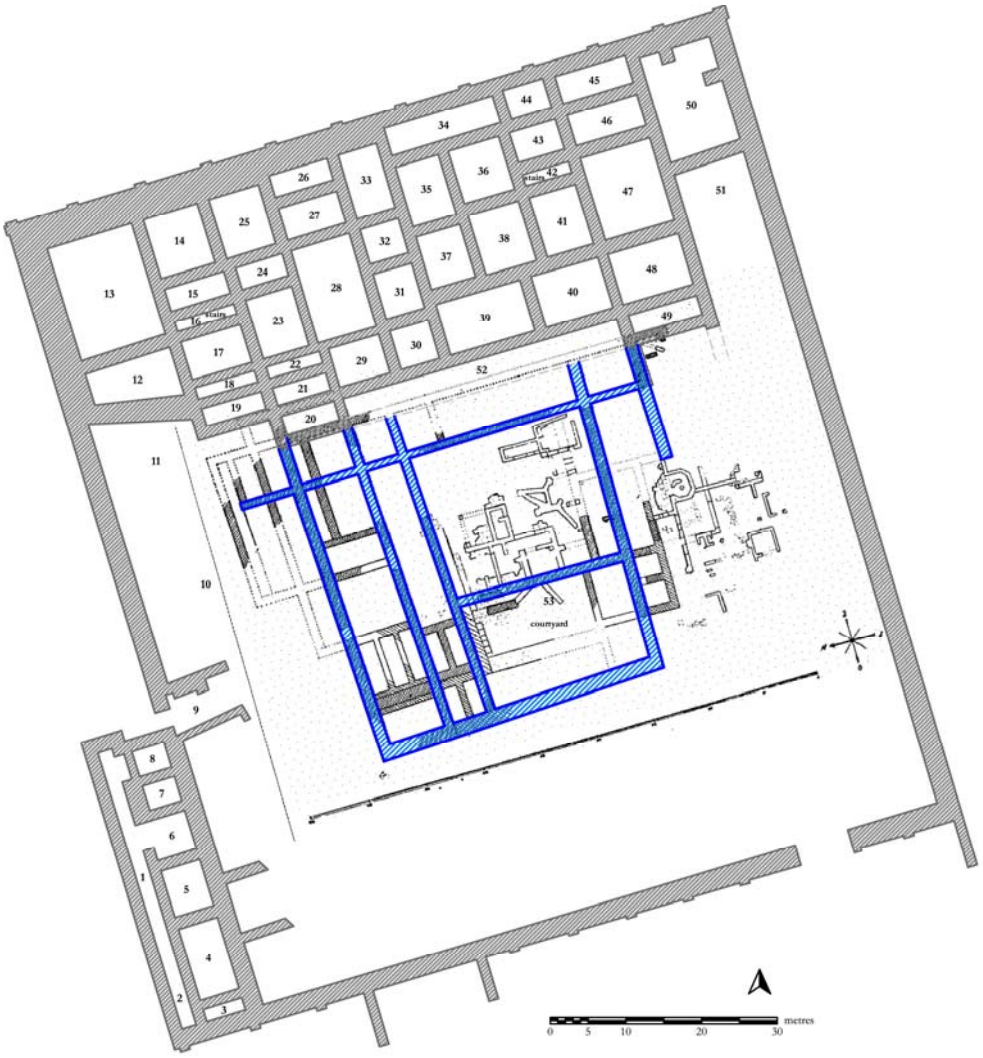


*Figure 4.9. Plan of the Warshama Palace, showing the central rooms removed by Hrozný.*

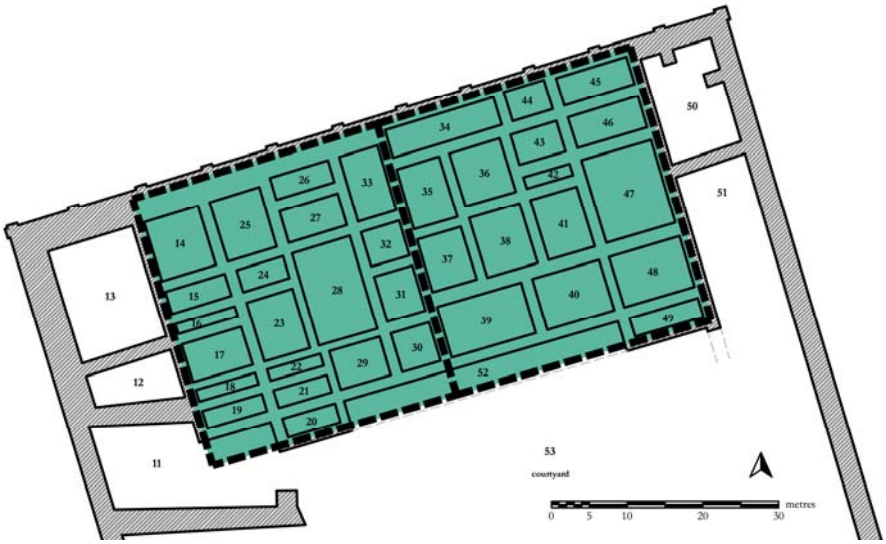


*Figure 4.10. Two halves of north wing of the Warshama Palace*

The other evidence lies in the expectation that the outer wall of the earlier half should be thicker; however the wall, that appears as the repetition axis for the two halves, joining the middle of the north wall and the middle of the south wall of the north wing, has the same thickness with the other inner walls. Another important point to mention is the thicker west half of the north wall. T. Özgüç suggests that this part of the wall has been thickened in the later periods,[153] which is also a support for this hypothesis.[154] Regardless of phasing, it can be said that the palace was planned through the repetition of two square units that have the same sizes.


*Figure 4.11. Repetition of rooms within the north wing of the Warshama Palace.*

The rooms are mainly repeated as longitudinal rows in the two halves (Figure 4.11). The first rooms to be used as same are the rooms 13 and 50, which are the largest rooms. Different from the other repetitions, these rooms had been mirrored according to the main axis which divides the north wing into two.

The second clear repetition appears in the row, starting from room 26 and ending in room 29, where it is visible on the second half, starting from room 45 and ending in room 48. In this row it is seen that the second largest rooms of the north wing, rooms 28 and 47, are repeated in the same row. The other repetition appears between the

[153] T. Özgüç 1999, 130.

[154] For the stone-by-stone plan see T. Özgüç 1999, Plan 1, and for the photo of the northwest corner see T. Özgüç 1999, Pl 10.

rooms 16, 17 and 37 and 23 and 88. Here it is seen that when merged together, rooms 16 and 17 correspond to room 37; while room 23 and 38 clearly appears the same size and place. The fourth correspondence is between rooms 14 to 35, 25 to 36 and 15 and 24 to 34. This repetition is not used in the exact order as in the second row. In this correspondence it is seen that, rooms 15 and 24, which become the same size with room 34 when joined together, had been shifted downwards, whereas rooms 14 and 25 upwards.

A final repetition is visible when the rooms 18, 19, 21 and 22 combined, where they become the same size as room 39. All of these repetitions point to the careful planning of the palace. Another thing to mention here is the repetition of rows of chambers is not visible in the Mesopotamian and North Syrian palaces. This case makes the Warshama palace different from the Mesopotamian and North Syrian palaces in which the units appear to have been repeated around smaller inner courts.

The west wing is on the lowest part of the palace. This wing measures to 25 m to 12 m, including 8 rooms. Six of these rooms are attached to the citadel wall from outside. This wing has been constructed on the weakest part of the palace to support the citadel wall.[155] The retaining walls, which are attached to the west wing from the courtyard, are another evidence of this support. According to T. Özgüç, only this part of the palace is gradually constructed.[156] This wing was planned as rooms, which are aligned with an orthogonal corridor that lays in north south direction, parallel to the citadel wall. The rooms situated on the east of the corridor. This property makes this wing different from the north, for the reason that there are no corridors within the true north wing. The plan of the west wing is more similar to the plan of the Level 8 palace on the terrace, in terms of spatial design, where the corridor of the terrace palace has been flanked by two rows of rooms.[157]

#### 4.3.1.4. Units and Functions of Rooms

The function of the rooms within the Warshama Palace is another important issue to be examined. The floor level of Warshama Palace is thought to be allocated for

[155] T. Özgüç 1999, 82.

[156] T. Özgüç (1999, 139) states that , with the decline in the trade there was no need for two palaces, so with the addition of this wing, possibly by Anitta, the "Old Palace" on the terrace had been abandoned and Warshama Palace started to be used as the only palace.

[157] For the plan of the terrace palace, see T. Özgüç 1999.

mainly service/administration and for storage.[158] The use of space suggested for the west half of the north wing, with a row less on the east of the western half, is storage; while the other half, including the missed row of the western half, is for administrative uses.

The rooms that are suggested to have the function of administration were the rooms where the incoming goods were weighed, counted, taxed and the payments were taken. Besides, the storage rooms were not the rooms where the provisions are kept but the goods are stored. The rooms, where jars, vases and bullae found, were suggested to be the store rooms and the ones that have seals, tablets and other precious small finds were suggested to be used as service and management rooms. The rooms 13, 28, 39, 40, 47, 48 and 50 are suggested to be residential in function; however, there is no clear explanation of the archaeological evidence to prove that they were.[159]

The palace had a large courtyard in the center of its plan. As aforementioned the size and exact boundaries of the courtyard are unknown, but taking into account the destroyed rooms in the other wings, it can be proposed that the units of the palace are gathered around the large and single courtyard. On the other hand, the question of whether the Warshama palace had inner courts is still pending. The inner courts of the Mesopotamian and North Syrian palace were structured differently; in the first, the inner courts are placed in the center of the units, which are repeated throughout the palaces and give access to the surrounding rooms; and in the latter the inner courts are planned as chains that provide access to the rooms along the chain.[160] All of the Middle Bronze Age palaces appear to have inner courts (Figure 4.12). The inner court is also observed in the Sarıkaya Palace of Acemhöyük, which have strong parallels with the Warshama Palace.

Thus, it is reasonable to think of the possibility that the larger rooms, Rooms 28 and 47, acted as the inner courts.[161] The location of these rooms, lying in the middle of

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[158] T. Özgüç takes (1999, 81-2) the floor level into account as the ground floor. However, as previously mentioned, this floor might belong to the basement and the functions attested for the rooms of the north wing belong to the basement compartment.

[159] It has been thought that the reason why Özgüç (2005, 93) thinks these rooms were residential is because those rooms were larger than the others.

[160] For a discussion of the difference between the Mesopotamian and Old Syrian palaces see Matthiae, 2002b.

[161] It should be said that this possibility is valid only for the second storey, otherwise it can easily be disproved by first the possibility of the dealt floor level being the basement without any doorways, and second by the lack of any pavements that can endure the open air conditions, where the floors appear as trodden earth. However, it is highly possible that the upper storey of the north wing provides the function of inner courts for these rooms.

the two halves, makes it highly preferable to suppose that these rooms give access to the surrounding rooms. T. Özgüç claims that being different from Mesopotamian and North Syrian palaces; the Warshama palace does not provide any inner courts. [162]

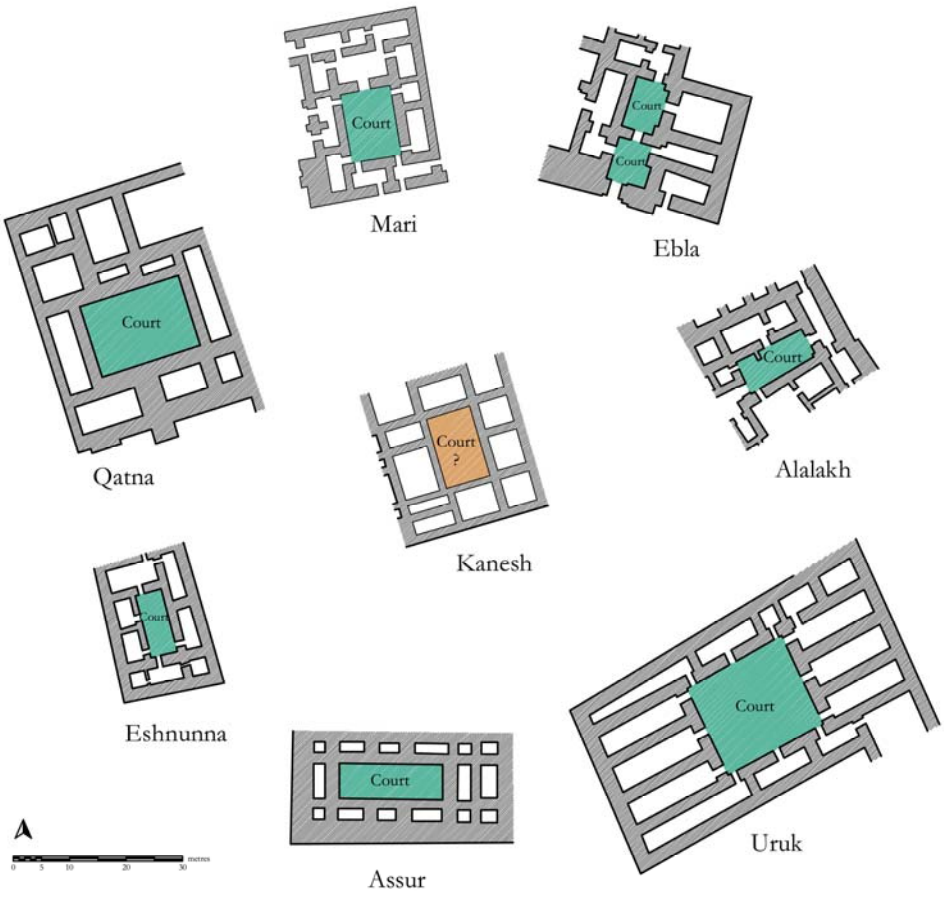


*Figure 4.12. The inner courts of the Middle Bronze Age palaces*[163]

The north wing had at least two storeys.[164] The upper floor debris found in some of the rooms of the north wing and the vast amount of timber used are the evidence to

[162] T. Özgüç 1999, 135.

[163] The figure shows only the inner court modules of the palaces. The complete plans are available in different publications; for Mari see, Roaf 2000, 119; for Qatna see, Pfälzner 2008, 219; for Eshnunna and Uruk see respectively Postgate 1994, 116, 140; for Alalakh see Marchetti 1999, Pl 5; and for Assur see, Pedde 2003, 120.

[164] The second storey of the Warshama Palace is problematic due to the reasons that was previously explained, see infra 161. Thus, the floor level has the possibility of being the floor of the basement, which makes the second storey, termed by T. Özgüç, becomes the true ground floor. This also explains T. Özgüç's stylization of the Warshama Palace (1998, 468) as a single block like building without recessions and processions. However, the presence of a true second storey over the ground floor is unknown.

claim the palace had a supported second storey.[165] Rooms 16 and 42 are suggested to be the staircases.[166] There is no detailed information or explanation of the evidence about the stairs, but by using the ancient parallels and modern dimensions, it is possible to make a reconstruction in which it can be proposed the staircases of the Warshama Palace were direct flight type, rather than the ramp stairs of North Syrian palaces or dog-leg type of the Mesopotamian palaces. The reconstruction of direct flight type of staircases originates from their long and narrow appearance.[167]

The west wing, which is inserted in the later period of the palace, is thought to function as a fortification unit because of the lack of any hearths, ovens or small finds and the foundations being thicker than needed in any different function.[168] There is no evidence for a second storey in the west wing of the palace.

#### 4.3.1.5. Permeabilities

The lack of the doors of the Warshama Palace prevents us referring the permeabilities within the palace. Exclusively, it is known that the palace was entered from west, through a postern gate. It is also possible to think that the wide gap in the foundations of the south citadel wall might have been an entrance, because of being the easiest way to reach the palace.

### OVERALL EVALUATION

In brief it can be said that the central Anatolian Middle Bronze Age sites, Acemhöyük and Kültepe have strong similarities in terms of the morphology and the location and number of the palaces, where they appear on the mound, rather than the lower city, and being two in number at the same time. Furthermore, the palaces of these sites, the Sarıkaya and Warshama Palaces, have very strong similarities which can be underlined as the building materials, construction techniques and functioning of the palace. The timber frameworked mudbrick palaces appear with large forecourts and planned in units having the shape of a square. Also, these palaces act as an institution of trade, in which the units within the palace are devoted to the administration of trade and storage of the goods and it is obvious that disperse use of spaces in these palaces was

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[165] T. Özgüç 1999, 61.
[166] T. Özgüç 1999, 81.
[167] For the explanation of the type of stairs see Blanc 1996, 13-4.
[168] T. Özgüç 1999, 83.

not the case. On the other side Tell Mardikh, as one of the best preserved sites of the Middle Bronze shows some diversities, compared to Anatolian sites, such as the location of the monumental buildings and bearing several monumental structures. Additionally the Western Palace of Tell Mardikh show basic structural and functional differences to the Sarıkaya and Warshama Palaces. The lack of the timber frame working, the longitudinal design of the structure can be counted for the differences in physical appearance, whereas the clearly divided different units, such as the reception suite, the storage units, which mostly serves to the palace staff and the food processing unit, are the basic difference in the functioning of the palace.

As it is seen, the descriptions of the case sites and the palaces, allows only the comparison of the structures for the physical appearance and functions within. Yet, the application of Space Syntax will provide further information for the spatial patterns, which is essential for the understanding of building traditions as phenotypes, and tie these patterns up with the use of spaces, in terms of functions. Additionally, the application of the method on a doorless structure by using different models will put forward how the circulation patterns are shaped in association with the models.

# CHAPTER V

# DATA ANALYSIS

As a well known archaeological theory, the formation processes,[169] either natural or cultural, have significant effects on archaeological evidence, resulting in the recovery of sets of often incomplete data. Besides these processes, the unsystematic excavation of older times with foci of ambitious interests, such as a certain occupation layer or a certain find like clay tablets, is another reason why archaeologists end up with even more fragmentary patches of past. In terms of available data and sources, the Middle Bronze Age palaces in the Near East, exposed by several archaeological expeditions, have their share of the same processes and actions.

Palace plans are often incomplete because, amongst other reasons, they were covered by later buildings,[170] damaged by the digging of later pits,[171] or quarried for building materials;[172] additional limitations include inadequate standards of excavation, poor research goals and incomplete publication. The archaeological data analyzed in this thesis, which comprises that from the Sarıkaya Palace of Acemhöyük, Palace Q of Tell Mardikh and the Warshama Palace of Kültepe, are also incomplete.

The Depth Analysis, which is explained in detail in the method chapter, highly depends on the identification of the doorways in order to calculate the depth of the cells and, consequently, understand the spatial patterning and the circulation patterns within the buildings. Due to reasons given above, the palace plans sometimes lack some of the doorways, as in the case of Acemhöyük and Tell Mardikh Palaces. Thus, it has been necessary to reconstruct the damaged parts of the palaces and their doorways. And sometimes there are no doorways, as in the case of Kültepe Palace basement.

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[169] Renfrew and Bahn 1991, 52. Renfrew and Bahn cite Schiffer (1996) for the distinction between the identification of natural and cultural formation processes. Here the C-transforms (*cultural formation processes*) are defined as the intentional or unintentional activities of human beings, such as the use/discard of an artifact, build/abandon of a building or plowing of the land; and N-transforms (*natural formation processes*) as natural events that affect the survival of the archaeological record.

[170] For the Archaic Palace and Palace Q of Tell Mardikh, see Matthiae 2006, 90, and Matthiae 1980, 107; for Sarıkaya Palace of Acemhöyük, see N. Özgüç 1972, 431; N. Özgüç 1980b, 620.

[171] For the palace of Beycesultan see, Lloyd and Mellaart 1965, 17.

[172] For Hatipler Palace of Acemhöyük see, N. Özgüç 1975, 563; N. Özgüç 1976, 715.

As it can be seen, the state of the available data for the doorways is threefold; doorways for which there is secure archaeological evidence, reconstructed doorways and non-existing doorways. Depth analysis of the Sarıkaya Palace and Palace Q, based on the secure archaeological evidence, is presented first; then hypothetical reconstructions of the Warshama Palace are analyzed.

The application of depth analysis to the Sarıkaya Palace and Palace Q provides information on the kinds of archaeological results that can be derived from such a study. Then the degree of difference between an application to secure archaeological evidence for the location of doorways and the reconstructions is assessed. Finally, the application of the analysis through different hypothetical circulation models on the Warshama Palace will be presented in a way that it shows how the configuration of spaces and consequently the spatial and circulation patterns are directed by the location of the doorways.

Analysis starts with an explanation of the color coding applied to the plans and isometric views. Then the preparation of the justified spatial graphs is described. Finally, calculation of the syntactic properties is explained. Figures for each step are given separately for the sake of clarity; in addition to which larger composite figures including all the steps of the analysis are presented in appendices.

### 5.1. THE SARIKAYA PALACE

For the application of depth analysis to the Sarıkaya palace at Acemhöyük two plans published by Öztan[173] and N. Özgüç were used.[174] From these plans, together with information derived from the previous reports, [175] a combined layout was prepared which, in turn, formed the basis for two separate plans used for analysis. Of these two plans, produced by digitization in AutoCAD, the first shows only the excavated

[173] Öztan 1991, 258.

[174] N. Özgüç 1979a, Plan 1.

[175] The plans of the Sarıkaya Palace are produced differently in each publication. Several plans of the Sarıkaya Palace, drawn by Akok and published by N. Özgüç, have different orientations; see N. Özgüç 1977, 362, 368; N. Özgüç 1979a, Plan 1; N. Özgüç 1980a, 87. The first major difference between two plans that are used in this thesis was the orientation of the structure. For this reason, the most up-to-date plan of Öztan was used as a template. The second major difference was the differentiation between the excavated parts and the reconstructions. N. Özgüç's plan of the Sarıkaya Palace was poor in showing which of the foundations were excavated and which were reconstructed. However, this differentiation was available in Öztan's plan, from which this data was taken. Then minor changes between the plans are plotted, such as the doorway on the northeast corner of the palace, see infra 85, and the doorway on the north of the corridor (Room 11).

brickwork and foundations that are securely located, while the second includes reconstructed parts of the palace.

Depth analysis is applied to two different data sets for the Sarıkaya Palace. First of these data sets includes only those doorways that are securely located by archaeological evidence, while the second is derived from the reconstructed plan of the palace.

### 5.1.1. Depth Analysis Based on Secure Archaeological Evidence

In this part the application of the Depth Analysis on the Sarıkaya Palace, based on secure archaeological evidence will be presented step by step.

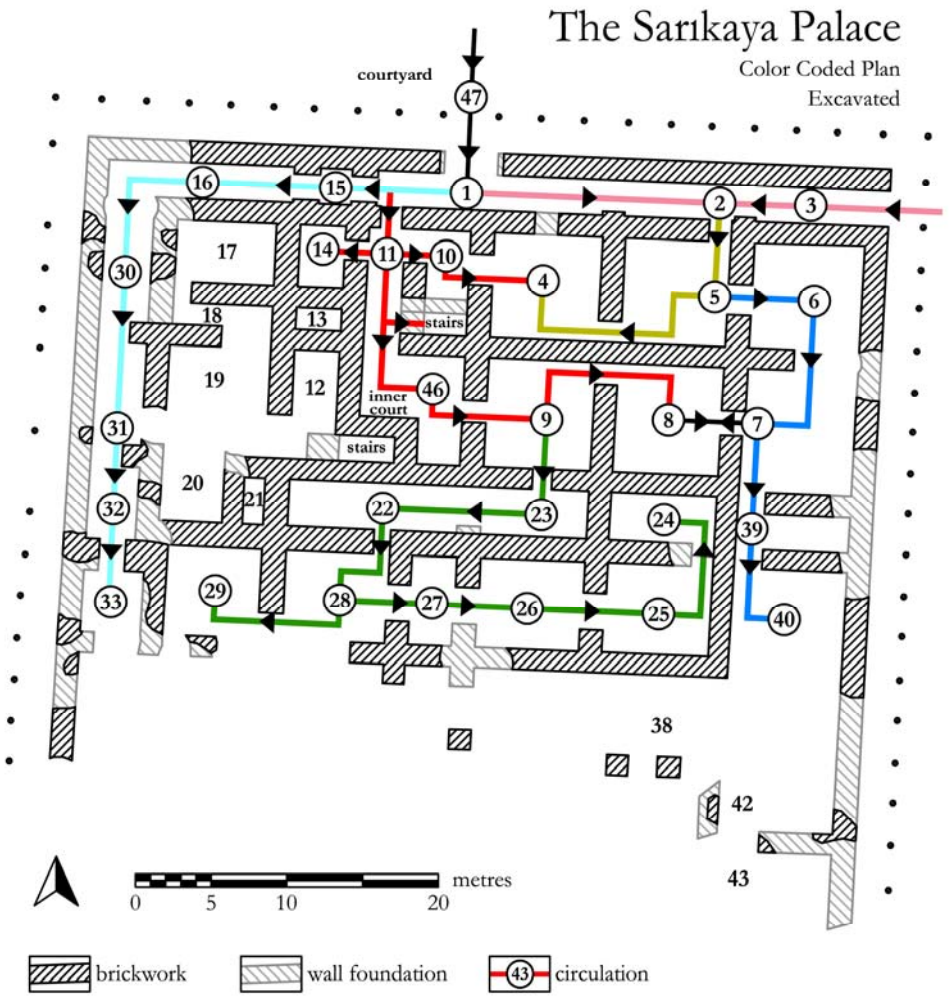


*Figure 5.1. Color coded plan of the Sarıkaya Palace, based on secure archaeological evidence.*

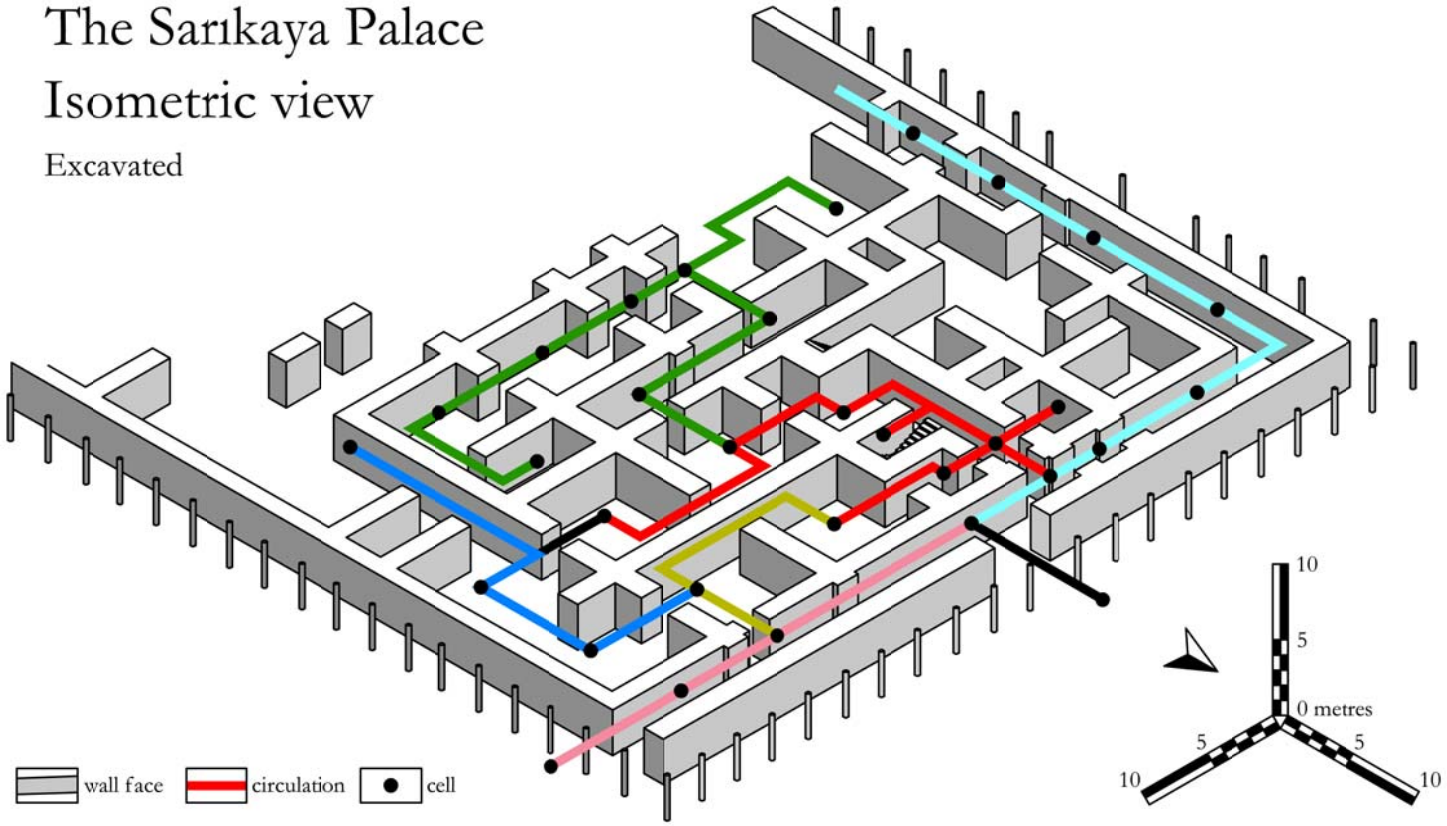


*Figure 5.2. Color coded isometric drawing of the Sarıkaya Palace, based on secure archaeological evidence.*

#### 5.1.1.1. Preparation of Color Coded Plan and Isometric View

The entrances of the Sarıkaya Palace, from north and east, are shown in black and pink respectively. The central core is represented by red. The long chains are shown in different colors: the western chain in light blue, the eastern chain in blue and the central south chain in green (Figure 5.1). Arrows showing the direction of the entrances to rooms are placed in association with the depths of the rooms. Passages between rooms, which occur at the same depth and join different chains, are represented by black bilateral arrows, as in the case of Rooms 7 and 8. The entrances to rooms that connect different chains at a higher depth value are shown by the continuation of the color codes of the chains; however, the two entrances are visualized by opposing arrows, as in Room 4 where the red line of the central chain comes from west and the olive green line from east. Finally the floating numbers on the plan belong to rooms with known presence but without located doorways.

