UNDERSTANDING THE CONSTRUCTION TECHNIQUE OF MİMAR SİNAN'S BUILDINGS: THE CASE OF LÜLEBURGAZ SOKULLU MEHMED PAŞA MOSQUE

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ABSTRACT

UNDERSTANDING THE CONSTRUCTION TECHNIQUE OF MİMAR SİNAN'S BUILDINGS: THE CASE OF LÜLEBURGAZ SOKULLU MEHMED PAŞA MOSQUE

Etyemez Çıplak, Leyla
Ph.D., Department of Architecture
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This dissertation constructs a comprehensive understanding of the construction techniques applied and developed by Mimar Sinan, which underlie the structural characteristics of 16th century Ottoman Architecture. Conducting a research into the literature on Classical Ottoman Architecture and Mimar Sinan's buildings, the study distinguishes Sokullu Mehmed Paşa *Menzil* Complexes in Lüleburgaz, Havsa and Payas among the buildings and complexes as known to be designed by Mimar Sinan. It focuses on the mosques of these three complexes, as mosques embody complicated systems and techniques of construction to respond spatial and structural challenges, and compares them to assess the changes and similarities in the construction techniques, as all of them are commissioned by the same donor and in the same decade. Among the three *menzil* complexes, the mosque in Lüleburgaz becomes prominent as Mimar Sinan was most probably personally involved in its construction process, while the other two in Havsa and Payas are supposed to be designed by Mimar Sinan and later constructed by his *kalfa*s and local architects.

After the literature survey that enables the specification of cases to be analyzed and evaluated, the study expands with pre-site survey and site surveys of each complex, all of which is represented by an individual catalogue including the restitutive and current site plans of the complex accompanied with its the historical, architectural and constructional features, and the three-dimensional mass model, plans, sections, elevations, and system details of the mosques in the respective complexes.

In respect to the information gathered and produced through surveys, the study focuses on Lüleburgaz Sokullu Mehmed Paşa Mosque and develops a particular methodology to analyze the construction technique in the mosque by a two-fold approach: "decomposition" and "re-composition." The methodology advances a "coding system" based on the analytical interpretation of sections showing system details, which are produced not only by the knowledge accessible in literature or visible in actual buildings but also by the critical interpretation of yet to be known or possible or unknown structural components, elements and materials. The coding system aims at an analytical and structural decomposition of building components, which contributes to the understanding of construction technique by the evaluation and classification of elements according to their structural behaviors and architectural purposes. The decomposed elements are individually studied with section drawings addressing to the changes in material, structural system and construction technique, and then re-composed to illustrate the techniques and processes of construction.

Aiming at constructing a comprehensive understanding of construction technique in Mimar Sinan's buildings, in particular, and 16th century Ottoman Architecture in general, this study develops a methodological approach and a catalogue system applicable in various studies on historical buildings from different periods to establish a database for expanding architectural knowledge not only in construction technique but also for guiding the projects in restoration and conservation.

Keywords: construction technique, Mimar Sinan, 16th century Ottoman Architecture, mosque, Sokullu Mehmed Paşa *Menzil* Complexes

ÖZ

MİMAR SİNAN YAPILARININ İNŞA TEKNİĞİNİ ANLAMAK: LÜLEBURGAZ SOKULLU MEHMED PAŞA CAMİSİ ÖRNEK ÇALIŞMASI

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Bu tez çalışması, 16. yüzyıl Osmanlı Mimarisi yapısal özelliklerinin bir parçası olarak Mimar Sinan tarafından uygulanan ve geliştirilen yapım tekniklerini kapsamlı olarak incelemektedir. Klasik Osmanlı Mimarisi ve Mimar Sinan'ın yapılarıyla ilgili literatür araştırmasının ardından tez, Mimar Sinan'ın tasarladığı bilinen yapı ve yapı grupları arasından seçilen Lüleburgaz, Havsa ve Payas'taki Sokullu Mehmed Paşa Menzil Külliyeleri'ne odaklanmaktadır. Çalışmanın bu üç yapı kompleksine odaklanmasının nedeni yapıların hepsinin aynı bani tarafından aynı on yıllık dönem içinde yaptırılmış olmasıdır. Tez çalışması, mekânsal ve yapısal zorluklara cevap veren karmaşık yapı sistemlerini ve tekniklerini içermesi nedeniyle, çalışma konusu seçilen üç menzil külliyesinin cami yapılarına odaklanmaktadır. Çalışma öncelikli olarak, üç menzil külliyesindeki üç camiyi, yapım tekniklerindeki değişiklikleri ve benzerlikleri analiz ederek değerlendirmekte, ardından Lüleburgaz'daki Sokullu Mehmed Paşa Külliyesi'nde yer alan camiyi detaylı olarak incelemektedir. Lüleburgaz'da yer alan cami, Mimar Sinan'ın yapım sürecine şahsen dahil olduğu düşünüldüğü için ön plana çıkmaktadır. Havsa ve Payas'ta bulunan diğer iki cami yine Mimar Sinan tarafından tasarlanmış, ancak Lüleburgaz'dakinden farklı olarak kalfalar ve yerel mimarlar tarafından inşa edildiği düşünülmektedir.

Tez kapsamında detaylı olarak çalışılacak yapının belirlenmesini sağlayan literatür taramasının ardından çalışma, her külliye için gerçekleştirilen ön çalışma ve arazi çalışması ile devam etmektedir. Her bir külliye, güncel ve restitütif vaziyet planlarının yanı sıra tarihi ile mimari ve yapısal özellikleri de içeren bir katalog ile temsil edilmiş olup, her bir katalogda söz konusu komplekslerdeki camilerin üç boyutlu kütle modelleri, planları, kesitleri, cepheleri ve sistem kesitleri yer almaktadır.

Araştırmalar sonucunda toplanan ve üretilen bilgiler ışığında, tez çalışması kapsamında Lüleburgaz Sokullu Mehmed Paşa Camii üzerinde yoğunlaşılmış ve caminin yapım tekniğini anlamak için "ayrışma" ve "yeniden birleştirme" olmak üzere iki yönlü özel bir yöntem geliştirilmiştir. Yöntem, literatürde erişilebilen bilgilere veya yapılarda günümüzde var olan izlere ek olarak, henüz bilinmeyen ya da bilinmesi mümkün olmayan yapısal bileşenlerin, elemanların ya da malzemelerin eleştirel bir şekilde yorumlanması ile oluşturulan bir "kodlama sistemi" geliştirir. Önerilen kodlama sistemi, yapı bileşenlerini analitik ve yapısal bir biçimde ayrıştırarak, bileşenlerin yapısal davranışlarına ve mimari amaçlarına göre değerlendirilmesi ve sınıflandırılması ile yapım tekniğinin anlaşılmasına katkıda bulunur. Ayrıştırılan yapı bileşenleri; malzeme, yapısal sistem ve yapım tekniğindeki değişiklikleri irdeleyen sistem kesitleri üzerinden teker teker çalışılmış; ardından yapısal sistemin oluşumunu, yapım tekniğini ve inşa süreçlerini göstermek için yeniden birleştirilerek anlatılmıştır.

Bu tez çalışması, özelde Mimar Sinan yapılarının, genelde ise 16. yüzyıl Osmanlı Mimarisi yapım tekniğinin kapsamlı bir şekilde incelemektedir. Çalışma yalnızca yapım tekniği çalışmalarında kullanılmak üzere değil; aynı zamanda restorasyon ve koruma projelerine rehberlik etmek üzere mimari bilginin genişletilmesi için bir veri tabanı oluşturulmasının temellerini atar. Önerilen yöntemsel yaklaşım ve katalog sistemi, farklı dönemlere ait tarihi yapılar üzerine yapılacak diğer çeşitli araştırmalar ve çalışmalarda da uygulanabilecektir.

Anahtar Kelimeler: yapım tekniği, Mimar Sinan, 16. Yüzyıl Osmanlı Mimarisi, cami, Sokullu Mehmed Paşa Menzil Külliyeleri

To Ali Emre Madran

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CHAPTER 1

INTRODUCTION

Mimar Sinan, being a renowned architect not only of the 16t^{h} century but also of today, has left his imprints in the territories of the entire Ottoman Empire. As being a chief architect for 50 years during the most glorious times of the Ottoman Empire, he has constructed above 400 buildings in all over the Ottoman Empire. In İstanbul, as the capital city of Ottoman Empire during that time, he has constructed more than 300 buildings. This excessive amount of buildings entirely changed the silhouette of Istanbul as well as its identity. Thus, Mimar Sinan and his works are always the focal issue of scholars who are conducting research on the Classical Ottoman Architecture.

1.1. Problem Definition

The studies regarding Mimar Sinan spread in a wide range of field and scopes. Many studies shed light to the history and architectural history of the period when Mimar Sinan was a chief architect and constitutes the significant part of the Classical Ottoman Architecture. There are numerous studies addressing his architectural style, plan and façade organizations of his buildings, which form the large majority of the research on Mimar Sinan. Doğan Kuban (1999), Gülru Necipoğlu (2005), Aptullah Kuran (1986), Oktay Aslanapa (1992), Reha Günay (2012), Metin Sözen (1975), J. M. Rogers (2006), Ernst Egli (1997), Godfrey Goodwin (1993) and Jale Erzen (1981) are the pioneering researchers of these studies. On the other hand, there are studies on his autobiographies written by Sâi Mustafa Çelebi based on the narrative of Mimar Sinan himself and his *vakfiye*s[1]. These studies mainly aim to provide further insights to his life and works. In the past, İbrahim Hakkı Konyalı (1948) and Rıfkı Melul Meriç (1965) have studied these manuscripts; whereas lately Gülru Necipoğlu (Sâi Mustafa Çelebi, 2006), Hayati Develi (Sâi Mustafa Çelebi, 2002), Metin Sözen (Sâi Mustafa Çelebi, 1989) and Zeki Sönmez (1988) developed these studies further.

The construction process, organization and management are other subjects regarding Mimar Sinan and his works. By studying the records named "*Süleymaniye Cami ve İmareti İnşaatı* (1550-1557)", giving detailed information on the construction of Süleymaniye Mosque, researchers reached unique data about the construction process of the complex and financial aspect of the era. Firstly, Ömer Lütfi Barkan (1972) and then Serpil Çelik (2001), (2009) published this archive material. The information about construction materials and their supplies, job descriptions of workers starting from the supervisors to the labourers, their working hours and payments were revealed by these publications

All of the studies mentioned above provide invaluable information, which clarify many unknown issues about Mimar Sinan and his architecture. On the other hand, these studies do not focus on the understanding of the building technology, construction technique and architectural details of the period that are crucial for the comprehensive conservation of Mimar Sinan's invaluable buildings. Furthermore, due to being considered as one of the most important cultural heritage in Turkey by the public authorities, today Mimar Sinan's buildings are rapidly subjected to conservation and restoration studies. These historic structures have some common structural problems related to their construction technique and architectural details. Unfortunately, during these restoration studies, some architectural details can be misinterpreted and can be lost irreversibly or irretrievably. Subsequently, these inappropriate conservation implementations can cause more severe structural problems affecting the entire building. Therefore, there is also a significant necessity of studies on the construction technique and architectural details of Mimar Sinan's buildings.

[1] *Vakfiye:* Endowment deeds establishing and describing the purposes, incomes, administration and trust of a *vakıf* (pious foundation); foundation charter (Devellioğlu, 2013, p.1322).

Accordingly, there are many studies concentrating on the construction technique of Mimar Sinan's buildings. Some of the researchers, such as Zeynep Ahunbay (1988), Müfit Yorulmaz (1987) and Erhan Karaesmen (1999) aim to provide a general assessment of construction technique of Mimar Sinan's buildings. Moreover, there are other studies focusing on the construction technique of specific buildings of Mimar Sinan. Some of the studies are Zeynep Çelik's (2009) research on Süleymaniye Mosque, Kazım Çeçen's (1988) on water supplies, Orhan Bozkurt's (1952) on his bridges and Gülsüm Tanyeli's (1991) work on the tombs, Neriman Şahin Güçhan and Esin Kuleli's (2009) study on Damascus Süleymaniye Complex that Mimar Sinan has constructed. In addition, there are some studies about the construction technique of a particular section of his buildings such as İsmail Hakkı Aksoy's (1982) work on foundations and Afife Batur's (1980) on the superstructure of his buildings. There are also studies, which focus on a particular architectural element of his buildings, such as windows in Ömür Bakırer's (1986) research or stalactite decorations of the portals in Ayla Ödekan's (1986) research. Besides, the materials used in Mimar Sinan's buildings are also important to be considered as a research topic, which has been continuously studied by engineers, conservation scientists as well as architects. These studies mainly aim to understand the material selection of Mimar Sinan and the material technology of its buildings. Serpil Çelik (2009), İlknur Aktuğ Kolay (2006), Emre Dölen (1986), Zeynep Ahunbay (2016), Ömür Bakırer (2000) and Murat Eriç (1986) are some of the scholars who dealt with the material selection and usage in Mimar Sinan's buildings. Kemal Erguvanlı (1989) is one of the scholars who work on the material characteristics of Mimar Sinan's buildings.

Furthermore, there are also many studies not directly focusing on the construction technique of the Mimar Sinan's buildings but rather the historic monumental structures of the era. Some scholars such as Hüsrev Tayla (2007), Sedat Çetintaş (1946) and Uluengins (2010) try to evaluate the construction technique of Classical Ottoman monumental buildings. Moreover, there are other studies that are concerned with a longer period of time or a certain historical period such as Şirin Akıncı's (1998)study on the buildings constructed between 1453 and 1730 and İlknur Aktuğ Kolay's (1999)study focusing on the 14th century buildings. Likewise, some concentrate on a specific material such as iron in Gülsün Tanyeli's (1990)study, brick in Ömür Bakırer's (1981) work, timber and stone in İlknur Aktuğ Kolay's (2000), (1986) studies on the structural use of these materials. Additionally, other scholars dealt again with a particular section or an element of these monumental structures. These scholars can focus on foundations such as Hamdi Peynircioğlu and İsmail Hakkı Aksoy (1981), upperstructure such as walls as Afife Batur (1970) and Muhittin Binan (1961), superstructure such as Ayşıl Tükel Yavuz (1983), Yılmaz Önge (1986), Nafiz Çamlıbel's (1993), Kader Rehyan (2011), and architectural elements such as arch systems by Afife Batur (1974) and Ayşıl Tükel Yavuz (1981), chimneys by Lütfi Zeren (1955), openings or window grills by Semavi Eyice (1976), or ornamentations by İlter Büyükdığan (2001).

As it is stated before, these sources provide significant insights to the construction technique and materials of historic structures. Although these studies are very crucial for understanding and preserving historic structures, they have shortcomings for a comprehensive, holistic and systematic understanding of construction technique of Mimar Sinan's buildings. Due to the studies focusing solely on a single aspect or studies generalizing certain buildings can overlook some critical issues and details. On the other hand, a holistic inquiry into a single building's construction technique in a systematic manner and in comprehensive detail gives chance to researchers to understand, identify and interpret the structure as an integral system. It is important to point out here that while the buildings themselves exist in their originality as sources of knowledge, they should be documented comprehensively and in detail including joint details for factual interpretations. Subsequently, these interpretations based on detailed documentation will provide a basis for appropriate conservation and restoration interventions. Therefore, in order to provide more accurate information as a basis for proper restoration and preservation of Mimar Sinan's buildings, there is a need for studies, which comprehensively investigate and document Mimar Sinan's buildings' construction techniques and architectural details with a systematic holistic approach.

1.2. Aim and Scope

Within this context, the thesis aims at searching for the construction technique of the buildings of Mimar Sinan and his era. Comprehensive and accurate information is aimed to be gathered about the selected buildings of Mimar Sinan by documenting them with a systematic holistic approach and in detail. This systematic documentation of the selected buildings is evaluated together with the constructional knowledge about Ottoman architecture accumulated until now as well as the written and visual archival sources related to the buildings. As a result of this systematic documentation and evaluations, an assessment about construction technique and process of the selected building is tried to be figured out. Then, it is thought that this assessment will contribute to the knowledge about the construction technique of buildings belonging to Mimar Sinan and his era and provide a base study for the conservation interventions and further studies.

In accordance with this purpose, a preliminary research[2] was conducted aiming at questioning the buildings which were possibly constructed by Mimar Sinan himself to select appropriate buildings that represent the construction technique of his buildings. As an outcome of this preliminary research, the buildings which were directed and constructed in İstanbul and its close vicinity are more likely to be attributed as Mimar Sinan’s own constructions. Additionally, this research shows that; the buildings that were specifically ordered by the sultan and his family and the buildings commissioned by the notables, such as grand viziers, grand admirals, provincial governors and administrators and military officers, should have been constructed by him.[3]

When the buildings attributed to Mimar Sinan are considered, the majority of them are mosques or complexes. The mosques are also the key building type of these complexes, which are mainly accentuated from the remaining buildings not only by scale but also with construction technique and building material.

[2] See Chapter 2; Subchapter 2.2

[3] See Table 2.

Moreover, the structural system and construction technique of mosques are complicated due to their large spanned spaces and challenging superstructures. In line with the aim of this thesis, the criteria identified below are taken into consideration to select the case study of the thesis:

- existence of the original construction technique and details in the building,
- having seen as few interventions as possible,
- readability of the original construction technique and details in the building
- accessibility of the details in order to be studied and documented on site
- availability of the archival materials and knowledge about the building
- being part of a complex giving chance to see and interpret the details in different buildings of the complex
- being preferably part of a complex, which has partially demolished buildings showing the details.

When all the above-mentioned criteria are considered, the mosque of Lüleburgaz Sokullu Mehmed Paşa *Menzil* Complex[4] is selected as the case study of the thesis, thought to be the most efficacious building for the case study. While, the case of Lüleburgaz Sokullu Mehmed Paşa Mosque complies with all these criteria, it also provides different opportunities. The complex, which was commissioned by the Grand Vizier of Sokullu Mehmed Paşa[5], is one of the three *menzil* complexes he commissioned.

The other two *menzil* complexes, which are also associated to Mimar Sinan, are in Havsa (Edirne) and Payas (Hatay). Hence, the existence of these complexes gives chance to interpret and compare the construction technique of the mosques commissioned by the same donor and same decade. Moreover, the complex in Havsa,

[4]For *Menzil* Complexes see Chapter 3, Section 3.1.

[5] For Grand Vizier of Sokullu Mehmed Paşa See Chapter 3, Section 3.1.

which is in the same geographical region and very close to Lüleburgaz, enables to evaluate the resemblances and differences. On the other hand, the complex in Payas, which is in a completely different geographical region, provides opportunities to assess the local influences and changes in construction technique.

Additionally, the mosques in Havsa and Payas are also in conformity with the criteria mentioned above. Moreover, the architectural features of these three mosques are different from each other, which provides to evaluate the varieties in construction technique of Mimar Sinan’s buildings. Therefore, the Mosque of the Lüleburgaz Sokullu Mehmet Paşa *Menzil* Complex is selected as the case of this thesis to study the construction technique of Mimar Sinan. The Mosques of Havsa and Payas Sokullu Mehmed Paşa *Menzil* Complexes are also studied in detail to assess the Lüleburgaz case and evaluate the variations.

It is important to note that, the soil properties of the construction site, the source of the material supplies such as stone quarries and the material technologies of the buildings are important issues to understand the construction technique of a building as a whole. In addition, material science is also significant for understanding the characteristics of the soil and materials used in the building. Due to the aim of this thesis, the characteristics of building materials and analytical research and experiments related to these characteristics are not within the scope of this thesis. On the other hand, these essential data are tried to be gathered from the archives and previous studies as far as is known.

It is also important to declare here that, the architectural elements, which have vast amount of different details and construction technique in their craftsmanship related to the woodwork, gypsum work, glasswork and lead work, are included in the scope of the thesis as the elements which were inserted in the load bearing elements during the construction process. Therefore, the structural components of these architectural elements are studied and their acts on the main load bearing elements of the buildings are examined.

1.3. Methodology of the Thesis Research

Considering the purpose of the thesis and the established scope mentioned above, the methodology of the study is composed of six main phases. These phases are literature survey, pre-site survey, site survey, analysis, evaluation, and conclusion.

The first phase is the literature survey which is two-fold. The first fold is the literature survey aiming select the appropriate building for studying the construction technique in Mimar Sinan's buildings and his era. For this purpose, all publications regarding Mimar Sinan and his architecture are reviewed. The different transliterations and translations of Mimar Sinan's autobiographies, which were written by Sai Mustafa Çelebi based on the oral narratives of Mimar Sinan, are considered. In the light of his autobiographies the life story of Mimar Sinan and his associated buildings are gathered in timetables to juxtapose the dates and the locations of the buildings associated with him and the location of Mimar Sinan himself. While explaining his life and constructions, the transliterations and translations of the manuscripts regarding Mimar Sinan are evaluated together with the scholars' related publications. Additionally, historical creditable novels are also conferred in order to comprehend the social life of the period of Mimar Sinan. As a conclusion of this literature survey, discussion is opened up on the possible buildings, which might have been personally constructed by Mimar Sinan.

The second fold of the first phase is the literature survey concerning the structural system and construction technique of the Ottoman Architecture with a special emphasis on Mimar Sinan's architecture. The information, which is accumulated until now about the Ottoman Architecture, is tried to be gathered together from various sources such as related books, dissertations, journal papers, symposium papers, research reports, technical reports and oral explanations. Additionally, in order to be more equipped in terms of the field of construction technique in Ottoman Architecture, Assist. Prof. Dr. Gülsün Tanyeli's course, named "*Osmanlı Mimarlığında Yapım Teknikleri*", was attended in 2015 spring semester in İstanbul Technical University. Afterwards, these different sources, which are accumulated until now, are tried to be also gathered in a table (of which an example can be seen in Table

1) by giving their contents such as the focused time period, building type and building sections. Subsequently, the knowledge about the construction techniques in Mimar Sinan's buildings are explained in the sequence of the construction process. If there is not any data related directly to Mimar Sinan, the information is tried to be acquired from the sources which focus on different time periods. If there is still no information, then the civil engineering sources and old sources, which were thought in the construction schools, such as Ali Talat Bey's (1925) and Rivington's Notes on Building Constructions (1901) and the experience driven oral explanations of the scholars are used. This gathered information constitutes the base for the following phases and is utilized throughout the study in order to support and develop the research in the latter phases.

Table 1: The configuration of the table which gathers the sources related to construction technique by giving their contents.

SOURCE	**SCOPE OF SOURCE**				**AIM and/or APPROACH OF SOURCE**						
Bibliography	Historical Period	Location	Number of Buildings (single/ multiple/ general)	Building Type	Study on Building/s with a Holistic Approach	Study on Various Buildings' Sections for a Holistic Approach	Study on Particular Section/s of the Building/s	Study on Particular Element/s of the Building/s	Study on Materials of the Building/s	Study on Tools and Process of the Constructions	Study on Architecture & Plan Organ. & Facade Organ.
Tanyeli, G. (1990). *Osmanlı Mimarlığında Demirin Strüktürel Kullanımı (15.-18. Yüzyıl)*. İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Ottoman Period	Anatolia (İstanbul)	General	Various					X (iron)		

Additionally, for the purpose of the study this literature survey on structural system and construction technique of the Ottoman Architecture, the terminology related with this field is tried to be developed. The terms, which are commonly used in Turkish in worldwide, are declared in Turkish in the thesis by giving the English vocabulary if there is, whereas if there is not any corresponding English term, the definition of this Turkish term is done. On the other hand, if there are terms which are totally foreign for the English terminology, then the Turkish terms are used directly by defining the term in English. Consequently, all of these terminology is accumulated in a glossary for the sake of this thesis.