The same color coding is applied on the isometric view, for a three-dimensional visualization of the permeabilities, which can be seen in Figure 5.2.

#### 5.1.1.2. Preparation of Permeability Graph

The preparation of the permeability graph starts by locating the courtyard, Cell 47 in Row 1. Taking access from the courtyard Cells 1 and 3 are placed in Row 2. Three rooms, Cells 2, 11 and 15, all of which are entered from the vestibule, Cell 1, are appointed to Row 3. Cell 2 is also entered from Cell 3, providing a ring. Barring three rooms of depth values of 3, the depth value of the third row is 9.

In the fourth row are located six rooms. The entrances for four of these cells, one of which is the central north staircase, and the other is the inner court, Cell 46, are provided by the corridor, Cell 11. The other two rooms having entrances from the corridor are Cells 10 and 14. The other room in this row, Cell 5, is entered by Cell 2. The last room in this row, Cell 16, taking its access from Cell 15 appears on the long western chain of the palace. Having six rooms of depth value of 4, equals the depth value of Row 4 to 24.

Row 5 includes four rooms. Cell 4, having two entrances, one of which is from Cell 5 and the other is from Cell 10 forms a ring. Entered from the inner court, Cell 9 appears as the room providing access for the central chain of the palace. Cell 6, which is entered by Cell 5, sustains the long eastern chain of the palace; whereas Cell 30, entered by Cell 16, sustains the long western one. The depth value assigned to the fifth row is

20, by having four rooms of depth values, each equals to 5.

Four rooms are located in the sixth row. Two of these rooms, Cells 8 and 23 are entered from Cell 9. The other room in this row is Cell 7, which is entered by Cell 6 and linked to Cell 8 in the same row, provides another ring in the graph. The last room of this row, Cell 31, sustains the long western chain of the palace, by taking access from Cell 30. Barring 4 rooms that each has depth values of 6, the value of the row equals to 24.

Row 7 consists of three rooms, which have entrances from separate chains and sustains these chains. The entrance for Cell 39 is provided by Cell 7. Cell 22 is entered from Cell 23 whereas Cell 32 from Cell 31. The value of depth of the seventh horizontal row is equal to 21.

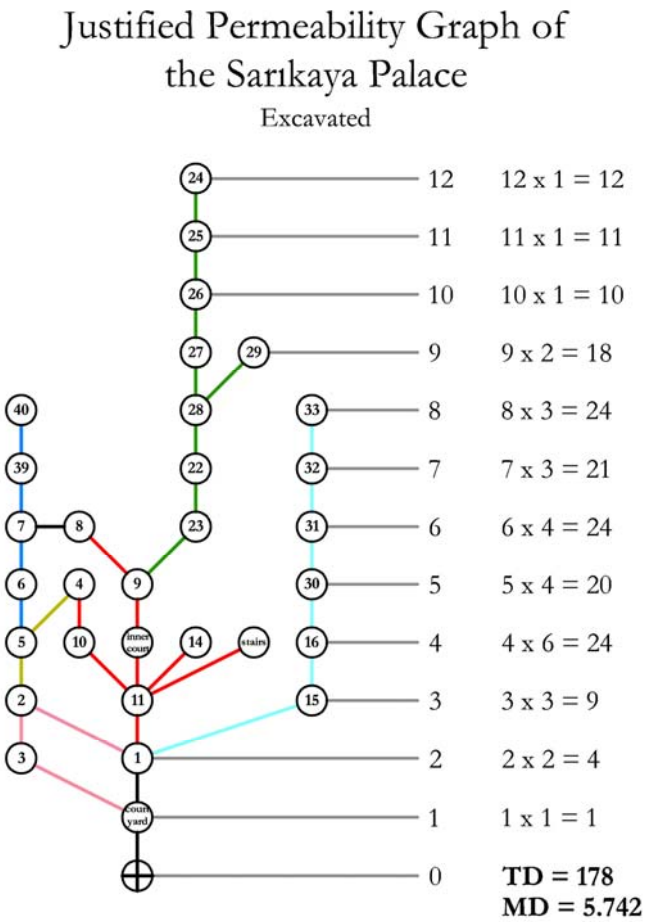


*Figure 5.3. Justified permeability graph of the Sarıkaya Palace, based on secure archaeological evidence.*

In Row 8 three rooms are situated. As in Row 7, the rooms of the Row 8 are the continuations of the separate chains. Cell 40, is reached by Cell 39 and forms the last secure room of the long eastern chain of the palace. Besides, Cell 33 that is entered by

Cell 32 is the last room of the long western chain. Cell 28, taking access from Cell 22, is the only room that takes the chain further south. Including three rooms of the depth value of 8, the depth value of the row equals to 24.

Row 9 has only two rooms, Cells 27 and 29. Both of these rooms take access from Cell 28. Each of the rest of the rows includes a single room, which is entered from the previous room situated in the lower row. Cell 26 is placed in Row 10, taking its access from Cell 27. The depth value of the row is equal to the room's depth value that is 10. Cell 25 is situated in Row 11 whereas Cell 24 in Row 12. Consequently, the permeability graph, based on the secure archaeological evidence for the location of doorways, is completed as in Figure 5.3.

**5.1.1.3. Calculation of Syntactic Properties**

The next step of the depth analysis is the calculation of the values for measuring syntactic properties. These calculations will be shown only for the first palace; the rest will be given as separate table for each palace.

Showing how deep a structure is, the formula applied for the calculation of the *Total Depth* is the sum of each cell or simply the sum of the multiplication of depth values in each horizontal row. Thus the calculation of the total depth of the Sarıkaya Palace, based on the secure archaeological evidence for the location of doorways, appear as in below,

TD = (1x1) + (2x2) + (3x3) + (4x6) + (5x4) + (6x4) + (7x3) + (8x3) + (9x2) + (10x1) + (11x1) + (12x1).

TD = 1 + 4 + 9 + 24 + 20 + 24 + 21 + 24 + 18 + 10 + 11 + 12.

TD = 178.

The *Mean Depth*, being the indication of which level is the average of the depth, is calculated by the equation follows,

$$MD = \frac{TD}{k - 1}$$

where TD is the Total Depth and k is the number of spaces. When the number of spaces is taken as 32, the Mean Depth of the Sarıkaya Palace, based on the secure archaeological evidence for the location of doorways, is calculated as follows.

$$MD = \frac{178}{32\text{-}1} = \frac{178}{31} = 5.742.$$

By using the mean depth value, it is possible to calculate the *Relative Asymmetry* of the complex. The formula is below.

$$RA = \frac{2(MD - 1)}{k - 2}$$

In order to find the value of *Relative Asymmetry* of the Sarıkaya Palace, based on the secure archaeological evidence for the location of doorways, the formula above is applied.

$$RA = \frac{2(5.742 - 1)}{32 - 2} = \frac{10.186}{30} = \mathbf{0.316}$$

The Relative Asymmetry value is useful in evaluating the symmetry/asymmetry of the complex itself, however in order to assess the symmetry/asymmetry of different sized palaces, the calculation of the *Real Relative Asymmetry* value is needed. The formula of RRA is as follows,

$$RRA = \frac{RA}{P_k}$$

where $P_k$ represents a constant which are available in Hillier and Hanson 1984, 114.[176] The constant the number of space that is 32, is 0.056. So, the appliance of the formula over the Sarıkaya Palace is as below.

$$RRA = \frac{0.316}{0.056} = \mathbf{5.643}$$

On the subsequent stage the calculation of the Relative Ringiness, which puts forward the distributedness/non-distributedness, is calculated. It can be calculated both for a complex as well as for a certain point, using two different formulas. The result of the first formula below, gives the Relative Ringiness of a complex;

$$RR_{\text{of complex}} = \frac{R}{2k - 5}$$

[176] For a detailed explanation see page 25.

where R is the distinct number of rings in the complex and k is the number of spaces. When the formula is applied for the values of Sarıkaya Palace, where the number of spaces is 32 and the number of rings is 3, based on the secure archaeological evidence for the location of doorways, the result appears as follows.

$$RR_{\text{of complex}} = \frac{3}{(2x32) - 5} = \frac{3}{59} = \mathbf{0.051}$$

The calculation of the Relative Ringiness of a point is acquired by the formula below,

$$RR_{\text{of a point}} = \frac{r}{k - 1}$$

where r represents the distinct number of the rings passing from that certain point and k the number of spaces. For the Sarıkaya Palace, the values for the courtyard, the inner court and the corridor are calculated. These calculations might reveal important results for the distributedness of the structure. The calculation for the courtyard is,

$$RR_{\text{of Courtyard}} = \frac{1}{32 - 1} = 0.032$$

and finally for the inner court and the corridor are,

$$RR_{\text{of IC}} = \frac{1}{32 - 1} = 0.032 \qquad RR_{\text{of C}} = \frac{2}{32 - 1} = 0.065.$$

The values of the syntactic properties are tabulated as in Table. 5.1.

*Table 5.1. Values for the syntactic properties of Sarıkaya Palace, based on secure archaeological evidence.*

| **The Values of Syntactic Properties for The Sarıkaya Palace (Excavated)** | **Number of Rooms** | **Total Depth** | **Mean Depth** | **RA** | **RRA** |
|---|---|---|---|---|---|
| | 31 | 178 | 5.742 | 0.316 | **5.643** |
| | **Number of Distinct Rings** | **RR of Complex** | **RR of Courtyard** | **RR of Inner Court** | **RR of Corridor** |
| | 3 | 0.051 | 0.032 | 0.032 | 0.065 |

### 5.1.2. Depth Analysis Based on Reconstruction

In this part the application of the Depth Analysis on the Sarıkaya Palace that is based on the reconstruction of the palace will be presented.

#### 5.1.2.1. Preparation of Color Coded Plan and Isometric View

The color coded plan of the reconstructed Sarıkaya Palace (Figure 5.4), uses the same colors with the color coded plan of the excavated parts. The difference lies in the addition of the units, northwestern and southern, with reconstructed permeabilities. The additional central western and southern parts are demonstrated by different colors. The continuation of the western wing of the palace sustains light blue, extending towards cell number 45, whereas the continuation of the eastern chain is shown in blue. On the southern wing, the chain extending from the central southern part is shown in yellow.

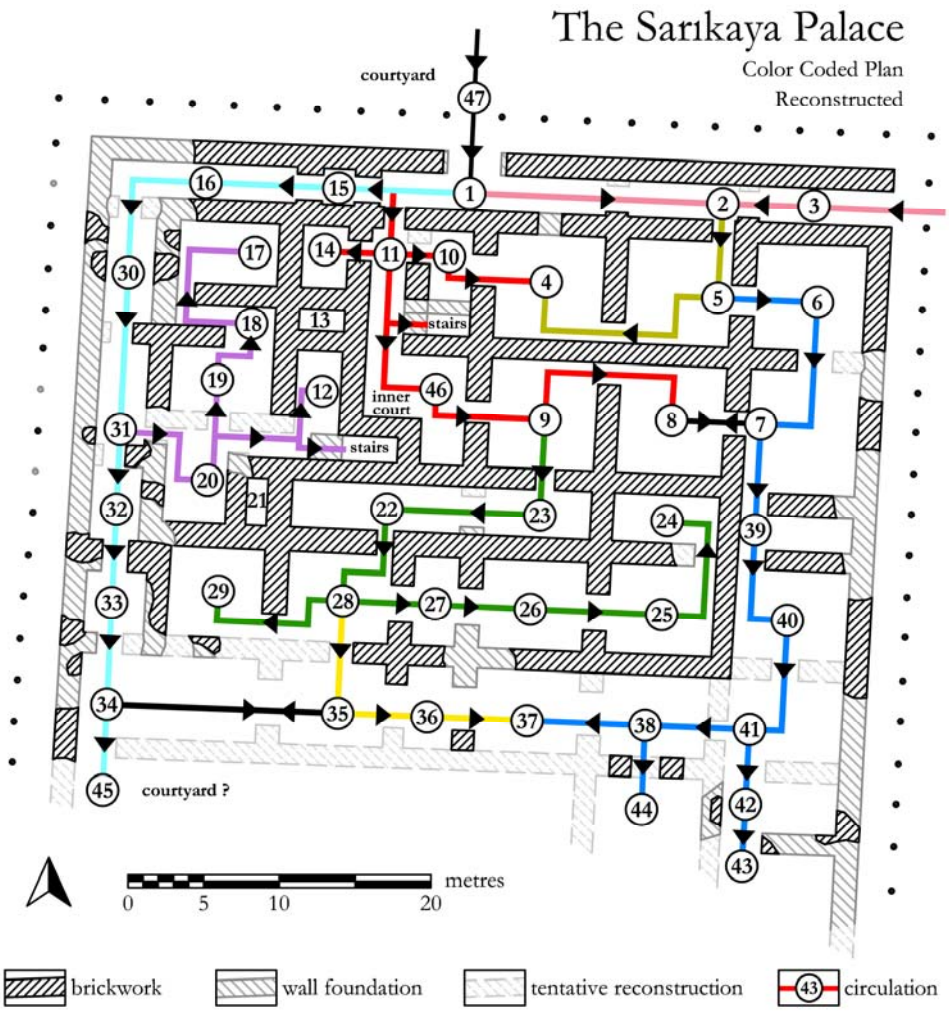


*Figure 5.4. Color coded plan of the Sarıkaya Palace based on reconstruction.*

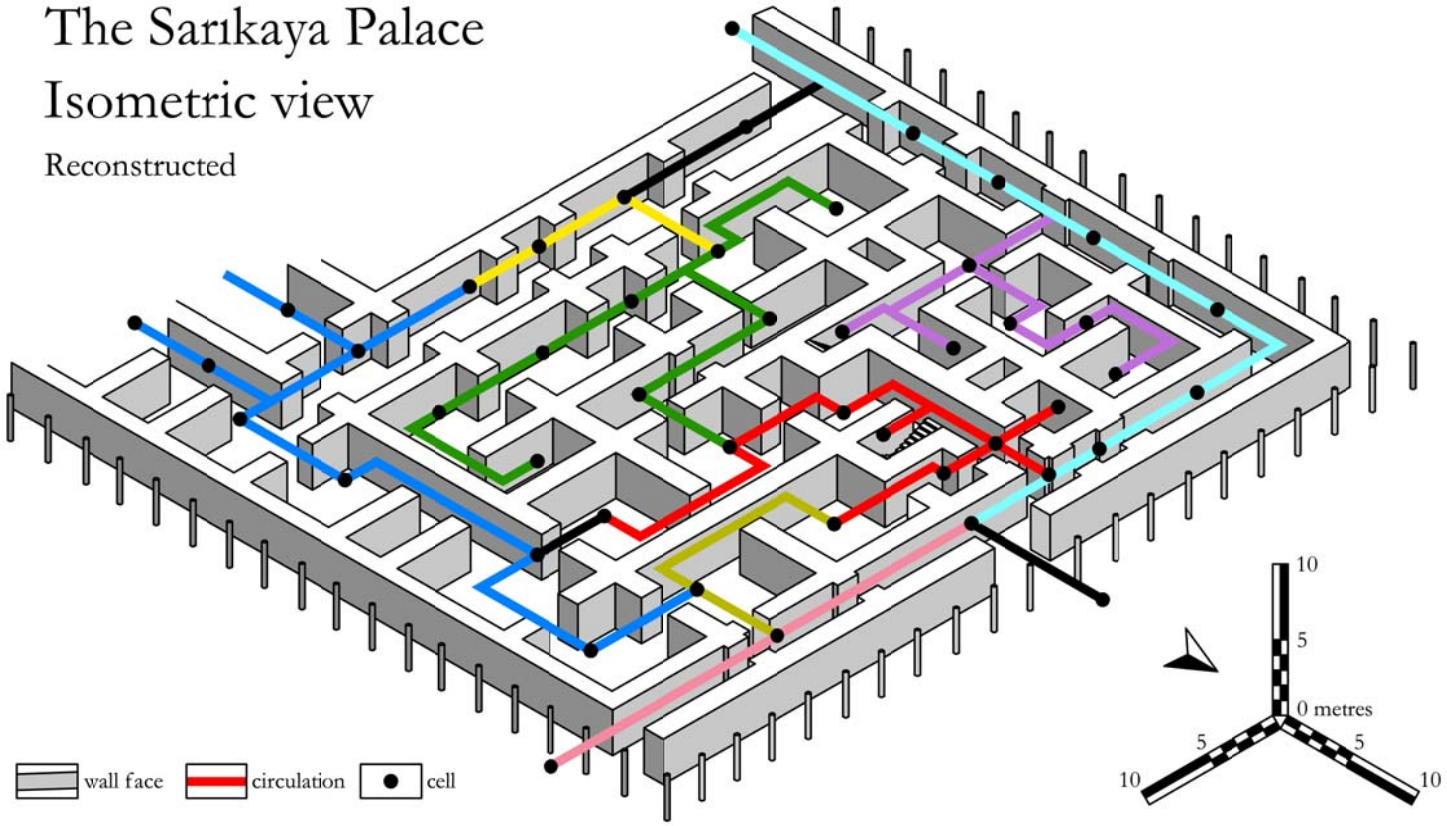


*Figure 5.5. Color coded isometric drawing of the Sarıkaya Palace, based on reconstruction.*

The black line on the south represents the passage between rooms that are on the same depth that is visible between cell numbers 34 and 35. Having the same attribute with cell number 4, the entrances for cell number 37 are depicted in different colors, which are yellow for the approach from cell number 35 and blue for the approach from cell number 38, for having higher depth value. The permeabilities of the southeastern rooms, cell numbers 42, 43 and 44 are also shown in blue, as the continuation of the eastern chain of the palace. The color coding for the isometric view of the reconstruction of the Sarıkaya Palace is the same, which can be seen in Figure 5.5.

**5.1.2.2. Preparation of Permeability Graph**

Up to the seventh horizontal row, the justified permeability graph based on the reconstruction of the Sarıkaya Palace (Figure 5.6) appears the same with the graph of the excavated evidence. Hence, in this section only further rows of the graph will be explained. In Row 7 four rooms are located. Three of these rooms, Cells 22, 39 and 32 are situated in the same location with the graph of the excavated evidence. The latter together with Cell 20 that is added by the placement of a doorway, which provides entrance for the central western unit, take their access from Cell 31. The depth value of the row, including four rooms having depth values equal to 7, is assigned as 28.

Row 8 provides five rooms. Of these rooms, Cell 40 sustains the eastern chain of the palace, taking access from Cell 39; Cell 28, which is entered by Cell 22, sustains the central chain; Cell 33, provides the continuation of the western chain of the palace by being entered from Cell 32; and finally two rooms, Cells 12 and 19, appear as the rooms on the central western unit, which are reached passing through Cell 20.

Being the most populated row of the graph, Row 9 includes seven rooms. The eastern chain of the palace continues with the reconstructed Cell 41, which is entered by Cell 40. The divarication in Cell 28 places three rooms in this row. Two of these three rooms, Cells 27 and 29 sustain the central chain, whereas the third, Cell 35 leads the way into the reconstructed southern part of the palace. On the southwestern part, the reconstructed Cell 34, reached passing through Cell 33, links the way to the southern wing with the reconstructed passage between this room and Cell 35. Two rooms on the central western unit, the staircase, entered from Cell 12, and Cell 18, accessed by Cell 19, are located in this row. Counting seven rooms of depth values of nine, the depth value of the row is assigned equal to 63.

Six rooms take place in the Row 10. Except for the two rooms on the southeast

wing, the entrances for all other rooms originate from separate wings by a single passage for each. Two rooms on the southeast part of the palace, Cells 38 and 42 are accessed by passing through the tentatively reconstructed Cell 41. Cell 26, reached passing through Cell 28, sustains the central chain of the palace. On the south wing the entrance of reconstructed cell 36 is provided by Cell 35, where as the entrance for Cell 45 by Cell 34. Cell 17, the deepest room of the central western unit, takes its access from Cell 18. This row, including six rooms that have depth values of ten, has a depth value of 60.

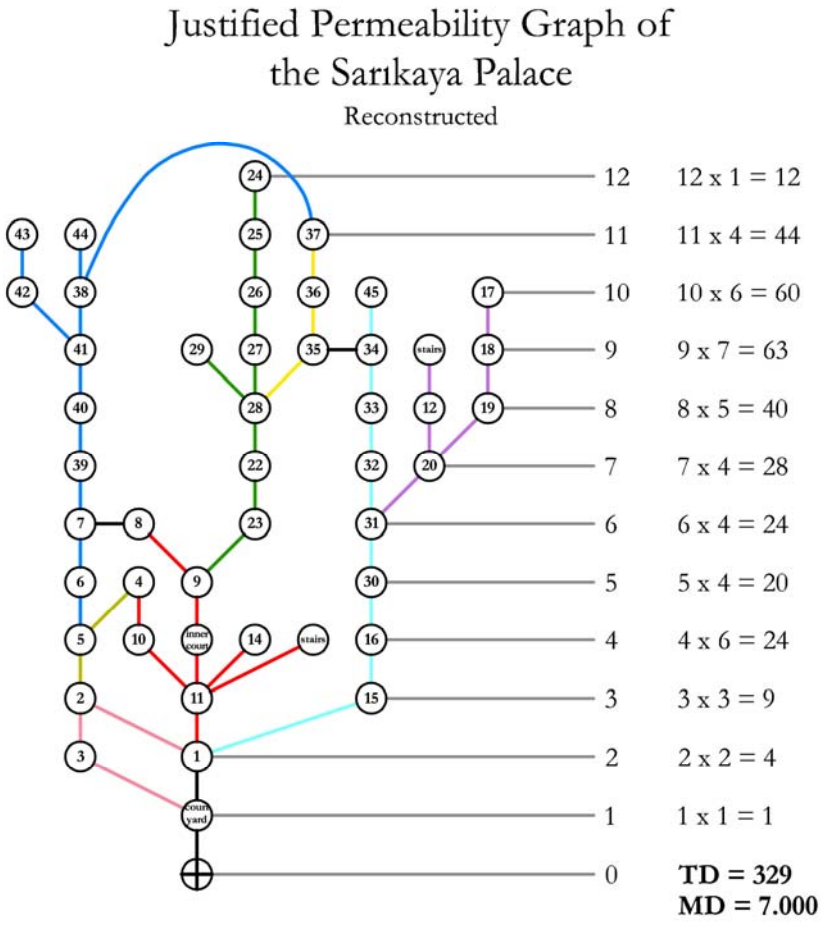


*Figure 5.6. Justified permeability graph of the Sarıkaya Palace, based on reconstruction.*

Row 11 includes four rooms, one of which is accessed by two rooms and others have single doorways from different rooms. On the southern part of the palace Cell 37, reached passing through Cells 36 and 38, forms the end of the loop. On the southwestern part of the palace Cells 43 and 44, first is entered from Cell 42 and the latter, being the second passage, from Cell 38 is the southernmost reconstructed rooms.

Finally, accessed by Cell 26, Cell 25 is the only room of this row that leads the way into a room of a higher depth value. The row has a depth value of 44, comprising four rooms of depth values that each are equal to 11. The only room in Row 12 is Cell 24 which is entered by Cell 25. Thus, the depth of the row appears the same with the room, equal to 12.

#### 5.1.2.3. Calculation of Syntactic Properties

On the subsequent stage, the calculations of the syntactic properties are made, of which the results are available in Table 5.2.

*Table 5.2. Values for the syntactic properties of the Sarıkaya Palace, based on reconstruction.*

| The Values of Syntactic Properties for<br><br>The Sarıkaya Palace Reconstructed | Number of Rooms | Total Depth | Mean Depth | RA | RRA |
|---|---|---|---|---|---|
| | 47 | 329 | 7.000 | 0.261 | **6.868** |
| | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court | RR of Corridor |
| | 5 | 0.055 | 0.021 | 0.043 | 0.064 |

## 5.2. PALACE Q

For applying depth analysis on Palace Q of Tell Mardikh, two plans and one isometric drawing are used. The first plan[177] is the excavation plan, showing originally what was excavated during the campaigns. The other plan[178] is the reconstructed block plan of Palace Q. The isometric drawing[179] has further reconstruction of the north central unit of the palace, which is not available in any of the published plans. The plans are superposed, in order to differentiate between the brickwork and foundation of the walls and the reconstruction of walls.