In the second phase, which is the pre-site survey, previous written and visual documents regarding the selected buildings are gathered and evaluated. Firstly, a study is conducted regarding the Sokullu Mehmed Paşa and the *menzil* complexes. Afterwards, the written and visual documents containing publications such as books, dissertations, journal papers, symposium papers, research reports, technical reports, maps, illustrations, research sheets and sketches of the previous studies; official documents such as Regional Conservation Council decisions, cadastral maps, the documents of Directorate General of Foundations; documents of previous projects such as drawings, photographs and reports; historical written documents such as inscriptions panels, foundation charters and imperial decrees. Additionally, the travel books, memoirs and engravings are also referred as the secondary sources. By reviewing the data gathered from this survey, base documents are designed to be used as a basis for the site survey.

During this phase, Lüleburgaz Sokullu Mehmed Paşa Complex's measured drawings, which constitute the orthographic set containing site plan, plan, elevations and sections, and project reports are achieved from the project owner, Özge Başağaç (Conservation Architect, METU). Başağaç prepared these drawings with her company named Yerdeniz Mimarlık Restorasyon Tasarım in 2013 and she had the technical report prepared in 2017. Additionally, the *hamam* of Lüleburgaz Sokullu Mehmed Paşa Complex was restored by the Lüleburgaz Municipality in 2013. The measured drawings, again containing the orthographic set, the restitution drawings, restoration projects and project reports which were prepared by ETUR A.Ş. are achieved from the Lüleburgaz Municipality.

For the Payas Sokullu Mehmed Paşa Complex, which was recently restored in two phases in accordance with two restoration projects prepared by two different offices. Firstly, the mosque and *tekke'*s measured drawings, restitution drawings and restoration project was prepared in 2005 by Mehmet Pekcan Işık who is the owner of the company of Işık Proje İnş. These edifices were restored in 2006. Thereby, the measured drawings, restitution drawings and restoration project of the mosque and *tekke* were achieved from Mehmet Pekcan Işık. Secondly, the restoration implementations on the rest of the complex was completed in 2013. Bora Işık (Conservation Architect, METU), BOAZ Eski Eserleri Koruma ve Mimarlık Ltd & Oğuz Ergeç Mimarlık prepared the restoration project in 2007. Therefore, the measured drawings, containing the orthographic set, the restitution drawings, restoration projects and project reports were achieved from the project owners.

On the other hand, for Havsa case the all measured drawings were prepared by the author according to the processed data by the software of Faro Scene 5.0 after the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen (Photogrammetry Expert). Because the complex has not been comprehensively documented since this thesis. Only measured drawings of the parts which contain the north wall and the last prayer hall of the mosque, was prepared by ETUR A.Ş. in 2012 for the reconstruction of the last prayer hall. They were achieved from the Havsa District Governorship.

In the light of the data gathered from the literature survey about the selected buildings are reviewed and the achieved measured drawings are converted into a suitable layout and prepared as the base drawings for documenting the construction technique during the site survey.

Accordingly, in the third phase, which is the site survey, the selected buildings are surveyed and documented on site to comprehend the structural system and construction technique. The site surveys of these complexes were held in three stages. In the first stage, the settlements and the complexes were visited and related documents are collected from the local governments, citizens, property owners and attendants of the complexes. Lüleburgaz and Havsa was visited for the first site survey in September, 2015. During these site surveys, besides the data and document collection, the buildings were photographed and detailed drawings are sketched from where the construction technique can be observed together with taking the measurement by conventional methods through metal meters and digital meters. Furthermore, for collecting the aforementioned documents related to Payas Sokullu Mehmed Paşa Complex, the province of Adana was visited in March, 2015. Because the architectural offices of BOAZ Eski Eserleri Koruma ve Mimarlık and Işık Proje İnş., which prepared the restoration projects of the complex, are in Adana.

The second stage of the site survey constitutes the comprehensive documentation of the details containing clues and traces of the construction technique in the selected mosques. The second visit to Lüleburgaz and Havsa was held in July, 2015 and to Payas was held in November, 2016. During this site surveys, the mosques were examined by systematically taking photographs and taking notes and last but most important, the system details were tried to be interpreted, generated and drawn through proportional sketches by taking measurements again with conventional measuring techniques. The crux of this site survey methodology[6], is documenting these system details of the buildings where the section of the building changes in terms of structural system and construction technique. Thereby, with an equipped perspective the section planes of the system details were determined by examining the mosques during the site surveys. (Figure 1,2,3) Trying to draw the system details by taking the section planes, where the structural system and/or construction technique change, provide a holistic understanding and comprehensive documentation of the mosques' constructions and how they were built. The technical knowledge, which contains the constructions in Ottoman Architecture and is acquired in the previous phase of the study, is used in order to interpret the investigated clues and traces on the buildings and draw these holistic section details of the mosques.

[6] The site survey methodology is an interpretation of the methodology developed by Neriman Şahin Güçhan in her Ph.D. Thesis (Şahin, 1995). Subsequently, Filiz Diri improved and utilized this methodology in her M.Sc. Thesis (Diri, 2010).

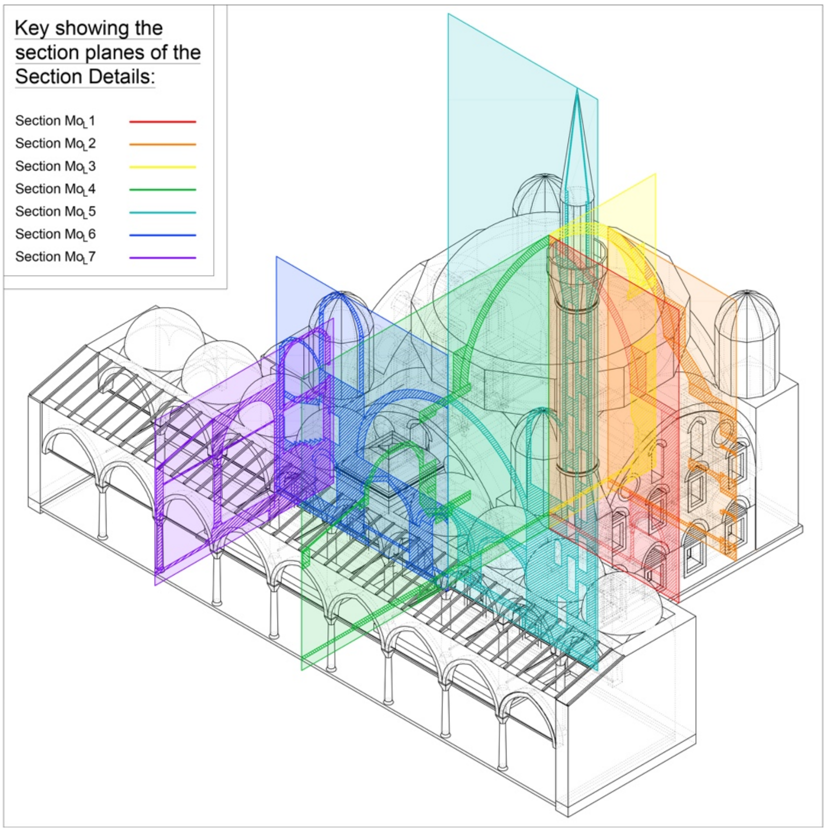

Figure 1: Axonometric drawing showing the section planes of Lüleburgaz Sokullu Mehmed Paşa Mosque’s system sections drawn by the author.

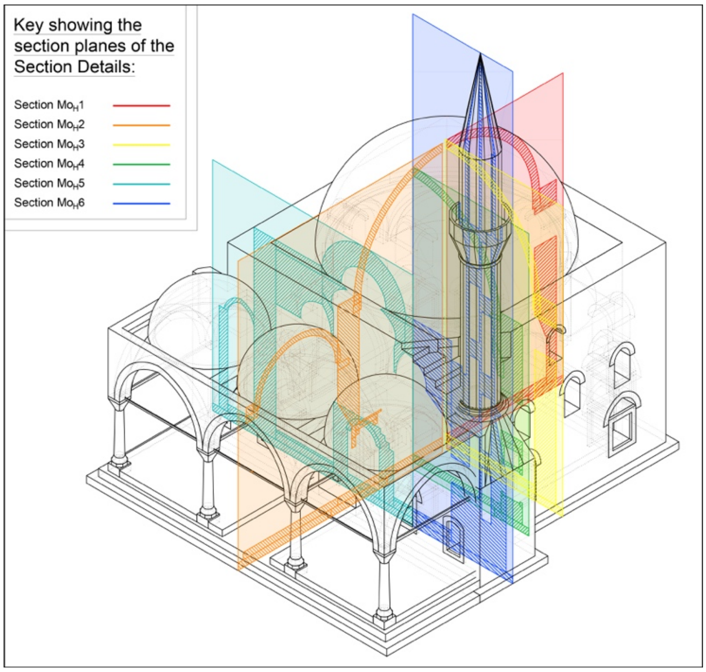

Figure 2: Axonometric drawing showing the section planes of Havsa Sokullu Mehmed Paşa Mosque’s system sections drawn by the author.

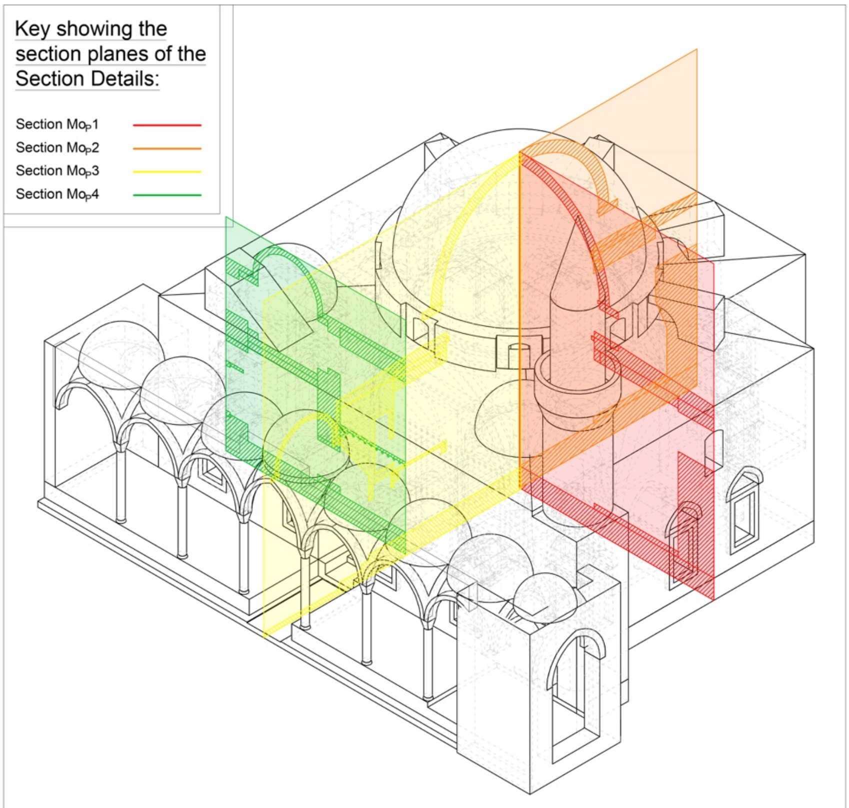

Figure 3: Axonometric drawing showing the section planes of Payas Sokullu Mehmed Paşa Mosque's system sections drawn by the author.

The third site survey was for checking, finding out and documenting the missing parts of the section details of the mosques. The third site survey was conducted in Lüleburgaz and Havsa in August, 2016. This site survey was held after the fourth phase which is mentioned below, so that it was in a later period when the study was proceeded and the experiences and achievements were developed much more in terms of understanding the construction technique. Thereby, the third site survey to Payas has not been needed. Because the second site survey to Payas was also at a later time, in November, 2016. Additionally, as it is mentioned before Havsa Sokullu Mehmed Paşa Complex has not been comprehensively documented since this thesis. During this third site survey, in August, 2016, the complex was scanned by FARO Focus 3D Scanner by the help of Kemal Gülcen in order to digitalize the drawings with more precise dimensions.

In the fourth phase, the three mosques are examined and analysed in order to understand the entire structural system and construction technique by means of the measured drawings of the site plan, plan, elevation and sections, 3D models and sections showing the system details which were, at the same time, being digitalized and drafted precisely on the AutoCAD with their exact dimensions. The measured drawings of Lüleburgaz and Payas were revised for making the recent alterations on the buildings. They were also checked whether there is any fault about the documentation. On the other side, the system details and elements details of these mosques are all measured and drafted by the author. As it is mentioned before, all drawings of Havsa Sokullu Mehmed Paşa Mosque are done by the author.

While examining and analysing these three mosques, a catalogue system was established both for drafting and representing the historical, architectural and constructional features (Appendix C). The catalogues for these three mosques were prepared as a booklet in A3 poster format. Each mosque has this booklet containing catalogue of the restitutive site plan of the complex with related historical data on it, current site plan of the entire complex, 3D mass model of the mosque, measured drawings such as plans, elevations and sections of the mosque and sections showing the system details. Therefore, a comprehensive representative catalogue for each three mosques are provided while trying to understand their constructions (Figure 4,5).

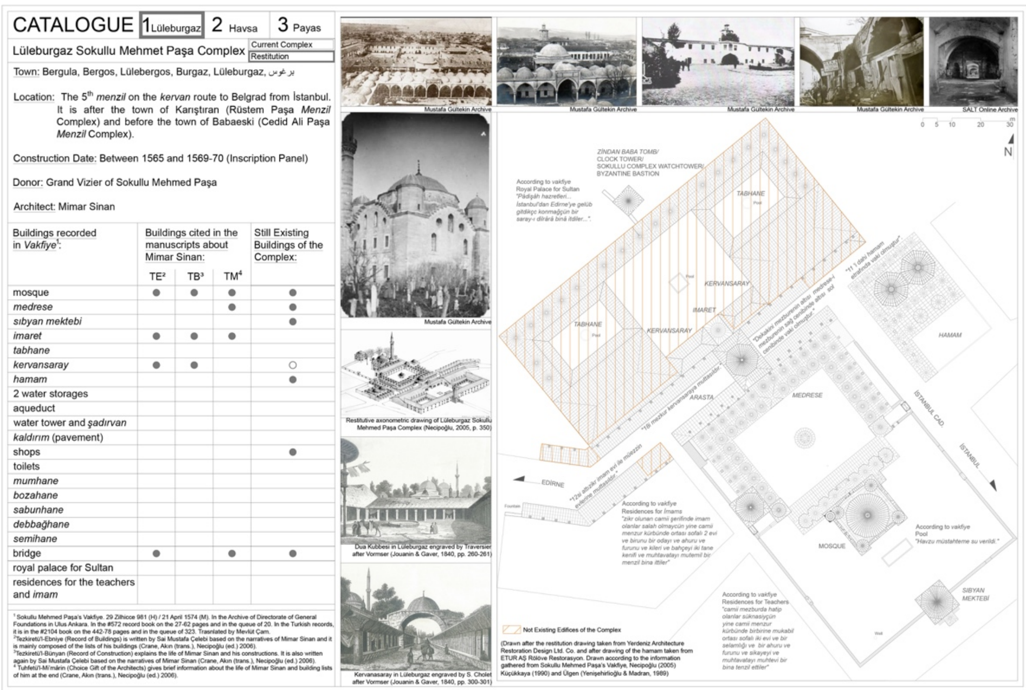

Figure 4: Restitutive Site Plan, excerpt from Catalogue of Lüleburgaz Sokullu Mehmed Paşa Complex

The invisible and inaccessible inside parts of the sections showing the system details are tried to be drafted based on the obtained and documented data during the site surveys together with the acquired knowledge on the basis of the literature review, the attended course on construction technique of the 16^{th} century Ottoman Architecture, experiences from different constructions and negotiations and discussions with the scholars who are competent in this field. Furthermore, these all system details are drawn by considering the dimensions and tools of the old Ottoman measuring techniques and units in order to grasp and interpret the meaning of the structural reasons. Besides, some details, which are even unpredictable, were tried to be drawn in consultancy of the scholars by taking critiques from them and draw the same system detail many times with many alternatives. About the structural necessities, the consultancy of civil engineers Mustafa Etyemez and Çağlar Çıplak; about the soil properties and physico-mechanical properties of stones, the consultancy of civil and geological engineers Çağrı Çıplak and Güler Dardağan; about the architectural necessities, the consultancy of highly experienced architects Emre Madran, Gülsün Tanyeli and Cansen Kılıççöte was received.

Therefore, in the sections showing the system details, there are exact drawings of the visible and documented parts and hypothetical drawings of invisible and inaccessible parts. For the reliability of this study, the documented and interpreted parts of these sections which show the system details are differentiated by using different colours, which also indicate the probable materials (Figure 5). Moreover, the building parts which are known to be reconstructed are left blank and also differentiated by colour in the sections showing the system details since these parts are not giving information on the original construction technique and building materials. Then, it can be dubious to draw them due to the lack of information and drawing them would not serve a purpose for the thesis.

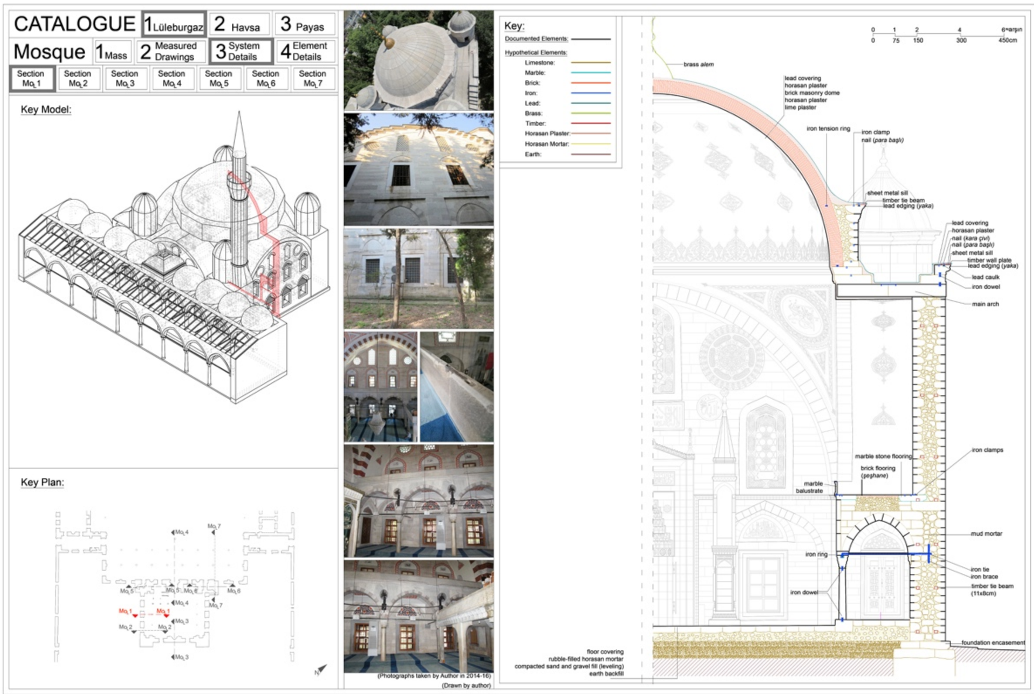

Figure 5: Excerpt from Catalogue showing system detail of Lüleburgaz Sokullu Mehmed Paşa Mosque and the key showing the different colors and meanings

In the light of these system details, all the structural building components are analysed in terms of their details, contents, materials, aggregations and construction techniques in a holistic manner. In other words, these system details show how these building components might have been composed[7] and got together and the whole composite[8] of the entire structure might have been constructed. Additionally, for this purpose, the 3D models of these three mosques are established in digital format as if the buildings are constructed from foundation to the roof. All the structural building parts are modelled one by one and composed together with their exact dimensions. Thus, the composite of the entire structure is visualized 3D in digital medium and comprehended.

[7] Compose: "*compousen*, from Old French *composer* 'put together, arrange, write' a work (12c.), from com 'with, together'+ poser 'to place,' from Late Latin *pausare* "to cease, lay down" (Online Etymology Dictionary, 2017)

[8] Composite: "'from Old French *composite*, from Latin *compositus* 'placed together,' past participle of *componere* 'to put together, to collect a whole from several parts,' from com 'with, together' + *ponere* 'to place' (past participle *positus*)" (Online Etymology Dictionary, 2017)

Afterwards, based on these system details, and 3D mass models and in the light of the discussions on the construction technique, the structure of the Lüleburgaz Sokullu Mehmed Paşa Mosque is tried to be divided in to its building components. That is to say, the holistic composition[9] of the Lüleburgaz Sokullu Mehmed Paşa mosque is separated in to its structural members like decomposing[10] the structural composition. Thereby, while decomposing the entire structure firstly the load bearing members and architectural elements are separated. Then, these load bearing members and architectural elements are once more separated according to their location and position. So that, these elements are separated regarding their functions and locations in the building. In the light of these separation, for the sake of the study these elements are coded with a systematic manner which shows where this element is located, whether the mentioned element is a load bearing or architectural element by also giving the well-known term used for these members.

The load bearing and architectural elements are separated by number coding giving the number "1" for the load bearing members and "2" for the architectural elements. For depicting the location of these elements, they are coded with the first letters of the proposed building parts such as infrastructure[11], upperstructure[12] and superstructure[13] regarding these parts' position according to the ground level and structural purpose. The infrastructure is defined as the building components which are under the ground level. The upperstructure is also defined as the building components which contains the elements above the ground level. Besides, the superstructure is

[9] Composition: "'action of combining,' also 'manner in which a thing is composed,' from Old French *composicion* (13c., Modern French *composition*) 'composition, make-up, literary work, agreement, settlement,' from Latin *compositionem* (nominative *compositio*) 'a putting together, connecting, arranging,2 noun of action from past participle stem of *componere* (see composite)" (Online Etymology Dictionary, 2017)

[10] Decompose: "'to separate into components,' from de- 'opposite' of + compose." (Online Etymology Dictionary, 2017)

[11] Infrastructure: structure's part which is below the ground "from infra- 'below, underneath, on the underside, beneath, + structure". *Altyapı* in Turkish

[12] Upperstructure: structure's part which is above the ground "from upper- 'part of a shoe above the sole,'+ structure" (Online Etymology Dictionary, 2017) *Üstyapı* in Turkish

[13] Superstructure: structure's part which is on the top "from super- '"above, over, on the top (of), beyond, besides, in addition to,' and + structure" (Online Etymology Dictionary, 2017) *Üstörtü* in Turkish

defined as the building components which cover the structure on the top and finalize the erection of the building.

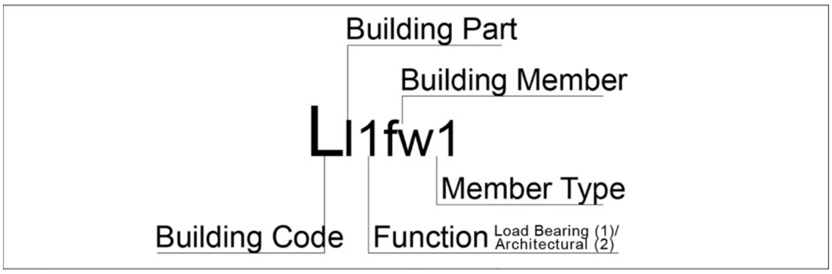

Figure 6: Coding System

Accordingly, this coding system (Figure 6, Table 2) is designed as an adaptable system in order to be able to develop and improve this study on further buildings. By giving the name codes of the buildings in front of the building component's code the coding system permits to study on different buildings. As it is seen in the table below different elements of different buildings are able to be coded and studied with many purposes (Table 2).

Table 2: Codes of Building Components

SUPERSTRUCTURE	S1 Superstructure Load-bearing Elements	S1d	Dome
		S1v	Vault
		S1r	Timber Roofing
		S1p	Pendentive
		S1s	Squinch
		S1t	Band of Turkish triangles
	S2 Superstructure Architectural Elements	S2w	Window
		S2b	Buttress
UPPERSTRUCTURE	U1 Upperstructure Load-bearing Elements	U1a	Arch
		U1l	Lintel
		U1v	Vault
		U1sl	Slab
		U1st	Staircase
		U1w	Wall
		U1p	Pier
		U1c	Column
		U1po	Post
		U1f	Floor
	U2 Upperstructure Architectural Elements	U2p	Portal
		U2m	*Mihrab*
		U2d	Door
		U2w	Window
		U2n	Niche
		U2b	Balustrade
INFRASTRCTR	I1 Infrastructure Load-bearing Elements	I1fo	Footing
		I1fw	Foundation Wall
		I1e	Encasement

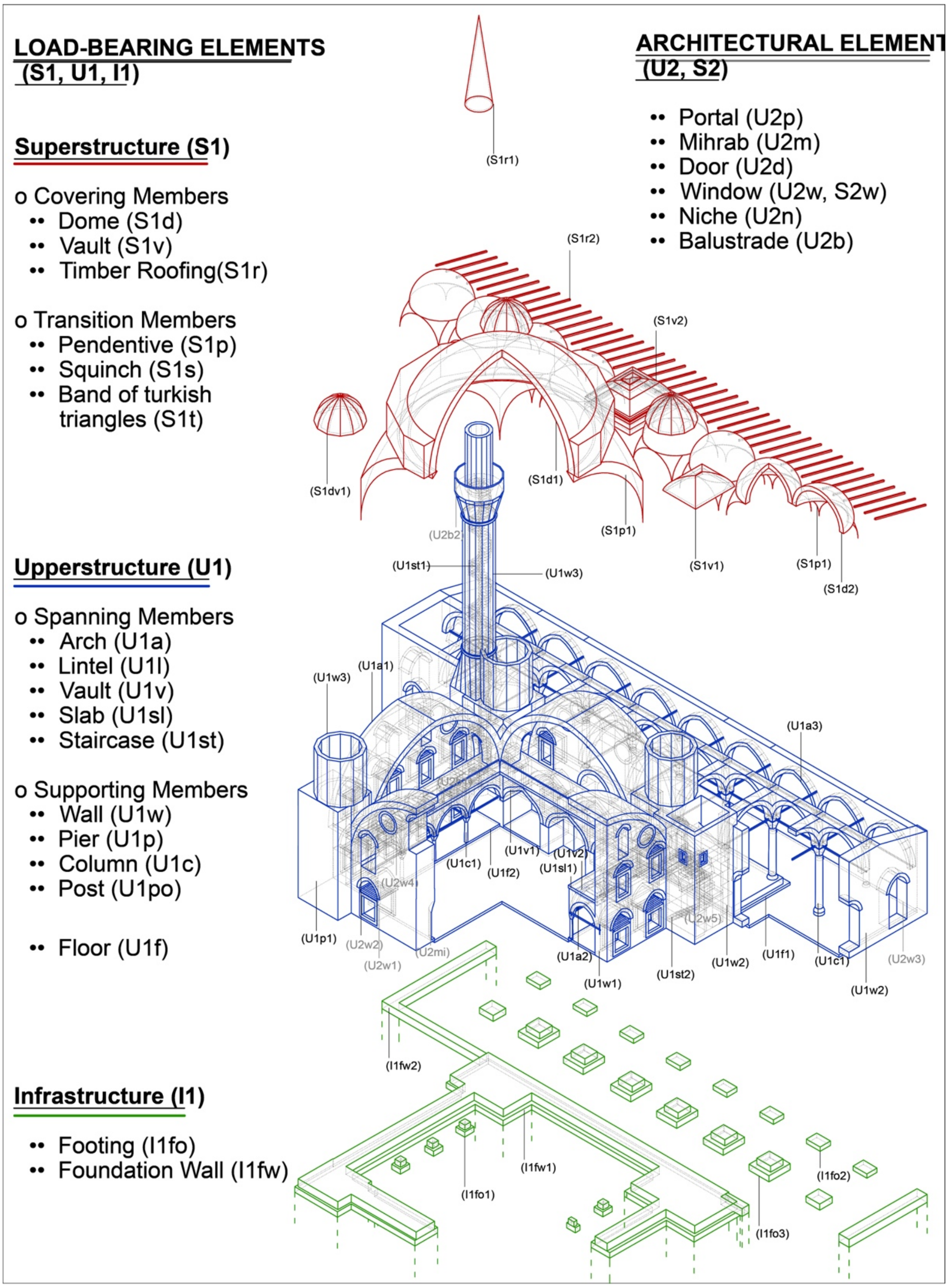

Figure 7: Axonometric drawing showing the codes of building components (produced by the author).

The fifth phase decomposes and evaluates the selected building based on the information acquired and analysed in the system details. In this phase, Lüleburgaz Sokullu Mehmed Paşa Mosque’s load bearing and architectural elements, which are decomposed in the light of the system details by coding, are classified in groups according to their construction technique in order to understand the types of these elements. These load-bearing and architectural elements are examined one by one in accordance with the coding system and the decomposing method developed in the previous phase. For this case, by adding number coding at the end, this coding system assigns a code for each type of load bearing and architectural elements of which the construction technique changes. As it is seen in the image above, each load bearing member and architectural element has a code (Figure 7) according to their alternating construction technique.

The different types of these elements, which are classified regarding their construction technique, are tried to be represented by sections of which the section planes may be horizontal, vertical and/or diagonal. In order to understand and convey the constructions of these elements, partial elevation, partial plan and partial section drawings, which show the details in orthographic manner, are used. These section planes are altered according to the element detail which is tried to be explained in the most efficient way.

Accordingly, as it is in the system details, there are also the invisible and inaccessible inside parts in these element detail drawings. These drawings, showing the details of these elements, are tried to be differentiated by colours as it is done in the system details. These element details which are drafted based on system details are again interpreted in the invisible and inaccessible parts by assembling together the obtained and documented site survey data together with the acquired knowledge on the basis of the literature review, the attended course on construction technique of the 16^{th} century Ottoman Architecture, experiences from different constructions and negotiations and discussions with the scholars who are competent in this field. The drawings of the element details are also interpreted and drafted again by taking account the old Ottoman measurement units and tools for constructing the buildings.

Additionally, element details of Lüleburgaz Sokullu Mehmed Paşa Mosque are also interpreted by using the data filtered from the other two mosques, Havsa and Payas Sokullu Mehmed Paşa Mosque. The unseen parts of the element details are tried to be interpreted by comparing the differences and resemblances of these three mosques. If there is not any clues or traces on the mosque of Lüleburgaz Sokullu Mehmed Paşa, then the generated drawings and taken photographs of Havsa and Payas Sokullu Mehmed Paşa Mosques data is used.

Moreover, in addition to the method which separates the documented and hypothetical parts of the detail drawings, in this phase, the sources which are used for drawing these details are referred for each type by number coding of which the number coding meanings are seen in the table below (Table 3). This coding key is put in the catalogues of the element details of Lüleburgaz Sokullu Mehmed Paşa Mosque and referred for each type of the element details. Besides, the contents and the detailed information about the used sources for each type of the element is explained in the text in the related subchapter 4.1. This method is developed in order to increase the reliability of the study, avoid speculations and give chance to the readers, who are checking the catalogues of the element details, to grasp the reliability of the element details at first glance and evaluate the drawings in referred reliability degree by thinking with possible alternatives.

Table 3: The table showing from where the referred information is gathered for generating the detail drawings

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents regarding the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

The sixth phase recomposes[14] the construction of the selected building, Lüleburgaz Sokullu Mehmed Paşa Mosque, which is surveyed, documented, analysed and evaluated by decomposing in previous phases. For this purpose, the information, obtained from the studies on the selected three buildings in previous phases, is evaluated together with the information acquired by explained ways from enumerated sources. It is important to add here that, as it is mentioned before, the construction and its process of the Mimar Sinan buildings is a challenging subject due to scarcity of the knowledge. In order to overcome this challenge for Lüleburgaz case all above mentioned study is evaluated together with the related archival materials such as imperial decrees and secondary sources such as memoirs of the travellers who visited Lüleburgaz and witnessed the site during the construction. Therefore, this phase attempts to revive the construction and its process of Lüleburgaz Sokullu Mehmed Paşa Mosque. Besides, this phase also tries to clarify the circumstances under of which the construction technique and details of the selected building, Lüleburgaz Sokullu Mehmed Paşa Mosque case, change. Moreover, this phase also examines whether there are typical construction principles or special cases with a unique construction technique and detail solutions and how frequent these different types can be encountered. Thereby, recomposing the construction of the structure of Lüleburgaz Sokullu Mehmed Paşa Mosque is explained starting from the preparation of the construction site and ending with locating the *alem*[15], as if the building is being constructed from the foundation until the roof.

1.4. Structure of the Thesis

The thesis is composed of five chapters. The first chapter is the introduction chapter containing the problem definition, aim, scope, methodology of the thesis research and lastly the structure of the thesis.

[14] Re-compose: " 'to put together, arrange again' from re- 'back to the original place; again, anew, once more,' + compose." (Online Etymology Dictionary, 2017)

[15] *Alem (Mahçe)* is the finial with the form of the small crescent that is placed on top of the domes and minarets.

The second chapter which includes the literature survey and review of the Mimar Sinan and his architecture, provides the theoretical background about Mimar Sinan and his architecture. This chapter examines the sources related to Mimar Sinan, conducts an enquiry for selecting the proper building to be studied in order to understand the construction technique of Mimar Sinan buildings and conveys the knowledge about construction technique in Ottoman Architecture by emphasizing on Mimar Sinan. Therefore, this chapter is developed on the basis of the phase two in the methodology of the thesis research.

The third chapter starts with a general description of the Sokullu Mehmed Paşa and the *menzil* complexes. Accordingly, by presenting the results of the site surveys and archival studies conducted in third and fourth phases in the methodology, this chapter contains the comprehensive descriptions and explanations of the selected three mosques starting from in which settlement they are, continuing with the complexes' significance, location and history, then passing to the mosques' architectural features, and finalizing with the explanations of the system details and the constructions technique in these buildings. Systematic documents as catalogues, which can be seen in the Appendix B, are prepared for this chapter. Thereby, this chapter is thought and constituted together with and parallel to the catalogues of the Lüleburgaz, Havsa and Payas in the appendices.

The fourth chapter contains firstly, the decomposition by evaluating and classifying the types of the building components and secondly, the recomposition of the construction and its process of Lüleburgaz Sokullu Mehmed Paşa Mosque. The investigations and the comprehension conducted in the phase five and six constitute this chapter. The systematic documentation as catalogues, which can be seen in the continued Appendix B, prepared also for this chapter. Therefore, as the third chapter, this chapter is also thought and built to be evaluated together with and parallel to the catalogues of the element details of Lüleburgaz Sokullu Mehmed Paşa Mosque in the appendices.

The fifth chapter conveys the conclusion of this thesis. The significant findings and contributions of this research and thesis is declared. The importance of the outputs such as the research method, the catalogue system, inventories and the glossary are stated. The challenges and advantages of the research method is explained. The borders of the study are drawn again and the subjects which are kept out of the scope of the thesis is mentioned. Lastly, the further possible studies and researches which can be conducted on the bases and in the light of this thesis suggested and proposed.

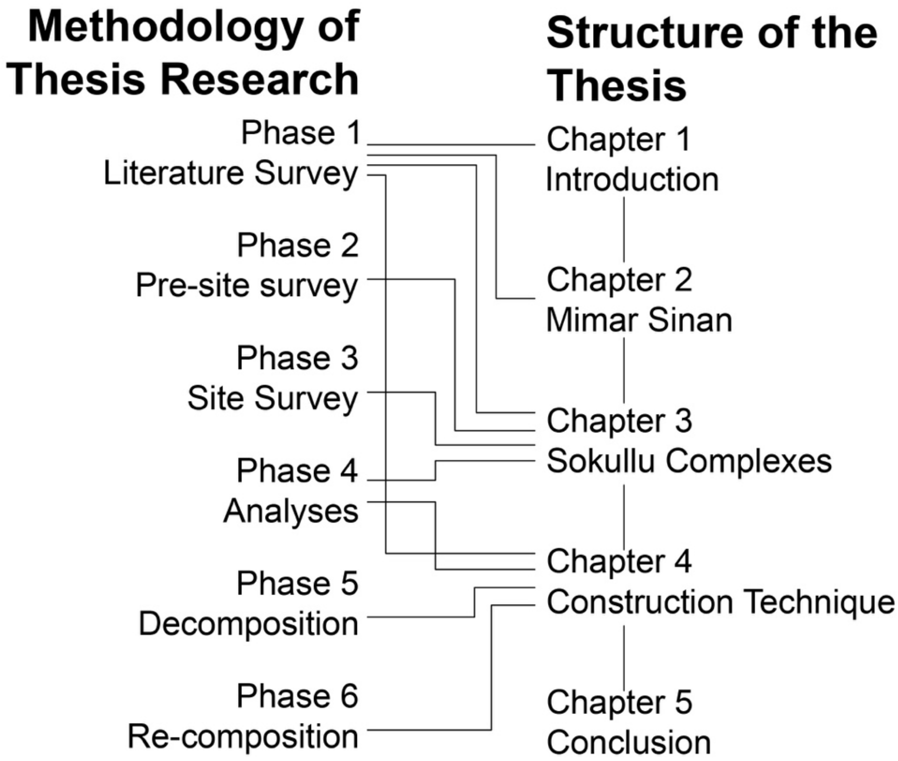

Figure 8: Relation schema between thesis research methodology and structure of the thesis.

CHAPTER 2

MİMAR SİNAN AND HIS BUILDINGS

Mimar Sinan, who had been the chief architect of the Ottoman Empire for about 50 years during the most powerful times of the Classical Age of Ottoman Empire[16], constructed more than 400 buildings all over the Ottoman territory. Therefore, Sinan himself and his buildings are always major topics within the scope of the Classical Ottoman Architecture[17]. There are numerous studies addressing his architectural style as well as the plan organization, typology and façade organization of his buildings in the field of architectural history. On the other hand, the construction technique and process, architectural details of his buildings have not attracted great interest yet, although structural systems and material technologies are continuously studied by civil engineers and conservation scientists together with architects.

2.1. Literature on Mimar Sinan and his Architecture

The studies in the field of architectural history addressing his architectural culture, style, ingenuity and plan and façade organizations of his buildings. Form the large majority of these researches on Mimar Sinan, Albert Gabriel (1944) Aptullah Kuran (1986), Oktay Aslanapa (1992), Metin Sözen (1992) Doğan Kuban (1997),

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[16] İnalcık gives the dates between 1300-1600 for the Classical Age of Ottoman Empire and he adds that starting from the reign of Sultan Süleyman I in 1522, until the 17^{th} century, the Empire was in the world power position (2013, p.7).

[17] Classical Ottoman Architecture is attributed the buildings constructed between the end of 15^{th} century and the beginning of 18^{th} century. (Kuban, 2007); (Aslanapa, 2004); (Kuran, 1986)

Gülru Necipoğlu (2005), Reha Günay (2012), J. M. Rogers (2006), Ernst Egli (1997), Hans G. Egli (1997), Godfrey Goodwin (1993) and Jale Erzen (1981) are the pioneering researchers of these studies.

Gabriel ((1944) conveys the life and oeuvres of Mimar Sinan. He provides drawings of his certain buildings and discusses the significance of Mimar Sinan in the Ottoman Architecture in the world.

Aptullah Kuran (1986), in his monographic study, catalogues Mimar Sinan buildings listed in his autobiographies. He gives brief information about Mimar Sinan's life and architecture and reviews all of his buildings by providing plan drawings of his buildings. As a conclusion, he assesses Sinan's architecture, his development by evaluating his all buildings.

Metin Sözen (1992), in his illustrated book, briefly explains Sinan's life and professional career regarding the Classical Ottoman Society. Then, Sözen briefly evaluates Sinan's works by means of numerous photographs taken by Sami Güner. He states that Sinan was the major architect of the last pre-industrial Empire.

In the book of "*Mimar Sinan'ın Hayatı ve Eserleri"* by Oktay Aslanapa (1992), he interprets the developments in the architectural style of Mimar Sinan's monuments by analyzing his constructions in chronological order. He tries to clarify the architectural contributions of Sinan to the Ottoman Classical Architecture.

Kuban (1997), in his book titled "*Sinan'ın Sanatı ve Selimiye"*, analyses the influences of Mimar Sinan's architecture on the world's architectural history by discussing the case of Selimiye Mosque which is associated by Kuban as the ingenuity of Mimar Sinan. Kuban, firstly, explains the historical context and architectural organization during the Classical Period and mentions about Mimar Sinan's life. He continues with the concept of "domed structures" before Sinan and discusses this domed structure issue together with Mimar Sinan's buildings.

Gülru Necipoğlu (2005), in her book titled "The Age of Sinan Architectural Culture in the Ottoman Empire" evaluates the architectural culture in Classical Ottoman Architecture by focusing on the Mimar Sinan and his era. Firstly, she explains the dynastic legitimacy and legal apparatus in order to evaluate the architectural patronage and culture during the age. Afterwards, she describes the architectural practice in this age by defining the institutional organization of chief architecture. Then, she defends that the architecture of Mimar Sinan is more related with an institutional, political, social, economic, cultural and aesthetic practices than an autonomous and self-referential field. Therefore, she explains the individual mosques with or without complexes grouped in terms of their patronage level by evaluating all written primary sources in the archives related with above-mentioned issues.

Reha Günay (2012), gives brief information about Mimar Sinan's life and manuscripts regarding his architecture. He groups some of Mimar Sinan's mosques according to two-dimensional ground floor plan organization with central dome originations having hexagonal, octagonal and square baldachin formed supporting system. Additionally, he gives brief information about other types of Mimar Sinan's buildings.

Furthermore, as the other researchers, J. M. Rogers (2006) also firstly explains the life and architecture of Mimar Sinan and then he focuses the importance of Mimar Sinan's influence on the Islamic Architecture and Muslim Culture.

Ernst Egli's book (2009) which was firstly published in 1954 in Zurich in German originally titled "*Sinan: der Baumeister Osmanischer Glanzzeit*" is a monographic study. His study firstly introduces the Ottoman government entity and organization, afterwards he briefly conveys Sinan's life. Then, he explains briefly Sinan's buildings by giving illustrations such as plan drawings and photographs. He mainly focuses on Sinan's twenty-two mosques and evaluates the progress in his mosques. Additionally, he gives brief descriptions about the other building types.

Subsequently, Hans Egli (1997) firstly brings up the subject of heritage from which Mimar Sinan might have been influenced and learnt. He concisely commentates the Seljuk and Ottoman Architecture before Sinan. Later, he assesses Sinan's oeuvres regarding their symbolic and formal analyses.

In the book titled "Sinan: Ottoman Architecture and Its Values Today", Godfrey Goodwin (1993) analysed Mimar Sinan's certain buildings' forms by means of comparative studies in order to assess his architectural progress in terms of illumination, space, volume and decoration.

Jale Erzen (1981), (1991), (1996), analyses the design principles and schema of the mosques of Mimar Sinan in her books. She executes aesthetical analyses on the facades and the plan organizations of Mimar Sinan's mosques.

These abovementioned introduced sources are invaluable studies of pioneers of the research on Mimar Sinan. The information in these important sources are utilized for evaluating the knowledge on construction technique in 16th century with a special emphasis on Mimar Sinan's architecture.

Additionally, there are numerous studies based on the manuscripts related with Mimar Sinan such as his autobiographies written by Sâi Mustafa Çelebi based on the narrative of Mimar Sinan himself, his *vakfiye*s[18] and imperial decrees. These studies, which are handled in the subsequent subchapter, mainly aim to provide further insights to his life and works. In the past, İbrahim Hakkı Konyalı (1948) and Rıfkı Melul Meriç (1965) have studied these manuscripts; whereas lately Zeki Sönmez (1988), Metin Sözen (Sâi Mustafa Çelebi, 1989), Hayati Develi (Sâi Mustafa Çelebi, 2002) and lastly Gülru Necipoğlu (Sâi Mustafa Çelebi, 2006) developed these studies further. Former researchers translate and explain the copies of the manuscripts which were achieved by them. Whereas Necipoğlu (Sâi Mustafa Çelebi, 2006) clarifies all copies of the manuscripts in different archives and explains them in detail. Afterwards, she compares these copies in terms of their contents by means of the tables.

The construction organization, management and process are other topics related with Mimar Sinan and his architecture. The records named "*Süleymaniye Cami ve İmareti İnşaatı* (1550-1557)" gives detailed information on the construction of Süleymaniye Mosque to the researchers and provides unique data about the construction process of the complex and financial aspect of the era. Firstly, Ömer Lütfi Barkan (1972) and then Serpil Çelik (2001), (2009) published this archive material.

Süleymaniye Complex is a glamorous and systematically programmed group of buildings which were constructed in a short period of time, when it is thought in its era, with a perfect working organization and order. The job descriptions, working hours and payments of the workers starting from the imperial council to the labourers

[18] *Vakfiye:* Endowment deeds establishing and describing the purposes, incomes, administration and trust of a *vakıf* (pious foundation); foundation charter (Devellioğlu, 2013, p.1322).

and materials and their supplies were determined and recorded. In the light of these records, The Construction Note-books of Süleymaniye Complex in İstanbul we can reach unique data about construction process and finance of the classical period of the Ottoman Empire. We can reach this information by the help of Barkan (1972) who has translated and published these records in his books and Çelik (2001), (2009) whose PhD Thesis was on this subject. As it is gathered from Barkan's book and Çelik's PhD Thesis and book these records are composed of first, "Annotated Accounting Books of Süleymaniye Mosque and İmaret" (*Süleymaniye Cami ve İmareti İnşaatına Ait Mufassal Muhasebe Defterleri*), second "Accounting Books of Süleymaniye Mosque and İmaret" (*Süleymaniye Cami ve İmareti İnşaatına Ait Muhasebe İcmalleri*) and third "Book Contains "The Orders and Recordings About the Construction of Süleymaniye" (*Süleymaniye İnşaatıyla İlgili Bazı Emir ve Kayıtları İhtiva Eden "Mecmua"*).