### 5.2.1. Depth Analysis Based on Secure Archaeological Evidence

This part comprises the step by step explanation of the application of Depth Analysis on the Palace, based on secure archaeological evidence.

#### 5.2.1.1. Preparation of Color Coded Plan and Isometric View

In the color coded plan of Palace Q, based on secure archaeological evidence (Figure 5.7.), the units as parts of the palace that have the same function are shown with the same color, on the contrary to the Sarıkaya Palace, of which the color coded plan

[177] Matthiae 1983, 533.
[178] Matthiae 1997, 20.
[179] Matthiae 1984, 21.

depended on the segments-chains of the palace because of having a single function that is storage.


*Figure 5.7. Color coded plan of Palace Q, based on secure evidence.*

The entrances[180] are shown in black and taking direct access from the large open space, the storage unit on the south is shown in yellow. The central core, separated into two as the south central and north central, are represented by two colors: the reception

[180] The presence of several entrances in the plan that is produced basing on the secure archaeological evidence, originates from the excluding of the hypothetical courtyard and the portico.

suite in red and the administrative unit in purple. The eastern peripheral part, which functioned as the chain of courtyards and extended from the southern entrance to the northern units, together with the western storage rooms are demonstrated in dark green. On the north the food preparation unit is visible with an olive green and the partially preserved storage unit is with blue.

The preparation of color coded isometric view of Palace Q followed the same principle, demonstrating the functionally differing parts by different colors. The convention used in the isometric view that is seen in Figure 5.8. is the same with the color coded plan.

#### 5.2.1.2. Preparation of Permeability Graph

In spite of the assumption that the southern end of the palace had a large courtyard, that is suggested without a secure archaeological evidence except being a large open space that directly gives access to a number of rooms of the palace, and is reached passing through a hypothetical portico, which was interpreted based on the presence of a single depression on the southwest corner of the palace that can be counted as a space for a base to support a column; the portico and the courtyard are not taken into account in the analysis because of being inaccurate. Excluding the portico and the courtyard, places the Cells 13 -the first inner court-, 2 and 10 in Row 1 of the permeability graph of the secure evidence (Figure 5.9).

Row 2 includes five rooms, with depth values of 2. Two of these rooms, Cells 9 and 11 are reached passing through Cell 10 and the other three rooms, Cells 12, 14 -the southern vestibule of the throne room- and 16 -the second inner court- are entered from the first inner court. The depth value of this row is equal to 10.

Three cells are placed on Row 3. Cell 17 -the northern vestibule of the reception suite- taking access from the southern vestibule, sustains the chain. The second inner court provides entrance for the two other cells of this row: Cell 15 -the staircase- and Cell 23 -the third inner court. The depth value of the row is assigned equal to 9, including three cells of depth values of 3.

In Row 4 three rooms take place. Cell 18b, the reception room of the suite, takes access from the northern vestibule and sustains the chain; whereas only one of the other two rooms, which both take access from Cell 23, sustains the chain further and that room is Cell 25. The other cell, Cell 24 is a dead end. The depth value of the row is 12.

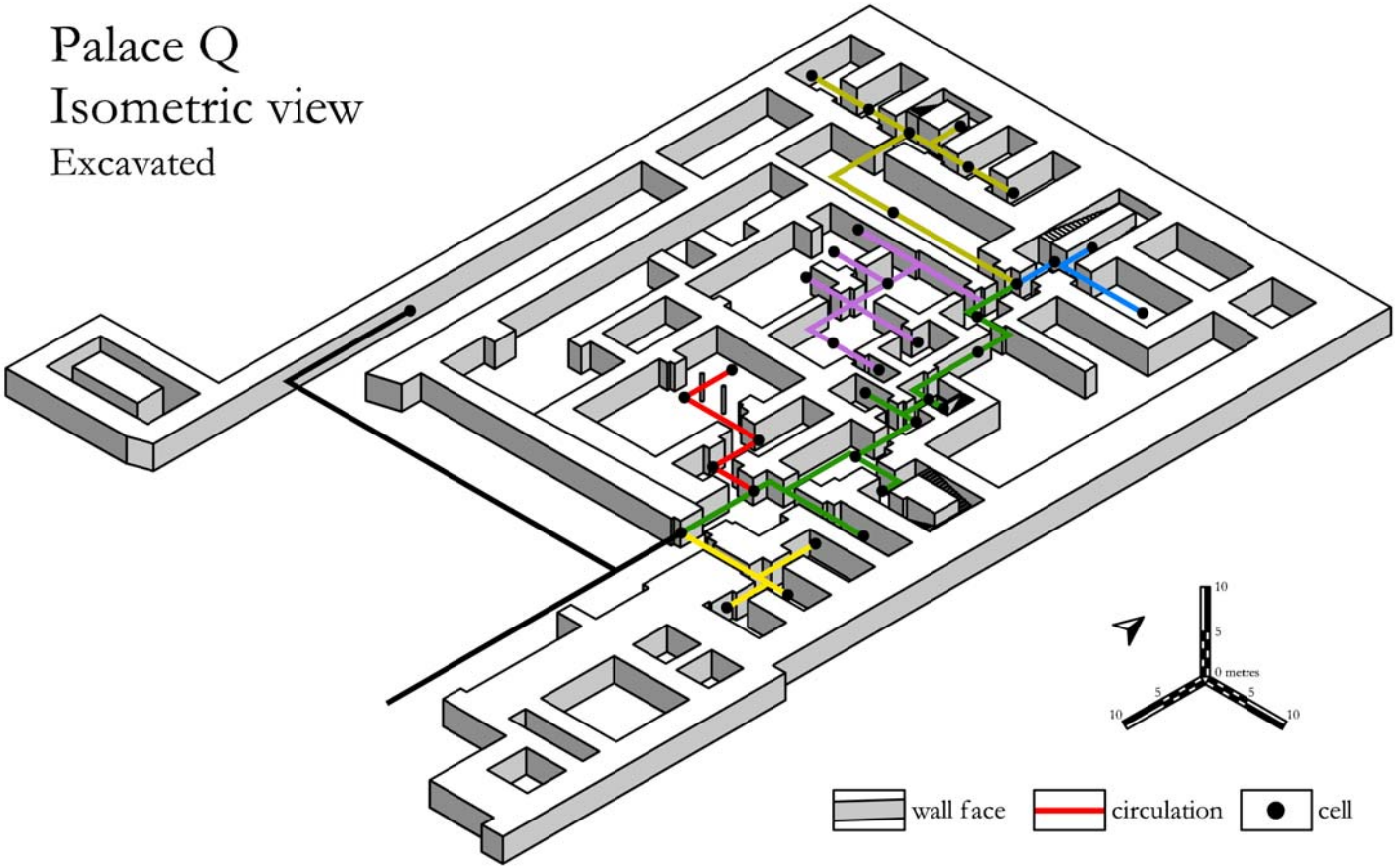


*Figure 5.8. Color coded isometric drawing of Palace Q, based on secure archaeological evidence.*

Row 5 includes three cells. First is the throne room, Cell 18a, which is entered by a colonnaded passage from Cell 18b. The excavated archaeological evidence does not provide any further headway from Cell 18b, hence the presence of the reconstructed Cell 19 is unknown and from Cell 18a because the doorway of Cell 22, which can also be placed on the western wing, is not located. On the eastern wing Cell 27 and the staircase are located, taking access from Cell 25. Placing three cells of depth value of 5, the depth value of the row is assigned equal to 15.

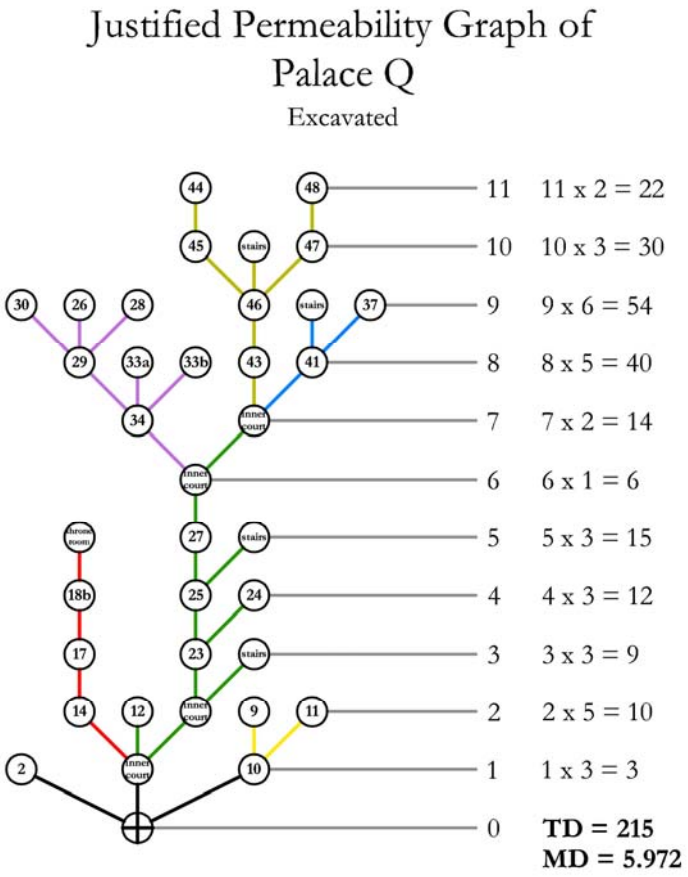


*Figure 5.9. Justified permeability graph of Palace Q, based on secure archaeological evidence.*

Since no step forward can be taken from the reception suite, the only room included in the Row 6 is Cell 35 -the fourth inner court-, taking access from Cell 27. The presence of the doorways in Cell 35 is important for being the origin of access for the north central and northern units. The depth value of the sixth horizontal row is the same with the only cell included on the row that is equal to 6.

Row 7 includes two cells, as a result of the divarication of the way into two from a

single cell, the fourth inner court. One of the cells is located on the central north unit, Cell 34 and the other is on the northern part, Cell 42 -the fifth inner court. The depth value of the row is equal to 14.

Containing five rooms that are located as groups in separate wing, Row 8 gets populated. Three of the rooms, Cells 29, 33a and 33b, are situated on the north central administrative unit, all of which takes access from Cell 34. From the fifth inner court the way divaricates resulting in the placement of other two rooms, Cell 41 on northwest part of the palace and Cell 43 on the northeast. The depth value of the row is assigned equal to 40, including five rooms of the depth value of 8.

Being the most populated row of the graph, Row 9 situates six cells. The cells on the northern central unit, Cells 26, 28 and 30, are entered from Cell 29. On the north, Cell 46 -the distributive room of the food processing unit is reached passing through Cell 43. On the northeast Cell 41 provides access for the staircase and Cell 37, through which the destructed northern part of the palace is reached. Further steps in the palace are available only in the food processing unit. The depth value of the row is calculated as equal to 54, by including cells that each has a depth value of 9.

In Row 10 three cells take place. All entered from Cell 46; Cells 45, 47 and the staircase assigns the depth value of the row, equal to 30. Finally in Row 11 two rooms, both of which are accessed by different rooms, are located. Cells 44 and 48, respectively entered by Cells 45 and 47, are the deepest rooms of the palace. The depth value of this last row is 22.

#### 5.2.1.3. Calculation of Syntactic Properties

The values of the calculated syntactic properties of Palace Q, based on the secure archaeological evidence are available on Table 5.3.

*Table 5.3. Values for the syntactic properties of Palace Q, based on archaeological evidence.*

| **The Values of Syntactic Properties for Palace Q (Excavated)** | **Number of Rooms** | **Total Depth** | **Mean Depth** | **RA** | **RRA** |
|---|---|---|---|---|---|
| | 36 | 215 | 5.972 | 0.284 | **5.796** |
| | **Number of Distinct Rings** | **RR of Complex** | **RR of Courtyard** | **RR of Inner Court** | **RR of Throne Room** |
| | 0 | 0.000 | 0.000 | 0.000 | 0.000 |

### 5.2.2. Depth Analysis Based on Reconstruction

This part constitutes the presentation of the application of Depth Analysis on Palace Q, based on reconstruction.

#### 5.2.2.1. Preparation of Color Coded Plan and Isometric View

For the color coded plan of Palace Q based on the reconstruction (Fig 5.10) the convention followed, is the same with the color plan produced for the secure archaeological evidence but with a number of changes.


*Figure 5.10. Color coded plan of the Sarıkaya Palace, based on reconstruction.*

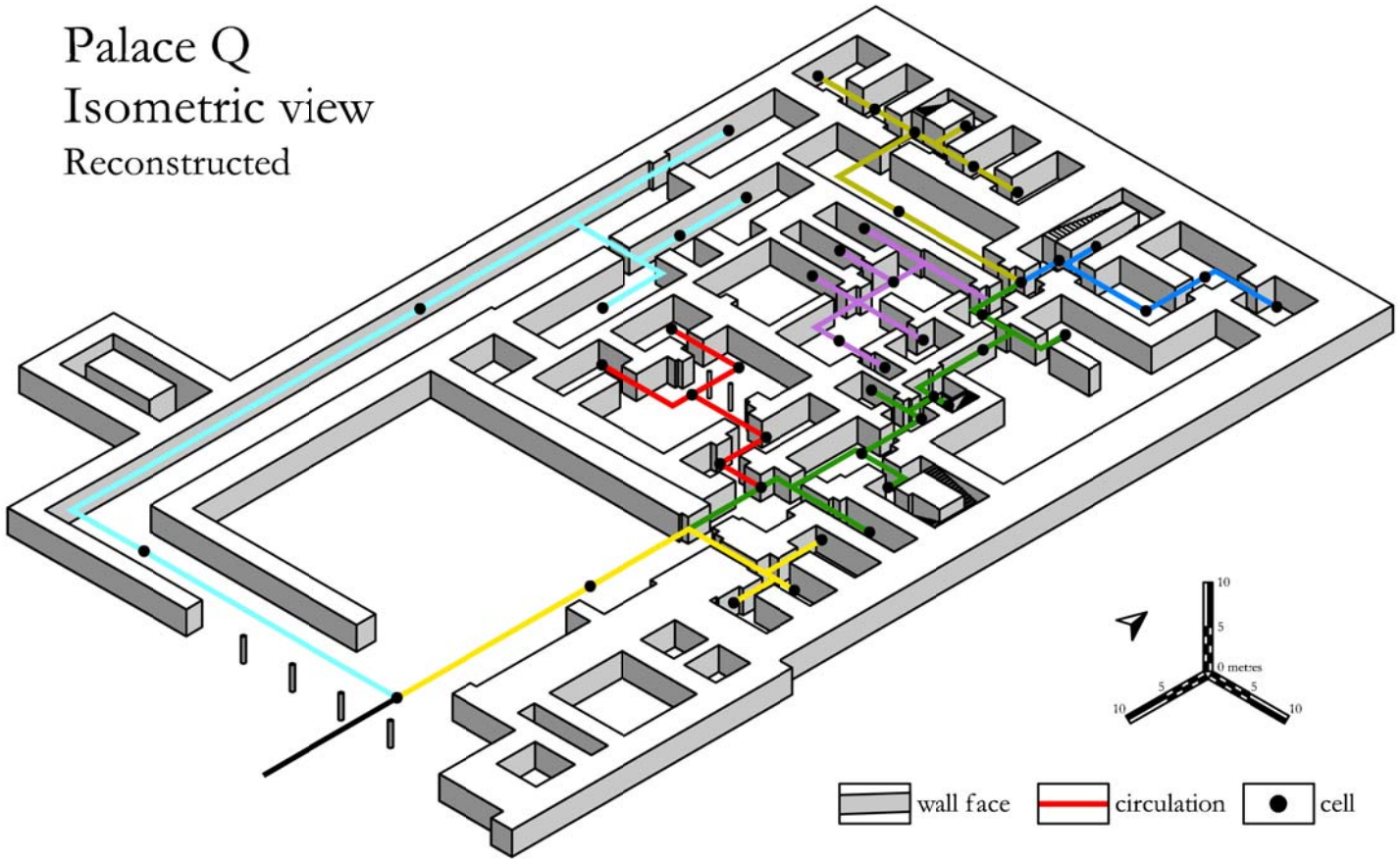


*Figure 5.11. Color coded isometric drawing of Palace Q, based on reconstruction.*

The first difference on the plan appears in the entrance of the palace, where a single entrance is demonstrated by black, giving access to the courtyard and the western wing of the palace. The western wings extending from the portico towards north, together with the additional rooms are shown in light blue. The addition of the courtyard is represented by the addition of pink.

The isometric drawing of the reconstruction of Palace Q uses the same colors with the color coded plan of the palace. The drawing is available in Figure 5.11.

**5.2.2.2. Preparation of Permeability Graph**

Before explaining the permeability graph of the reconstruction of Palace Q (Figure 5.12), it should be underscored that together with minor changes of the addition of a number of interior rooms, there is a major change in the addition of the portico and the courtyard, resulting in the shifting up of the horizontal rows of the graph that has been prepared based on the secure archaeological evidence.

The preparation of the graph starts with placing the portico, Cell 1, in Row 1. The cells in the subsequent row are Cell 3 -the courtyard- and Cell 2 -the western corridor. Row 3, which corresponds to the first row of the previous graph, has four cells. Two of the cells, the first inner court and Cell 10, take direct access from the courtyard whereas other two, Cells 21 and 49 from the western corridor. The depth value of the third horizontal row equals to 12.

Row 4 comprises six cells. Both entered by Cell 10, Cells 9 and 11 constitute the end of the southeastern storage unit. The storeroom to the east of the western corridor, Cell 31 is accessed by Cell 21. The entrance of all other cells, Cells 12 and 14 -the southern vestibule of the reception suite- and the second inner court, are provided by the first inner court. Including cells of each having depth values equal to four, the assigned depth value of the row is equal to 24.

Four cells are placed in Row 5. Cell 17, -the northern vestibule of the reception suite- is reached passing through the southern vestibule. The passages from the second inner court, situates two more cells in this row, Cell 23 and the staircase. Finally, on the west Cell 32, taking access from Cell 31 forms the end of the western chain. Row 6, corresponding to Row 4 of the previous graph, includes the same three rooms, Cells 18b, 24 and 25; however, the depth value of the row changes from 12 to 18, because of the shifting up of the levels.

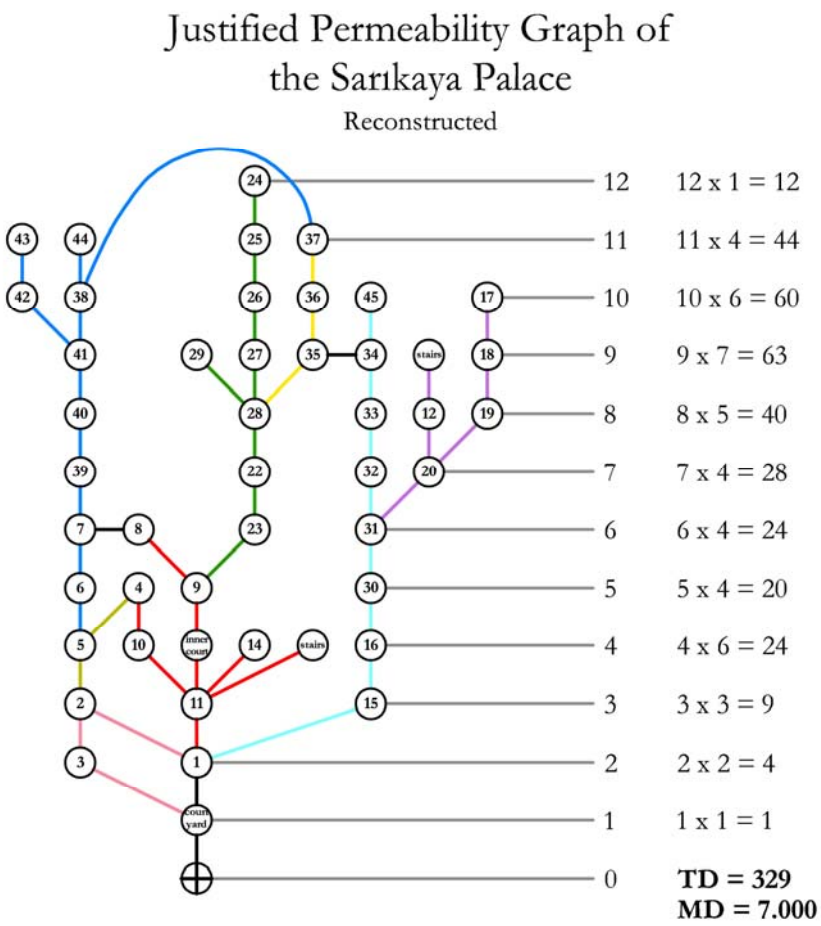


*Figure 5.12. Justified permeability graph of Palace Q, based on reconstruction.*

Row 7 includes four cells that originate from separate rooms as groups of two. First group is located on the reception suite, consisting of the true throne room -Cell 18a- and the reconstructed room -Cell 19. The other group is on the eastern peripheral wing constituting Cell 27 and the staircase, which takes access from Cell 25. Comprising four rooms of the depth value of 7, the depth value of the row is calculated equal to 28.

Being different from the corresponding Row 6 of the graph of the excavated evidence, Row 8 includes three rooms. This difference originates from the addition of two rooms with known presence but unknown entrances, one of which is the back room of the king -Cell 22- taking access from the throne room and other is Cell 36 on the destroyed northeast wing, entered by Cell 27. The last cell of the row, the fourth inner court, appears the same with the previous graph in terms of leading the way into further wings. The depth value of the row is equal to 24.

Rows 9, 10 and 11 correspond respectively to the Rows 7, 8 and 9 of the graph of

secure archaeological evidence. The only difference is the depth values of these rows, basing upon the shift in the rows. The depth value of ninth row, having two cells, is equal to 18, secondly the depth value of the tenth row, including five cells, is calculated as 50 and finally the depth value of the eleventh row, having six cells, becomes 54.

The last two rows of the graph changes with the addition of the reconstructed entrances of rooms on the northeast corner of, extending the chain further. Four cells are included in Row 12; three of which appear the same in the previous graph, Cells 45 and 47 and the staircase; taking access from Cell 46. The newly added room of the graph is Cell 39, entered by Cell 37. The depth value of Row 12 is 48. The last row, Row 13, includes three rooms, all of which are entered passing through different cells. Cells 44 and 48, respectively accessed by Cells 45 and 47, are the dead ends on the north food processing unit, whereas the last secure room on the northeast of the palace, with known presence but unknown doorway, Cell 38, entered by Cell 39 constitutes the end of the graph. The assigned depth value of the last row is 39.

#### 5.2.2.3. Calculation of Syntactic Properties

The results for the calculation of syntactic properties of the reconstruction of Palace Q are available on Table. 5.4.

*Table 5.4. Values of syntactic properties of Palace Q, based on reconstruction.*

| The Values of Syntactic Properties for Palace Q Reconstructed | Number of Rooms | Total Depth | Mean Depth | RA | RRA |
|---|---|---|---|---|---|
| | 47 | 352 | 7.489 | 0.282 | **7.421** |
| | **Number of Distinct Rings** | **RR of Complex** | **RR of Courtyard** | **RR of Inner Court** | **RR of Throne Room** |
| | 0 | 0.000 | 0.000 | 0.000 | 0.000 |

### THE WARSHAMA PALACE

For the application of depth analysis on the Warshama Palace, two plans, one stone by stone plan and one block plan, are used. Both of the plans, which are available in T. Özgüç 1999, are produced without doorways. The stone by stone plan shows the surviving foundations and mudbrick walls of the Warshama Palace together with the circular palace underneath it. Because of the structural complexity of the plan, it is superposed with the second plan, which is the block plan of the Warshama Palace.

This process proved to be useful in understanding which of the walls and foundations belong to the later palace -Warshama Palace- and which of the walls of the later palace stand above the foundations.

In the subsequent stage, for analyzing the palace, circulation models are produced with hypothetical doorways. The production of these models depends on the supposition that the excavated rooms of the palace are exactly repeated on the ground floor.[181] The production of the models follows some basic principles. Firstly, the doors are proposed in locations where the walls are tentatively reconstructed or only the foundations stand to a certain height, assuming that these are the collapsed parts because of being the poorly supported sections palace, which might indicate the location of the doorways. Secondly ancient parallels are used for some of the rooms; such as the storage units. Finally modern criteria, together with ancient parallels are used for the reconstruction of the staircases.

Before introducing the models, it should be underscored that the proposed circulation models for the Warshama Palace are just hypothetical models, which do not provide any archaeological inferences for the comparisons with other palaces, but can only suggest how would the circulation patterns would differ, if differs, when designed basing upon different principles.

The proposed circulation models for the Warshama Palace can be separated into two as "courts models" and "linear models", each having two sub-models. For each model firstly the origination of the model will be explained and for each sub-model, the explanation of the proposed permeabilities will be followed respectively by the explanation of the color coded plans, the preparation of the permeability graphs, and the tabulation of the syntactic properties.

### 5.3.1. Courts Models

The courts models bases upon the idea that the Warshama Palace had two inner courts. There are several reasons to plan a building with inner courts. First of all, the inner courts act as hubs by aggregating and distributing the movement of the people, thus controlling the entrances of other rooms build around the inner court. Secondly, because of being unroofed spaces, by placing the inner courts in the center of different units, people benefited from them as a source of light. There is one more reason; more

[181] The reason for this supposition is the possibility that the excavated floors of the Warshama Palace belong to the basement.

social, that is the courts are the spaces where the wall paintings of the palace were mostly displayed, in order to show the visitors the power of the rulers or elites of the community. As a tradition many of the Middle Bronze Age palaces excavated so far, were planned in units which are composed of rooms assembled around an inner court, where these units are repeated within the palace.[182]

Although T. Özgüç claims that there were no inner courts existed in the Warshama Palace,[183] it is possible that the two large rooms, Cells 28 and 47, which appear to form the centre of the two units of the Warshama Palace, may have acted as inner courts. Thus, the idea of applying "courts model" on Kültepe Palace originates from the contemporaneous parallels of the Warshama Palace, and the production of the two courts model based upon the centralization of the inner court and providing access from the inner court to the rooms around it.

#### 5.3.1.1. Depth Analysis on Courts Model 1

The Courts Model 1 is entered from the doorway on the west through a postern, Cell 9. Passing through the postern, the way runs into the central courtyard, Cell 53.[184] Towards north the central courtyard, the corridor is reached, giving direct access to Rooms 20, 29, 30, 39, 40, 48 and 49. Rooms 20, 30 and 49 do not provide further access.

Room 29, giving access to the western inner court on the north and to the small storage unit on the west provides two chains of interlinked rooms. The first chain starts passing through Room 29, runs into Rooms 21 and 22 and then ends respectively in Rooms 19 and 18. There is no information available for the function of these four rooms; however by comparing the size, the narrow and rectangular shape of these rooms and the way they cluster, makes it highly preferable to think that this group of rooms would be the a storage unit. The second chain, starting from Room 29, continues with the western inner court (Cell 28), runs into Rooms 23, 24 and Room 31.

Each room entered from the western inner court provides separate chains. The first chain wanders the mid-west and the west parts of the north wing. Passing through Room 23, the way goes into Room 17. Entered by Room 17, Room 12 gives access to

[182] See Figure 4.10.
[183] T. Özgüç 1999, 9.
[184] As previously mentioned, this part is problematic due to the fact that there were rooms on this part of the palace, which were removed during the earlier excavations. Thus, the model ignores the presence of these rooms.

Room 13, which is the last room of the chain. The second chain allows movement on the north-west part of the north wing. The way divaricates in Room 24, runs into Rooms 15 and 25. Room 15 provides entrance to the staircase and Room 25 leads the way into Room 24. The final chain is a long chain that allows seeing the eastern part of west half of the north wing. This chain starts with Room 31. Passing through Room 31, Room 32 is entered. Room 32 gives access to Room 33. Room 33 provides entrance for Room 27, which leads the way into the last room of the chain, Room 26. So each cell in the western half of the north wing is visited by these chains.

On the eastern half of the north wing, Room 37 is reached passing through Room 39. But the main circulation within the eastern half of the north wing is provided by Room 40, which leads the way into the eastern inner court. As the western inner court, the eastern inner court is the origin of three chains. First of the three chains, passing through the eastern inner court, goes into Room 51 and ends in Room 50, which is entered by Room 51. The second chain starts with the eastern inner court, runs into Room 46, which gives access to the last room, Room 45, of the chain. These two chains allow movement on the eastern part of the north wing. The last chain is actually a group of chains, where the way divaricates in Room 41, goes into Rooms 38 and 43 and the staircase. Room 43 gives access to Room 44. Room 38 provides entrance for Room 36, which is opened to two rooms, Rooms 34 and 35. These rooms are linked by a doorway, generating the only loop in the circulation. This group of chains provides the visit through western part of the eastern half of the north wing.

#### 5.3.1.1.1. Preparation of Color Coded Plan and Isometric View

Being different from the other palaces color coded plans, the preparation of the color coded plan of the Courts Model 1 depends on the demonstration of the corresponding chains of the two halves of the north wing.

In the color coded plan of Courts Model 1 (Figure 5.14) the entrance through the postern to the corridor, together with the southern dead-end rooms on the north wing are shown in yellow. The side-by-side rooms, which take their entrances from the corridor, are shown in pink. The first chains originating from the first rooms, Room 29 and 40, are demonstrated by green. Red color represents both of the inner courts and the very first rooms that are entered by the inner courts. The chains that end by the largest rooms on the northeast and northwest corners of the north wing are colored in purple. The divarications of the chains in the very first rooms, Rooms 24 and 41, which

are accessed passing through the inner courts, are illustrated in different colors; olive green and light blue. Finally the single direct chains originating from the very first rooms that are entered from the inner courts, Rooms 31 and 46, are demonstrated by blue.


*Figure 5.13. Color coded plan of the Warshama Palace, Courts Model 1.*

The color coding of the isometric view of the Courts Model 1, available in Figure 5.14, follows the same convention with the color coded plan.

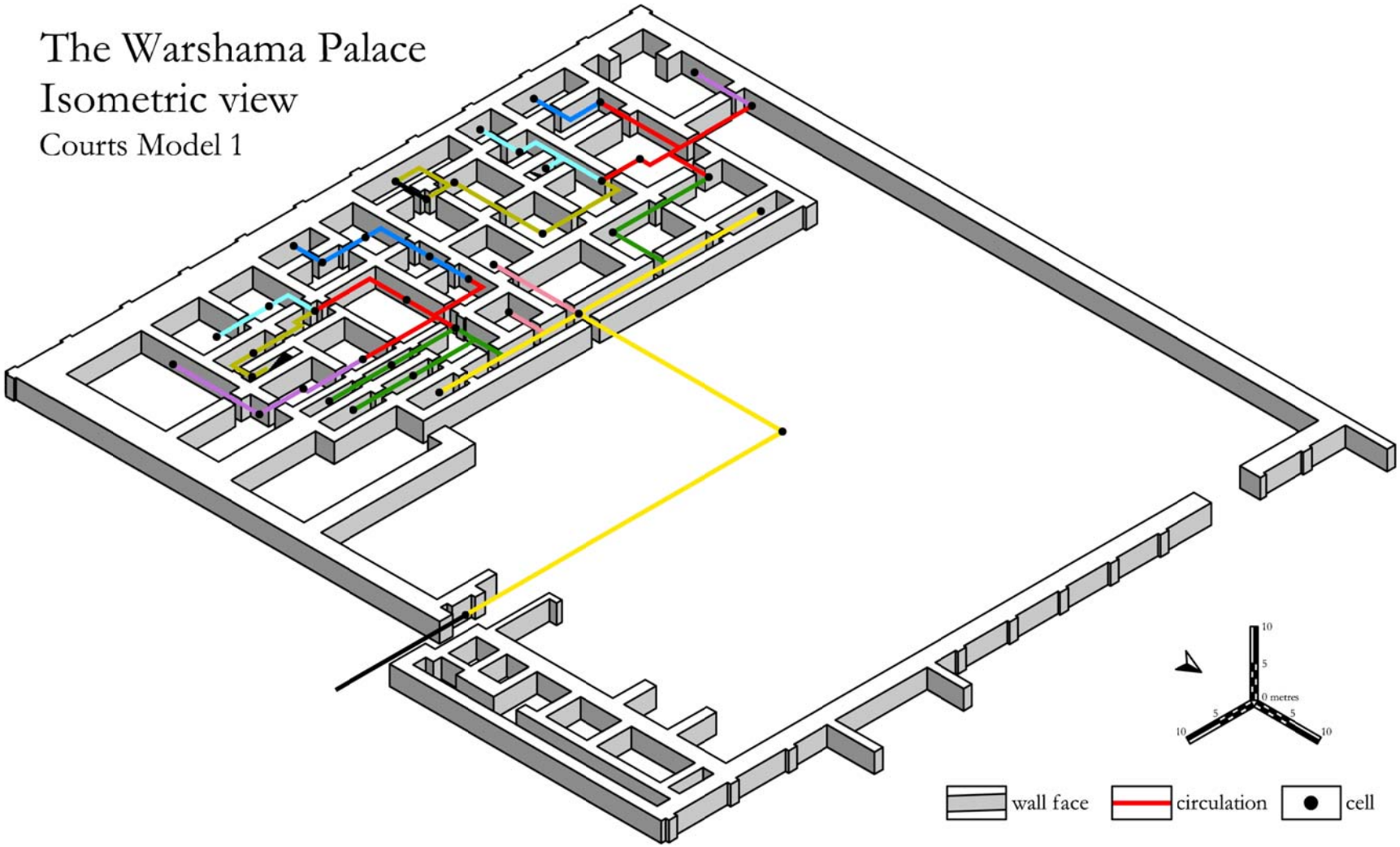


*Figure 5.17. Color coded isometric drawing of the Warshama Palace, Courts Model 2.*

#### 5.3.2.1.2. Preparation of Permeability Graph

The preparation of the permeability graph of Courts Model 1 (Figure 5.15) starts with the placing of the carrier space at level 0. The postern, Cell 9, gets the depth value 1. The courtyard, reached passing through the postern, gets the depth value of 2 and placed in Row 2. Following the courtyard, the corridor is entered. The corridor has the depth value of 3 and is visible in Row 3. The rooms, Cells 20, 29, 30, 39, 40 and 49, which takes their access from the corridor, are located in Row 4.. They all have the same depth value that is equal to 4 and the depth value of the row is assigned equal to 24. The circulation from the entrance to these seven rooms appears the same in all of the proposed circulation models. Therefore this part, representing the fourth level of the circulation will not be explained separately in all of the models' permeability graphs. The explanation of the rest of the permeability graphs will start with row 5.

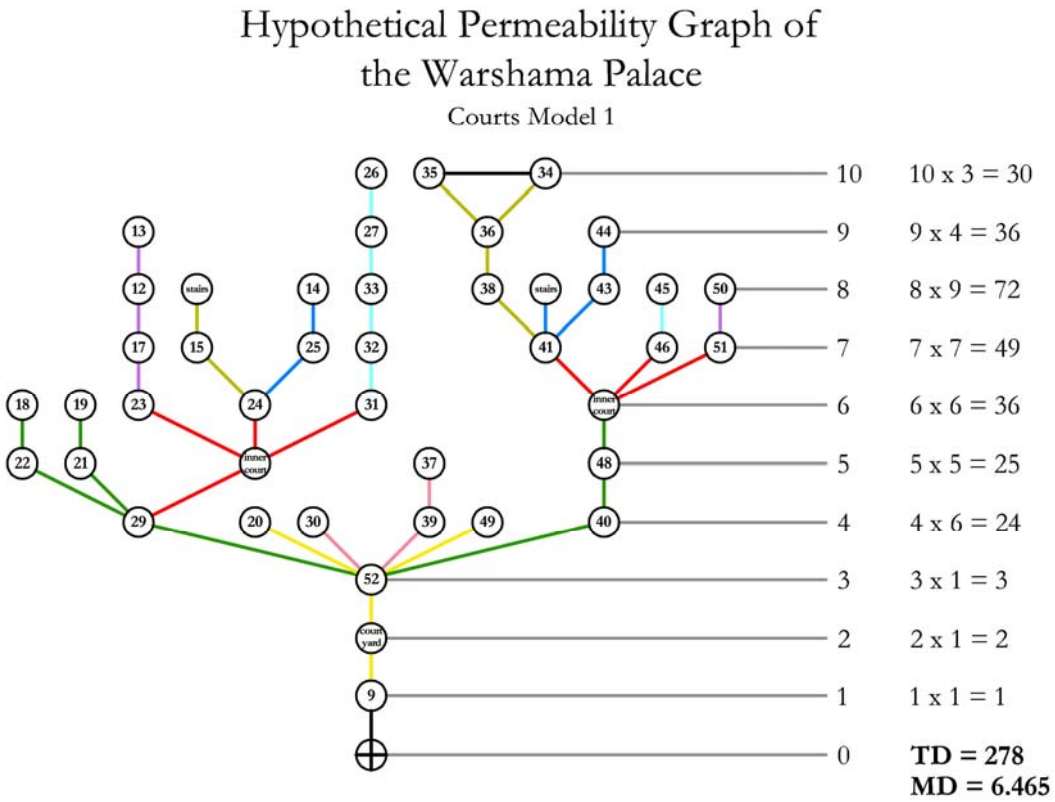


*Figure 5.15. Justified permeability graph of the Warshama Palace, Courts Model 1.*

Row 5 comprises five rooms. Taking access from Cell 29, Cells 21, 22 and the western inner court, on the western half of the north wing, are placed in this row. Two

rooms on the eastern half of the north wing, Cell 37 and 48, the first entered by Cell 39 and the other by 40, also take place in this row. Including five rooms of depth value of five, the depth value of the row is equal to 25.

Row 6 includes six rooms, one of which is on the eastern half and others on the western half of the north wing. The only room on the eastern half, taking access from Cell 48, is Cell 47 -eastern inner court. Two of the rooms on the eastern half, Cells 18 and 19, are entered respectively by Cells 22 and 21. The divarication of the way in the inner court places three more rooms, Cells 23, 24 and 31, creating three chains on the western half. The depth value of the row is equal to 36.

In Row 7 seven rooms with the depth value of 7 are located. The split of the way on the eastern inner court into three places Cells 41, 46 and 51 are in this row, bringing in three chains. On the western half of the north wing, two of the rooms 17 and 32, are entered by different rooms, respectively Cells 23 and 31 sustaining the two chains originating from the inner court; whereas other two, Cells 15 and 25 from a single room, Cell 24, creating two more chains. The depth value of the row is assigned equal to 49.

Row 8 is the most populated row, including nine rooms. On the eastern half, three of the cells, Cells are accessed by a single room, Cell 41 whereas others, Cells 45 and 50, are entered from different rooms, respectively from Cells 46 and 51. The latter two rooms form the end of the chain and the first two takes the eastern chain further. On the western half four rooms, all of which are entered from different rooms, are located. Sustaining the long chain originating from Cell 31, Cell 33 is entered by Cell 32. On the west of the western half Cell 12 is reached passing through Cell 17. Finally Cell 14 and the western stairs, which form the end of the two chains divaricated in Cell 24, are entered respectively from Cells 25 and 15. Including nine cells of depth value of 8, the depth value of the row is appointed equal to 72.

Four rooms of depth value of 9 are located in Row 9. These rooms are grouped in two, Cells 13 and 27 on the eastern half and Cells 36 and 44 on the western half. On the eastern half Cell 44, entered by Cell 43 is the last room of one of the chains divaricates from Cell 41, whereas Cell 36, taking access from Cell 38, sustains the other chain extending from Cell 41. On the western half Cell 13, leaded by Cell 12, forms the end of the chain originating from Cell 23; while Cell 27, entered by Cell 33, sustains the chain originating from Cell 31.

The last row of the graph, row 10, includes three rooms, one of which is situated

on the western half of the north wing, and two on the eastern half. Cell 26, which is reached passing through Cell 26, is the last room of the chain originating from Cell 31. Cells 34 and 35, both entered from Cell 36, forms the end of the chain originating from Cell 41. The passage between these cells creates the single loop within the palace, which is also plotted on the graph.

#### 5.3.2.1.3. Calculation of Syntactic Properties

The values for the syntactic properties of the Courts Model 1 of the Warshama Palace is tabulated in Table 5.5

*Table 5.5. Values for the syntactic properties of Courts Model 1.*

| **The Values of Syntactic Properties for The Warshama Palace Courts Model 1** | **Number of Rooms** | **Total Depth** | **Mean Depth** | **RA** | **RRA** |
|---|---|---|---|---|---|
| | 43 | 278 | 6.465 | 0.260 | **6.190** |
| | **Number of Distinct Rings** | **RR of Complex** | **RR of Courtyard** | **RR of Inner Court** | **RR of Throne Room** |
| | 1 | 0.012 | 0.000 | 0.000 | 0.000 |

### 5.3.1.2. Depth Analysis on Courts Model 2

The Courts Model 2 is basically the same with the Courts Model 1, except including one more doorway between the two halves of the north wing of the Warshama Palace. In the first model the two halves of the north wing were accepted as two separate units without passages between them. In the Courts Model 2, in order to link these two separate units, one more doorway is suggested between Cell 31 and 37, while all other doorways remain the same. The addition of this link adds one more loop to the circulation.

#### 5.3.1.2.1. Preparation of Color Coded Plan and Isometric View

For the presentation of proposed permeabilities, the color coded plan of the Courts Model 2 (Fig 5.16), uses the same colors with the color coded plan of the Courts Model 1. The difference between the plans is not the color itself, but the addition of the passage that links Cells 31 and 37. Following the principle that the color coding takes the depth values of the rooms into account, and hence Cell 31 is a level deeper than Cell 37; the link between these rooms is demonstrated by pink as a continuation of the chain

originating from Cell 39 and passes through Cell 37; whereas the link between Cells 31 and the inner court, which is shown in red remains the same. Being different from the color coded isometric drawing of the Courts Model 1, the color coded isometric drawing of Courts Model 2 (Figure 5.17) shows the addition of the passage between Cells 33 and 37. All other links between rooms, uses the same convention with the color coded plan. As in the previous isometric drawings the cells that are subject to the analysis are represented by black nodes.


*Figure 5.16. Color coded plan of the Warshama Palace, Courts Model 2.*

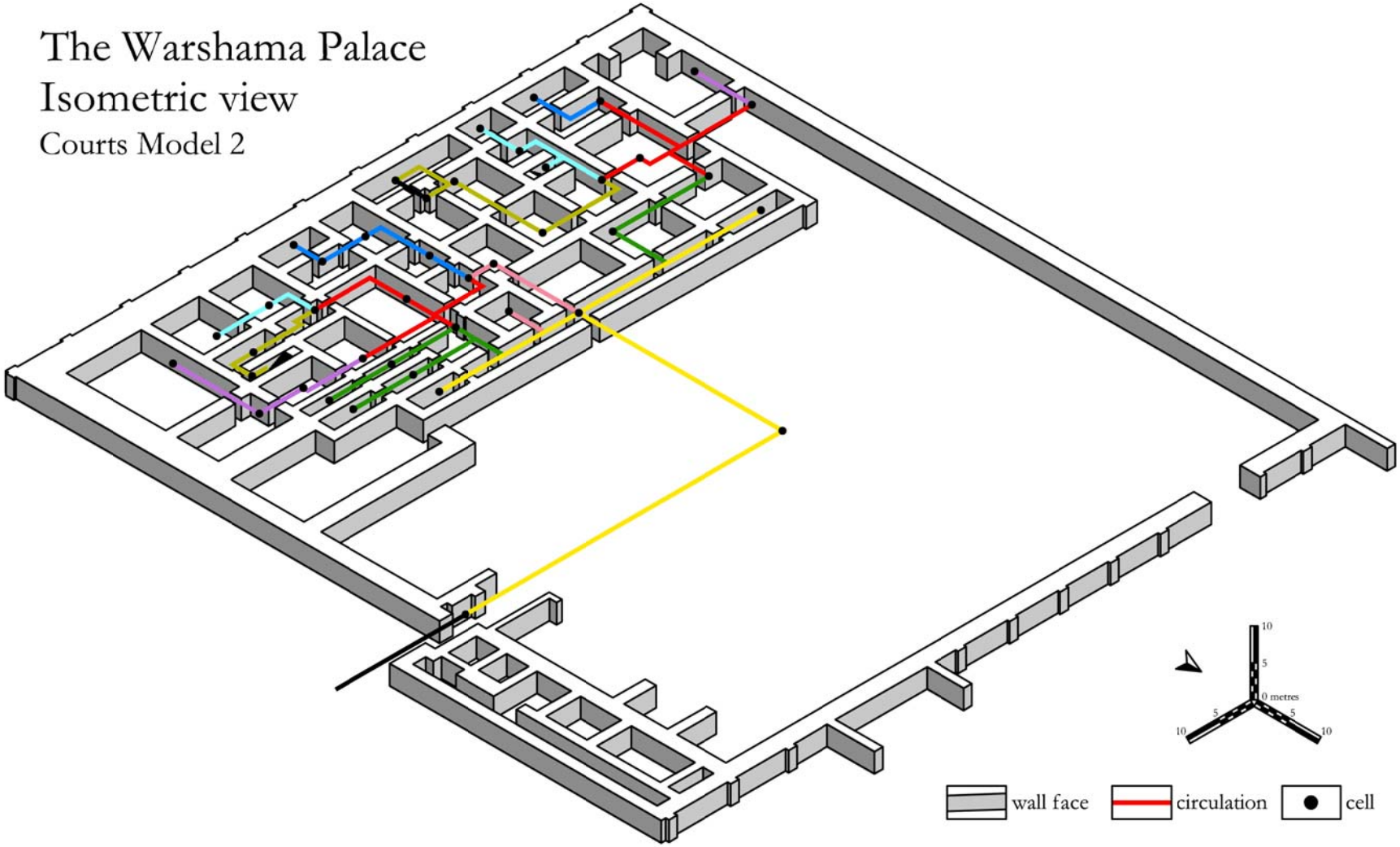


*Figure 5.17. Color coded isometric drawing of the Warshama Palace, Courts Model 2.*

#### 5.3.1.2.2. Preparation of Permeability Graph

The permeability graph of the Courts Model 2 (Figure 5.18) locates a slight change on the graph of the Courts Model 1 that is the additional passage between Cells 31 and 37, which can be observed in between Rows 5 and 6.

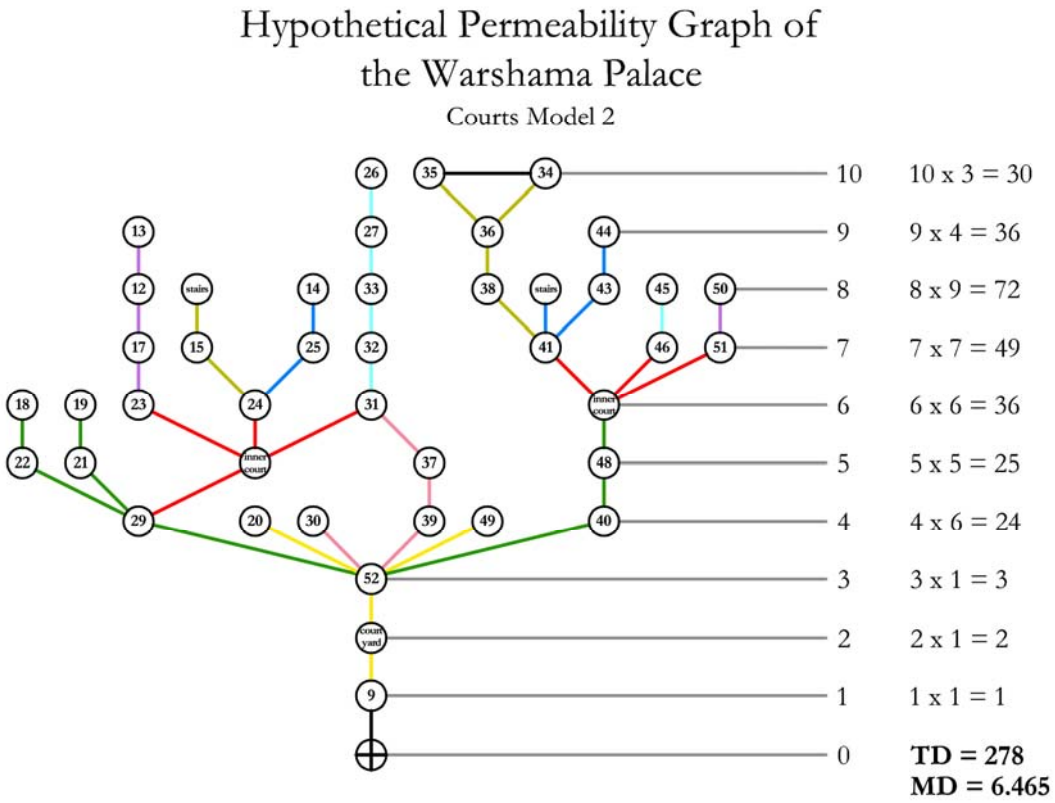


*Figure 5.18. Justified permeability graph of the Warshama Palace, Courts Model 2.*

#### 5.3.2.1.3. Calculation of Syntactic Properties

Values of the syntactic properties of the Courts Model 2 is available in Table 5.6.

*Table 5.6. Values for the syntactic properties of Courts Model 2*

| The Values of Syntactic Properties for<br><br>The Warshama Palace Courts Model 2 | Number of Rooms | Total Depth | Mean Depth | RA | RRA |
|---|---|---|---|---|---|
| | 43 | 278 | 6.465 | 0.260 | **6.190** |
| | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court | RR of Throne Room |
| | 2 | 0.024 | 0.000 | 0.000 | 0.000 |

### 5.3.2. Linear Models

The production of the "Linear Models" is originated from the planning principle of the north wing, where the rooms of the wing are repeated in longitudinal rows.[185] Thus following the idea of this repetition, starting from the corridor the entrances are placed in a way that the rows of rooms form longitudinal chains of interlinked rooms.

#### 5.3.2.1. Depth Analysis on Linear Model 1

As aforementioned the circulations through the carrier space towards the rooms, which are entered from the corridor, appear the same in the linear models. Therefore, the explanation of the proposed permeabilities starts directly from those rooms.

In the Linear Model 1, the corridor gives access for six rooms, Cells 20, 29, 30, 39, 40 and 49. Two of those rooms, Cells 20 and 49, do not provide any further chains. On the other hand each of all other rooms is the origination of separate linear chains.

The divarication in Room 29 creates three chains of interlinked rooms. First chain, after passing through Room 29, starts with Room 21 and ends with Room 19. The second chain, starts with Room 22, runs into Room 18, which provides passage for Room 17. In Room 17, the way splits into two more chains. The first chain originating from Room 17 goes into Room 12 and end in Room 13, and the second chain runs into the staircase and Room 15, providing access to the last room of this chain, Room 14. The last chain originating from Room 29 first enters into room 28 which gives passage to Room 23. Passing through Room 23, Room 24 is entered and following Room 14, the last room of the chain, Room 25 is reached. By these three chains it becomes possible to visit the rooms located on the western portion of the western half of the north wing.

Leaving the corridor behind, the source of another chain is Room 30. This chain is the only branchless chain within the palace that starts by Room 30, passes through Room 31 and enters Room 32 which is respectively followed by Rooms 33, 27 and 26. Trailing this chain allows visiting the rooms on the eastern and northern portions of the western half of the north wing.

The next chains are originated from Room 39 by the split of the way into two. After passing through Room 39 first of these two chains, runs into Room 37, which provides access for Room 35 and ends in Room 34; whereas the second first goes into Room 38 that gives passage to Room 36 and again ends in Room 34. These two chains

[185] See page, 56-7.

appear to have the same origin, Room 39 and destination, Room 34, which creates a loop in the circulation. Following these chains it possible to visit the western portion of the eastern half of the north wing.

The last room entered by the corridor, Room 40, is the origin of two chains. The first chain, passing through Room 40, is followed by Room 41. The chain divaricates into two in Room 41 by giving access to the eastern stairs and Room 43. The last room of the chain, of which the entrance is provided by Room 43, is Room 44. The second chain, after passing through Room 40, reaches Room 47, by splitting into two passes to Rooms 46 and 51. From Room 46 there is a doorway for Room 45, whereas from Room 51 to 50. These two chains allow one to visit the eastern portion of the eastern half of the north wing.

**5.3.2.1.1. Preparation of Color Coded Plan and Isometric View**

The preparation of the color coded plan for the Linear Model 1 (Figure 5.19) based on the demonstration of the separate chains in different colors. Firstly, the trail between the postern and the very first rooms that are entered by the corridor are shown in yellow. The two chains, originating from Room 29 and visiting the storage rooms on the southwest of the north wing, are illustrated in pink; whereas the way extending towards north, after passing through one these chains are shown in olive green. The first and the third chain originating from Room 29, is represented by blue.

The branchless chain starting with Room 30 is shown in green. Red is used for the demonstration of the two chains originating from Room 39 for the reason these chains unite in the end, while for the separate two chains, of which the source is Room 40, different colors, light blue and purple are preferred.

The color coded isometric drawing of the Linear Model 1, color conventions are used the same with the color coded plan. The rooms that are subject to the analysis are shown in black nodes. The isometric drawing is available as Figure 5.20.