The first source contains construction period belong to Emin Sinan Bey who is the *binaemini* (supervisor) of the construction and lasts about 5 years and 7,5 months. These accounting books are 165 in amount and each containing one or two weeks' construction period and has about 8-30 pages and it gets 2973 in total. They contain weekly expenditure, worker's wage and the material prices totally and separately. The front of the first page acts as a cover page that has the number of the accounting book with Arabic letters or directly with numbers and the starting and the finishing date of the construction period. Accordingly, the back of the first page there is the alphabetical list of the workmen and the workers' name grouped according to their working class starting from *sengtıraş* (stone master). At the end of these working class lists for each working class it was written that the working days and the daily wages of the workmen. On the other hand, the accounting books numbered 44 were the documents that belong to the one-month construction period's documentations before Sinan Bey. During that time period Anadolu Muhasebecisi Mustafa was the supervisor of the construction.

The second source summarises the accounting book and collect the data in one book with 5 different subjects. The total amount of money and the sources for money are depicted in this source. The third and the last source consists of the information about the construction period of Hüseyin Çelebi Bey written in *sülüs* type and consists of 100 pages and there are 311 records about the first 3-year construction period of Süleymaniye Complex.

In the light of these descriptions it can be said that these sources give detailed information about the construction process, workers' organization, hierarchical schema of the construction, materials and their supplies, financial organization and the workers' ethnicity.

Accordingly, there are other studies searching deeply and comprehensively on Mimar Sinan's single buildings or complexes. Neriman Şahin Güçhan and Esin Kuleli's book (2009) is one of these sources. They convey the history, architecture, construction, materials, conservation, value and problems of the Süleymaniye Complex in Damascus. They reveal the alterations among the buildings of Mimar Sinan due to the local influences caused by the geographical regions. Kazım Çeçen's (1984) (1988) (2000) studies are other sources deeply searching on the water supply systems which were constructed by Mimar Sinan. He gives detailed and invaluable information about the logic behind the water supply systems designed by Sinan, construction, calculation and conservation of these systems in his priceless books. Fatih Müderrisoğlu (1997) is also the other scholar who totally investigates the Lüleburgaz Sokullu Mehmed Paşa Complex in his book which is mentioned in the related subchapter.

Moreover, there are many studies focusing on the construction technique of Mimar Sinan's buildings. Some of the researchers, such as Zeynep Ahunbay (1988), Müfit Yorulmaz (1987) and Erhan Karaesmen (1999), (2008) aim to provide a general assessment of construction technique of Mimar Sinan's buildings. Moreover, there are other studies focusing on the construction technique of specific buildings of Mimar Sinan. Some of the studies are Zeynep Çelik's (2009) research on Süleymaniye Mosque, Kazım Çeçen's (1988) on water supplies, Orhan Bozkurt's (1952) on his bridges and Gülsüm Tanyeli's (1991) work on the tombs that Mimar Sinan has constructed. In addition, there are some studies about the construction technique of a particular section of his buildings such as İsmail Hakkı Aksoy's (1982), work on foundations and Afife Batur's (1980) on the superstructure of his buildings. There are also studies, which focus on a particular architectural element of his buildings, such as windows in Ömür Bakırer's (1986) research or stalactite decorations of the portals in Ayla Ödekan's (1986) research. Besides, the materials used in Mimar Sinan's buildings is also an important research topic, which has been continuously studied by engineers, conservation scientists as well as architects. These studies mainly aim to understand the material selection of Mimar Sinan and the material technology of its buildings. Serpil Çelik (2009), İlknur Aktuğ Kolay (2006), Emre Dölen (1986), Zeynep Ahunbay (2016), Ömür Bakırer (2000) and Murat Eriç (1986) are some of the scholars who dealt with the material selection and usage in Mimar Sinan's buildings. Kemal Erguvanlı (1989) is one of the scholars who work on the material characteristics of Mimar Sinan's buildings. The information in these sources are gathered explained in detailed manner in the related subchapter 2.3 which investigates and explains the construction technique in 16th century with a special emphasis on Mimar Sinan's architecture. The conveyed knowledge about the construction technique of Mimar Sinan's buildings in these sources are tried to be clearly understand, attentively contemplate and melt in the same pot in order to relay the comprehensive and detailed information.

Additionally, it is important to append here that there are also technical and constructional information in the autobiographies of Mimar Sinan. Sai Çelebi (2006) gives information about construction of the water supply systems as aqueducts and bridges. Firstly, from the autobiography we can obtain that in the first half of the 16th century there was a water supply problem in Istanbul due to the increasing number of the people living in Istanbul. To solve this problem Mimar Sinan was assigned. Sai Çelebi (2006) says that he firstly surveyed and estimated the cost of these constructions. Sai Çelebi adds that while Mimar Sinan was wandering around, he realized the ancient water supply systems from earlier periods. We learn that the latter constructions of this water system might have been somehow a repair or a reconstruction of the system, again in masonry system. Moreover, in the autobiographies we can interpret the knowledge how Sinan was measuring the water and how he designed the water supply system. He gives measures (*lüle)* for the adequate amount of water for a water supply system. Besides, it is important to say here that there is a drawing of Mimar Sinan that shows the Kırkçeşme Water Supply

Systems in the archives. Afterwards, Sai Çelebi (2006) mentions about the orders for constructing water and fountain networks in all settled Istanbul. It shows the organized urban structure of the water supply systems in Istanbul that is still being used.

Furthermore, Sai Çelebi (2006) also gives clues about some construction details of Mimar Sinan. He explains about the construction of Büyükçekmece Bridge in Istanbul. Sai Çelebi says that there had been an old bridge in Büyükçekmece which was demolished by the waves of the water. Firstly, Sai Çelebi states that Mimar Sinan tried to understand why this old bridge had been demolished. After understanding the reason, Sinan tried to overcome these foreseen problems. Sinan interprets that the destruction might have been caused by weak foundation of the bridge and the loose soil of the area. Then Sai Çelebi states that Sinan designed the bridge on much stronger soil close to the sea and presented it with a drawing to the Sultan. Sai Çelebi (2006) explains the construction process of the foundations. Firstly, the trenches were excavated, in these trenches wooden frameworks (*sandıkça)* were put and the water filled in these frameworks were poured out with the help of the pumps *(tulumba)*, then the wooden piles were tacked down with the help of the mechanic systems *(şahmerdan)*. Secondly, the stone masonry foundations and structure started to be built, the stone units are tied to each other by pouring lead in the grooves which makes the foundation footings and the bridge itself as a monolithic structure.

The sources mentioned above provide significant insights to the architecture of Mimar Sinan. In the light of these studies, many obscurities are clarified. Although these studies are very crucial for understanding and preserving historic structures of Mimar Sinan, there is a need for holistic inquiry into a single building's construction technique in a systematic manner and in comprehensive detail in order to provide more accurate information as a basis for proper restoration and preservation of Mimar Sinan's buildings. As it is mentioned before, the research and literature review on these sources are utilized in the subchapter 2.3 which examines and describes the construction technique in 16th century with a special emphasis on Mimar Sinan's architecture. Knowledge about the construction technique of Mimar Sinan's buildings in these sources are tried to be evidently comprehend and contemplate in order to relay the comprehensive and detailed information.

In accordance with this purpose, firstly, a preliminary research is needed for questioning the buildings which were possibly constructed by Mimar Sinan himself to select appropriate buildings that represent the construction technique of his buildings.

2.2. Questioning Mimar Sinan's Buildings with Reference to His Autobiographies

This section is an enquiry into the buildings which were personally constructed by Mimar Sinan. To the purpose of this section, the life story of Mimar Sinan, gathered from his autobiographies, is explained together with the recorded buildings which were associated with him in his autobiographies. The life story of Mimar Sinan and his associated buildings are gathered in timetables to juxtapose the dates and the locations of the buildings associated with him and the location of Mimar Sinan himself. The final part of this section opens up a discussion on the possible buildings, which were personally constructed by Mimar Sinan.

The life story of Mimar Sinan is tried to be understood mainly from the autobiography written by Sâi Mustafa Çelebi based on the oral narratives of Mimar Sinan himself.[19] The transliterations and translations of autobiographies are compared among each other to make use of common information and to avoid conflicting records. Moreover, some other scholars' publications, mentioned before, such as Necipoğlu (2005, 2013), Kuran (1986), Günay (2002), Egli (1997, 2009), Konyalı (1948), Refik (1931) and Erzen (2004) are also utilised to obtain further information. Lastly, historical novels of Coral (2001), Dino (2007) and Mansel (2008) are also consulted in order to understand the social life of the period and Sinan.

According to this purpose, Mimar Sinan's life is visualized in a chronologic sequence based on his autobiographies mentioned above. Afterwards, the buildings recorded together with their location by Sai Çelebi and listed and edited by Necipoğlu

[19] The translations of these autobiographies which are explained in detail below were transliterated into Turkish by Hayati Develi and Samih Rifat (Develi (ed.), 2002) and Suphi Saatçi (Sözen (ed.), 1989) and translated into English by Howard Crane and Esra Akın (Necipoğlu (ed.), 2006). These transliterations and translations are used to explain the life story of Mimar Sinan. It is important to mention that there are some discussions going on about these autobiographies among scholars but these discussions are not pointed out because of the scope of this thesis.

(2006, pp. 353-391) are taken directly from the appendices of her study. Afterwards, the construction dates of these buildings are obtained from Kuran's study in the appendices (Kuran, 1986, pp. 271-405). The buildings are listed again in chronological order to juxtapose the information on buildings with the life schedule of Mimar Sinan (Table 8-15). Furthermore, to understand the places where Sinan may have visited and seen as well as to visualise the geographical and numerical distribution of buildings, a GIS database is formed. The number and the distribution of buildings in the cities of the Ottoman territories are analysed with the help of this database. Accordingly, in the light of these comparative timetables and maps, a list of buildings possibly built by Sinan himself is created and reliability of this list is discussed in the last part of this section.

2.2.1. The Manuscripts about Mimar Sinan

There are seven manuscripts that include information on Mimar Sinan. Five of these manuscripts are directly related to Mimar Sinan and his works. On the other hand, the remaining two focus on limited subjects which are related with Mimar Sinan's constructions and indirectly with Mimar Sinan (Kuran, 1986, p. 20). According to Necipoğlu, the five manuscripts were written by Sai Mustafa Çelebi and dictated by Mimar Sinan. Therefore, current scholarship accepts these five manuscripts as the autobiographies of him (Sâi Mustafa Çelebi, 2006, p. VII).

1. **Risâle-i Selimiye** was written by Dayızade Mustafa Efendi (Kuran, 1986, p. 20) as a monograph which tries to understand and reveal the modular system of the Selimiye Mosque by the help of mystic explanations (Sâi Mustafa Çelebi, 1989, p. 20).

2. **Risâle-i Padişahnâme / Menâkıb-ı Sultan Süleyman** was written by Poet Eyyubi in verse and composed of 72 papers (Kuran, 1986, p. 20). This manuscript points out 'the grandiosity and bravery' of Sultan Süleyman I in the battles, campaigns and conquests. Additionally, it mentions the buildings commissioned by Sultan Süleyman I. While explaining these buildings, the manuscript specifically emphasizes the

construction, repair and renovation of the aqueducts (Sâi Mustafa Çelebi, 1989, p. 21).

3. **Adsız Risale (Untitled Treatise)** is thought that it appears to be a partial, preliminary draft of Tuhfet-ül-Mi'mârin (Sâi Mustafa Çelebi, 2006, p. 10). Since the treatise contains only the *hamam*s that were recorded as the Mimar Sinan's buildings, although the latter treatise contains all other type of the buildings. According to Necipoğlu, Adsız Risale was written by Sai Mustafa Çelebi based on the oral narratives of Mimar Sinan himself like the later treatises. Because the genre of this treatise is similar to another treatise authored by Sai Mustafa Çelebi (Sâi Mustafa Çelebi, 2006, p. 10).

4. **Risalet-ül-Mi'mâriyye (Treatise in Architecture)** is also thought as the preliminary draft of the preface of Tuhfet-ül-Mi'mârin (Sâi Mustafa Çelebi, 2006, p. 10). This treatise gives brief information about Mimar Sinan's life at its beginning and then it lists the eleven building types, which are associated with Mimar Sinan. However, the manuscript ends abruptly without listing the buildings. Again, due to the resemblance of its structure, content and genre, it is assumed that Risalet-ül-Mi'mâriyye is written by Sai Mustafa Çelebi based on Mimar Sinan's own oral narrative (Sâi Mustafa Çelebi, 2006, p. 10).

5. **Tuhfet-ül-Mi'mârin (Choice Gift of the Architects)** is accepted as the completed version of Adsız Risale and Risalet-ül-Mi'mâriyye. Like Risalet-ül-Mi'mâriyye, this manuscript gives brief information on the life of Mimar Sinan and written in the form of prose and verse. The same passages can be found in this text with the Adsız Risale and Risalet-ül-Mi'mâriyye (Sâi Mustafa Çelebi, 2006, p. 12). The reason why this manuscript is believed to be the completed version is the comprehensive list of buildings at the end of it (Table 4). The lists were given by categorizing the buildings into twelve. First building type is the Friday mosques which were grouped according to their patrons. The first group of this first type is the mosques which were constructed for the members of the dynasty. The second group is the mosques constructed for viziers and grandees and the third group is only for the grandees. The other building types are *mescid*, *medrese* and school, hospitals, palaces, water channels, garden villas and pavilions, *hamam*, warehouses and lastly *kervansaray* and cisterns successively. According to Necipoğlu, this

manuscript should have been written by Sai Mustafa Çelebi due to the resemblance of its structure, content and genre to other known manuscript associated with Sai Çelebi based on the dictation of Mimar Sinan (Sâi Mustafa Çelebi, 2006, p. 12).

On the other hand, according to Kuran (1986, p. 20), this manuscript should have been written after Mimar Sinan's death due to the buildings in the list which were built after him. One suggestion is that Sai Mustafa Çelebi might have added these buildings of which design was done and construction was started by Mimar Sinan and completed by Mimar Sinan's *kalfa*s after his death. This suggestion does not imply that the entire text is written after Mimar Sinan's death. Necipoğlu also supports this suggestion by stating that the buildings that were completed after Sinan's death should have been added later since they are handwritten marginal notations different from the main body (Sâi Mustafa Çelebi, 2006, p. 42).

6. **Tezkiret-ül-Ebniye (Record of Buildings)** is a manuscript written by Sai Mustafa Çelebi based on the narratives of Mimar Sinan and is mainly composed of the lists of his buildings (Table 4). The author and how the author has written the text are explained at the beginning of the manuscript. The text starts with a versified introduction and after a praise of the sultans of Islam, it continues with a brief information on Mimar Sinan's life. Afterwards, the buildings of Mimar Sinan are listed in twelve categories. The Friday mosques are not grouped for the first time but instead, they are listed randomly. All building types are presented starting with their locations. The building types are Friday mosques, mescids, medreses, darulkurras, tombs, imarets, hospitals, aqueducts, bridges, kervansarays, palaces, warehouses and hamams consequently. There are 16 copies of Tezkiret-ül-Ebniye in different archives, whose structures and contents are the same with minor changes in the building lists (Sâi Mustafa Çelebi, 2006, p. 4).[20]

7. **Tezkiret-ül-Bünyan (Record of Construction)** explains the life of Mimar Sinan and his constructions. It is also written by Sai Mustafa Çelebi in verse and prose based on the narratives of Mimar Sinan. The

[20] For detailed information about the copies of Tezkiret-ül Ebniye see (Develi, Rifat (trans.), Sâi Mustafa Çelebi, 2002), (Crane, Akın (trans.), Necipoğlu (ed.), Sâi Mustafa Çelebi, 2006). These sources translate and criticize the original texts. Also for the other translations see (Refik, 1931) and (Meriç, 1965).

manuscript starts with the thanks and praise to God, four great caliphs, Imam Hasan and Hüseyin, sultans, *şehzades* (princes) and lastly to grand viziers. Afterwards, the author explains the reasons behind these texts. Then, it starts to explain the life story of Mimar Sinan. The campaigns, conquests and successes of Mimar Sinan are explained in details. After Mimar Sinan becomes the chief architect, the manuscript starts to explain the orders of the Sultan Süleyman I to Mimar Sinan such as the construction of Şehzade Complex, construction of aqueducts, construction of Süleymaniye Complex, and construction of water supplies for the imperial garden of Topkapı Palace. Then, the manuscript passes through the reign of Sultan Selim II and explains the order of Selim II to construct Selimiye Complex and the text ends with a verse praises the Selimiye Mosque. It is very remarkable that the manuscript especially explains the constructions of the aqueducts and water supply systems in details (Sâi Mustafa Çelebi, 2002). There are 11 copies of Tezkiret-ül-Bünyan in different archives.[21] Furthermore, Kuran claims that Tezkiret-ül-Bünyan also contained the list of buildings (Kuran, 1986, p. 22). However, it has not been encountered in any other source mentioning that this manuscript contains the list of Mimar Sinan's buildings.

There are 17 different building lists, 16 of which are found from the copies of Tezkiret-ül-Ebniye and one from the Tuhfet-ül-Mi'mârin (Sâi Mustafa Çelebi, 2006, p. 353). As it is mentioned before, these two sources give the buildings in a different manner with different numbers as it can be seen in Table 4. These buildings are listed in different orders in Tezkiret-ül-Ebniye and Tuhfet-ül-Mi'mârin. Hence, the buildings listed in different copies of Tezkiret-ül Ebniye are also in different order and have a few differences in their numbers.

[21] For detailed information about the copies of Tezkiret-ül Bünyan see, (Sözen (ed), Saatçi (trans.), Sâi Çelebi, 1989), (Develi, Rifat (trans.), Sâi Mustafa Çelebi, 2002), (Crane, Akın (trans.), Necipoğlu (ed.), Sâi Mustafa Çelebi, 2006). These sources mainly translated and criticized the original texts.

Table 4: The numbers of the recorded buildings of Mimar Sinan in Tezkiret-ül Ebniye and Tuhfet-ül Mi'mârin. (The numbers are calculated according to (Sâi Mustafa Çelebi, 2006, pp. 353-391).

Building Type	Number of Buildings			
	Tezkiret-ül-Ebniye	Tuhfet-ül-Mi'mârin	Common for TE & TM	Total
Mosque	79	95	75	99
Mescid (Masjid)	51	45	45	51
Medrese (Madrasa)	57	64	53	68
Darülkurra (Quran School)	7	8	7	8
Türbe (Tomb)	22	43	18	47
Mektep (School)	0	6	0	6
İmaret (Hospice)	17	20	15	22
Darüşiffa (Hospital)	3	3	3	3
Darülhadis (Hadith School)	0	1	0	1
Darültıp (Medical School)	0	1	0	1
Tekke (Dervish Convents)	0	7	0	7
Aqueduct	8	9	8	9
Bridge	8	7	6	9
Kervansaray (Caravanserai)	20	21	13	28
Han (Khan)	0	3	0	3
Fountain	0	1	0	1
Cistern	0	1	0	1
Palace	29	24	20	33
Köşk (Mansion)	0	3	0	3
Mahzen (Warehouse)	6	4	4	6
Hamam (*Bathhouse)*	46	39	30	55
Renovation	21	25	20	26
Total	374	430	317	487

2.2.2. Mimar Sinan's Life and Buildings

Mimar Sinan was born in Ağırnas which is a town in the north-east of Kayseri circa the years of 1489 and 1498, changing according to different scholars.[22] It is commonly mentioned that he was Armenian in origin. Due to the lack of reliable sources, his origin has not been clarified yet although Kuran says many scholars claimed that Sinan was an Armenian, Greek, Bulgarian, Serbian or Albanian. However, Kuran also adds that Mimar Sinan cannot be an Armenian since Armenians were excluded from the *devşirme* system and from the Janissary corps in the beginning of the 16th century (Kuran, 1986, p. 16). It is mentioned that his father was a carpenter and a stonemason in Ağırnas and Sinan had been trained by him until the beginning of 16th century when he was chosen for the *devşirme* system. But again, Kuran claims that he must not have had any skill of art or craft to be accepted to Janissary corps (Kuran, 1986, p. 16). Accordingly, Sai Çelebi states in Tezkiret-ül Bünyan that in 1512, during the reign of Sultan Selim I, Mimar Sinan was conscripted into Ottoman service with the *devşirme* system and was the first of the choices of young male citizens who were conscripted from Anatolia for the military services.

It is important to add here that the records of the Janissaries were kept by the Janissary Agas. Unfortunately, there is no evidence from these records. It is mainly because, after "Vak'ay-i Hayriye", known as the auspicious incident, the Janissary corps was disbanded and replaced with a more modern military force by Sultan Mahmut II in June 1826, resulting in the destruction of these records (Kuran, 1986, p. 17). On the other hand, there are other sources different from the manuscripts that were recorded by the biographer Sâi Mustafa Çelebi about Mimar Sinan's background. The *Vakfiye'*s (foundation charters) of him and an order of Sultan Selim II that forgives and spares his relatives on Sinan's request from the general exile of Kayseri's Armenian community to the island of Cyprus and permits them to settle in Istanbul nearby him (Kuran, 1986, p. 16), (Necipoğlu, 2005, p. 129). Therefore, it can be said that he was an Armenian collected as young Janissary with the name Sinan bin

[22] 1489 (Mayer 1956, 121), (Aslanapa 1971, 217); 1489-91 (Necipoğlu 2013, 175); 9th of Recep, 1490-91 (Egli 2009, 31); 1491 (Goodwin 1971, 477); 1492 (Sözen 1975, 160); 1497-98 (Kuran 1986, 17).

Abdülmennan. He had been a Christian before being a Janissary. It is due to the fact that Abdülmennan was a generic name, meaning God. This denomination was for the young Janissaries who had been Christians before (Sâi Mustafa Çelebi, 2002, p. 37).

Mimar Sinan's Life and Buildings Before becoming Chief Architect (1489-1538)

It is recorded by Sai Mustafa Çelebi in the Tezkiret-ül Ebniye that after being conscripted into Ottoman *devşirme* system and arrived at Istanbul, Sinan started to be trained as a master of carpentry *(neccarlık)* during his military training as a cadet *(acemioğlan),* and attended the campaigns of Arab and Persian territories. It is mentioned that he went to the Arab and Persian territories in the service of Sultan Selim I's army and acquired architectural knowledge as much as possible from these experiences. After these military expeditions, he was occupied as a servant to the notables of that period and became a Janissary in 1521 (Necipoğlu, 2005, p. 131). Moreover, we learn from Tezkiret-ül Bünyan that he served for the households of grandees and became a Muslim during his years as a cadet. These corps of cadets were used as labours for transporting the building materials in ships, stone quarries and in constructions (Necipoğlu, 2005, p. 131). As a different view, Konyalı (1948, p. 29) records that he might have served the Grand Vizier Pargalı İbrahim Paşa as a cadet after coming to İstanbul and he adds that possibly, he was given the Islamic name Sinan there and İbrahim Paşa set him free after his education and service was finished. But there are not any other sources that can support this view.