**5.3.2.1.2. Preparation of Permeability Graph**

Up to Row 5, the permeability graph of Linear Model 1 (Figure 5.21) appears the same with the proposed permeability graph of the Court Models 1. In Linear Model 1 the next step further from the rooms in Row 4, places eight rooms that have the same depth value equal to 5, in Row 5. The entrances for Cells 21, 22 and 28 are provided by Cell 29. Cell 31 is entered by a doorway from Cell 30. The passage to Cells 37 and 38 is possible by doorways from a single room, Cell 39; whereas Cells 41 and 48 from Cell 40.


*Figure 5.19. Color coded plan of the Warshama Palace, Linear Model 1.*

Ten rooms, which have the depth value of 6, are placed in Row 6. Except four of these rooms, the rooms appear to be single passages for the further rooms, originating from single rooms. The entrance for Cell 18 is provided by Cell 22 and 19 by 21. Being different from Court Model 1, Cell 32 is entered from Cell 31, rather than 28. Cells 35 and 36 are reached after passing through Cells 37 and 38, respectively. Cell 47 has its doorway from Cell 48. The four rooms with exception are Cells 23, 24, 43 and the stairs. The entrance for Cell 23 and 24 are provided by Cell 28 whereas the eastern stairs and the Cell are entered from Cell 41.

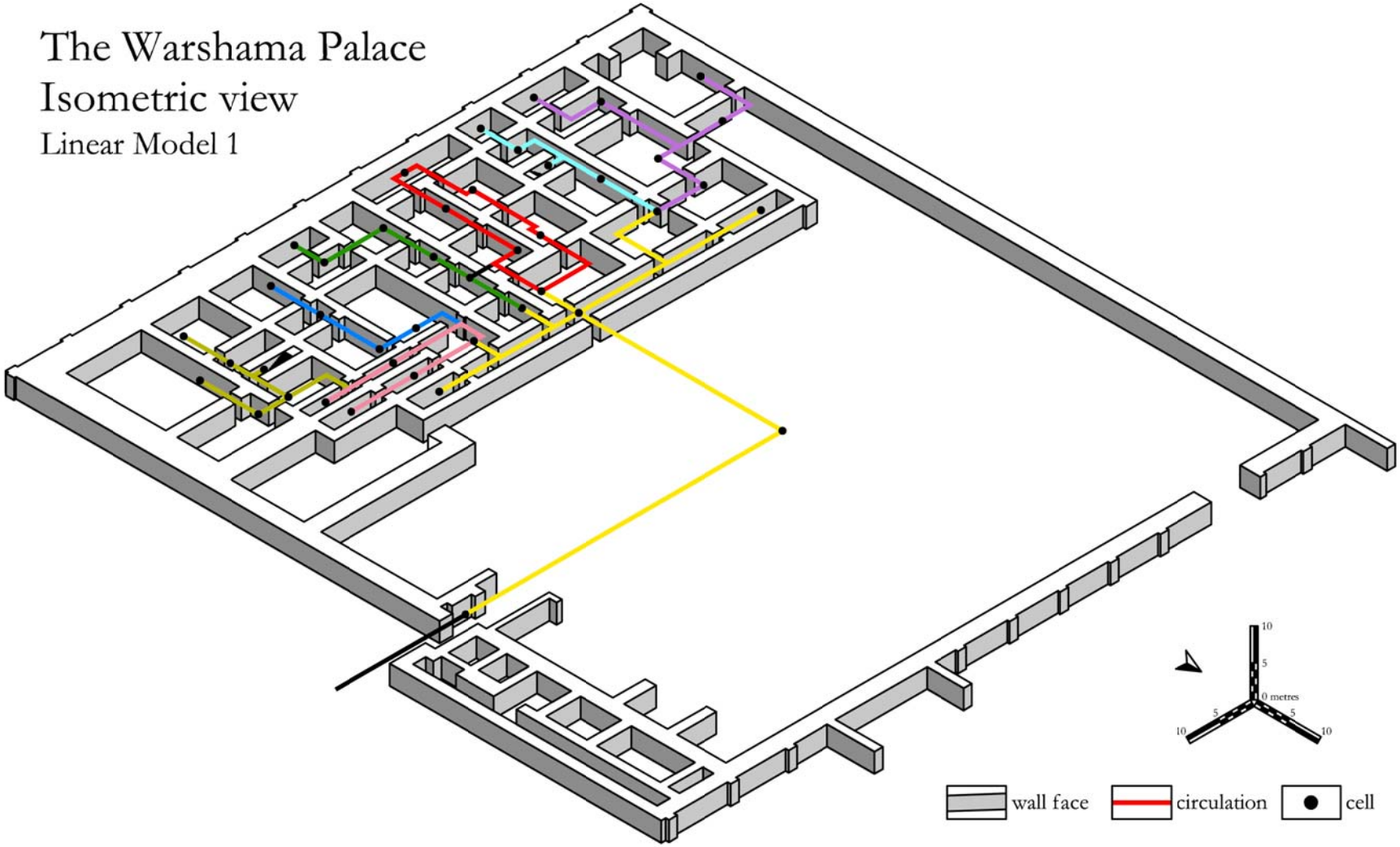


*Figure 5.20. Color coded isometric drawing of the Warshama Palace, Linear Model 1.*

The rooms in Row 7 are Cells 17, 25, 33, 34, 44, 46, and 51. The doorways for Cell 17, 25 and 33 are from Cells 18, 24 and 32 respectively. Cell 34 is entered from two rooms, Cells 35 and 36. Cell 47 gives access to two of the rooms that have the depth value of seven. These are Cells 46 and 51. The last room of the seventh horizontal row is Cell 44, of which the entrance is from Cell 43. All of these rooms share the same depth value of 7.

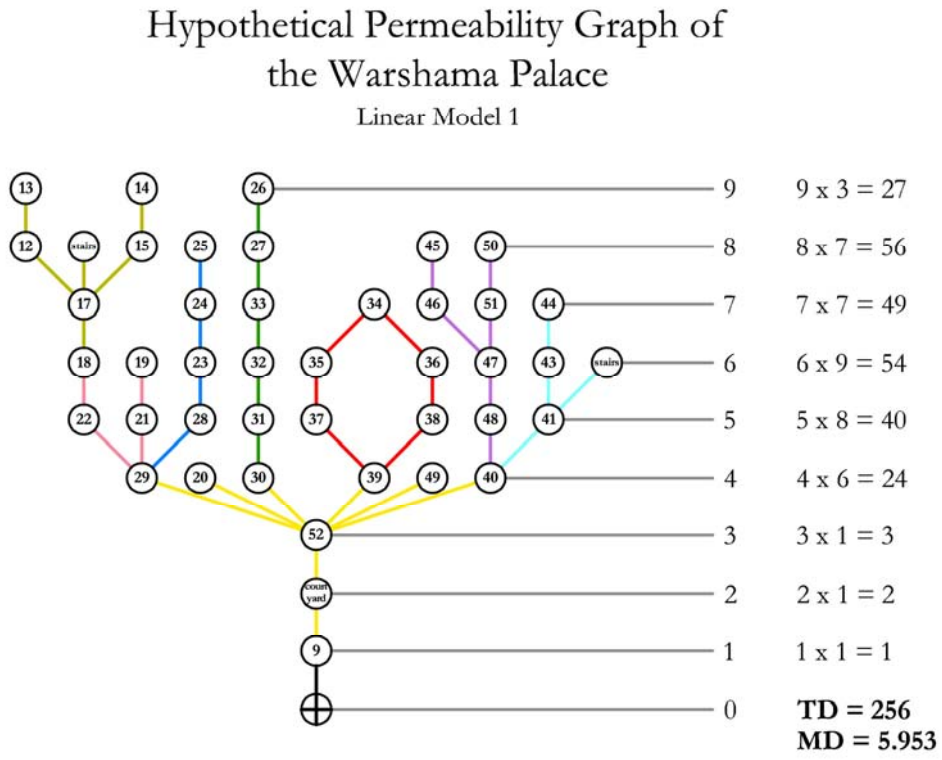


*Figure 5.21. Justified permeability graph of the Warshama Palace, Linear Model 1.*

Row 8 comprises six rooms, each of which has depth value of 8. Three of these cells, Cells 12, 15 and the western stairs have their access from a single room, Cell 17. Cell 27 is reached by passing through Cell 33. The entrance for Cell 45 is provided by Cell 46 and Cell 50 is entered from Cell 51.

The deepest three rooms that have a depth value of 9 are located in the last row, Row 9. These are Cells 13, 14 and 26. Cell 13 is reached after passing Cell 12. The access for Cell 14 is from Cell 15 and finally the entrance for Cell 26 is provided by Cell 27.

**5.3.2.1.3. Calculation of Syntactic Properties**

The calculated syntactic values for the Linear Model 1 are presented in Table 5.7.

*Table 5.7. Values for the syntactic properties of the Linear Model 1.*

| The Values of Syntactic Properties for<br><br>The Warshama Palace Linear Model 1 | Number of Rooms | Total Depth | Mean Depth | RA | RRA |
|---|---|---|---|---|---|
| | 43 | 256 | 5.953 | 0.236 | **5.619** |
| | **Number of Distinct Rings** | **RR of Complex** | **RR of Courtyard** | **RR of Inner Court** | **RR of Throne Room** |
| | 1 | 0.012 | 0.000 | - | - |

#### 5.3.2.2. Depth Analysis on Linear Model 2

Linear Model 2 is basically the same with Linear Model 1, with the exception of the addition of a doorway between Rooms 31 and 37. As in the Courts Model 2, the reason for locating a doorway between these rooms is to link the two halves of the palace by a passage. The location of the doorways for the rest of the palace remains the same.

##### 5.3.2.2.1. Preparation of Color Coded Plan and Isometric View

The color coded plan of the Linear Model 2 (Figure 5.22) repeats the colors of color coded plan of the Linear Model 1, where the chains originating from the very first rooms that are entered from the corridor are represented by different colors. The only difference between these color coded plans appears in the added doorway between Room 31 and 37.

The passage between rooms 31 and 37 is demonstrated by a different color, due to the convention that the identification of the colors takes into account the depth values of the rooms. In terms of depth Room 31 and 37 appear on the same level, thus the link between these rooms are represented by black, rather than continuing with the colors of the chains, which are green for Room 31 and red for Rooms 37, that they take place in.

The color coded isometric drawing of the Linear Model 2(Figure 5.23) exactly follows the preferences of the colors within the color coded plan of the Linear Model 2. The chains are shown by different colors that are the same in the color coded plan of the Linear Model 1, together with the black nodes representing the rooms of the palace.


*Figure 5.22. Color coded plan of the Warshama Palace, Linear Model 2.*

#### 5.3.2.2.2. Preparation of Permeability Graph

The permeability graph of the Linear Model 2 (Figure 5.24) is basically the same with the permeability graph of the Linear Model 1, except the additional doorway between Cells 31 and 37 is plotted in the graph of the Linear Model 2. This addition appears between the Cells 31 and 37 in Row 5, as it is Courts Model 2, which ties up the circulation within the two halves.

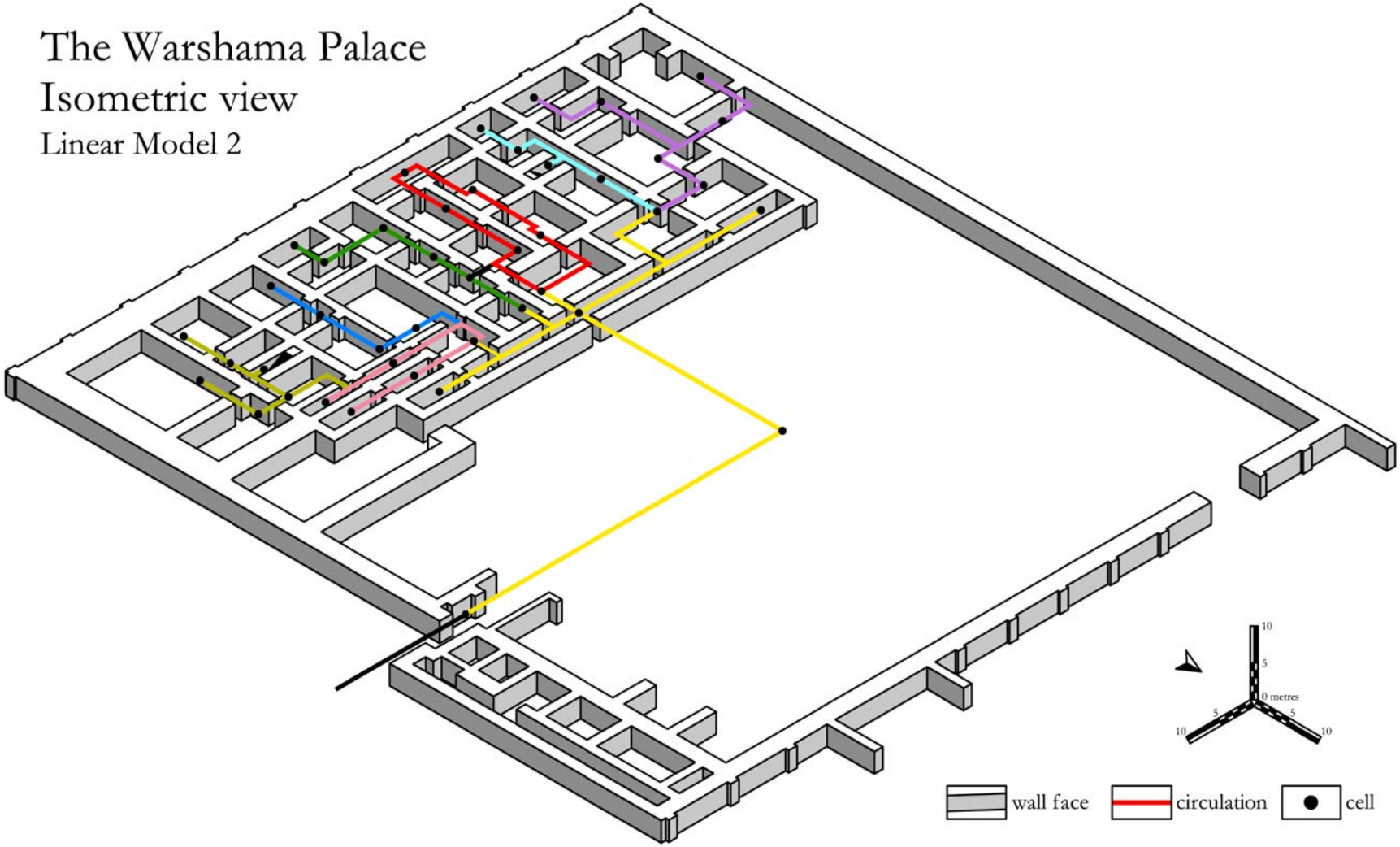


*Figure 5.23. Color coded isometric drawing of the Warshama Palace, Linear Model* 2.

For the reason that the depth values of the Cells 31 and 37 are equal, the link between these rooms is shown by black. This addition does not change the depth value of the fifth horizontal row, but adds a second loop to the circulation, where the first one is visible between Cells 39 and 34.

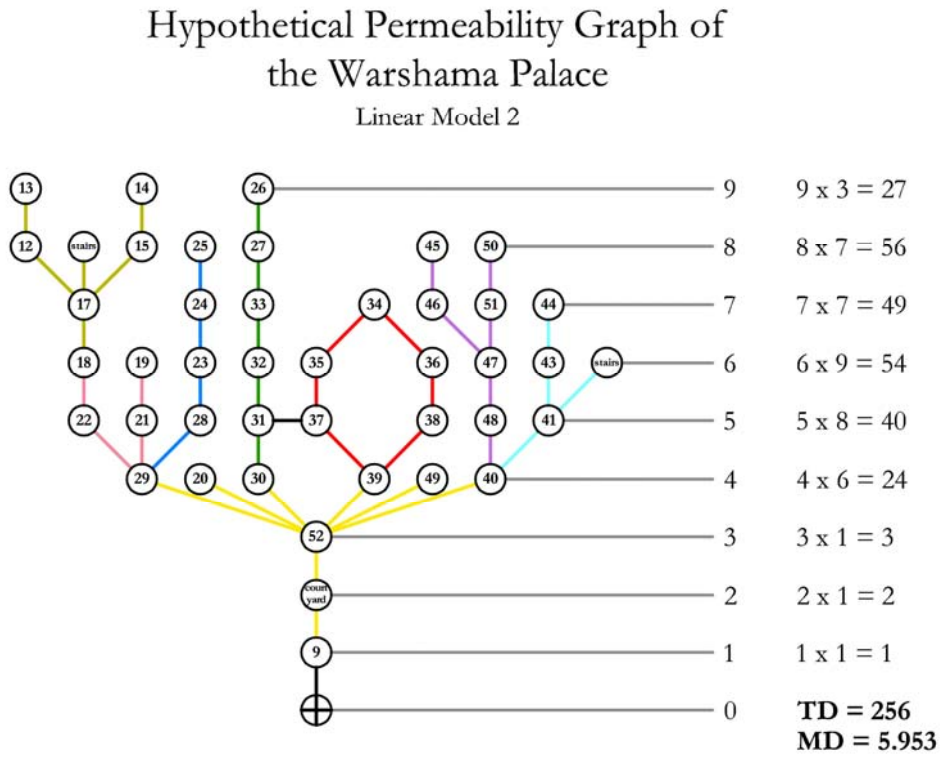


*Figure 5.24. Justified permeability graph of the Warshama Palace, Linear Model 2.*

#### 5.3.2.2.3. Calculation of Syntactic Properties

The calculated syntactic values for the Linear Model 2 are tabulated in Table 5.7.

*Table 5.8. Values for the syntactic properties of Linear Model 2.*

| The Values of Syntactic Properties for<br><br>The Warshama Palace<br>Linear Model 2 | Number of Rooms | Total Depth | Mean Depth | RA | RRA |
|---|---|---|---|---|---|
| | 43 | 256 | 5.953 | 0.236 | **5.619** |
| | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court | RR of Throne Room |
| | 2 | 0.024 | 0.000 | - | - |

This chapter comprised the objective explanation of the application of Depth Analysis on the excavated and reconstructed data of the Sarıkaya Palace and Palace Q and on the hypothetical models, Courts Models and Linear Models, of the Warshama Palace. The results of these analyses will be provided in the following chapter.

# CHAPTER VI

# RESULTS

This chapter mainly interprets the results that are derived from the application of the depth analysis on the palaces, which were explained in the previous chapter. Firstly the results will be given for the analysis of the Sarıkaya Palace and Palace Q based on secure archaeological evidence and subsequently the reconstructions. Then for each building, this will be followed by the comparison of the results of the palace with the results of its reconstructions. On the subsequent stage the comparisons of the Sarıkaya Palace and Palace Q will be introduced in a way that, the excavated evidence from each palace and the reconstructions will be separately compared. Finally, adding the Warshama Palace to the picture, the results for the four models will be introduced.

## 6.1. THE SARIKAYA PALACE

The results of the depth analysis of the Sarıkaya Palace will be explained in regard to the following order firstly the syntactic properties, symmetry and distributedness is introduced, secondly the results will be evaluated in relation with the function and the privacy of the rooms, taking the excavated evidence and the reconstructions separately. On the final stage, a comparison for these data will be introduced.

### 6.1.1. The results of depth analysis for the excavated data

The application of depth analysis on Acemhöyük, based on the archaeological evidence puts forward that the structure tends to be *symmetric* in terms of integration, which is suggested by the justified permeability graph and the relative asymmetry value. This relatively symmetric pattern can be read through the justified permeability graph, where the wings of the palace -the western wing with light blue, the eastern wing with blue, the central north wing with red and the central south wing with green- are seen as flowing three chains that are originated from the vestibule. It is possible to observe that these chains are almost symmetric to each other; although two of these chains are linked by passages in between, which only have an effect on the distributedness of the structure. Therefore, the whole circulation pattern becomes relatively symmetric.

The monitoring of the symmetry of the structure becomes possible yet by the justified permeability graph. It should be remembered that the symmetric patterns are, for the most part, represented by shallower graphs. Although the south central chain creates a long sequence, extending towards the deeper levels, the concentration of the cells on the lower levels of the justified permeability graph, based on the excavated data of the Sarıkaya palace, is the indication that the circulation pattern tends to be symmetric.

The relatively symmetric pattern of the excavated Sarıkaya Palace is also attested by the relative asymmetry value. As previously introduced, the RA values are, always between 0 and 1; and the lower RA values are the representation of the symmetric patterns, whereas the higher ones point to an asymmetric pattern. Based on the excavated evidence, the relatively low RA value of the Sarıkaya Palace, that is equal to 0.316, suggests that the palace tends to be symmetric in pattern.

The depth analysis on the Sarıkaya Palace, based on the secure archaeological evidence also puts forward that the spatial pattern of the structure is *distributed* in terms of circulation. Loops within the palace, which originates from the passages between rooms that are located on different chains, demonstrates the ringiness of the structure. This can be read from the spatial graph where the distinct rings, mainly three rings, are visible on the lower levels of depth. As aforementioned, the distributedness of a structure is attested by the Relative Ringiness value, which indicates an increasing ringiness within the structure when it rises. The Relative Ringiness value that is equal to 0.051 thus points to the distributed pattern of the structure.

On the other hand the relative ringiness values of some particular cells provide information for the hubs within the palace. Comparing these values to the values of the complex, the information for the hubs is gathered. Of those hubs, the corridor -Cell 11-, has a higher RR value than the complex, that is equal 0.065, by resting within two loops, thus, appears as the most distributive cell of the structure.

It is previously mentioned that excluding the vestibule, the corridor and the inner court, all of other rooms were used as store rooms; however, there is an apprehensible distinction between what is stored and where. Besides physically monitoring the wings of the palace, the justified permeability graph demonstrates this separation in the use of space. The regular depot rooms on the west wing are visible with light blue chain; the eastern wing, which was used for storing metals, is separately visible by blue; the south

central wing where the vases and other goods, which are found together with scattered bullae are stored, is visible with green chain; and the north central wing, providing the major access to the units, is at the core of the spatial graph and visible in red.

Furthermore, the depth of the rooms gives us clues about the privacy of the rooms. The rooms on the central north part of the palace appear on the deeper levels of the justified permeability graph, without giving access to any further rooms; representing the privacy of the special storage rooms, which contains goods belonging to different officials that are attested by the bullae.[186] However, the bullae depot (Room 6), on the contrary to what is expected, is seen on the relatively lower depth level, Row 5, and as being highly accessible from several rooms.

In brief, the pattern of the Sarıkaya Palace, based on the excavated data, is formed by three chains of interlinked rooms, running along the western and eastern sides and in the center, of which all ends separate from each other, whereas the eastern and central chain are linked by a number of passages between them.

### 6.1.2. The results of depth analysis for the reconstructed data

The application of the depth analysis on the Sarıkaya Palace based on the reconstruction of the palace, shows that the structure tends to be *symmetric*. This property can be traced on the permeability graph, as well as by the relative asymmetry value.

As it will be remembered, the reconstruction of the palace is performed by the addition of a series of room along the southern part and the placement of a doorway to give access to the western central unit. On the justified permeability graph of the reconstruction, it is possible to see the peripheral rooms on the eastern and western wing and the central core as almost symmetric chains -eastern chain by blue, western chain by light blue and the central chain by red and green- that originate from the vestibule. Besides, these chains are joined by a fourth chain, not clearly distinctive but can be followed by the line starting from Room 34 and ending in Room 35. The appearance of this fourth chain is horizontal rather than vertical, as a result of tying up the other three chains, which for the most part does not have an affect on the symmetry but the ringiness. Furthermore, the relatively low RA value that is equal to 0.316, suggests that the structure tends to be symmetric. The depth analysis on the Sarıkaya Palace, based on the reconstruction, also asserts that the spatial pattern of the structure

[186] Veenhof 1993, 654-5.

is *distributed* in terms of circulation. As it previously mentioned, the justified permeability graph demonstrates the joining of the two chains, the eastern and the central, on the lower levels, whereas it shows the links between the three chains, on the higher levels. Likewise, the RR value of the analysis that is equal to 0.055, pointing out the ringy pattern of the reconstructed Sarıkaya Palace.

The RR values of each particular cell within the palace, point to the state of these cells in terms of being hubs. The corridor -Cell 11- appears as a distributive hub, by being a member of three rings and with its high RR value that is equal to 0.064. It should also be mentioned that the vestibule and Cell 9, the provision depot of the palace, share the same state and RR value with the corridor. The other important hub appears as the inner court, which is located in a way that it is within two loops. The inner court has a high RR value, equal to 0.043. The other important secondary hubs that share the state of the inner court are attested as Cells 5, 7, 28 and 35, which can also be traced from the permeability graph.

The permeability graph for the reconstruction of the palace shows the distinction of function of rooms, where the regular depot rooms on the western wing appear with light blue, the metal store rooms on the eastern wing with blue, the special storage rooms on the central south wing with green, and finally the depot rooms for the luxury goods on the central west with purple. In addition, for the reconstructed rooms on the southern part, the graph represents an inconsistent pattern with more horizontally chain that is for the most part related with the depth of rooms and might be interpreted as being the reconstructed use of space.

The central southern wing as previously mentioned in the results for the data of the Sarıkaya Palace, appears as a private and distinct wing for the reasons of being located on the deepest levels of the justified permeability graph and by not providing any further access. In addition to the store rooms on the south central wing, the rooms for the luxury goods, that are located on the central western wing, also seems to be distinct and private. The bullae room, Room 6, appears as highly accessible by being on the lower levels, while being accessed by several rooms. On the contrary the other bullae room, Room 42, appears more private, at the deepest level.

The spatial pattern of the reconstructed Sarıkaya Palace is formed by three chains, representing the western, the central and the eastern wing, that are all joint by a fourth chain which interlinks these three chains on the reconstructed southern wing.

### 6.1.3. The comparison of depth analysis results for the excavated and reconstructed data

The comparison will be mainly based on the differences and the similarities of the syntactic properties that are derived from the analysis of the excavated and reconstructed data from the Sarıkaya Palace, as well as the comparison for the results with regard to the function and privacy.

As previously introduced, both for the excavated and reconstructed data the spatial pattern inclines to be symmetric. However, the comparison of the justified permeability graphs and the Real Relative Asymmetry values puts forward that the data of the reconstruction of the Sarıkaya Palace is less symmetric than the excavated data.

As the method implies that the patterns which tend to be symmetric are represented by shallower graphs; firstly, the continuation of the three chains of the reconstructed palace into deeper levels of the graph (Figure 6.1) -except the central chain which appears the same in both of the graphs- is the indication that the excavated evidence from the palace appears more symmetric than its reconstruction and secondly, following the justified permeability graph, it is possible to see that the graph of the reconstructed evidence is deeper than the excavated one, not in terms of the depth of the deepest rooms, but the concentration of rooms on the deeper levels. The main reason for this is the addition of the reconstructed rooms to the south of the palace, which can only be reached by passing through other wings, as well as the addition of the reconstructed passage between the central western wing -with known presence, but lacking an entrance for the most part- and the western wing. The addition of the central western wing and the most southern rooms, Rooms 42, 43 and 45, also makes the graph more populated on the higher levels of depth and result in a more branchy pattern on the graph of the reconstruction of the palace than the graph of the excavated.

The difference between the reconstructed and the excavated data of the Sarıkaya Palace is also attested by the comparison of the values of syntactic properties. As it will be remembered, RA values are used for understanding the symmetry/ asymmetry of a single structure; however, for the comparison of several structures of different size, the RRA values are used, in order to eliminate the affect of size. Thus, here the RRA values of both data step in. The lower RRA values, as it is in the RA values, points to a more symmetric pattern.

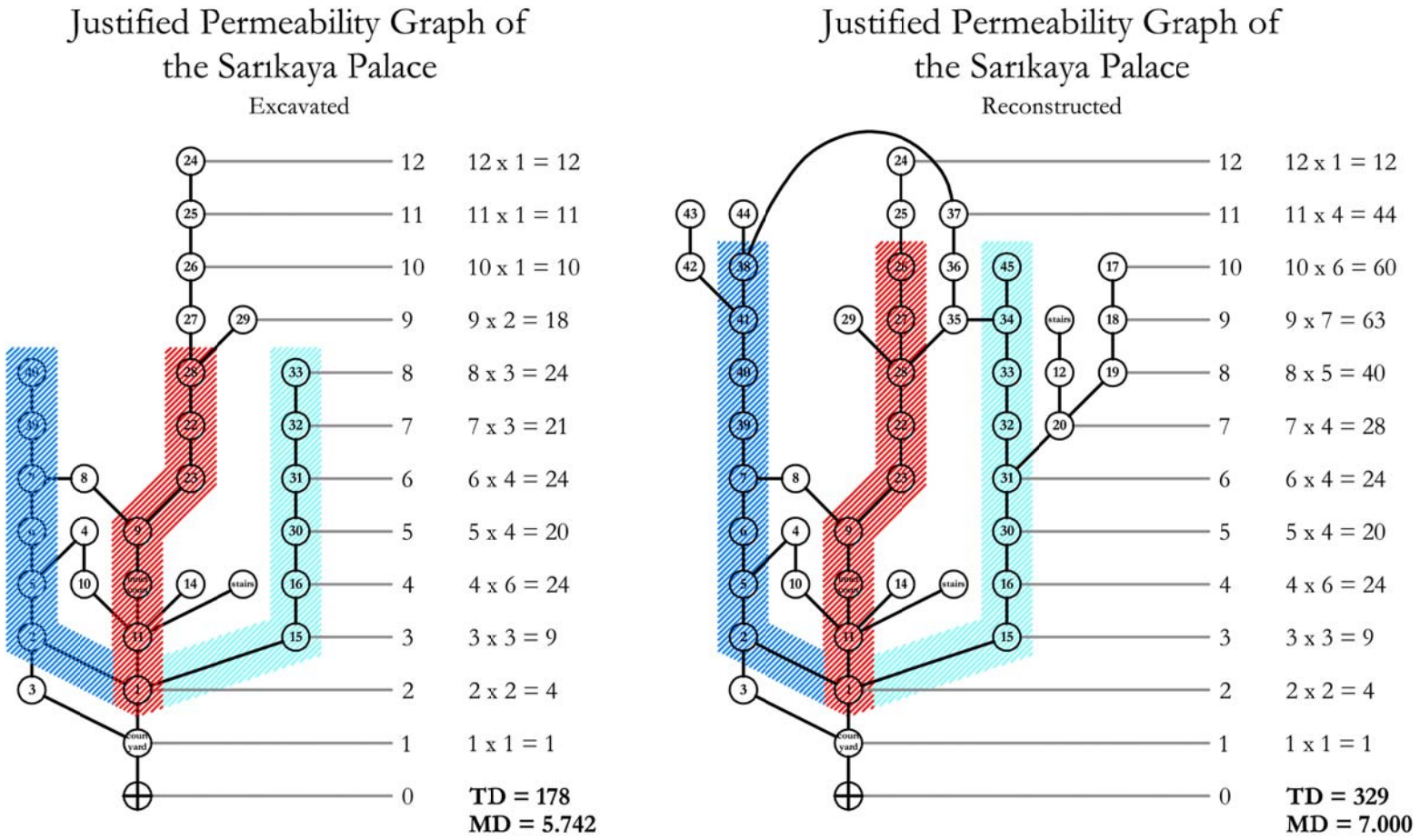


*Figure 6.1. Symmetric chains of the Sarıkaya Palace for the excavated and reconstructed data.*

Following the convention, when the RRA values of the data for the excavated evidence and the reconstruction, that are equal to 5.643 and 6.868 respectively, it is possible to put forward that the verified palace provides a more symmetric pattern than its reconstruction.

In the previous sections of this chapter it has been put forward that the excavated evidence and the reconstructions of the palace both appear distributed in terms of circulation. Furthermore, the comparison of the justified permeability graphs and the relative ringiness values suggests that the reconstruction of the Sarıkaya palace, presents a more distributed pattern than the excavated evidence.

When the justified permeability graphs of the excavated and reconstructed data are compared, it is seen that the reconstruction of the palace have two more loops than the exposed palace, where five rings are visible in the first and three in the latter (Figure 6.2). The addition of the southern rooms on the reconstruction, creating one more chain that joins the two of the rings on the exposed palace, results in the increase of the ringiness on the reconstruction.

This increase is also observed by the comparison of the relative ringiness values that is equal to 0.051 for the excavated data and 0.055 for the reconstructed. As aforesaid, when the RR value is equal to 0, it means no loops are available within the structure whereas the higher RR values points to a more distributed pattern. Thus, the higher RR value of the reconstructed data of the Sarıkaya Palace is more distributed than the excavated data, in terms of circulation.

One of the other issues to be compared is the distinction of the function of rooms within the structure. As previously introduced, there are segments within the palace which are reserved for different storage facilities, which can be traced both in the analysis of the excavated and reconstructed data, such as the regular storage rooms on the western wing, the metal store rooms on the eastern wing, the special storage rooms on the southern central wing. However, the spatial graph of the reconstructed data presents one more separately traced wing that is the central western wing, where the luxury goods are stored. The reason for this difference originates from the addition of the passage into the west wing, leading the way into the central west wing, where the existence of the rooms are known but lacks a main entrance to enable it to be include it in analysis of the excavated data.

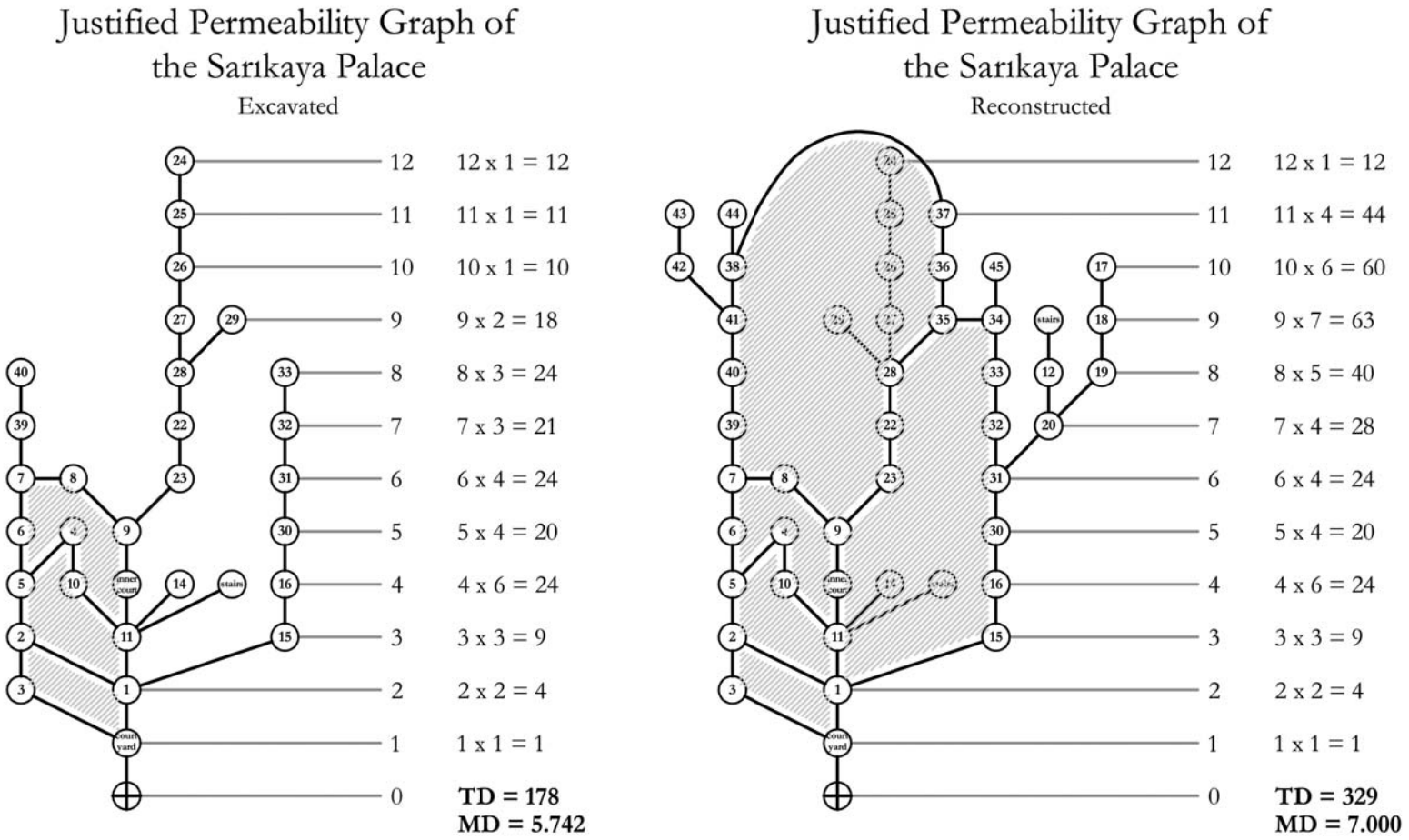


*Figure 6.2. Rings of the Sarıkaya Palace for the excavated and reconstructed data.*

The southern wing is problematic in terms of function due to the fact that it is a reconstruction of barely identified rooms; nevertheless it is possible to see this wing on the graph, not as a totally separated but a more connecting unit, where other storage facilities could have been placed.

To sum up, it can be said that the palace and its reconstruction show similar patterns, which are both symmetric and distributed; however, including a number of rooms on the deeper levels and connecting the rows of rooms verified in the palace makes the spatial pattern of the reconstruction less symmetric but more distributed. Thus, it is possible to put forward that a number of additional rooms can change the pattern of a structure, even though the change is slight.

### 6.2. PALACE Q

The results of the depth analysis of Palace Q will be introduced in the following way that firstly the syntactic properties, symmetry and distributedness will be explained; secondly the results will be evaluated in relation with the function and the privacy of the rooms, separately for the excavated evidence and the reconstruction. Consequently, a comparison for results of the analysis of these data will be presented.

#### 6.2.1. The results of depth analysis for the excavated data

The application of the depth analysis on Palace Q, based on the excavated data of the palace shows that the structure tends to be *symmetric*. The symmetry of the structure can be traced on the permeability graph, as well as by the relative asymmetry value.

The justified permeability graph of Palace Q, based on secure archaeological evidence demonstrates the symmetric pattern which can be read through two chains, originating from the first inner court and other two chains sourcing from the fourth inner court. First group of chains lay in the lower levels of depth, where the reception suite visible by red and the chain of inner courts visible by green are seen. The latter group of chains, constituting the northern wing and central northern wing of the palace, is located on the deeper levels of depth, where the administrative unit is visible by purple and the food processing unit and the storage unit are visible by olive green and blue respectively.

The justified permeability graph, even it is not shallow, shows symmetry of the structure in a way that the number of rooms below the mean depth level, equal to 5.972, is more or less the same amount of the rooms above the mean depth level. The almost

equal distribution of these rooms points to the symmetry of the structure, where the number of rooms within the peripheral chain and the reception suite appear almost the same amount with the number of rooms on the northern and central northern wings.

Furthermore, the relative asymmetry value of Palace Q, based on the excavated data, identifies the symmetry/asymmetry of the structure. As it will be remembered the closer the RA value gets to 0, the tendency of a structure to be symmetric increases. Thus, the RA value, that is equal to 0.284, points to the symmetric pattern of the exposed Palace Q.

The depth analysis of Palace Q, based on the excavated data, puts forward that the structure is *non-distributed* in terms of circulation. This identification becomes possible by the spatial graph and the relative ringiness value.

The justified spatial graph of the excavated Palace Q, by presenting no rings within the palace, identifies the palace as a non-distributed structure. Because there are no rings available in the circulation of the palace, the relative ringiness value, which is calculated by the division of the distinct number of rings with the number of spaces in the structure, thus becomes equal to 0; yet again pointing to the non-distributedness of the exposed palace Q.

As previously mentioned Palace Q is divided into several segments in terms of use of space. The functional division of the palace can readily be observed by the justified permeability graph. In the graph, red colored segment represents the reception suite of the palace; the green colored part shows the peripheral chain of the inner courts, together with the western wing store rooms which take access from these inner courts; purple demonstrates the administrative unit; the olive green colored segment exhibits the food processing unit; and finally the blue colored section displays the partially survived, northern depot rooms.

The observation of the relationship of the depth and the controlled entrances of some units provides information for the privacy. In Palace Q, one of these observed units is the reception suite, where the throne room is included, appearing to be used as both private and public. Placing of the reception suite onto the lower levels of depth, points out an easy access for the reception suite was intended, both for the king and his visitors. However, the entrance for the throne room, being controlled by the inner court plus the two vestibules, Cells 14 and 17, might be the indication of the separation between the users of the room; the king as the inhabitant and the public as visitors.

The other unit to be observed is the administrative sector, which appears private to its users. Located on the higher levels of depth of the permeability graph and being controlled by an inner court, it can be said that this segment of the palace seems to be private. This might put forward that the usage of the unit is restricted to the officials, who were taking part in operation of the administrative issues.

The last unit, which is of special importance in terms of privacy, is the food processing unit. The justified permeability graph demonstrates that this unit is accessed via a large corridor, Cell 43, and placed on the deepest levels. The state of the food processing unit is rather different from the reception suite because this unit is not easily accessible and not controlled by a small inner court. This might be the indication that only the servants and employees of the palace use the area; thus placed on the location that is restricted to reach. Except being private, this might also show that the less desired functions are placed on locations within the palace that are difficult to reach.

### 6.2.2. The results of depth analysis for the reconstructed data

The depth analysis on the reconstruction of Palace Q puts forward that the structure tends to be *symmetric*. It is possible to read the symmetry of the structure through the justified permeability graph, as well as by the relative asymmetry values.

The justified permeability graph of the reconstructed Palace Q demonstrates the symmetric pattern which can be read through three groups of chains; two chains, originating from the portico, another two chains from the first inner court and finally two chains sourcing from the fifth inner court. First group of chains that are almost symmetrical to each other, located on the lowest levels of depth, constitutes of the eastern storage unit, visible with yellow, and the western peripheral ring, visible with light blue. Second group of chains lies in the lower levels of depth, where the reception suite, visible with red, and the chain of inner courts, visible with green, are seen. The last group of chains, including the northwestern and northeastern wings, is located on the deeper levels of depth, where the food processing unit is visible by olive green and the storage unit is visible by blue.

Although the justified permeability graph of the reconstructed Palace Q is not shallow, the symmetric pattern of the structure can be demonstrated by the spatial graph where groups of chains are observed being located on different levels of depth and each chain separately appearing on the same level with its counterpart. Besides the justified spatial graph, with the low relative asymmetry value that is equal to 0.282 puts forward

that the reconstructed Palace Q tends to be symmetric.

The reconstructed Palace Q is *non-distributed* in terms of circulation. Although there are additional rooms in the reconstruction of the palace, none of those rooms are placed in a way that they provide a ring within the palace. Thus, the justified permeability graph of Palace Q reconstruction does not demonstrate any rings, whereas the calculated relative ringiness value equals to 0, both showing the palace has a non-distributed pattern.

The separation of the use of space within the reconstructed palace remains almost the same with the excavated evidence. The difference appears firstly in the addition of the portico and the courtyard, which can be seen as a yellow chain on the permeability graph and secondly, in the western peripheral wing that is demonstrated by a light blue chain on the same graph. It should be remembered that the western peripheral wing is destroyed by later pits, resulting in the loss of the walls and floors in this part of the palace. Following Matthiae's argument, arguing that the western peripheral ring would have been another chain of inner courts providing access to the western rooms as in the case with the eastern peripheral chain,[187] the picture of the division of the functions within the palace remains the same; however, this suggestion would have an affect on the symmetry of the chains, where the western peripheral wing would appear symmetric particularly to the eastern one on the justified permeability graph.

The privacy of the rooms is not deeply affected by the reconstruction, where the reception suite, the administrative unit and food processing unit appear more private than the other units. However, it should be said that the addition of the king's back room makes this room even more private than the throne room, because of the suggestion that this room is used by the king, rather than being a location where he sees his visitors. Furthermore, the addition of the portico and the courtyard provides a more controlled entrance to the palace; where the entrance of the western peripheral ring is controlled by the portico, while the first inner court, which gives access to the reception suite and the southeastern storage unit, is controlled by the courtyard.

[187] Matthiae 1983, 536.

### 6.2.3. The comparison of depth analysis results for the excavated and reconstructed data of Palace Q

The comparison of the depth analysis results for Palace Q and its reconstruction will be mainly based on the differences and the similarities of the syntactic properties for both data, as well as the comparison for the results in relation to function and privacy.

Following the previously introduced analysis results for the excavated and reconstructed Palace Q, the data puts forward that both the palace excavated and its reconstruction show a pattern that tend to be symmetric. Nevertheless, the comparison of the justified permeability graphs and the real relative asymmetry values points out that the reconstruction of the palace provides a less symmetric pattern than the exposed palace.

When the permeability graphs of the palace, are compared, it is seen that the permeability graph of the palace reconstruction is deeper than the graph of the excavated evidence. This difference originates from the addition of the portico and the courtyard in the reconstruction, which resulted in the shifting of the entire rows of the excavated graph to two more levels deeper. This fact constitutes the first reason that the excavated Palace Q shows a more symmetric pattern than its reconstruction (Figure 6.3.) The second difference between the graphs that points out the more symmetric pattern of the excavated Palace Q is the more dendritic appearance of the justified graph of the palace reconstruction. The addition of the rooms onto the deeper levels of the graph of the reconstruction, with single entrances from already existing chains rather than creating new long chains is the reason of the branchy appearance, suggesting a less symmetric pattern for the reconstruction.

As previously introduced, RA values are used only for the understanding of the symmetry/asymmetry of a single structure and the real relative asymmetry values allows a comparison of different sized structures for their symmetry/ asymmetry, canceling the effect of size. Besides, the lower RRA values points to the tendency of the structure to be more symmetric. When the RRA values of the excavated and reconstructed data are compared it is seen that the RRA value of the reconstructed data, equal to 7.421, is higher than RRA value of the excavated data, equal to 5.796, suggesting a less symmetric pattern of the reconstruction of the palace.

The other syntactic property to be examined is the unringiness of Palace Q. Both of the data shows that the structure is non-distributed in terms of circulation.

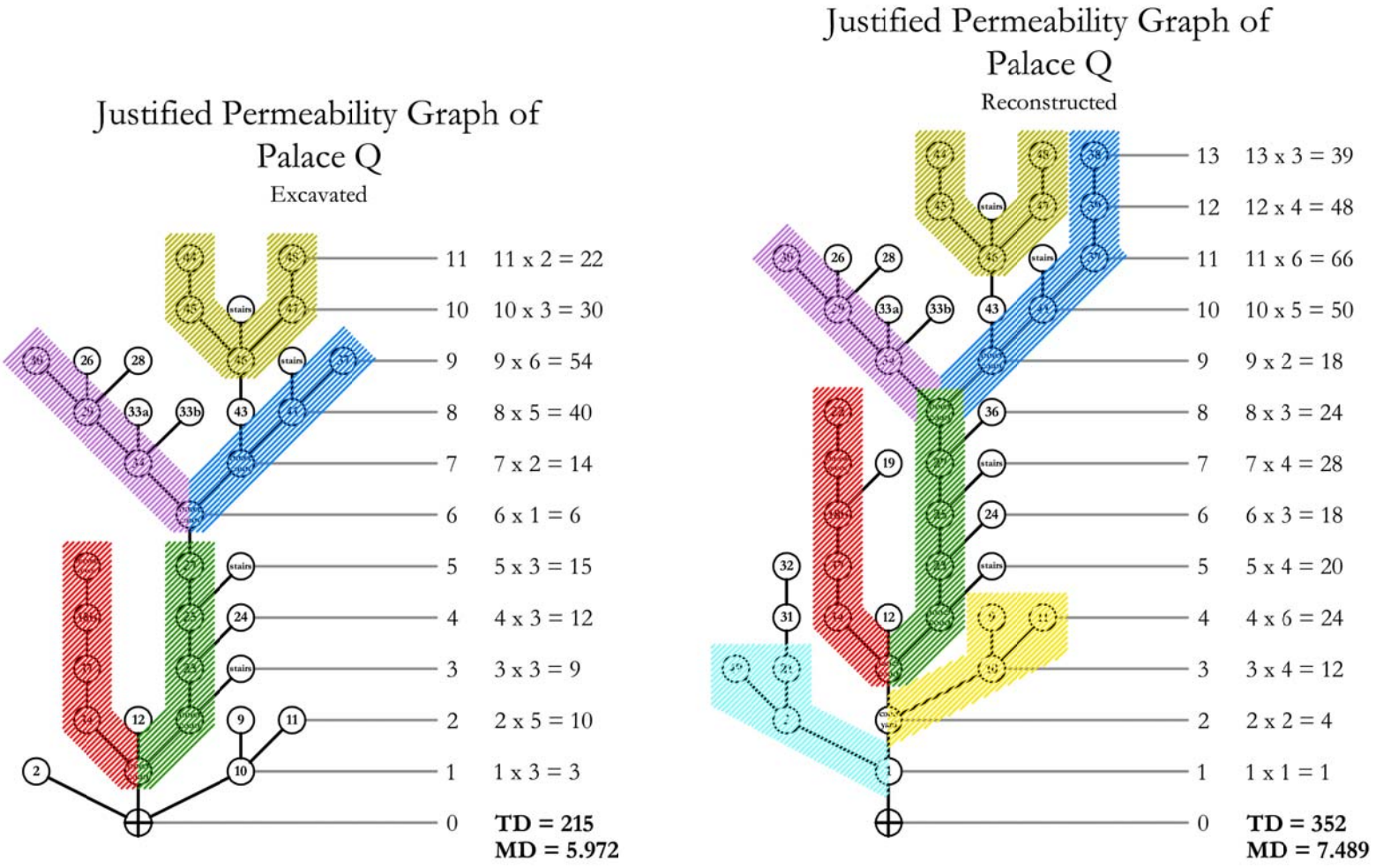


*Figure 6.3. Symmetric chains of Palace Q for the excavated and reconstructed data.*

The reason for this non-distributed pattern is no additional passages between the existing or between the suggested rooms are provided. The non-distributedness of the structure suggests that movement towards the rooms on the deeper levels is gradually controlled by rooms that are located on lower depths. The separation of the functions of the units can be observed both by the spatial graphs of the excavated and reconstructed data.

In the graphs, red colored segment represents the reception suite; green colored part shows the peripheral chain of the inner courts together with the store rooms on the western wing which take access from these inner courts; purple colored part demonstrates the administrative unit; olive green colored segment exhibits the food processing unit; and finally blue colored section displays the partially surviving, northern depot rooms on the justified permeability graph of the excavated data. With a number of additional rooms on these units, the justified permeability graph of the reconstructed data conserves the division of the functions; furthermore, it adds two more units to the palace, where the western peripheral wing is seen by light blue and the entrance facilities, the portico and the courtyard, is demonstrated by yellow.

The last issue to be compared is the privacy of some units. In both of the analysis, the permeability graphs put forward that the reception suite, the administrative unit and the food processing unit have differing privacy issues, by means of depth levels and the control over the entrances. The reception suite is where the public is allowed to visit the king, which can be read from the lower depth values, as well as the high control over the entrance for the throne. The administrative unit appears more private than the reception suite in terms of level of depth but less private in terms of the control over the entrances. By locating this unit on the higher levels of depth, relatively easy access for the palace officials might have been intended; however, the less controlled entrance, which appears to be held only by a single inner court, might represent exclusive usage of the unit by the officials. Finally the most private unit seems to have been the food processing unit, by the placement of the unit on the deepest levels and which is controlled by a corridor.

In brief, it can be said that the palace and its reconstruction show similar patterns, which both tend to be symmetric and both appear non-distributed. Nevertheless, in the graph of the reconstruction, the shifting of depth levels of the spatial graph of the excavated data as a result of the addition of the portico and the courtyard to the lower

levels, and the addition of a number of rooms to the already existing layout makes the reconstruction of the palace less asymmetric than the exposed palace. Thus, it becomes possible to put forward that the results that are derived from two different sets of data, show differences, even though the change is slight.

## 6.3. COMPARISON OF THE SARIKAYA PALACE AND PALACE Q

The comparison of the syntactic properties for excavated data and the reconstructed data of the Sarıkaya Palace and Palace Q will be performed separately by the help of the justified permeability graphs and calculated values, in order to provide a counterbalanced evaluation. Additionally, these properties with regard to functional division and privacy will be presented by an overall comparison which will mainly be based on the permeability graphs.

### 6.3.1. The comparison of depth analysis results for the excavated data

As previously introduced, the analyses of the excavated data of the Sarıkaya Palace and Palace Q propose that both of the palaces have a tendency to be symmetric by means of spatial pattern. However, the comparison of the permeability graphs and the values of the syntactic properties show that the excavated Sarıkaya Palace inclines to be more symmetric than the excavated Palace Q.

Demonstration of more symmetric pattern of the Sarıkaya Palace over Palace Q through the comparison of the justified permeability graphs is threefold. Firstly, it can be said that the three symmetric chains of the Sarıkaya Palace, which were previously introduced as representing the western and eastern wings and core of the palace, are much more traceable than the two groups of chains, the first group representing the reception suite and the eastern peripheral wing, whereas the second the food processing unit and the northeastern storage unit of Palace Q. This fact is supported by the theory that the symmetric patterns are represented by branching of the chain of rooms on a peculiar level and run into further levels symmetrically;[188] which allows the statement that the spatial pattern of the Sarıkaya Palace is more symmetric than Palace Q. Secondly, the extension of these chains into deeper levels is restricted in the graph of the Sarıkaya Palace, but the second group of symmetric chains of Palace Q is located on the deeper levels of the graph. Finally, the concentration of the rooms on the lower levels is noticeable on the graph of the Sarıkaya Palace but the rooms of Palace Q are

[188] Hillier and Hanson 1984, 184.

concentrated equally on both lower and higher levels of depth on the spatial graph. Following these three assessments and the method (more symmetric patterns are represented by shallower graphs), it becomes possible to say that Palace Q presents a less symmetric pattern than the Sarıkaya Palace.