Accordingly, it can clearly be understood that Sinan developed his architecture skills by his training as a carpenter, by working in the construction sites and by travelling to Arab and Persian territories in order to learn information about buildings during his Janissary apprenticeship years as a cadet before being a Janissary in 1521. Furthermore, it can be seen from the tables (Appendix I) there are not any noteworthy buildings assigned to him until the early 1520s.

After Sultan Süleyman I ascended the throne, the army was set out to Belgrade in 1521 and Rhodes in 1522 according to the Tezkiret-ül Bünyan by Sai Çelebi, Mimar Sinan was one of the Janissary officers of the army and became a cavalry (*atlısekban*) after these military successes. In the documentary “Until Eternity”[23] directed by Süha Arın, the important settlements on the battle route towards Belgrade were Istanbul, Edirne, Filibe, Sofia, Nis, Sabak (*Böğürdelen),* Zemun and Belgrade. The documentary reminds that the army repaired the castles and bridges while passing through these settlements. Sinan, most probably, worked for these construction sites as it is also mentioned by Necipoğlu (2013, p. 178). For the Rhodes campaign, the documentary states that the army set up a base in Marmaris to attack Rhodes by handmade stone grenades. Therefore, it can be assumed that Mimar Sinan should have deduced the weak points of structures while tearing the Rhodes Castle down. When we look at the tables (App. A), till the early 1530s, there is the Sultan Selim I Complex in Istanbul and Çoban Mustafa Paşa Complex in Gebze which were designated to Sinan till the early 1530s. According to Kuran (1986, p. EK VI), Sinan cannot be the builder of these complexes but instead, he could have worked on the construction sites or repaired these buildings afterwards.

As it is mentioned again in Tezkiret-ül Bünyan by Sai Çelebi, army and Sinan departed from Istanbul to Mohacs in 1526 after which Sinan successively became a *yayabaşı* and *zemberekçibaşı* as the 82nd janissary regiment in charge of mechanical devices and catapults. This promotion shows his military engineering skills and his success (Necipoğlu, 2013, p. 178). The army had constructed and demolished bridges through their routes on the Sava and Drava rivers, as the aforementioned documentary states. As it is seen in the tables (App. I), Çoban Mustafa Paşa Bridge in Svilengrad can be one of the possible examples.

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23 “Until Eternity” is a documentary prepared in 1988 for the commemoration of International Mimar Sinan Year. The documentary which is composed of 6 parts lasting 30 minutes explains the life and works of Mimar Sinan. The documentary was prepared by MTV film and prepared by the help of the many experts in Arabic, Persian and Ottoman languages, architects, art historians and social anthropologists who are working for the Mimar Sinan Research Center. Moreover, Prof. Dr. Metin Sözen, Prof. Mustafa Cezar, Prof. Dr. Kazım Çeçen, Prof. Müfit Yorulmaz, Doç Dr. Yavuz Cezar, Dr. Filiz Çağman and Dr. Mehmet Çayırdağ were the consultants and İlknur Kolay, Suphi Saatçi, Nil Çamay, Ümit Karpat and Meliha Şimşek were the researchers of the project. It is important to add here that “Until Eternity” received "Jury Special Award" at the 1989 Lausanne International Film Festival on Architecture and Urbanization, the "Architecture Award" at the 1990 UNESCO International Art Films Competition and the "Council of Europe Special Award" at the 1990 Bordeaux Festival of Films on Architecture and Urban Planning. [http://www.mtvfilm.com/en/film/until-eternity/] (Last accessed, 14.11.2013)

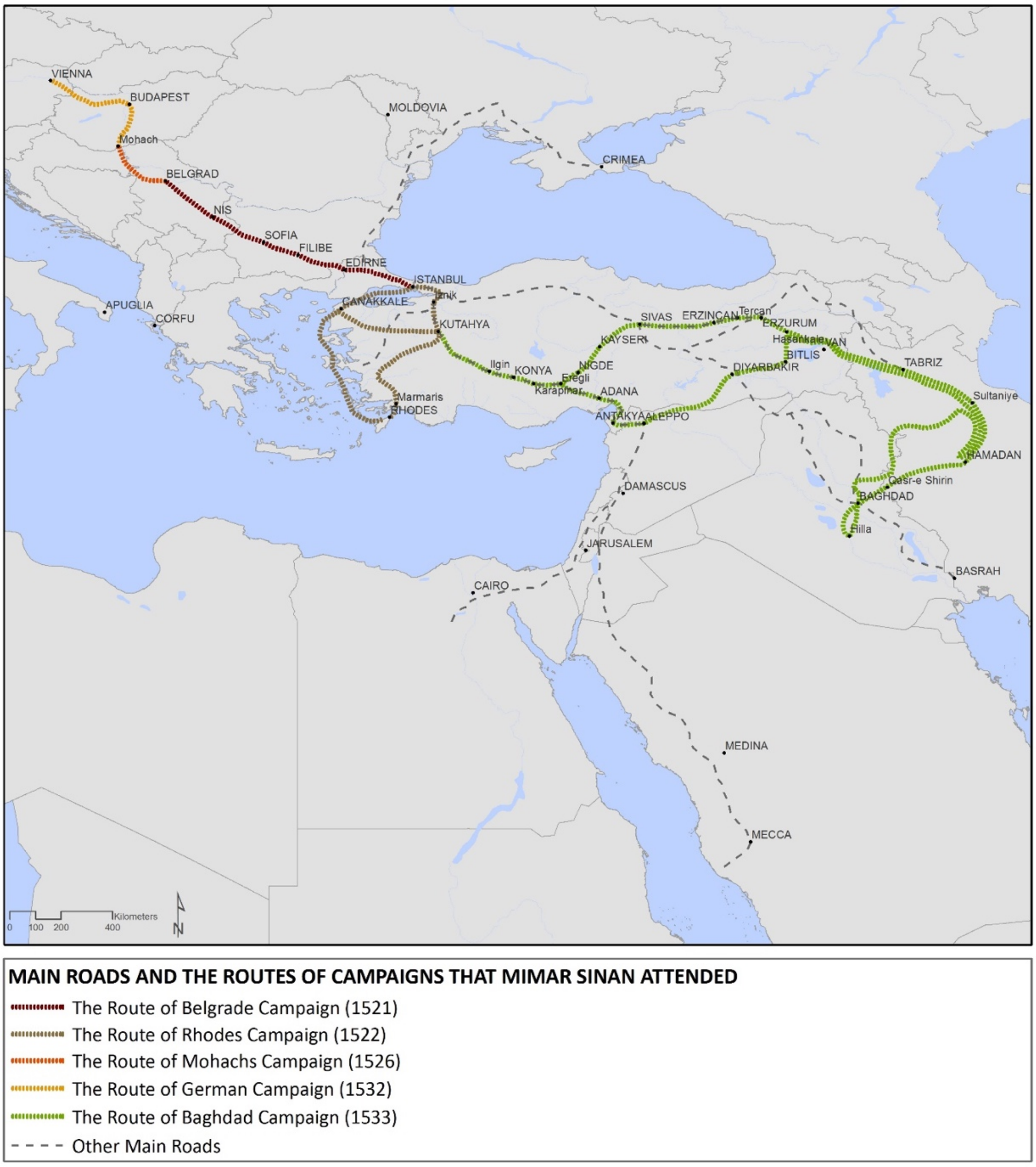


Figure 9: Main Roads and the Routes of Campaigns that Mimar Sinan attended. (Main Roads taken from (Necipoğlu, 2013, p. 765) and the routes taken from the documentary "Until Eternity")

In Tezkiret-ül Bünyan, Sai Çelebi continues with the later campaign to German lands and Baghdad campaign through the Persian territories in 1533. The aforementioned documentary claims that Sinan had been to İznik on the route and seen Kasım Paşa Mosque and the Hagia Sophia as well as to Kütahya and Ilgın. Sinan also had been to Konya and seen Anatolian Seljuk examples of İnce Minareli Medrese and Karatay Medresesi; also to Karapınar, Ereğli, and Niğde where he had seen Sungurbey

Mosque. From Niğde, he succeeded to Kayseri, Sivas, Erzincan and Tercan seeing Mama Hatun Tomb as well as Erzurum where he had seen Yakutiye and Hatuniye Medreses; Hasankale seeing Çoban Bridge and also to Van. Subsequently, in the Tezkiret-ül Bünyan, Sai Çelebi gives an important memoir of Sinan in the city of Van. During this Persian campaign, known as *kızılbaş* rabble, on the shore of the Lake Van, Sultan Süleyman I and his vizier Lütfü Paşa wanted Sinan to construct ships in order to learn news about the situation of the Persian soldiers on the opposite shore. Mimar Sinan showed his maximum effort and constructed the galleys rapidly and then with the will of the Paşa, he became also the captain of the galleys and was favoured with the rank of *Haseki*.

According to the documentary, the Ottoman army then started to follow the Persian Shah who was running away from the army and this campaign lasted about one and a half years. During this campaign, Sinan had been to Tabriz, Sultaniye, Hamadan, Qasr-ı Shirin and Baghdad and seen the examples of early Islamic, Abbasid, İlkhanid, Akkoyunlu, Karakoyunlu and Great Seljuk architecture. The documentary continues with the aftermath of the campaign when the Ottoman army turned back from a different route passing through Diyarbakır where Sinan had seen Fatih Paşa Mosque, Aleppo where he had seen the castle, and Antakya where he had seen Habib-ül Neccar Mosque.[24] When this route (Figure 9) is compared with the tables (App. I), Sultan Süleyman Mosque in Van, Abdülkadir Geylani Mosque and Tekke and Abu Hanifa Tekke in Baghdad associated with Mimar Sinan, draw attention. Moreover, Necipoğlu (2013, p. 178) supports this possibility by stating that, Sinan had participated in the constructions of Abdülkadir Geylani Mosque and Abu Hanifa Tekke during the Baghdad campaign.

Consecutiely, Sai Çelebi says in Tezkiret-ül Bünyan that Mimar Sinan went to Corfu and Apulia in 1536 and Moldavia in 1538 together with the Ottoman army. The most important campaign might have been undoubtedly Moldavia for Mimar Sinan. As Sai Çelebi explains in Tezkiret-ül Bünyan, while the army was proceeding in the

[24] Also, the route can be identified from the miniatures of Matrakçı Nasuh who attended the army in the Baghdad campaign from his *Beyan-ı Menazil-i Sefer-ul Irakeyn* (Chronicle of Stages of Campaign of Iraq and Persia).

marshy territories of Moldavia, the River Pruth did not permit the army to pass through and many engineers and architects couldn't solve this problem. Thus, Lütfü Paşa suggested Mimar Sinan to Sultan Süleyman I for the construction of a bridge. As it is written by Sai Çelebi in the Tezkiret-ül Bünyan, the bridge was constructed in ten days and the army crossed it with 'felicity' and later the bridge was demolished in order to prevent its destruction by the enemies afterwards. When the dates and the locations of the buildings which are attributed to him in the list of Tezkiret-ül Ebniye by Sai Çelebi and listed in the tables (App. I) are evaluated, it can be stated that almost all the buildings attributed to him constructed during these campaigns are in Istanbul. These buildings are most probably the constructions that he had participated in the remaining times of these campaigns.

Subsequently, in Tezkiret-ül Bünyan Sai Çelebi conveys that when the army turned back to Istanbul, his master architect Acem Alisi passed away, and the rank of chief architect fell vacant. As a consequence of this situation, again, Lütfü Paşa suggested that Haseki Sinan should be the chief architect. Sai continues by stating that after the Moldavia campaign in 1538, Mimar Sinan became the chief architect and he was able to serve as an architect for three sultans of the Ottoman Empire and constructed many buildings all over the Ottoman territories. This was the beginning of a remarkable career.

During all these campaigns towards Europe and the Middle East and his training as a soldier and carpenter in between 1512-1538, he should have proven himself not only as a soldier but also as a trained engineer and a promising architect. It can be understood that he always observed the environment, buildings and territories to remain in his mind. As Kuran (1986, p. 241) states, although Sinan had not planned to be an architect in the early years of his youth, the coincidences, his diligence and also his talent made him become a chief architect.

Moreover, it is obvious that he developed his knowledge and talent by working in the constructions during the campaigns as well as in the constructions or repairs of the palaces, pavilions and mansions of the notables of the empire under the control of his masters. Unfortunately, there is not any clear information about these building constructions, in which Sinan has worked. But it can be seen in the building lists of

Sai Çelebi, the buildings constructed before he became the chief architect were attributed to him. Although these buildings are recorded as his constructions, Sinan could only have been the student of his master architect and assigned for specific works.

Mimar Sinan's Life and Buildings After becoming Chief Architect (1538-1588)

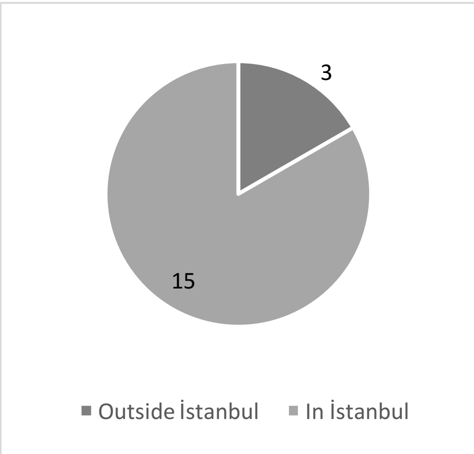
By becoming a Chief Architect, Sinan was introduced to the task of supervising and controlling the entire construction sites, the flow of the building materials from the quarries and ateliers of these supplies as well as controlling the corps of royal architects and local architects within the Ottoman Empire. He was also responsible for the survey, design, cost estimation, construction and control of the public and private constructions in Istanbul. Moreover, he was not only responsible for the construction works but also, he was in charge with the administrative works of royal architects and training the team of *kalfa* and young architects (Kuran, 1986, p. 26); (Necipoğlu, 2013, pp. 217-240). As Necipoğlu (2013, p. 217) mentions, the responsibilities of Mimar Sinan were concentrated in mostly Istanbul and followed by Edirne as the former capital. She adds that Mimar Sinan was also in charge of other distant states constructions but he controlled these sites by either assigning and sending royal architects from Istanbul or assigning local city architects and sending drawings and models of the buildings together with the written documents. Besides, Necipoğlu (2013, p. 218) states that supervising the buildings commissioned by sultans and grandees by being personally on the site is one of the major tasks of the chief architect. Additionally, Kuran (1986, p. 26) mentions that it is impossible to say that Sinan has been in any other places for construction while the imperial buildings were being constructed in Istanbul and Edirne. In these circumstances, it is clear that Mimar Sinan should have mostly been in Istanbul during certain periods of time and close to Istanbul for the special case of the imperial buildings.

When we turn back to Sinan's personal life, after being the chief architect he married Gülruh Hanım at around the age of 50 according to his *Vakfiye's* (Konyalı, 1948, pp. 149-152). He had five children from Gülruh Hanım named Mehmed, Mustafa, Ummi, Hüma and Hatice. Afterwards, he had another wife, Mihri Hatun, and he had two children named Ümmihan and Neslihan from her. Although the exact dates of these marriages cannot be identified from the *Vakfiye*'s, it can be understood that his first wife was Gülruh Hanım and the second was Mihri Hatun (Konyalı, 1948, p. 153). The personal life of Mimar Sinan reveals that he founded a family and had a sedentary life in İstanbul after becoming the chief architect.

Accordingly, in Tezkiret-ül Bünyan, Sai Çelebi explains the imperial and monumental constructions of chief architect Mimar Sinan in Istanbul and Edirne which supports the above-mentioned claims. The first building that Sai Çelebi refers to is the Şehzade Sultan Mehmed Mosque, which was ordered by Sultan Süleyman I in the memory of his deceased son Şehzade Mehmed. The construction of this building was started in 1543 and ended in 1548 (Kuran, 1986, p. 302). The building was the most important construction for Mimar Sinan until that time so he gave his maximum effort. Kuran (1986, p. 64) claims that when the city of Istanbul of the time is imagined, this building should have been among the most important and magnificent buildings such as Hagia Sophia, Fatih, Bayezid and Sultan Selim I mosques.

Although Sai Çelebi does not mention in Tezkiret-ül Bünyan, he listed in Tezkiret-ül Ebniye 13 buildings of Sinan constructed in between 1538-1543 before starting Şehzade Sultan Mehmed Mosque. When it is seen from tables (App. I) and figure 7, Haseki Hürrem Sultan Mosque, Mahmud Ağa Mosque, Yunus Bey Mosque are some of them in Istanbul. Also, there are other buildings which are not in Istanbul such as Haseki Hürrem Sultan Mosque and İmaret in Svilengrad and Haseki Hürrem Sultan Imaret in Jerusalem. These distant buildings should have been designed by him but they could not have been personally constructed by Sinan due to the reasons discussed above.

Furthermore, as Sai Çelebi states in Tezkiret-ül Bünyan, during the construction of Şehzade Mosque, Mimar Sinan was personally involved in the construction of 9 other buildings dating from the same period that were Mihrimah Sultan Complex, Hanım Sultan and Rüstem Paşa Mosque, Sultan Selim I *medresesi*, Hüsrev Paşa *türbesi*, Rüstem Paşa *kervansarayı* and Yakup Ağa *hamamı* in İstanbul, which can also be seen in the tables (App. I) and figure 7. The most remarkable one among these buildings is Mihrimah Sultan Complex since the construction date of Şehzade Mosque and this complex is exactly the same. When the status of Mihrimah Sultan as a princess is considered, the importance of her complex gives an idea of how busy Mimar Sinan was. Sinan should have mostly dealt with these buildings almost at the same time and he could only have attended to the other construction sites much less. Additionally, in the tables (App. I) there are mosques in Basra, Aleppo and Bolvadin which can be Sinan's design but cannot be his own constructions.



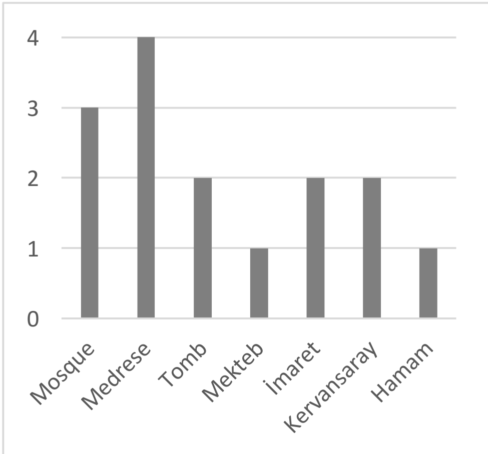


Figure 10: Buildings Constructed Between 1543-1548 in İstanbul during Şehzade Sultan Mehmed Mosque was being constructed.

After mentioning Şehzade Sultan Mehmed Mosque, Sai Çelebi explains in detail about the Kırkçeşme Water Supply in Tezkiret-ül Bünyan. This aqueduct system was constructed in between 1554 and 1564 (Kuran, 1986, p. 404). In Tezkiret-ül Bünyan, Sai Çelebi gives detailed information on the construction of the system and remarks it as 'marvellous engineering'. According to Necipoğlu (2013, p. 151), Sinan was always in close cooperation with water channel superintendents *(suyolları nazırı),* thus it can be said that he does not have to be always on the site. Moreover, when this construction was started, the construction of most significant buildings was still ongoing in İstanbul. Sultan Süleyman I Mosque was the most remarkable building of the most notable person of the era, the Sultan himself. Sai Çelebi explains the characteristic and process of construction in Tezkiret-ül Bünyan, by giving details about gathering and erecting the marble columns, and also mentions the efforts of Sinan to complete the building. Furthermore, while Sai Çelebi is telling an anecdote of Sinan with Sultan Süleyman I, he states that when Süleyman I had been in Edirne, Ferhad Paşa Palace was being constructed. Therefore, we can understand that even being for a short period of time, Sinan had the chance to be in different sites during the construction. In between the construction dates of Sultan Süleyman I Mosque, there are about 30 buildings constructed as it can be seen in the tables (App. I). The buildings which are in distant cities are thought to be supervised by his *kalfa*s who were sent by him to the provinces or by local architects. For instance, according to the archival documents, Necipoğlu (2013, p. 752) revealed that Mimar Mehmed Çavuş was assigned in 1552 to construct the kervansaray of Rüstem Paşa in Sapanca and Mimar Müslihüddin was sent to Damascus in 1553 for the construction of Süleymaniye Complex. In fact, Sinan should have mostly spent his time on the construction site of Sultan Süleyman I Mosque, because there is not any other building construction commissioned by the grandees of the Empire. For the other buildings in İstanbul, he should have appointed his *kalfa*s and controlled them in his spare times.

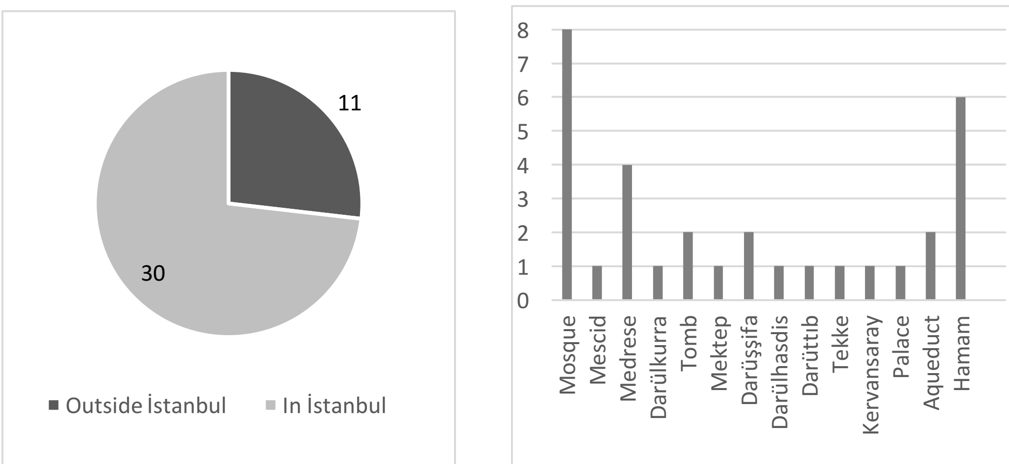
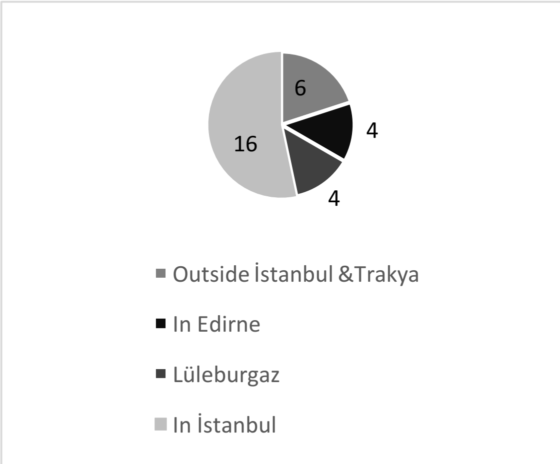


Figure 11: Buildings Constructed Between 1550-1557 in İstanbul during Sultan Süleyman I Mosque was being constructed.

Subsequently, in Tezkiret-ül Bünyan Sai Çelebi mentions the memoirs of Sinan about constructing a water wheel well in Sultan's garden, giving details about the conversations between Sinan and Sultan Süleyman I. Sai Çelebi continues with the construction details of Büyük Çekmece Bridge. According to Kuran, the construction of this bridge lasted about three years between 1565-1568 (1986, p. 403). When the tables (App. I) are evaluated, it can be seen that Sultan Süleyman I died during this bridge was being constructed, and Sinan also constructed a tomb for the sultan. Mihrimah Sultan Mosque and *hamam*, *darülkurra* and *kervansaray* of Sokullu Mehmed Paşa, tombs of Semiz Ali Paşa and Sokullu Mehmed Paşa are the buildings of Mimar Sinan that were commissioned by the grandees in Istanbul and Edirne. The other buildings are in Damascus, Van and Medina, which should have been designed by Mimar Sinan and constructed by his *kalfa*s or local architects under his control. For instance, as it is discussed by Güçhan and Küleli (2009, pp. 20-21), Süleymaniye Complex in Damascus was constructed in sequence by his *kalfa* Müslihiddin who was sent to Damascus, by Todoros who was a local architect together with the local masons and architects basen on the design of Mimar Sinan.

Lastly, Sai Çelebi in Tezkiret-ül Bünyan tells about the construction of Sultan Selim II Mosque in Edirne. The construction phase lasted from 1568 to 1574 (Kuran, 1986, p. 299). During this period, Mimar Sinan is supposed to be mostly in Edirne. In addition, the recorded buildings seen in the tables (App. I) supports this argument. During this time interval, three complexes were constructed, Selimiye Complex in Edirne, Sokullu Mehmet Paşa Complex in Lüleburgaz and in İstanbul (Figure 4,5). Sinan should have spent his time mainly for the construction of Selimiye Complex and the others should have been completed by the help of his *kalfa*s. He should have been very occupied with these constructions and therefore it is impossible for him to attend the constructions in Payas, Diyarbakır and Baghdad. He should have designed the buildings and sent these designs to others architects. It is important to remind here that he had been to these cities before and informed about these cities.



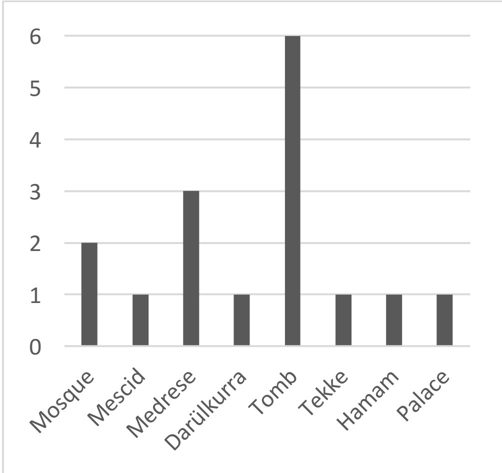
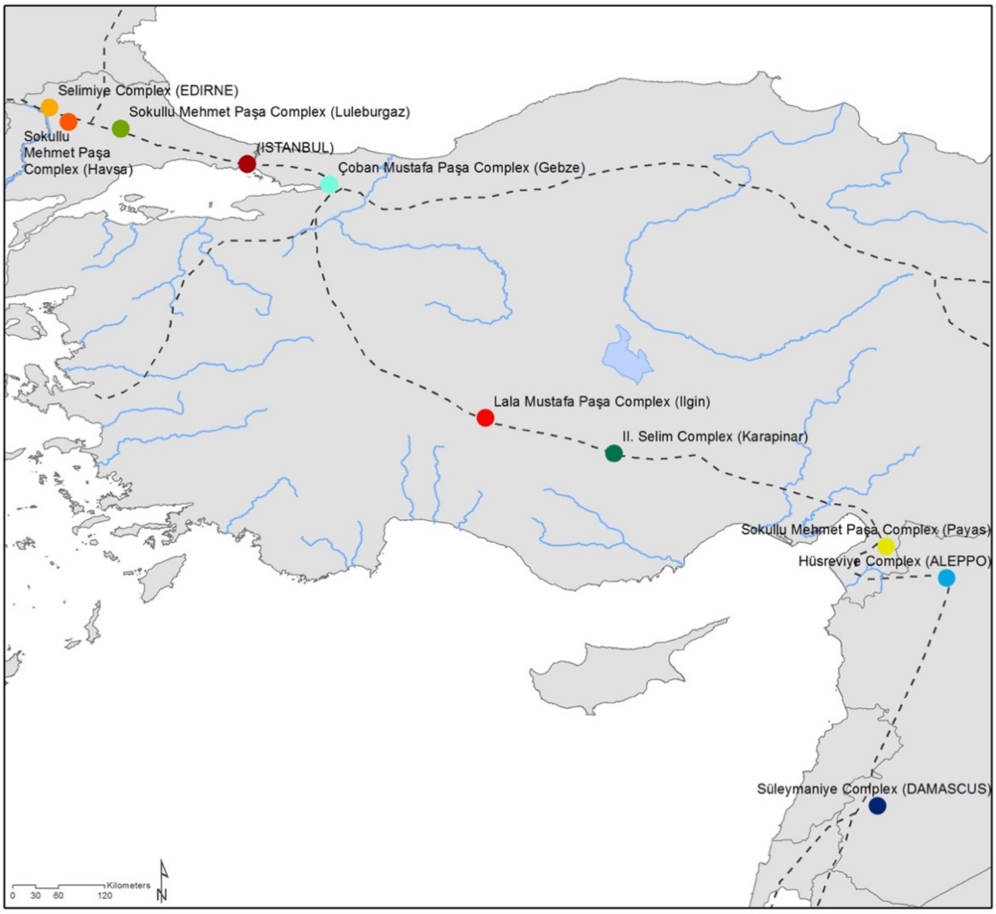


Figure 12: Buildings Constructed Between 1568-1574 in İstanbul during Sultan Selim II Mosque was being constructed.

When Selimiye Mosque was finished, Mimar Sinan was about 80 years old. He was too old to control the entire construction and administrative works however he continued his duty as a chief architect till the end of his life. According to the tables (App. I), he built four important complexes in İstanbul after his 80th age for the grandees of empire and about 20 buildings in İstanbul. He should have gotten help from his *kalfa*s to complete these buildings. In addition, the lists mention buildings in Kayseri, Diyarbakır, Visegrad and Manisa however, it is not possible that they were constructed by Mimar Sinan. As a supporting information, Necipoğlu (2013, p. 750) states based according to the archival documents that Mimar Mehmed Subaşı was sent to Manisa instead of Mimar Mahmud who died in 1586 to complete Sultan Murad III Mosque. Moreover, as Necipoğlu (2013, p. 217) states, Mimar Sinan went to Mecca in 1584 and should have probably met with the architects on his route and controlled their works. Thus, it can be stated that he might have designed Lala Mustafa Paşa Kervansaray in Ilgın and Melek Ahmed Paşa Mosque in Diyarbakır while he was passing through these cities.

Kuran (1986, p. 245) claims that, after 1575, Mimar Sinan could not have a chance to construct a new complex or a building as important as Sultan Selim II Mosque and its complex. Kuran grounds this situation to his age and the loss of charm of architectural concepts that he developed. Kuran (1986, p. 245) also adds that the alterations in the architectural style had already been started while he was still alive.

This might reveal that he was not able to control all his constructions so that his *kalfa*s should have played a part during construction of these buildings. Even though Mimar Sinan was the chief architect, his *kalfa*s might possibly have designed and constructed these buildings and Mimar Sinan might have controlled and approved the works before constructions were initiated as an honorary president of the royal architects.



GEOGRPHICAL DISTRIBUTION OF MIMAR SINAN'S COMPLEXES

- Completed in 1524
- Completed in 1537
- Completed in 1554
- Completed in 1563
- Completed in 1569
- Completed in 1574
- Completed in 1575
- Completed in 1577
- Completed in 1584

- Complexes in Istanbul
- Main Roads

1	Haseki Complex	1539	7	Mihrimah Sultan Complex	1565
2	Şehzade Complex	1548	8	Sokullu Mehmet Paşa Complex	1572
3	Mihrimah Sultan Complex	1548	9	Zal Mahmut Paşa Complex	1577
4	Sinan Paşa Complex	1555	10	Atik Valide Sultan Complex	1579
5	Süleymaniye Complex	1557	11	Şemsi Ahmet Paşa Complex	1580
6	Kara Ahmet Paşa Complex	1565	12	Kılıç Ali Paşa Complex	1580

Figure 13: Geographical Distribution of Mimar Sinan’s Complexes (Dates taken from (Necipoğlu, 2013).

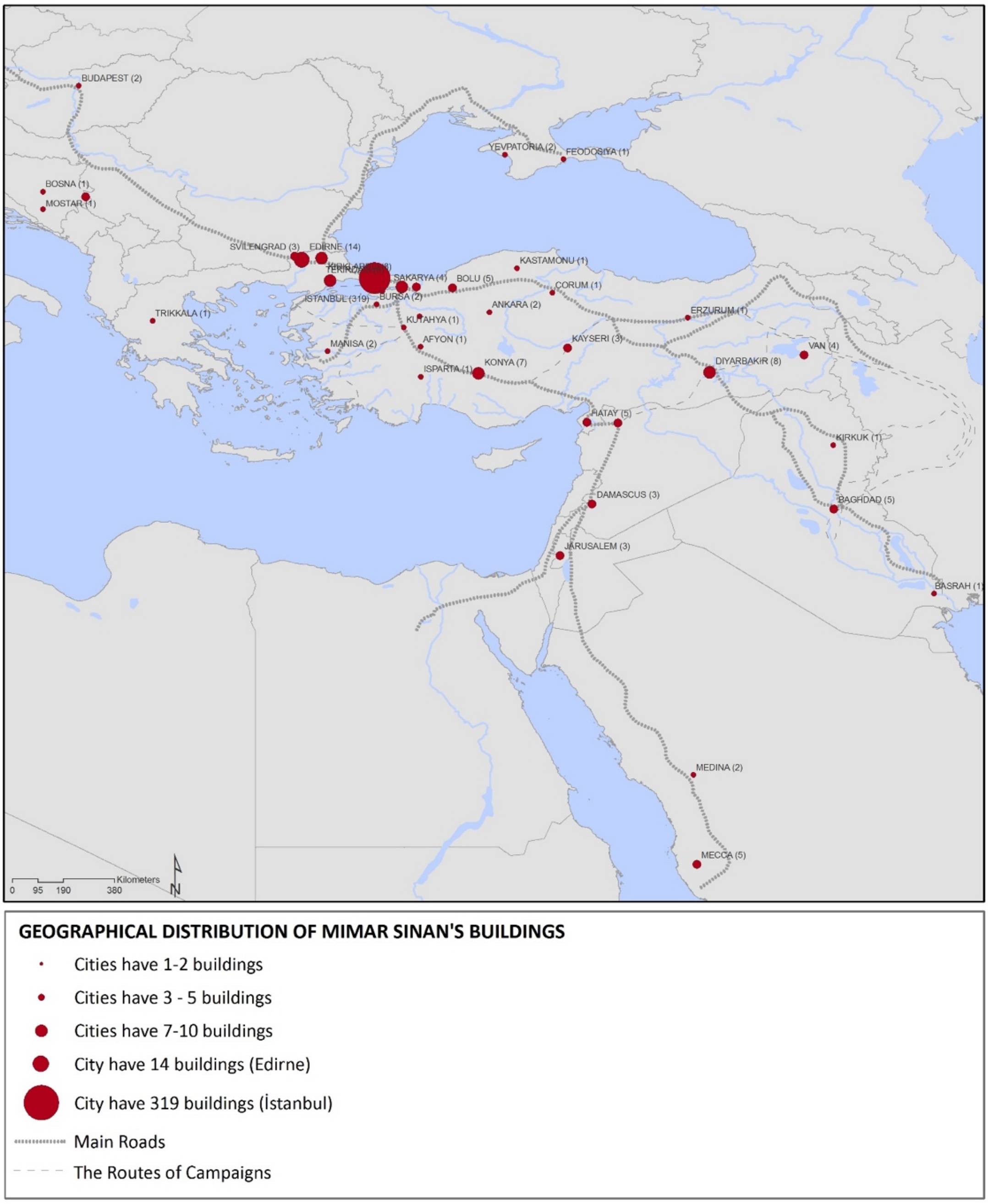


Figure 14: Geographical Distribution of Mimar Sinan's Buildings (Numbers are calculated based on (Sâi Mustafa Çelebi, 2006, pp. 353-391))

To sum up, Mimar Sinan constructed numerous buildings as a chief architect, most of which were in İstanbul. But according to Kuran, he could not have been in any place other than İstanbul while the imperial buildings were being constructed in İstanbul. He should have designed buildings in other cities and controlled the process, but he could not have been personally in the construction sites for the entire buildings including even the ones in İstanbul. He should have sent his *kalfa*s to distant places. Kuran (1986, pp. 26-27) supports this argument by stating that when a building project was finished, the chief architect should have approved it and sent it to the sultan for his approval in accordance with the rules of the Ottoman Empire. Therefore, Mimar Sinan should have spent his time in İstanbul when he was the chief architect. However, there are exceptional cases such as Selimiye Mosque that he was personally involved during its construction. Agreeing with Kuran, when we look at the geographical and numerical distribution of the buildings attributed to Mimar Sinan, it can be said that Mimar Sinan was an Istanbul architect whose working site is bounded by Edirne in the west and İzmit in the east as seen in Figure 14 above.

2.2.3. Discussion

As it is mentioned before, the aim of this section is to reveal the buildings which were personally constructed by Mimar Sinan. Accordingly, the life story of Mimar Sinan is explained together with the discussions of recorded buildings which were attributed to him in his autobiographies. These two data are gathered in timetables in order to juxtapose the dates and the locations of the buildings with the location of Mimar Sinan himself.

When it is interpreted in a chronological order by the help of these timetables, it is easily seen that Mimar Sinan cannot personally construct a building when his military service was going on. The buildings dating back before him becoming a chief architect cannot be his works but associated with his masters. On the other hand, these buildings can be the constructions that Sinan have attended when he was in the military service, being trained as an architect and joining the constructions, renovations and repairs of the buildings patronised by notables in Istanbul under the control of his masters. Therefore, it can be said that the buildings which date before 1538 cannot belong to Mimar Sinan.

After being a chief architect, he started his construction works. During this period, he should have been resided in Istanbul due to his aforementioned responsibilities as a chief architect, which obliged him to stay in İstanbul and its close vicinity. Another reason is the importance of the buildings that were under construction in Istanbul. It is less likely that Mimar Sinan has gone somewhere in Anatolia while the masterpieces of the Ottoman Empire were being constructed. Even Sai Çelebi insistently claims in Sinan autobiographies that he has actively worked on the construction sites of his major imperial buildings.

Table 5: The List of Building Complexes Possibly Built Personally by Mimar Sinan in İstanbul and Close to İstanbul

	Building Complexes	**City**	**Distrcit**	**Date**
Ordered by Sultans	Şehzade Mehmed Complex	ISTANBUL	Sehzadebasi	1548
	Süleymaniye Complex	ISTANBUL	Suleymaniye	1557
	Selimiye Complex	EDIRNE	City Center	1575
Ordered by Sultan’s Family	Haseki Complex	ISTANBUL	Haseki	1539
	Mihrimah Sultan Complex	ISTANBUL	Uskudar	1548
	Mihrimah Sultan Complex	ISTANBUL	Edirnekapi	1565
	Atik Valide Sultan Complex	ISTANBUL	Uskudar	1579
Ordered by Notables of the Ottoman Empire	Sinan Paşa Complex	ISTANBUL	Besiktas	1555
	Kara Ahmet Paşa Complex	ISTANBUL	Topkapi	1565
	Sokullu Mehmet Paşa Complex	KIRKLARELI	Luleburgaz	1569
	Sokullu Mehmet Paşa Complex	ISTANBUL	Kadirga	1572
	Zal Mahmut Paşa Complex	ISTANBUL	Eyup	1577
	Şemsi Ahmet Paşa Complex	ISTANBUL	Uskudar	1580
	Kılıç Ali Paşa Complex	ISTANBUL	Tophane	1580

Therefore, it can be concluded that the buildings which were directed and constructed in Istanbul and its vicinity close to Istanbul were constructed by Mimar Sinan himself (Table 5). Additionally, the buildings that were specifically ordered by the sultan and his family should also have been constructed by himself. Furthermore, it is important to remember that the buildings, which are important for the prestige and power of the empire and its notables, were most probably constructed under the control of Mimar Sinan, such as the buildings commissioned by grand viziers, grand admirals, provincial governors and administrators and for military officers of the imperial council. Nevertheless, it is really difficult to claim that the buildings manifesting the prestige and power of the notables constructed in a city other than Istanbul were constructed personally by Mimar Sinan. But it would not be wrong if it is claimed that these buildings were designed by Mimar Sinan.

Although further studies should be undertaken to identify the buildings that were personally constructed by Mimar Sinan himself, it is clear that he has designed the buildings and controlled their construction when he was a chief architect. On the contrary, it is also obvious that he could not have been personally in the construction site for all these cases since even in İstanbul there were many constructions which were continuing at the same time (Figure 7). Thus, he should have received support from his *kalfa*s. For instance, for the case of Kılıç Ali Paşa Complex in İstanbul Tophane, there are discussions between the scholars who claim the complex should be associated to Mimar Sinan (Necipoğlu, 2005, p. 428) and who defend that this complex should belong to another royal architect (Kuban, 1997, p. 117). Although, the complex is included in all lists in the autobiographies of Mimar Sinan, the unconventional plan layout of the mosque causes this discussion. Thereby, it should be always in a corner of the mind that the construction works in Classical Ottoman Architecture was not a single man's issue. It was an organizational work which was continued under the control of the royal architects which were led by a chief architect, by Mimar Sinan in between the dates 1538-1588.

When all his life story, before becoming a chief architect, is considered, it is obvious that he has developed his knowledge and talent by working on the constructions during the campaigns and constructions and/or repairs of the palaces, pavilions and mentions of the notables of the empire under the control of his masters. He has sifted through the architectural examples of the earlier periods and tried to understand the logic behind the site, structure and form. Afterwards, during his chief architecture period, he designed and constructed hundreds of buildings, collating his previous practices with these ancient and earlier period's construction traditions in a distinctive creative manner. He left the imprints of his distinctive architectural idiom on all over the Ottoman Empire territories from the Danube to the Tigris and also, he formed the latter character of the Ottoman Architecture (Necipoğlu, 2013, p. 15).

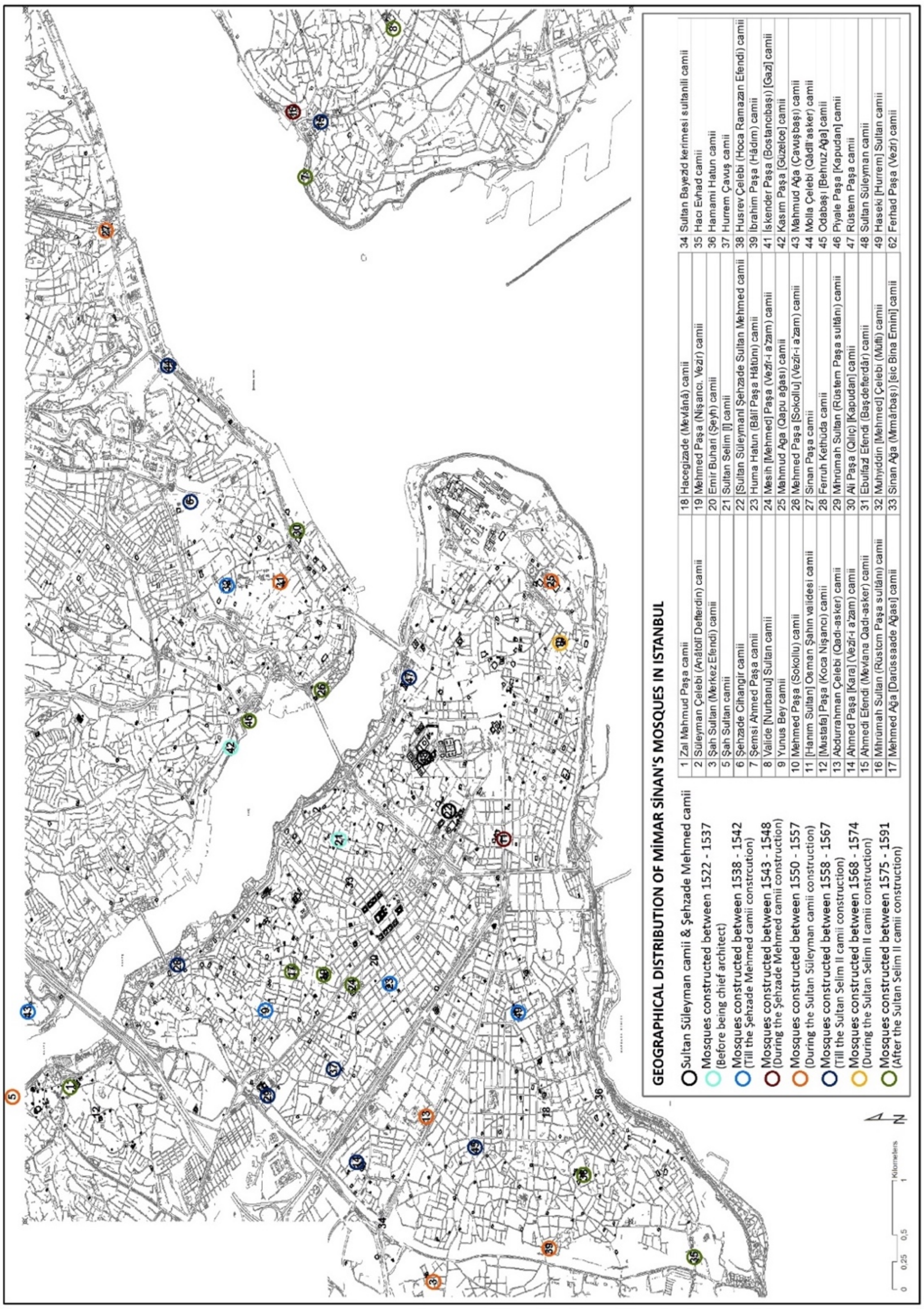


Figure 15: Geographical Distribution of Mimar Sinan's Mosques in İstanbul showing the Different Time Period's Constructions

2.3. Construction Technique In 16th Century Ottoman Architecture with Emphasis on Mimar Sinan

The construction technique of the 16th century Ottoman Architecture, which may be also interpreted as the construction technique in Mimar Sinan's buildings, has always been an important research topic. However, it is too difficult to reconstitute the technique and process with the limited knowledge (Tanyeli G. , 2009, p. 99). This limited knowledge primarily consists of the written documents which were recorded during the construction of the monumental buildings[25]. Although the records belong to buildings that were constructed in different centuries, the construction technique continued to be used even in the 18th century (Akıncı, 1998, p. 5). Besides, the autobiographies of Mimar Sinan also give some details of his significant buildings such as the Bridge of Büyükçekmece, Selimiye Mosque and Kırkçeşme Aqueducts[26]. In addition, current studies searching for the construction technique are the other sources. These studies try to clarify the construction technique and process of the era by studying the construction technique of existing buildings and their traces through site surveys and literature survey.