This difference in the spatial patterns of the palaces is also attested by the comparison of the real relative asymmetry values. For the elimination of the size effect, the real relative asymmetry values are used rather than the relative asymmetry values and the lower values of real relative asymmetry indicates more symmetric patterns. The RRA value for the excavated Sarıkaya Palace, that is equal to 5.643, is lower than that of Palace Q, which is 5.796; pointing out that the Sarıkaya Palace tends to be more symmetric than Palace Q.

Contrary to the symmetry, the ringiness of the Sarıkaya Palace and Palace Q are completely different. The Sarıkaya Palace, barring three rings on the spatial graph and having the relative ringiness value that is equal to 0.051, presents a distributed pattern; whereas Palace Q shows a non-distributed pattern by the lack of rings on the spatial graph and thus, having the relative asymmetry value that is equal to 0.

### 6.3.2. The comparison of depth analysis results for the reconstructed data of the Sarıkaya Palace and Palace Q

The analysis of the reconstructed data of the Sarıkaya Palace and Palace Q shows that both of the palace reconstructions have a tendency to be symmetric in terms of spatial pattern. Nevertheless, the comparison of the permeability graphs and the values of the syntactic properties puts forward that symmetry of the reconstructed data of the Sarıkaya Palace and Palace Q presents similar points towards the same results but slightly differ in the increase of the difference in terms of tendency to be symmetric.

The further symmetric pattern of the Sarıkaya Palace over Palace Q can be demonstrated by the justified permeability graphs in two ways. Firstly, it is observed that the three symmetric chains of the Sarıkaya Palace, extending into further levels of depth, are much clearly noticed than the three groups of chains of Palace Q. Secondly, it can be said that the chains of the reconstructed Sarıkaya Palace run into further depth levels in the graph almost symmetrically; however on the deeper levels of the graph the chains does not show a consistent symmetry, where it appears much more branchy. Thus, following Hillier and Hanson's theory of branches from particular level extending into further levels symmetrically, allows the conclusion that the spatial pattern of the Sarıkaya

Palace is more symmetric than Palace Q.

The comparison of the real relative asymmetry values for the reconstruction of the palaces also puts forward this difference in the spatial patterns. The RRA value for the reconstructed Sarıkaya Palace, that is equal to 6.868, is much lower than that of Palace Q, which is calculated as equal to 7.421; pointing out that the Sarıkaya Palace tends to be more symmetric than Palace Q.

The ringiness of the palace reconstructions is completely different. The reconstructed Sarıkaya Palace includes five distinct rings whereas the reconstructed Palace Q does not provide any rings; which can be both traced in the permeability graphs. The relative ringiness value of the reconstructed Sarıkaya Palace equal to 0.055, indicates the distributed pattern of the reconstruction. On the other hand, the relative ringiness value of the reconstructed Palace Q, that is equal to 0, identifies the reconstruction of the palace as non-distributed.

### 6.3.3. Overall Results for the Comparison

The archaeological inference that can be derived from this study is about the spatial patterns of the Sarıkaya Palace and Palace Q. Although both of the structures appear symmetric, the comparison of the permeability graphs demonstrates the differences that make the Sarıkaya Palace more symmetric than Palace Q.

It is attested that the Sarıkaya Palace is planned through the establishment of three chains of rooms, two existing and one reconstructed, around a chain, which forms the central core that includes a single inner court. As opposite to the Sarıkaya Palace, Palace Q is planned through several small chains, which comprise different units within the palace that always take access from one semiperipheral chain of inner courts. Thus, it can be stated that the symmetric chains which attest the symmetric pattern of the Sarıkaya Palace and Palace Q serve differently (Figure 6.4.)

In the Sarıkaya Palace, the peripheral wings -the east, the west and the reconstructed south wings- are mainly used for the circulation through these wings. The exclusion of these peripheral wings would not leave the rest of the palace inaccessible, where they are accessed by the central core that is formed around the inner court. However, the state of the peripheral wing within Palace Q is totally different from the Sarıkaya Palace. The eastern semiperipheral wing appears to provide access for the central core, the northern and the eastern units of the palace, whereas the exclusion of this wing would leave these units totally inaccessible.

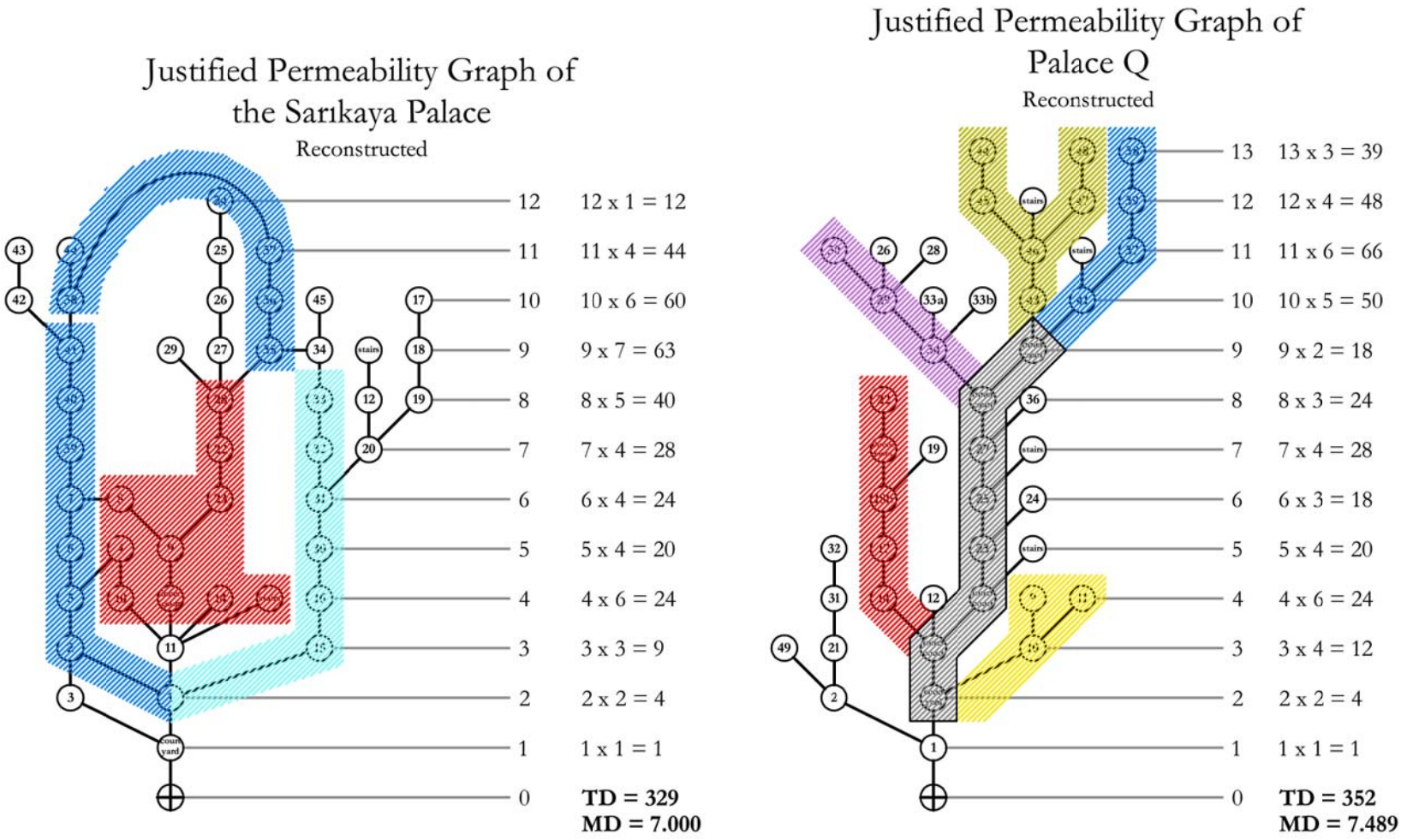


*Figure 6.4. Difference in the spatial pattern of the Sarıkaya Palace and Palace Q.*

One of the results for the identification of the spatial pattern of the Sarıkaya Palace is that the structure resembles a larger exercise of the inner court model that is observed in the Mesopotamian Palaces. On the other hand, Matthiae argues that being different from the Mesopotamian palaces, the Old Syrian palaces are characteristically formed in a way that the movement within the palaces is conducted through a semiperipheral chain of inner courts. (Figure 6.4)[189] The second result is that the study of the spatial patterns of Palace Q attests the theory put forward by Matthiae.

Study of the spatial patterns of the Sarıkaya Palace and Palace Q provide valuable information for the circulation. As it is previously introduced, the Sarıkaya Palace presents a highly distributed circulation pattern, where the chains of the palace are strongly linked to each other, resulting in an easy access between the units whereas an easy but less controlled movement within the palace. On the contrary Palace Q presents a non-distributed circulation pattern, where the semiperipheral chain does not allow easy access between units, pointing out to the gradual and highly controlled movement within the palace.

The functional divisions of the Sarıkaya Palace and Palace Q are also considerably different. Regardless of the fact that there appears to be an inner division, the Sarıkaya Palace acts as a single storage unit that is assembled around a central inner court, where trading goods and the records of these goods, namely by bullae, and the provisions of the palace are kept. Besides, some storage units are a subject of privacy. However it can be said that neither the distribution of the storage facilities nor the privacy of these units seem to follow a consistent pattern.

Contrarily, Palace Q gathers several different functions under a single roof, where the reception suite, the administrative unit, the storage facilities and the food processing unit are located. For this division of functions within Palace Q, Matthiae suggests that the front spaces are reserved for the entrance and distribution, the central core for the reception and the back of the palace for the food preparation and storage, which was an exercise of the repetition of the layout of the Eblaian houses.[190] Additionally, it becomes possible to say that this division, which can be read by the help of the permeability graphs, happened gradually with regard to the layout and the movement within the palace also creating a gradual privacy for the units.

[189] Matthiae 2002b, 193; Matthiae 1984, 19.
[190] Matthiae 1997a, 132.

The difference in the circulation patterns, the functional division and privacy of the Sarıkaya Palace and Palace Q makes it highly preferable to think that the purposes of the palaces were different by means of operation. Sarıkaya Palace, being one of the very important institutions of a trading city, appears to be an administrative building, whereas Palace Q presents properties of a true palatial complex.

## 6.4. THE WARSHAMA PALACE

The results for the analysis of the proposed circulation models will be explained only for its syntactic properties and by the comparison of these results it is sought to propose how different models can affect the spatial pattern of a single structure.

### 6.4.1. The results of depth analysis for the Courts Models

As it will be remembered, the only difference between the Courts Model 1 and Courts Model 2 is a single doorway suggested between the two halves of the north wing. Thus, the results for both of the models will be given in one accord.

The application of the depth analysis on the Courts Models puts forward that both of the models represents a tendency to be *symmetric*. The symmetry of the proposed models for the structure can be read through the justified permeability graphs and the relative asymmetry values.

The permeability graphs of the Courts Model 1 and 2 both present symmetry in the branching of same amount of chains for the two halves of the north wing, where the three chains for the eastern half and three for the western can be seen. Secondly, the same number of branches originating from both of the inner courts, which can be seen by red color on the graph, points out the symmetry. The divarication of the way in Cells 24 and 41 in the same way also appears symmetric. The relative asymmetry values of the Courts Models are the same and equal to 0.260. Being close to 0, this RA value suggests that the Courts Models proposed for the Warshama Palace tend to be symmetric.

On the other hand, the application of the depth analysis on the Courts Models shows that both of the models presents a *distributed* pattern; whereas Courts Model 2 is more distributed than Model 1 by the addition of one more doorway, which ties the two halves of the north wing, as previously introduced. The additional doorway creates one more ring in the Courts Model 2, increasing the ringiness of the structure, where it can be seen on the permeability graph. The relative ringiness value of the Courts Model 2, that is equal to 0.024, also attest the more distributed pattern of the Court Model 2 by

being higher than the RR value of the Courts Model 1, equal to 0.012.

### 6.4.2. The results of depth analysis for the Linear Models

As it was in the Courts Models, the only difference between the Linear Model 1 and Linear Model 2 is that Linear Model 2 has one more doorway suggested between the two halves of the north wing. The affect of the addition of this single doorway will be investigated with the permeability graphs and the relative asymmetry values.

The application of depth analysis on the Linear Models of the Warshama Palace suggests that both of the models propose a tendency for the structure to be *symmetric*, which can be read through the justified permeability graphs and the relative asymmetry values.

The permeability graph demonstrates a clear symmetry for the six chains that divaricate from the corridor -Cell 52-, leaving three chains on the left, representing the very first rooms on the western half of the north wing, and three on the right, showing the corresponding rooms on the eastern half. Secondly, the eight linear chains, each sourcing from the very first rooms, again appear symmetric on the permeability graph. Furthermore, the same and low RA values of both of the models, that are equal to 0.236, underline the symmetry of the models.

On the other hand, both of the models appear to be *distributed*. Moreover, by the help of the permeability graphs and the relative ringiness values, it is possible to say that the Linear Model 2 presents a more distributed pattern than the Linear Model 1. The permeability graph of the Linear Model 2 demonstrates one more ring, which is a result of the additional doorway. Besides, the higher RR value of the Model 2, that is equal to 0.024, than the RR value of the Model 1, equal to 0.012, points out the more distributed pattern of the Model 2.

### 6.4.3. The Comparison of the Result of Depth Analysis for Courts Models and Linear Models

As previously introduced, each with two sub-models both of the models creates a pattern for Warshama Palace that tends to be symmetric. However, the comparison of the justified permeability graphs and the relative asymmetry values[191] shows that the Linear Model appears more symmetric than the Courts Model.

[191] Being different from the comparison of the Sarıkaya Palace and Palace Q, the relative asymmetry values are used for measuring the symmetry/asymmetry of the Warshama Palace, because the compared structure is a single building that shows no difference in number of spaces.

The symmetry in the permeability graph of the Linear Model, in which the linear chains originate from the corridor forms the symmetry, is much traceable than the permeability graph of the Courts Models, in which the symmetry can only be observed in a number of divaricated chains. Additionally, the RA values imply the difference of these models in terms of spatial pattern. The higher RA value of the Courts Models, that are equal to 0.260, when compared to the RA values of the Linear Models, equal to 0.236, points out that the Courts Models present a less symmetric pattern than the Linear Models.

Furthermore, the ringiness of the structure appears the same in pairs as Models 1 and Models 2. The Courts Model 1 and the Linear Model 1, keeping the two halves of the north wing separate, appear less distributed than the Courts Model 2 and Linear Model 2, where those halves are joined by a single doorway on the same location. This is also attested by the difference in the RR values. The equal RR values of the Models 2, being higher than the equal RR values of the Models 1, suggest a more distributed pattern for the Models 2 than Models 1.

The appearance of the same RA values as in groups, for the Courts Models and for the Linear Models, is another issue to be examined. As it was put forward by Hillier and Hanson, the least number of lines connecting the spaces within a structure will be equal to (the number of spaces)-1 and any increase in the number of the lines connecting the spaces within the system will increase the ringiness but will not affect the symmetry of the structure.[192] The results of the two different Courts Models and the Linear Models agree with this theory and present attested two examples, as corresponding pairs, with same RA values but different RR values.

Contrarily, both the permeability graph and the RA values would have been different, if this passage between the two halves was to be placed between rooms that are located in highly opposing levels of depth. This can not be explained by the Warshama models, because the possible passages that can be suggested between the two halves of the north wing would always appear on the closely related depth levels; but Palace Q would set a good example for this because of the distinctive difference of depth levels between the units; such as a doorway that is to be opened -completely hypothetically- between the throne room and the administrative unit, would converge

[192] Hillier and Hanson 1984, 153-54.

the administrative unit of Palace Q to the reception suite in terms of depth, meanwhile would increase the ringiness of the structure as a result of adding a ring to the palace.

Thus, it can be said that the additional passages that are opened between rooms located on the same or close depth levels does not change the symmetry of the structure but cause an increase in the ringiness, as in the case of Courts Models; whereas additional doors between rooms on the different levels would cause a change both in the symmetry and the ringiness of the structure.

The analysis of the models also shows that amongst the models Courts Model 2 appears as similar to the Sarıkaya Palace. If it was known that the second storey of the Warshama Palace had doors, it would be preferable to think that the circulation pattern would be like Courts Model 2 rather than other models.

Finally, with the guidance of the analysis on the models proposed for the Warshama palace, it becomes possible to conclude that the spatial patterns within a structure are highly directed by the location of doorways, and the internal structure of a building along with the movement within the building is highly affected by the access between rooms. Secondly it is possible to state that it can be said that a model, would reflect the repeated architectural spatiality as an output that is similar to the base type.

# CHAPTER VII

# CONCLUSION

Although many archaeologists have studied the Middle Bronze Age buildings with different point of views and approaches, the spatial analysis of these structures was left out as an issue to be examined. Following the rarity of study in the area of the spatial patterns of the Middle Bronze palaces, this thesis presented an application of Depth Analysis on the palaces at Acemhöyük, Tell Mardikh and Kültepe in order to assess the feasibility of the method and seek to find out what kind of archaeological results can be derived from this study in order to fill this gap. Yet, a number of important results are inferred.

Firstly, it is possible to say that Depth Analysis is proved to be successful in demonstration of the spatial patterns of the Sarıkaya Palace and Palace Q through the display of the internal structures by the justified permeability graphs. Although there appeared to be slight differences in the graphs when applied to different data of the palaces, excavated and reconstructed; the examination of the permeability graphs suggests that the Sarıkaya Palace presents a pattern that tends to be symmetric and highly distributed whereas Palace Q symmetric but non-distributed.

Secondly, it is possible to say that Depth Analysis proved to be successful in identifying the spatial patterns of these palaces, in cumulative form, through calculation of values for syntactic properties, which was highly useful in the comparison of the different size of data sets. The relative asymmetry values were useful in the comprehension of the symmetry in the buildings whereas the comparison of real relative asymmetry and relative ringiness values were invaluable source of data for the understanding of differences between the symmetry and the distributedness of the structures. Depth analysis showed that the Sarıkaya Palace is more symmetric than Palace Q whereas these palaces appear completely different in distributedness.

Thirdly, Depth Analysis is proved to be successful, when used with information coming from the excavations, in exhibition of the division of structures into functional units and providing information for the relationships of these units together with the

degree of privacy through the recurrences of the cells. The Sarıkaya Palace, that is known to act as a storage facility on the ground floor, shows a division of rooms according to what is stored; and the store rooms, where precious goods are kept, seems to be more private than other store rooms. Palace Q has a distinct division of different functions with a gradual privacy. These functional divisions and privacy of rooms can readily be read through the permeability graphs.

On the other hand, adding the Warshama Palace -a doorless structure- to the picture, is analyzed through generated models. The application of depth analysis on these models showed that the Courts Models, centered on the idea that the central large two rooms might have acted as inner courts, is much less symmetric in pattern than the Linear Models, which was produced following the structural design that is the longitudinal repetition of rooms. Thus, Depth Analysis appeared as an indication that the internal structures of buildings and the movement within are highly directed by the location of doorways, by means of passages between cells.

As it will be understood, this thesis used three different forms of data for the analysis; the excavated data based on the secure archaeological evidence, the reconstructed data and the hypothetically produced data. As it is presented the results of the excavated and reconstructed data of the Sarıkaya Palace and Palace Q, which were sufficient enough to allow application of the analysis, are different. Besides, the result for the models of Warshama Palace showed that there is considerable difference between two models; consequently, both showing the results of Depth Analysis are dependent to the amount of available data. To conclude it can be said that, when used with care –paying attention to the available data, Depth Analysis is a valuable source of information in the apprehension of spatial patterns of the Middle Bronze Age palaces. A more successful usage of the method lies in comparative studies, providing results for different size of buildings. So, Depth Analysis would be a useful method for the identification of genotypes for a certain region through the analysis of suchlike buildings for further research.

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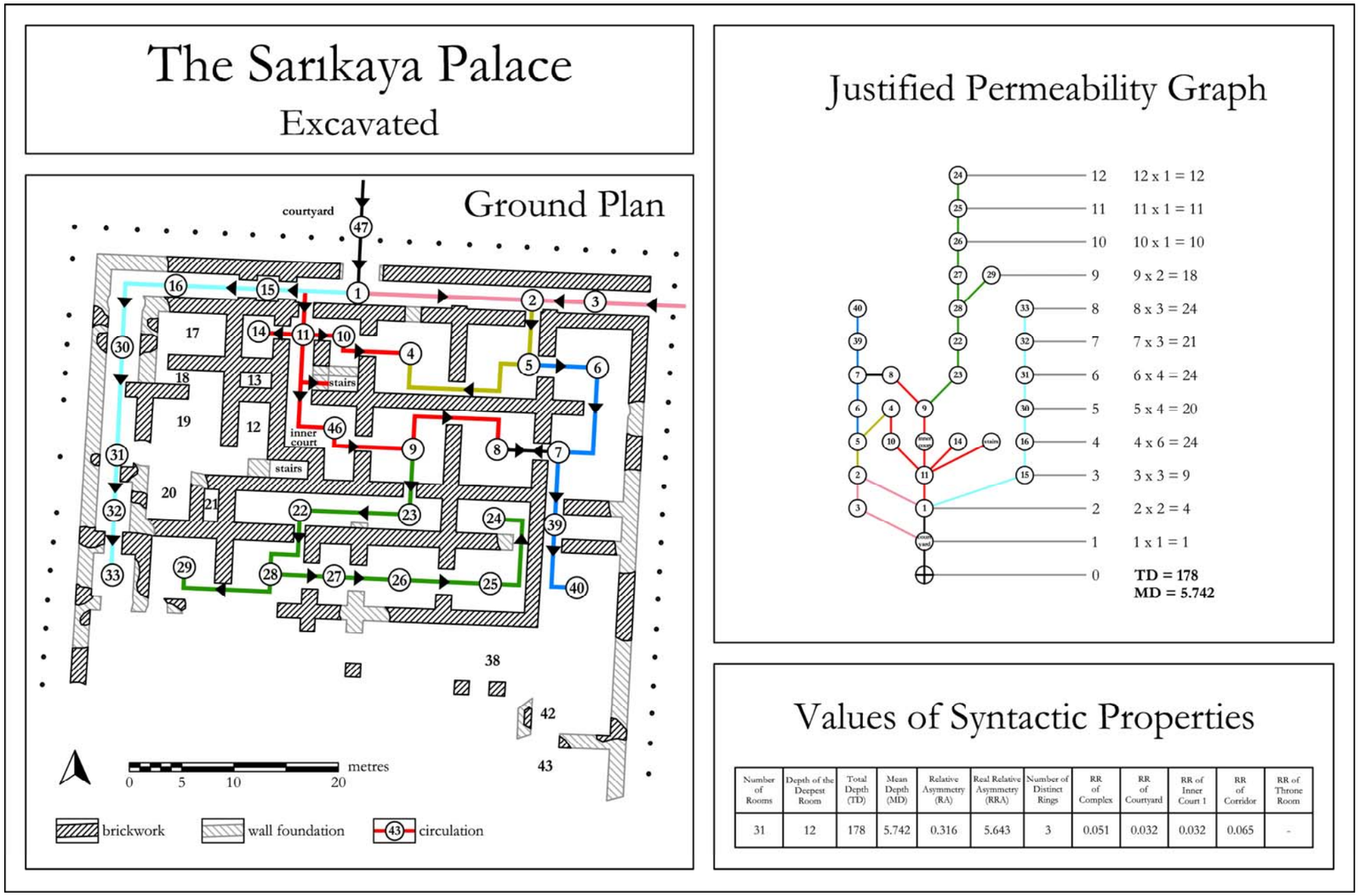
## APPENDICES

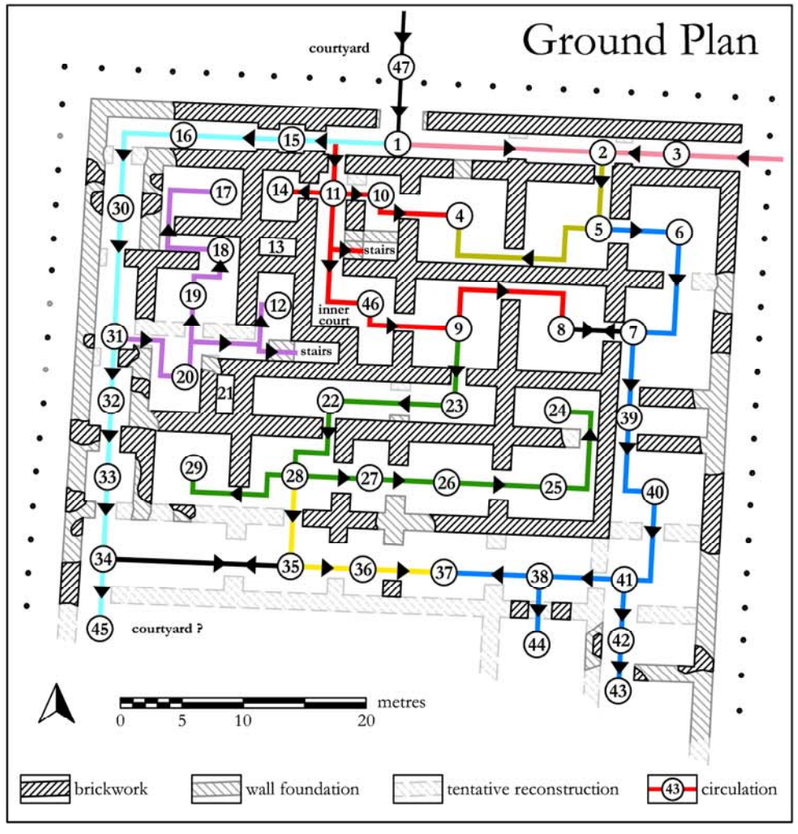
**APPENDIX A: Composite plan of the Sarıkaya Palace based on secure archaeological evidence, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**

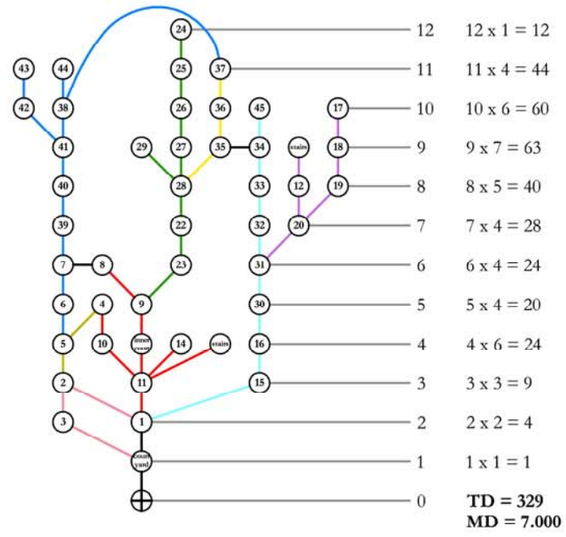



| Number of Rooms | Depth of the Deepest Room | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Corridor | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 12 | 178 | 5.742 | 0.316 | 5.643 | 3 | 0.051 | 0.032 | 0.032 | 0.065 | - |

**APPENDIX B: Composite plan of the Sarıkaya Palace based on reconstruction, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**

# The Sarıkaya Palace
## Reconstructed

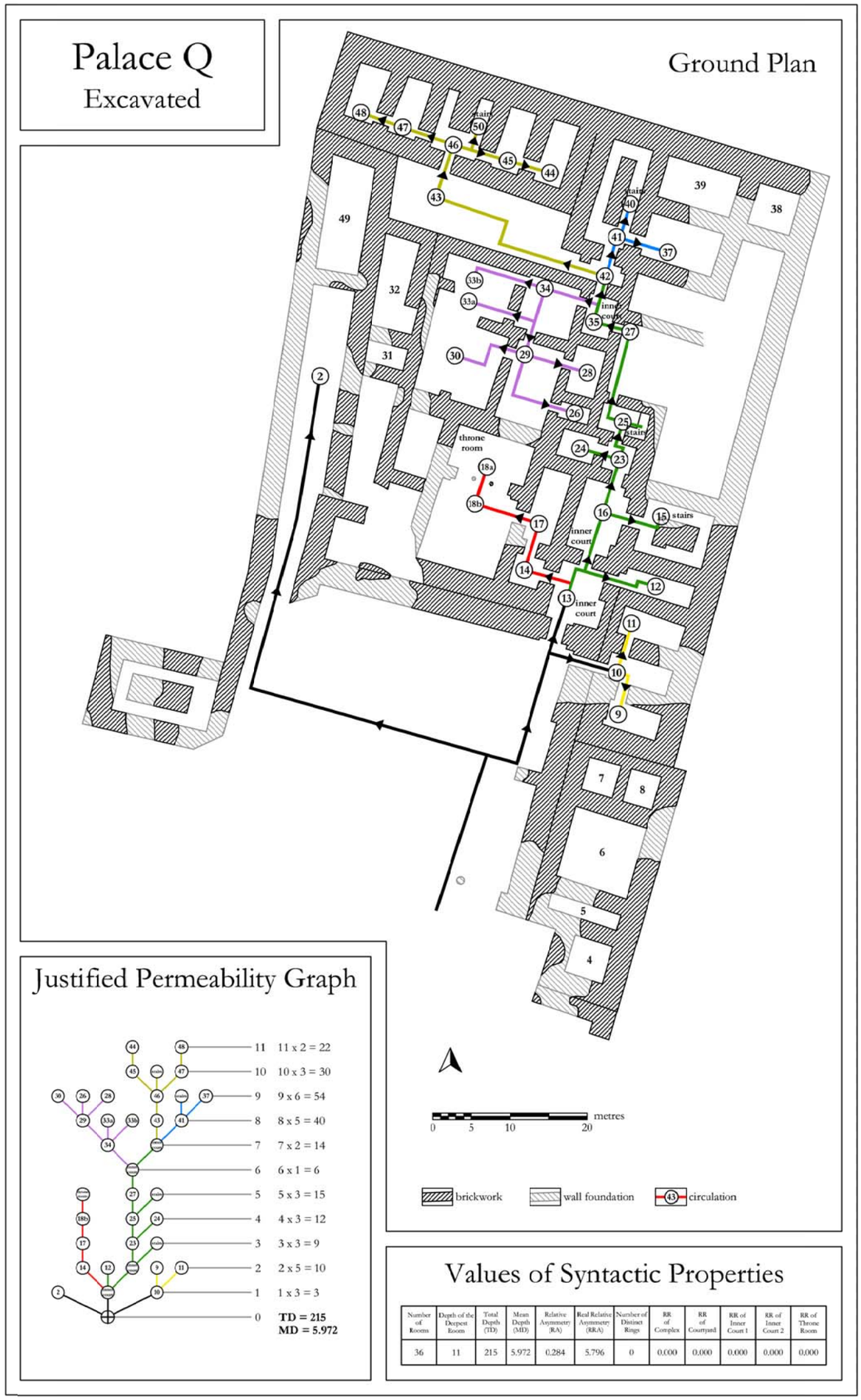



## Values of Syntactic Properties

| Number of Rooms | Depth of the Deepest Room | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Corridor | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | 12 | 329 | 7.000 | 0.261 | 6.868 | 5 | 0.055 | 0.021 | 0.043 | 0.064 | - |

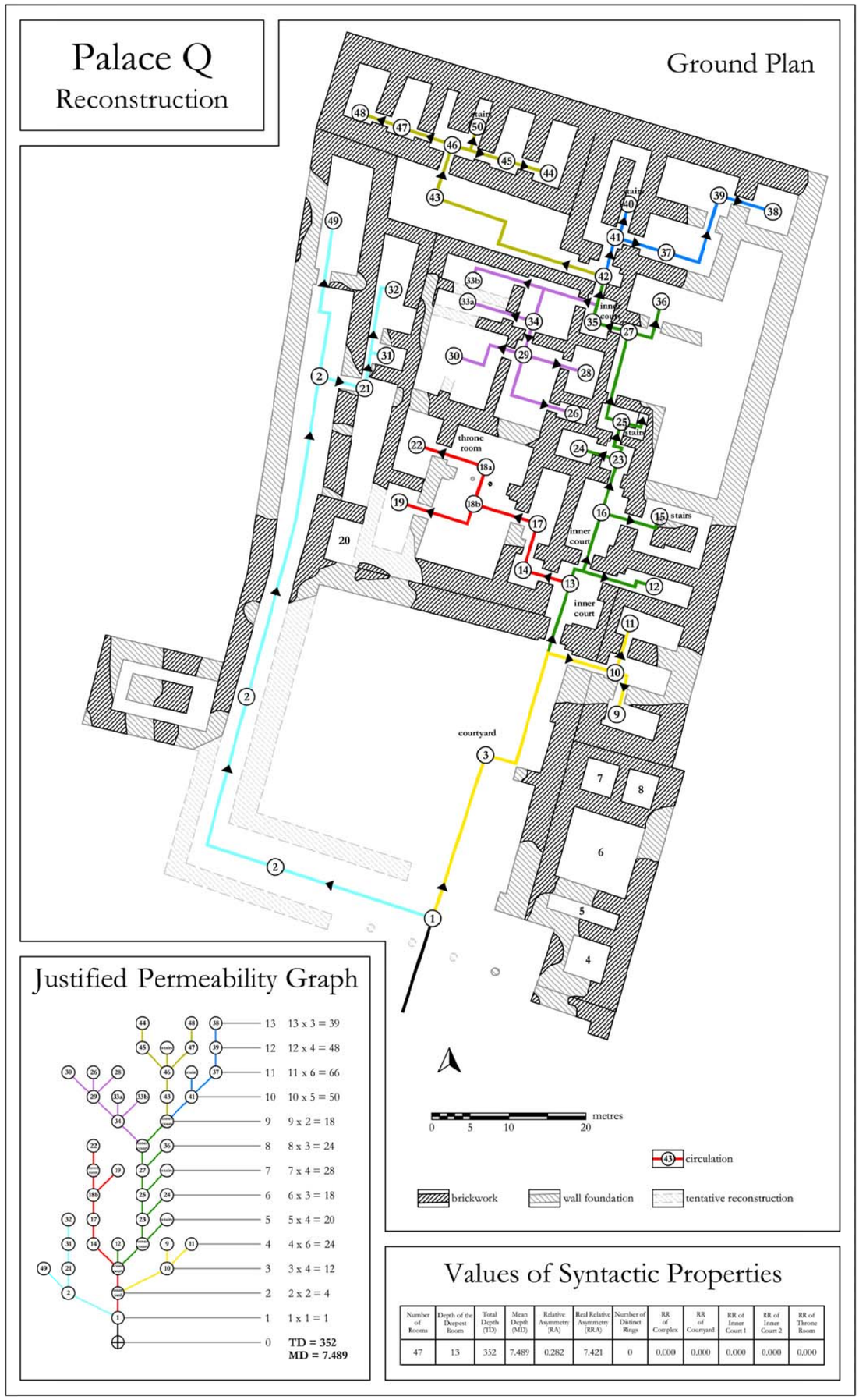
**APPENDIX C: Composite plan of Palace Q based on secure archaeological evidence, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**




## Values of Syntactic Properties

| Number of Rooms | Depth of the Deepest Room | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Inner Court 2 | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | 11 | 215 | 5.972 | 0.284 | 5.796 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**APPENDIX D: Composite plan of Palace Q based on reconstruction, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**




## Values of Syntactic Properties

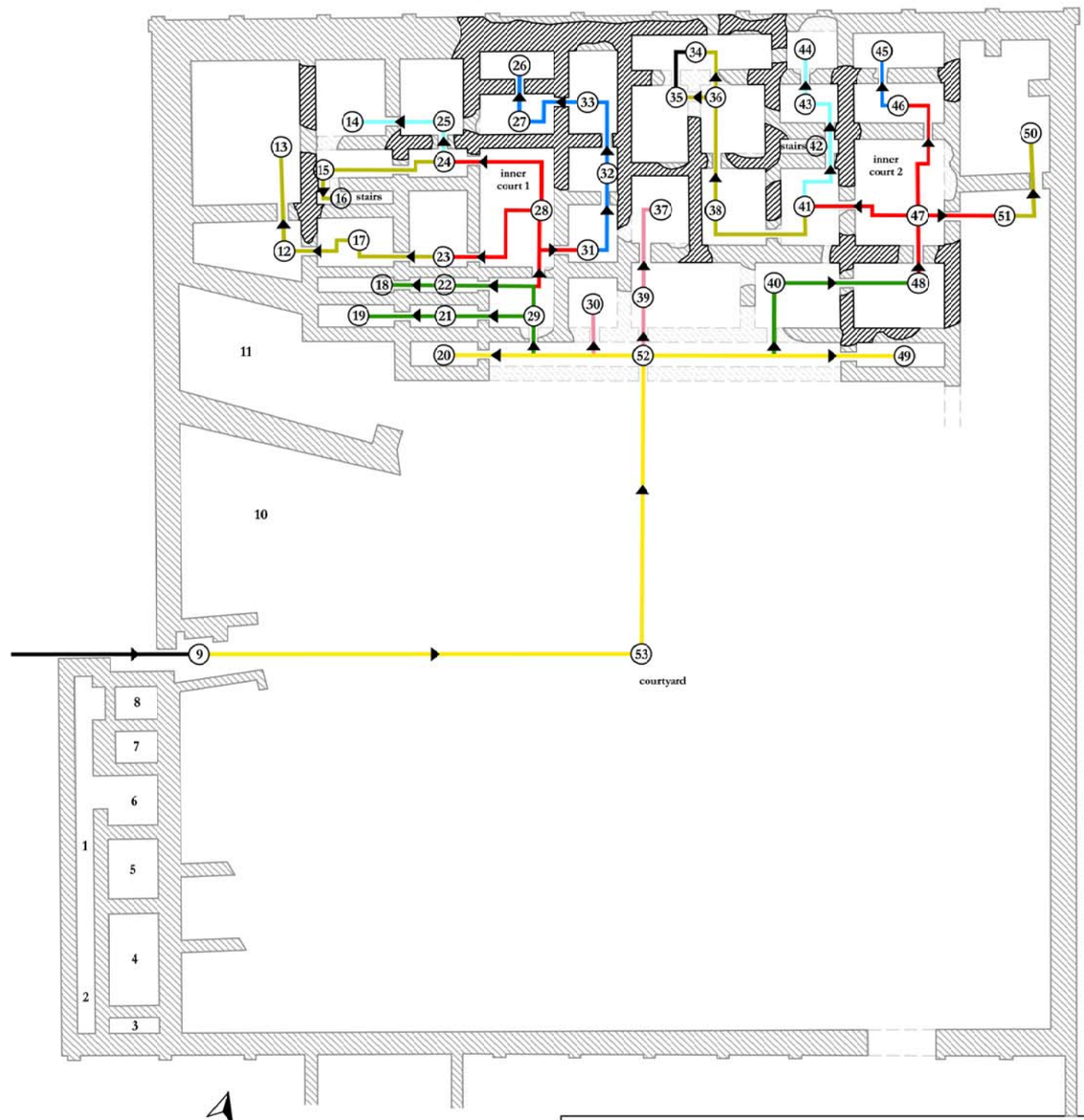
| Number of Rooms | Depth of the Deepest Room | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Inner Court 2 | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | 13 | 352 | 7.489 | 0.282 | 7.421 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**APPENDIX E: Composite plan of the Warshama Palace based on Courts Model 1, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**

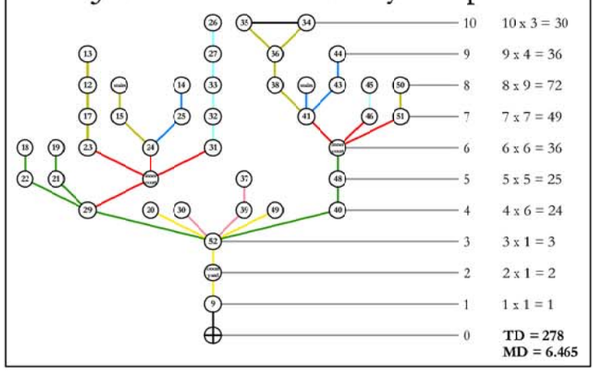
# The Warshama Palace

## Courts Model 1

## Top Plan




## Justified Permeability Graph




## Values of Syntactic Properties

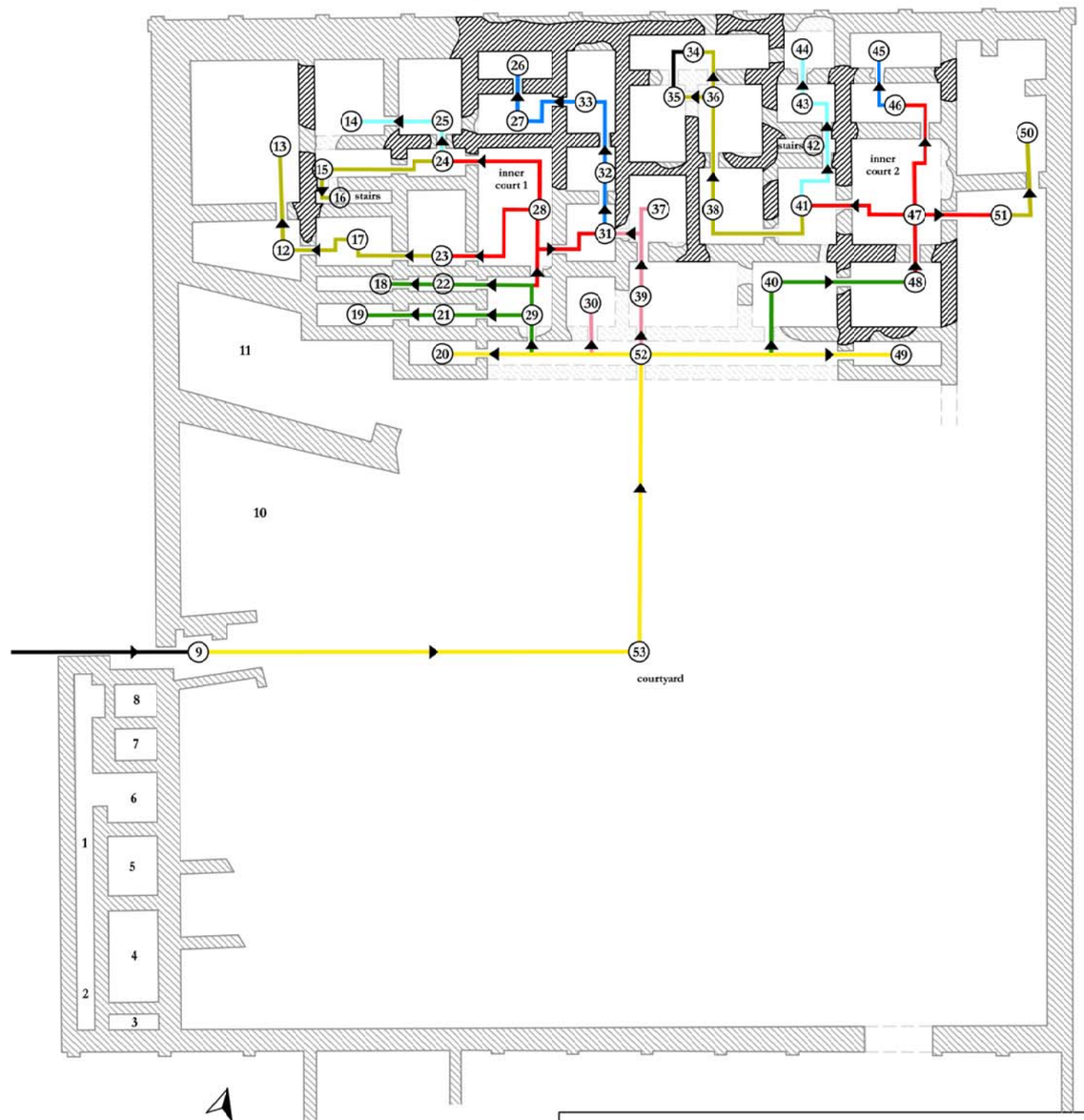
| Number of Rooms | Depth of the Deepest Rooms | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Inner Court 2 | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 9 | 278 | 6.465 | 0.260 | 6.190 | 1 | 0.012 | 0.000 | 0.000 | 0.000 | - |

**APPENDIX F: Composite plan of the Warshama Palace based on Courts Model 2, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**

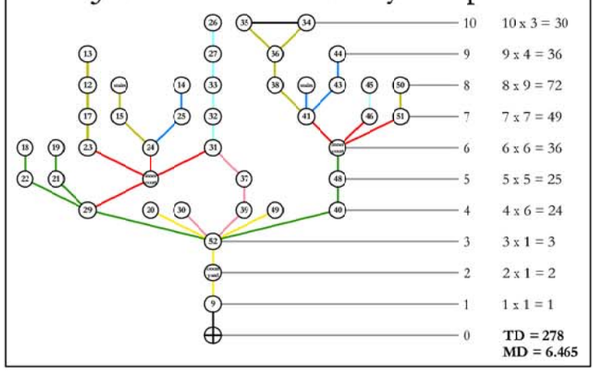
# The Warshama Palace

## Courts Model 2

## Top Plan



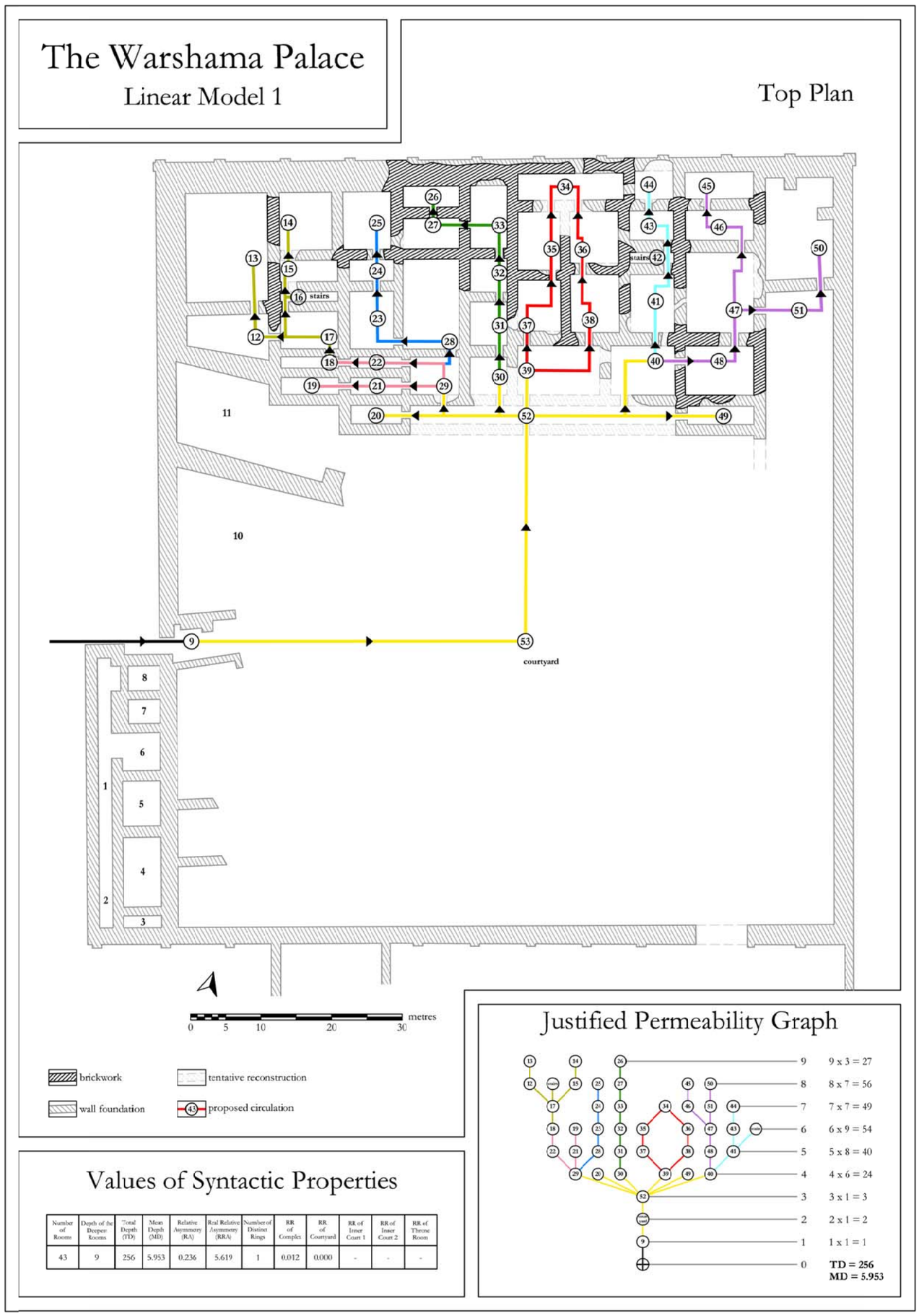

## Justified Permeability Graph




## Values of Syntactic Properties

| Number of Rooms | Depth of the Deepest Rooms | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Inner Court 2 | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 10 | 278 | 6.465 | 0.260 | 6.190 | 2 | 0.024 | 0.000 | 0.023 | 0.000 | - |

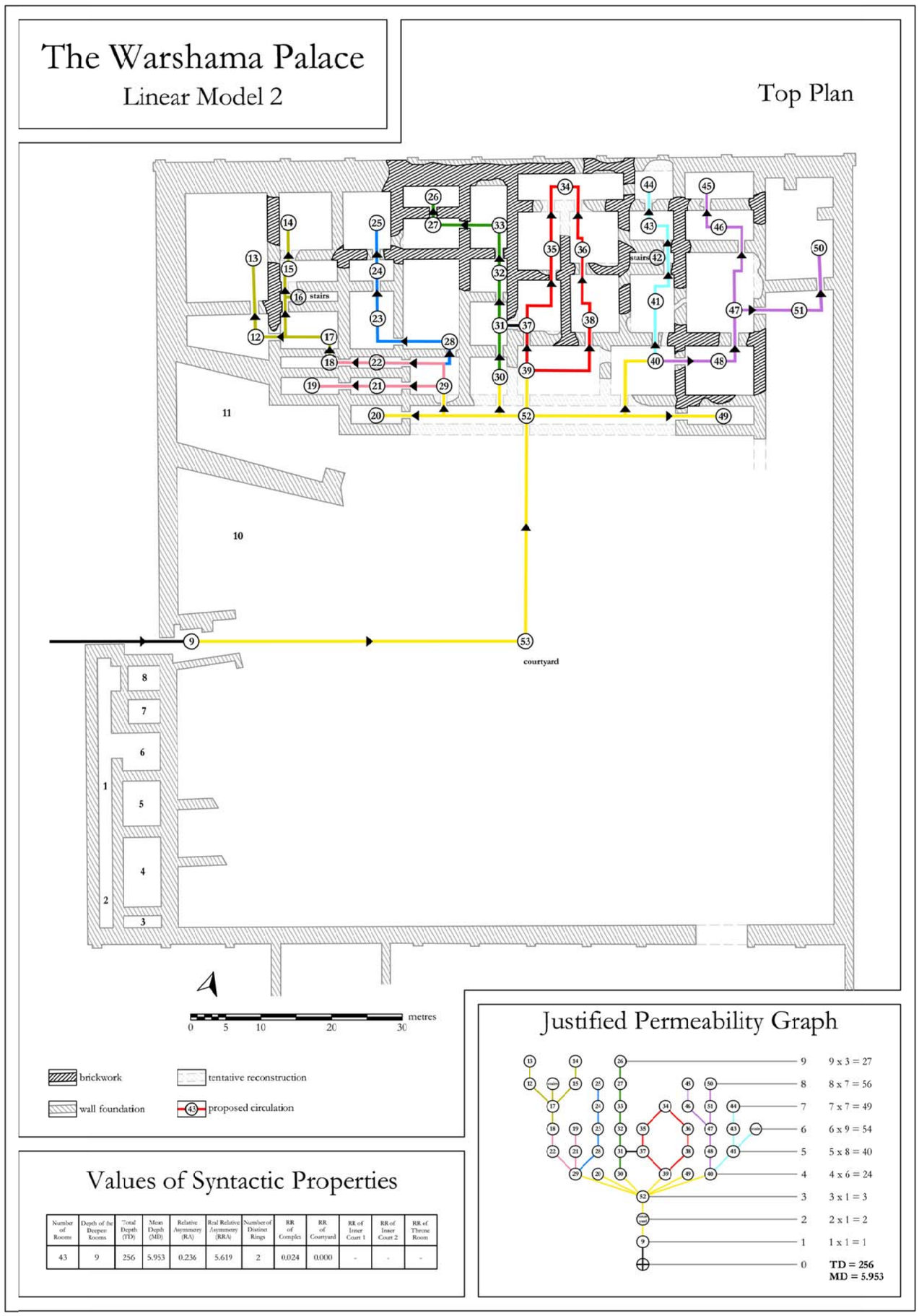
**APPENDIX G: Composite plan of the Warshama Palace based on Linear Model 1, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**




## Values of Syntactic Properties

| Number of Rooms | Depth of the Deepest Rooms | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Inner Court 2 | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 9 | 256 | 5.953 | 0.236 | 5.619 | 1 | 0.012 | 0.000 | - | - | - |

**APPENDIX H: Composite plan of the Warshama Palace based on Linear Model 2, showing the color coded plan, the justified permeability graph and the table of syntactic properties.**




## Values of Syntactic Properties

| Number of Rooms | Depth of the Deepest Rooms | Total Depth (TD) | Mean Depth (MD) | Relative Asymmetry (RA) | Real Relative Asymmetry (RRA) | Number of Distinct Rings | RR of Complex | RR of Courtyard | RR of Inner Court 1 | RR of Inner Court 2 | RR of Throne Room |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 9 | 256 | 5.953 | 0.236 | 5.619 | 2 | 0.024 | 0.000 | - | - | - |