Therefore, these studies which are listed in the Table 19 (App. II) are invaluable since they comprise original data. Unfortunately, the present day measured drawings and the documents of the intervention processes do not comprise the information regarding the construction technique.

However, during the restoration processes, documenting the new findings related to the original details of the structure would construct a priceless knowledge. Thereby, the knowledge about the construction technique in the 16th century Ottoman Architecture is gathered through the historical written documents and contemporary researches. This information is briefly summarized in relation to the construction process of the building components. These components are categorized as the preliminary works before construction, infrastructure with the foundation,

[25] (Ahmet Efendi, *Tarih-i Cami-i Nur-u Osmani,* 1335-37); (Ca'fer Efendi, *Risâle-i Mi'mâriyye*, 1614); (Barkan, *Süleymaniye Camii ve İmareti İnşaatı 1550-1557*, 1972).

[26] (Sâî Mustafa Çelebi, 2006) See Chapter 2; Section 2.1

upperstructure with supporting and spanning members, superstructure with transition and covering members and lastly the architectural elements which are all defined in the methodology of the thesis research in Chapter 1.

2.3.1. Preliminary Works Before Construction

The preliminary works of the construction process are almost the same before the modern tools were started to be used. These works include the preparation for the construction and arrangement of the building site. Firstly, the selected building site was measured by the architects to prepare a topographic map. This work, which was called *mesaha*[27], was held by the help of the measurement tools such as *iki ucu mühürlü urgan*[28] and *havaî terazi* (Tanyeli & Tanyeli, 1993, p. 126). This topographic map was used to provide a base for design process of the building. According to Necipoğlu (1986, p. 243), grid-based ground floor plans together with sketchy elevation drawings, were used to represent the design ideas and guide constructions. In addition, models[29] should have been prepared for the remarkable buildings of the Sultans. As Necipoğlu (1986, p. 231) gives examples from 15th and 16th century plan drawings, it can be deduced that Mimar Sinan has also used this subdivided, traced, gridded papers for preparing ground floor plans of his buildings (Figure 16). According to Barkan (1979, p. 461), the only paper purchase recorded in the existing documents were the purchase of the *varak-i Istanbul* folios are the only drawing paper which were recorded in the existing documents in between July 13, 1555 and September 10, 1558.

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[27] *Mesaha:* measuring or surveying the piece of land (Redhouse, 1861, p. 785).

[28] *İki ucu mühürlü urgan:* A rope which is made of silk and has 75 *terzi zirai* (75x68cm) length. The unit dimensions are marked with the knots on the rope. It was used for measuring the length (Tanyeli & Tanyeli, 1993, p. 126).

[29] The model of Süleymaniye Mosque can be seen in the miniatures in the Surname-i Hümayun; a 16th century document that explains the festivals during the circumcision feast of the son of Sultan Murad III (Surname-i Hümayun. (1344). 432 vr. Topkapı Sarayı Müzesi Kütüphanesi).

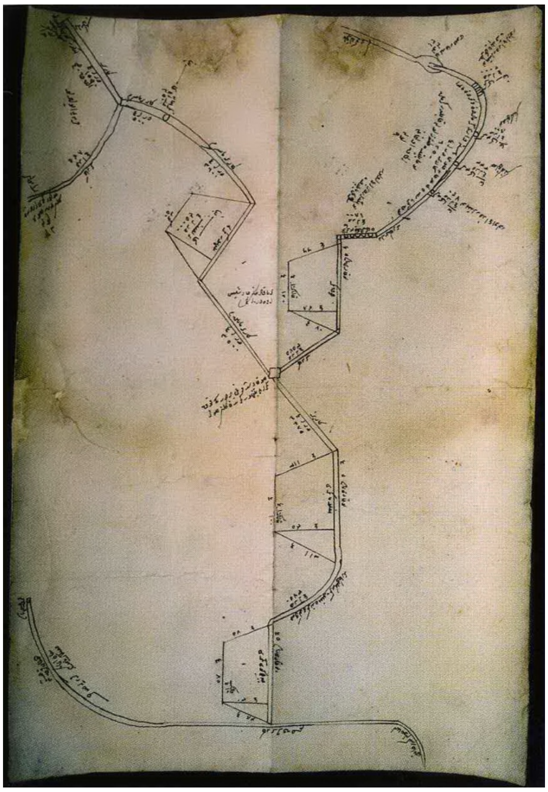
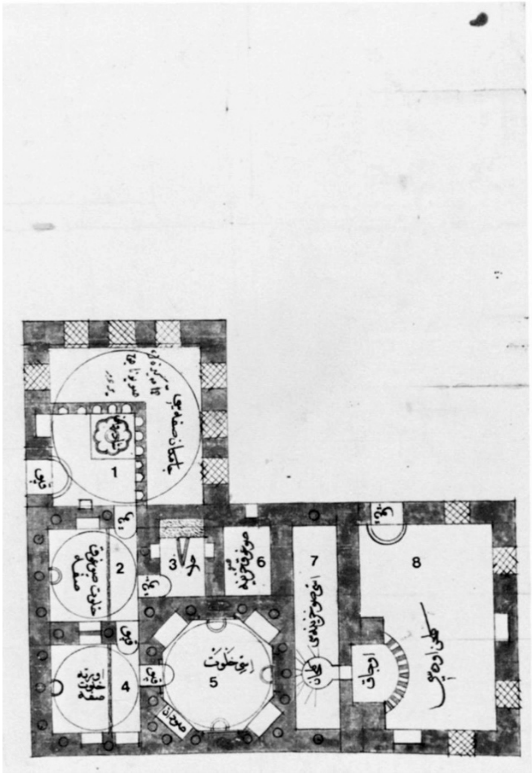
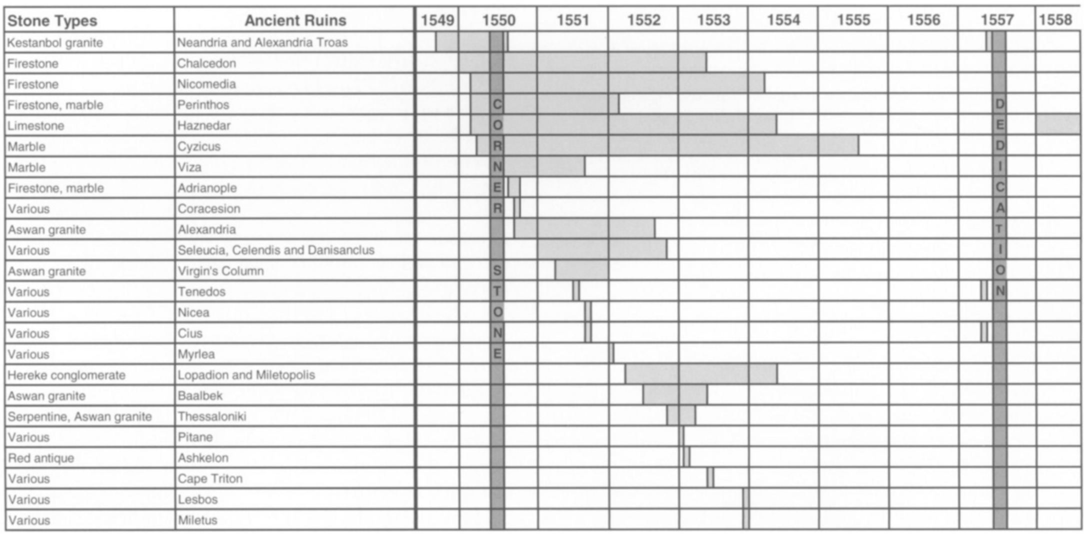
 

Figure 16: (Left) The survey drawing of Kırkçeşme water supply system belong to Mimar Sinan in early 1560s (Necipoğlu, 2005, p. 127); (Right) Plan f a *hamam* in late 16th century from Osterreichische Nationalbibliothek Vienna Cod. 8615, fol. 151r ((Necipoğlu, 1986, p. 225)

Subsequently, the building site should have been arranged according to the drawings and regulations. The pre-existing buildings in the building site were demolished and the storages for the materials, the ateliers for the special crafts such as carpentry, smith craft and offices for the supervisors were prepared (Akıncı, 1998, p. 22). Concordantly, the employee and material supply were the other issues that should have been solved during the entire process from the beginning. It can be observed in the timetable below (Table 6), Aktuğ and Çelik (2006) evidenced that there should be a continuous material supply management according to the process of the construction. Barkan (1972, p. 51) also mentions about these preparations before the beginning of constructing the foundation of Süleymaniye Mosque, such as the purchases of *odtaşı,* which was used for the foundations, in the beginning of 1550s. Moreover, 16th century decrees containing orders calling for compulsory service were sent to *kadı*s of various regions for the construction of Mimar Sinan's buildings. The decrees gave orders to find and send the specialized workmen and provide convenience for material supplies.

Table 6 The stone acquisition timetable of Süleymaniye Complex in İstanbul ((Aktuğ & Çelik, 2006, p. 257)



The main building material was *küfeki*[30] (a type of limestone) which is easy to obtain, carve and dress for Mimar Sinan's buildings. The limestone quarries, which were in Bakırköy, Yeşilköy, Bahçelievler, and Haznedar in İstanbul, were state owned properties. For the other cases which are in smaller scales and far from Istanbul, the stone should have been supplied from private enterprises. Another significant stone for Mimar Sinan's buildings was *odtaşı*[31] *(seng-i ateş),* which is a dacitic tuff and mainly obtained from the state-owned quarries in Karamürsel. The white marble, which is also known as Marmara marble, was also an important building material. As it can be understood from its name that the white marble was quarried from state owned quarries in the Marmara Island. In addition, the ancient archaeological sites served as marble and lime reserves for the Ottoman constructions in the era of Mimar

[30]*Küfeki*: Bakırköy mactra (mollusk-shell) limestone (Aktuğ & Çelik, 2006, p. 259). *Kefeke/köfeki/küfeki:* from Arabic *köfek*, 'porous stone like a sponge' For further information about the properties of *küfeki*, see (Erguvanlı & Ahunbay, The Building Stones of Sinan's Monuments in Istanbul, 1989).

[31] *Odtaşı*: *Seng-i ateş,* a coarse sandstone resistant to fire. For further information about *odtaşı,* see (Ahunbay Z. , *Karamürsel'in Od Taşı ve Tarihî Yapılarda Kullanımı*, 2016) and (Ahunbay Z. , *Osmanlı Mimarlığında Od Taşı*, 1995)

Sinan (Tanyeli & Tanyeli, 1993, p. 128). Consequently, some special stone blocks for certain cases were ordered from ancient sites. For instance, it is recorded in the *Tezkire't-ül Bünyan* that, two of the columns belong to the courtyard arcade of the Süleymaniye Mosque had been brought from Alexandria and Baalbek (Sâi Mustafa Çelebi, 2002, p. 65).

In addition, due to being in different geographical regions, the main construction material, limestone, may vary in its morphological and physical features. For instance, in Süleymaniye Complex in Damascus, Güçhan and Kuleli (2009, p. 117) conveys the physico-mechanic features of the used limestone which is warmer yellowish than the limestone used in the İstanbul cases. Again, as it can be seen in the photograph below (Figure 17), the use of different stones may be encountered in the Mimar Sinan's building which are in different geographical regions. The colours of the stones may change due to different types of stones used in these buildings.

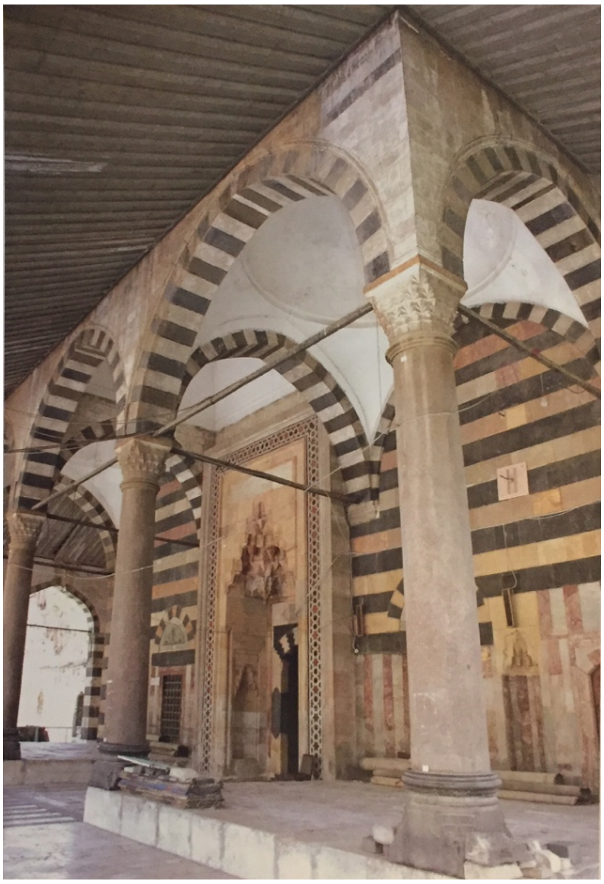


Figure 17: The last prayer hall and the entrance façade of the mosque in Damascus Süleymaniye Complex ((Şahin Güçhan & Kuleli, 2009, s. 56)

The other main building material for Mimar Sinan's buildings was terracotta based material as brick[32]. Brick was supplied by purchasing from the stock of merchants or by ordering from private enterprises or it was manufactured in the plants or enterprises run as a trust by the State on contract (Akıncı, 1998, p. 39). For Sinan's buildings, timber was another building material, which is a common substance found in nature. Furthermore, iron was one of the significant materials used in the constructions of Mimar Sinan. It was brought from the Balkan Peninsula specially from Samakov. The small iron members such as nails were also able to be produced in the ateliers on site (Tanyeli G. , 1990, pp. 6-17). Likewise, lead which was a critical component, was also brought from the Balkan Peninsula (Tanyeli & Tanyeli, 1993, p. 130).

2.3.2. Infrastructure

For the purpose of the thesis, the infrastructure is defined as the constructions below the ground level of the building as a phase of the construction process regarding the positions and the functions of the components.

<u>The Foundation</u>

In the 16th century, or in Mimar Sinan's era, the arranged construction site should have been flattened for the in-situ implementation of the building layout to its exact position on the site. In order to assign the borders of the building on the site, düzen *ipi*[33] was used (Tanyeli & Tanyeli, 1993, p. 130). The scholars[34] explain the construction of the foundations based on the historical documents. They agree that the excavation of the site was continued until reaching the bedrock or dense soil. They also claim that for the cases in which the building site was on a loose soil and it was

[32] For further information about brick see (Sönmez N. , *Osmanlı Dönemi Yapı ve Malzeme Terimleri Sözlüğü,* 1997, pp. 106-108)

[33]*Düzen ipi:* A gridded mesh which consists of tied ropes in order to implant the building measurements on the construction site (Ca'fer Efendi, 2005, p. 111).

[34] (Ahunbay Z., 1988, pp. 532-533); (Tanyeli & Tanyeli, 1993, pp. 130-131); (Akıncı, 1998, pp. 54-66)

impossible to reach the dense soil, the wooden consolidating piles with iron shoes[35] were driven into the soil (Figure 18). Over these dense soil and/or consolidated soil, a timber grillage (*iskara*[36]) with a *horasan* mortar layer was anchored.

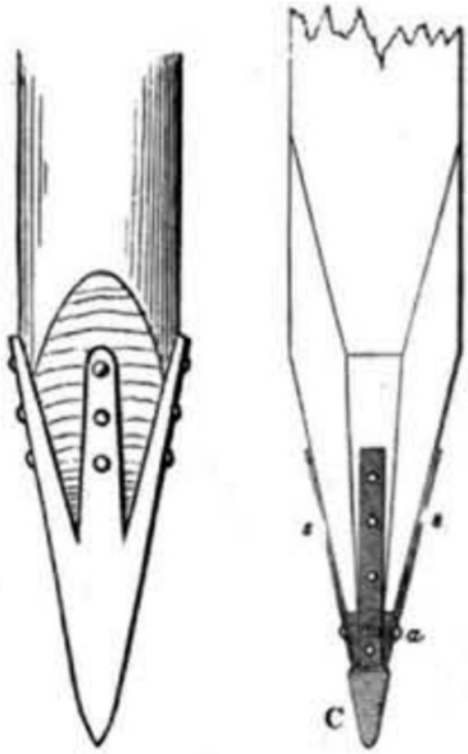


Figure 18: The wrought iron shoes with an ordinary form (Rivington's Notes on Building Construction, 1901, s. 226)

The scholars explain that this timber grillage with mortar was for preparing the levelled base in order to construct the foundation. In addition, this timber grillage was also for tying the consolidating piles to each other and confirm the *horasan* mortar layer in order to uniformly distribute the load to the ground. This *horasan* mortar layer which is about 30-40 cm, acted as a raft for the foundation. The continuous foundations were started to be laid on this raft layer. The mentioned sources state that the foundations were generally constructed with *odtaşı* and limestone with progressively narrowing layers of encasements. When the foundation level reached to the ground

[35] For further information about the consolidating piles see (Rivington's Notes on Building Construction, 1901, p. 226).

[36] *Iskara/ıskare/ızgara/ızkara:* A grid composed of timber linear elements which uniformly distribute the load carried by foundations to the soil (Arseven C., 2017, p. 27)

level, another levelling was needed to be done to continue the construction of the upperstructure.

Accordingly, the excavated foundation trenches which were dug for the foundation should have been filled after the foundation level was reached to the ground, since the excavated parts of the soil should also have been on the ground level to continue the construction of the upperstructure. By examining the previous studies and records, it can be suggested that for the buildings, which have deep foundations due to the loose soil properties, vaulted galleries were constructed (Ahmet Efendi, 1335-37); (Dabanlı, Çılı, & Kâhya, 2013). The galleries may have also provided channels for the installations (Akıncı, 1998, p. 57) and rooms or cisterns in the basement (Aksoy, 1982, p. 60) (Figure 19).

Figure 19: Galleries under Sultan Selim I Mosque (Bayraktar, 2011, p. 117)

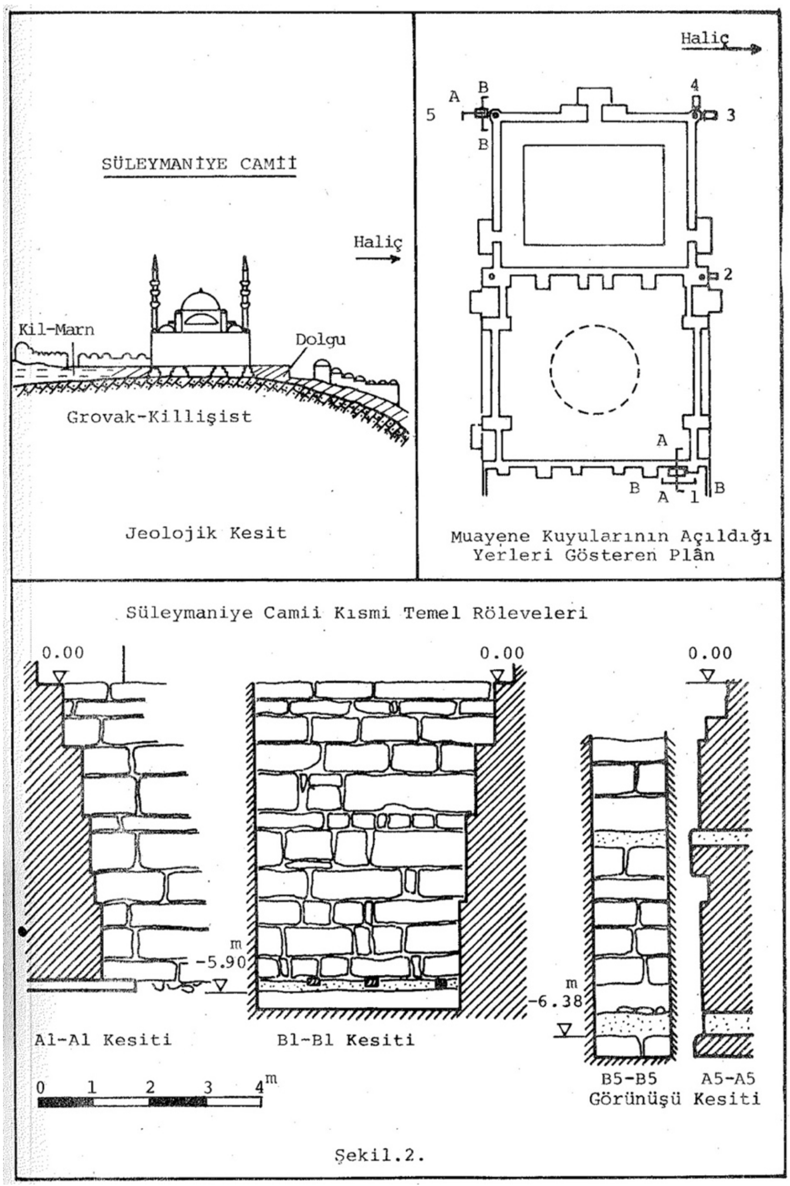


Figure 20: Measured Drawings of Süleymaniye Mosque’s Foundation (Peynircioğlu, Toğrol, & Aksoy, 1981, p. 43)

The inspection wells, excavated around Süleymaniye Mosque by the Directorate General of Foundations in 1957, shed light to the scholars for the interpretation of shallow foundations over dense soil. The measured drawings were drafted during this excavation (Figure 20). Additionally, according to Mustafa b. Celal, who is a historian in 1550s, in his chronicle titled “*Tabakat'ul-memalik ve derecat'ul-mesalik*”, Mimar Sinan constructed vaulted platform to level the base on which the mosque was constructed (Aktuğ & Çelik, 2006, p. 252).

Furthermore, *Tarih-i Cami-i Nur-u Osmani,* written by Ahmet Efendi in 1916-18, also gives clues about the foundations over loose soil. By the help of this publication, researchers have drafted measured drawings of the foundation of Nur-u Osmaniye Mosque with interpreting the unseen parts of the foundations (Figure 21).

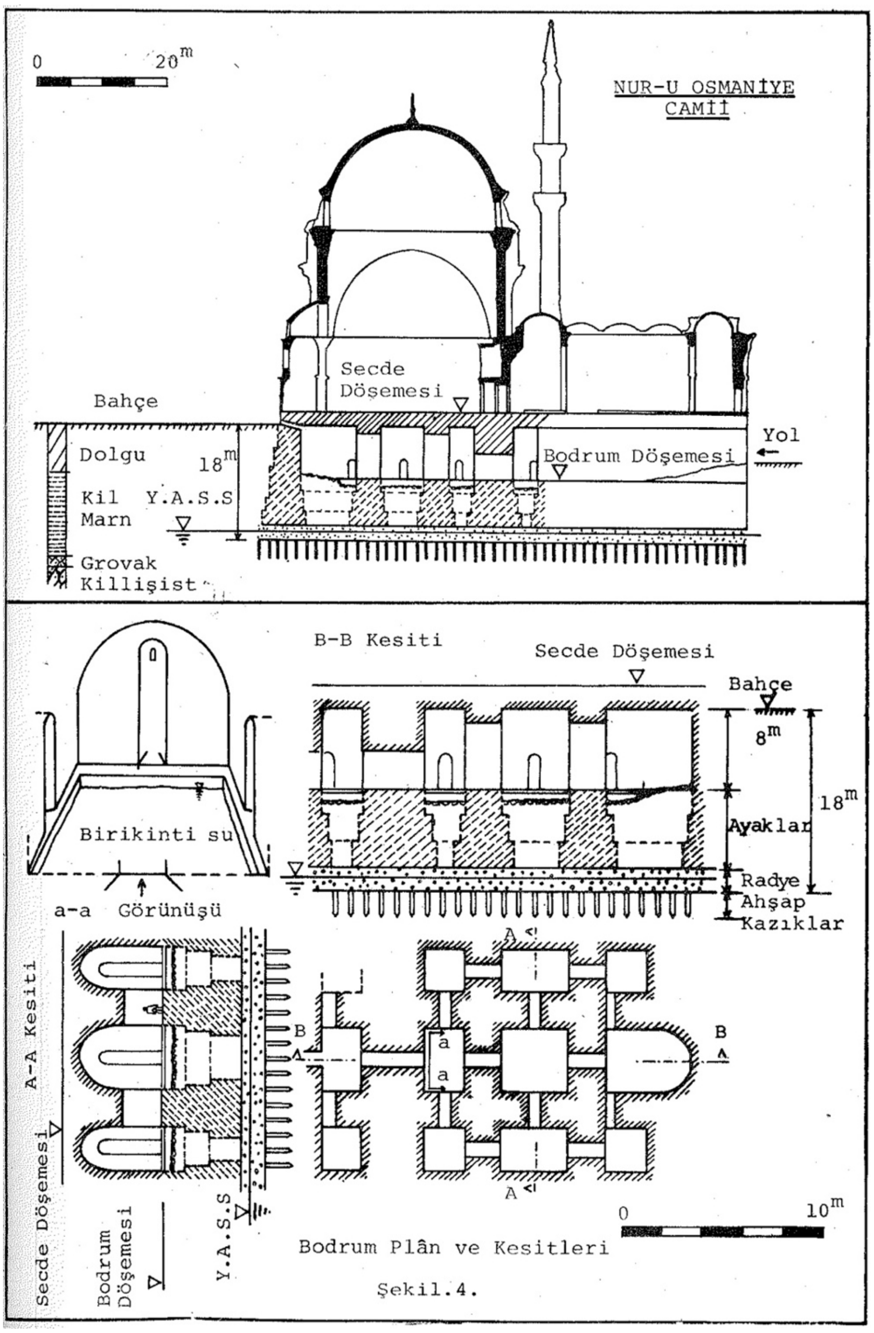


Figure 21: Measured Drawings of Nur-u Osmaniye Mosque's Foundation (Peynircioğlu, Toğrol, & Aksoy, 1981, p. 45)

As it is seen in the drawings above (Figure 21), vaulted galleries were most probable solutions for deeply excavated infrastructures. This possibility is also supported by Bayraktar (2011, pp. 112-119), who defends that in the foundations of the Ottoman mosques, there are wells and galleries to provide a natural ventilation and prevent the dampness problems. Thereby, in the light of these examples it can be interpreted that Mimar Sinan might have preferred to construct deep foundations over loose soils which were consolidated with timber piles and raised with vaulted galleries and he might have preferred shallow foundations if the soil was dense or bedrock and suitable for directly laying the raft over it.

2.3.3. Upperstructure

For the purpose of the thesis, the upperstructure is defined as the constructions above the ground level until the level where the curvilinear components of the superstructure start. Again, the positions and the functions of the components are taken into account for phasing the construction process. Floors, spanning members and supporting members are these components belonging to the upperstructure.

<u>Floor</u>

For this thesis, floors are defined as the walkable surfaces which sit on the ground level of the buildings. Thus, ground floors, could have been constructed inside the walls, like in the *harim*[37] sections, or outside, like in the last prayer halls (space for late arrives). Due to the scarcity of the knowledge about the construction technique of the floors in all Ottoman Architecture, Dr. Gülsüm Tanyeli's[38] oral explanations, which were noted down during her course on the Construction Technique in Ottoman

[37] *Harim:* The mosques' interior space which is for prayer between the entrance and the *mihrab*. This large prayer hall is suitable for the crowd to pray together (Devellioğlu, 2013, s. 381).

[38] Assist. Prof. Dr. Gülsün Tanyeli is an academic member of İstanbul Technical University, Faculty of Architecture, Graduate Program in Restoration. The name of Tanyeli's course which was attended in 2015 spring semester, was "*Osmanlı Mimarlığında Yapım Teknikleri*" (Construction Technique in Ottoman Architecture).

Architecture, are creditable. The knowledge that she conveyed to her students are the experience-driven information. According to her, after the construction of the foundation was finished, a levelling should have been done to continue the construction of the upperstructure. Therefore, before laying the flooring unit materials such as brick[39] or stone plates, the site should have been filled and aligned with the first encasement level (Figure 22). This is because that after this encasement level, the building walls and flooring were started to be built up and there is a need to have an evened site. The walls should have been located on their exact locations on top of the first encasement to construct the entire upperstructure with the precise dimensions. Thus, the flooring unit materials are thought to be laid on the levelled site. Furthermore, Tanyeli adds that, this floor laying was constructed by pining down into a thick mortar layer, which may have also been consolidated by the timber grillage (*iskare)* to set a uniform base.

Figure 22: The floor of the entrance porch of Mehmet III Tomb (by the author, 2015)

[39] The bricks for floor laying are the specialized ones named *Şeşhane* brick. They are hexagonal bricks with two standardized dimensions. The dimension between the bigger (*kebir*) one's opposite edges is 46,5cm and for the smaller one this dimension is 37,2cm (Sönmez N., 1997, p. 108).

Supporting Members

Supporting members of the buildings are defined as above-ground load bearing elements, which transfer the load directly to the foundation. These members are vertical elements such as walls, piers and columns. These vertical elements, which are very high structures, should have necessitated scaffoldings for their construction (Tanyeli & Tanyeli, 1993, p. 131).

Wall as Supporting Member

The walls were masonry constructions composed of stone and/or brick unit materials, which were jointed with lime based *horasan*[40] mortar. The thickness of the walls was changing according to the load they bear. According to Ahunbay (1988, p. 534), the thickness of the masonry walls might have changed between about 65cm-200cm in Mimar Sinan's buildings. She says the walls of the buildings which are composed of small unit spaces covered with small domes, such as *kervansaray* and*, medreses* the wall thickness varies between 65-85cm. She gives the example of İzmit Pertev Paşa Mosque, whose dome diameter is 16,75cm, as one of the thickest wall with 203cm.

In Sinan's buildings in the 16th century, the types of the walls can be grouped based on their unit materials. The simplest wall construction technique was rubble stone masonry walls with timber tie beams (Ahunbay Z. , 1988, p. 533). The stone units, used in this type, were not dressed, they were used as they were, without a dressing. The jointings of this type of walls might have been coincidental; whereas these walls were levelled at certain height intervals by means of timber tie beams (Figure 25). Accordingly, Akıncı (1998, p. 88) adds that the corners or the ends of these walls were tried to be fasten with more precise stone units (Figure 23).

[40] *Horasan:* Fragmented terracotta substances such as brick, tile, pipe pieces which are in red color. When it is mixed with the lime, they compose a mortar as strong as the cement mortar (Arseven C. , 2017, p. 75). This mortar is called *horasan* mortar of which the ingredients are *horasan*, lime, water and sometimes sand (Sönmez N., 1997, p. 49).

Figure 23: (Left) Drawing of a rubble masonry wall in *Medrese* in Süleymaniye Complex, İstanbul (Akıncı, 1998, p. 89) (Right) Back wall of the *Medrese* in Süleymaniye Complex, İstanbul (by the author, 2015)

The other types of wall constructions were composed of two faces or skins, which were laid up in masonry fashion to a modest height and then, the space between them was filled with rubble stone and pieces of stone and brick adhered by *horasan* mortar. The scholars[41] reach a consensus and classify these types of walls considering the used unit materials on the faces. According to the stone dressing on the face, the stone masonry ones are grouped as rough-cut stone masonry and fine-cut / cut stone masonry. The technique of constructing these two types are almost the same. The reason behind the preference among these two due to economic opportunities.

Figure 24: Selimiye Mosque in Edirne with fine cut stone masonry (by the author, 2006)

[41] Tanyeli & Tanyeli, 1993, p. 132; Ahunbay Z., 1988, p. 534; Akıncı, 1998, p.67; Tayla, 2007, p. 185.

The fine-cut stone masonry was usually used for the significant buildings, representing the prestige of the donor, as seen in the photograph above (Figure 24). If these stone units are thought as rectangular prisms, the fine cut dressing was applied on the faces which affects the exterior wall surface. As it can be seen in the drawings below (Figure 25), this fine stone dressing was applied on the whole face facing to the wall exterior. That is, for four lateral faces of the rectangular prism stones, fine cut was applied for about 15cm depth through the wall inside. On the other hand, the rear face of the stone which is inside the wall was roughly shaped or kept as it was for better adhesion (Tanyeli & Tanyeli, 1993, p. 132).

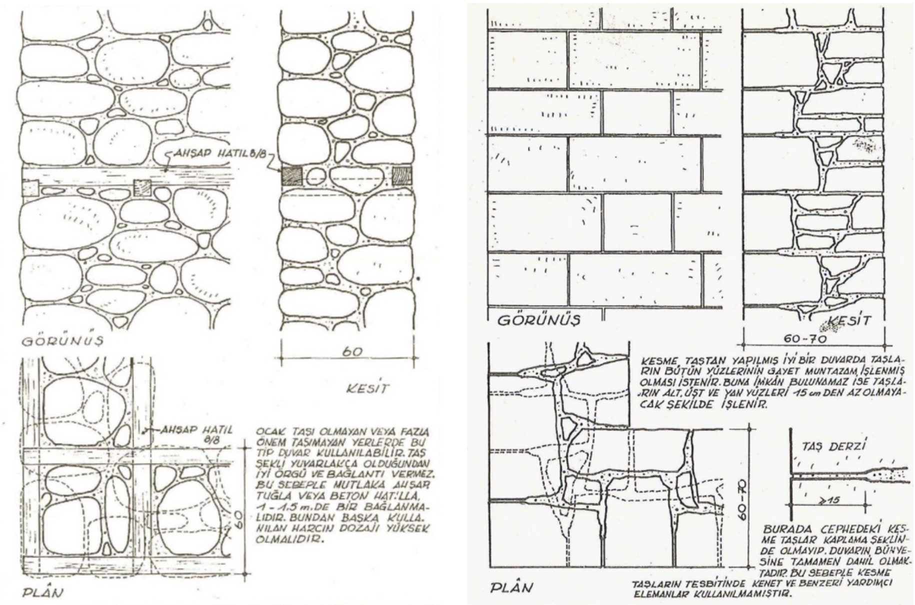


Figure 25: (Left) Rubble Masonry Wall (Eldem S. H., 1973, p. B2.1). (Right) Fine Cut Stone Masonry Wall (Eldem S. H., 1973, p. B3.1)

The cut stone masonry walls were constructed with adjacent jointing with very thin mortar layer in-between. As it can be seen in the drawings below (Figure 26), for increasing the strength of the bonds between stone units, usually iron clamps, rarely iron dowels that were anchored by melted lead were used[42]. Iron dowels were used to

[42] Tanyeli G. , 1990, p. 45. For further information about iron clamps and dowels see: Tanyeli, G. (1990). *Osmanlı Mimarlığında Demirin Strüktürel Kullanımı (15.-18. Yüzyıl).* İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).

strengthen the walls in case of the lateral loads caused by cantilevered units such as eave cornices (Tanyeli & Tanyeli, 1993, p. 133).

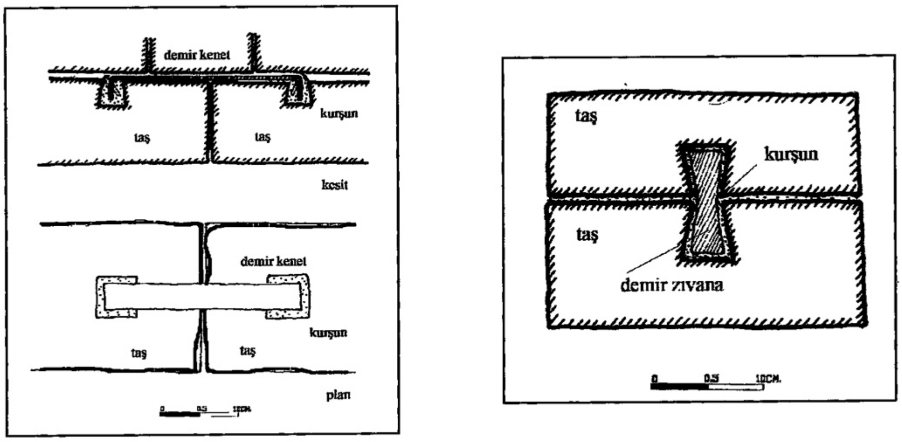


Figure 26: The details of clamp and dowel (Akıncı, 1998, p. 68)

According to the scholars mentioned above, the other type is the rough-cut stone masonry. For this case, Akıncı states that, due to the roughly dressed stone units, the horizontal jointings between the stones were aligned by means of thicker (about 1-3cm) jointings. Akıncı also adds that, this type of walls was generally plastered and usually used for the interior wall surfaces of the buildings (1998, p. 84).

The other type of masonry walls mentioned by the scholars is alternating rows of brick and stone[43]. Ahunbay states that 2/3 rows of bricks together with 1 row of stones was the general order for Mimar Sinan's buildings (1988, p. 534). She mentions that there are also exceptions such as Haydar *Hamamı* in İstanbul with vertical brick use in the walls composed of alternating rows of brick and stone, and the use of 3 rows of stone and 2 rows of brick in Haseki Mosque in İstanbul.

The common features for these three types were the mortared aggregate infill between two facing skins and the tie beams (*hatıl*) which tied all around the wall at certain heights. The tie beams, which are laid inside the walls, composed of two parallel rectangular cross sectioned longitudinal continuous timber elements and shorter timber ones (*püştivan)* nailed perpendicular to longitudinal ones (Figure 27).

[43] For further information see: Batur, A. (1970). Osmanlı Camilerinde Almaşık Duvar Üzerine. *Anadolu Sanatı Araştırmaları*, 2, 135-208.

Bayraktar (2011, s. 139-143) suggests that these tie beams made of either timber or iron are the most crucial components for earthquake resistance of masonry buildings. These tie beams created levelling for the whole structure. The tie beams, which were laid and anchored longitudinal and transverse between these levels, strengthened the masonry structure to resist the lateral loads causing tension force in case of earthquakes. Thus, it can be suggested that, at certain height intervals the upperstructure components should have been tied by means of horizontal tension members to provide a tied levelling and continuously bonded entire system.

Figure 27: The photograph showing how the joint between a tie beam and a *püştivan* is. (by the author, 2014)

Subsequently, Arun states that tie beams also fastened the two faces of the masonry walls to prevent the swelling of the wall and the disintegration of the wall's two faces under vertical loads. Arun (2005, p. 5) also adds that the height intervals between two tie beams should have been about 150cm which is about 2 *arşın.* Tanyeli and Tanyeli (1993, p. 135) also support these two scholars by stating that there should be at least four levels for a monumental masonry building. According to them, tie beams were mainly the timber ones. They state that iron ones have started to be used after the 16th century. Moreover, they mention about the plumb (*şakül/çekül),* which is an instrument for verticality control for the walls. They also state that the level control for horizontality was achieved by *havai terazi,* which was defined previously.

Additionally, the walls with mortared rubble infill between two faces could have been also constructed with different facing types (Akıncı, 1998, p. 67). Due to the economic and aesthetic concerns, the faces on the exterior might have been cut stone and the interior faces might have been rough-cut stone (Tanyeli & Tanyeli, 1993, p. 132). As it can be seen in the photograph below (Figure 28) Mimar Sinan was used alternating rows of brick and stone on the exterior of the wall and rough cut stone masonry on the inside face of the wall. It can be deduced that the exterior surface of the wall is exposed, whereas inside surface of the wall was most probably plastered. As being a secondary building as regard to the more important buildings such as mosques these buildings such as *darülkurra and sıbyan mektebi* were mostly constructed with different facing types and plastered inside wall surface.

Figure 28: The *Darülkurra* of Üsküdar Atik Valide Complex (1570-79) (By the author, 2014)

Mimar Sinan was used all of these wall types in his constructions. Due to the technological limitations, the construction technique of the walls, as the other building components, could not be changed rapidly. The logic behind constructing the walls, main supporting members of the masonry structures, by levelling them with certain intervals at certain heights was continued for centuries.

Pier as Supporting Member

The piers are masonry structures, which were mostly constructed by the same principles with the fine-cut stone masonry walls. There are also exceptions such as the Kadırga Sokullu Mehmed Paşa Mosque with brick courses in between the cut-stone masonry (Figure 29). Like the walls, the tie beams should have penetrated into the piers. It is known that clamps were used in order to fasten the facial stone courses, whereas it is not known whether the pins, that were vertical linear iron elements going inside the piers, were used (Tanyeli & Tanyeli, 1993, p. 134) . It is important to add here the experiences of Cansen Kılıççöte[44], who witnessed the restoration of the piers of Selimiye Mosque in Edirne. Kılıççöte orally conveyed that the facing stones of the piers were large irregular polyhedrons engaging to each other and they were fastened with clamps and the inner part of the faces were packed with regular courses of rough-cut stone, rubble and *horasan* mortar. It is thought that the engaging irregular polyhedron forms of the facing stones should have been for preventing the swelling and disintegration of the piers under tons of vertical loads.

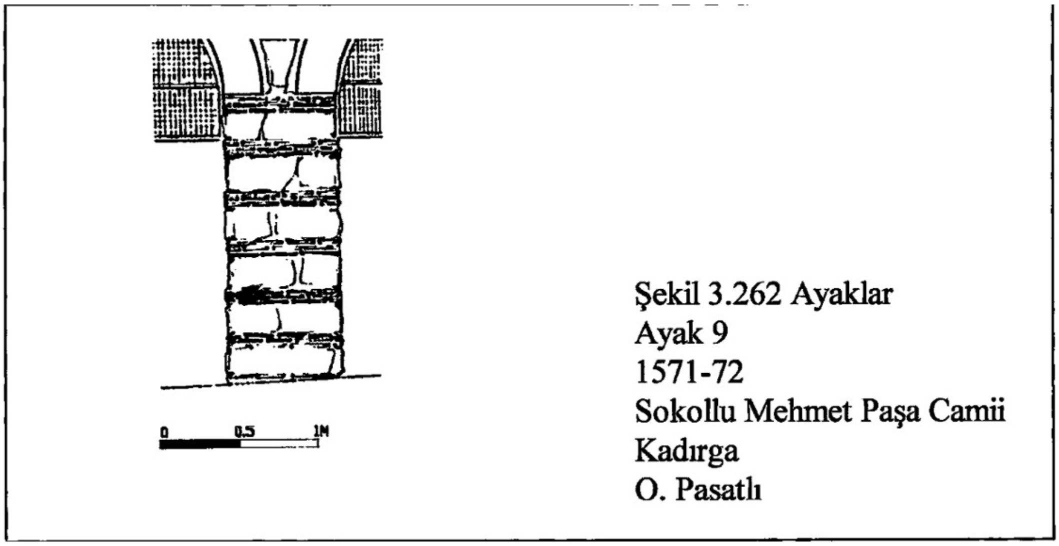


Figure 29: The drawing of Kadırga Sokullu Mehmed Paşa Mosque's pier ((Akıncı, 1998, p. 234)

[44] Cansen Kılıççöte, who is a conservation architect, used to work in the Directorate General of Foundations. During the conservation implementations were going on in 1990s, Kılıççöte was assigned as the controller for the restoration of Selimiye Mosque.

Additionally, Ahunbay (1988, p. 535) states that the piers supporting the dome of the Sokullu Mehmed Paşa Mosque in Azapkapı was constructed with marble drums having heights between 51-107 cm (Figure 30). According to her, the mortared jointings can be observed and there should be vertical iron dowels which bind the drums.

Figure 30: Piers of Sokullu Mehmed Paşa Mosque in Azapkapı ((Kadırga Sokullu Mehmed Paşa Mosque, 2011). Retrieved August 05, 2017, from http://www.3dmekanlar.com/tr/sokullu-camii.html)

Column as Supporting Member

The columns, single vertical supporting members, were mainly composed of a base, a monolithic shaft and a capital. As Akıncı (1998, p. 223) states that, there are a few exceptions with columns composed of drums such as in Azapkapı Sokullu Mehmed Paşa Mosque. These components were pinned with dowels, which were fastened with melted lead. Rings, which were made of brass or bronze, were used to hide the jointings between these components. While the monolithic shafts mainly have circular cross sections, for special cases, as Akıncı gives examples (Figure 31), the shafts with rectangular, polygonal and square cross sections were used (1998, p. 223).

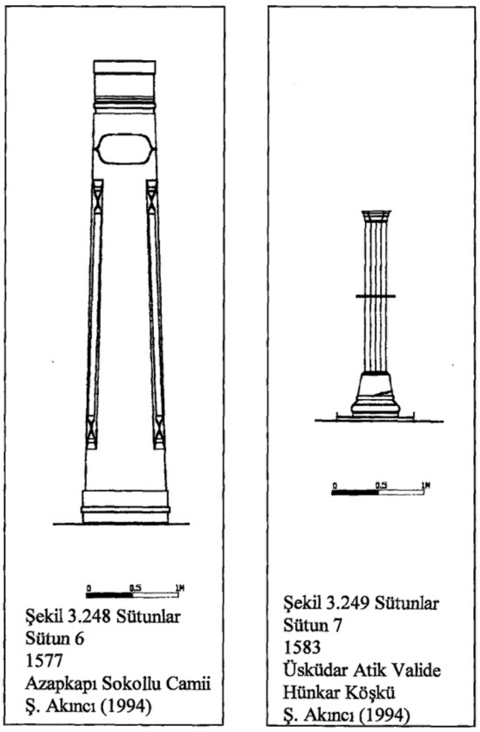
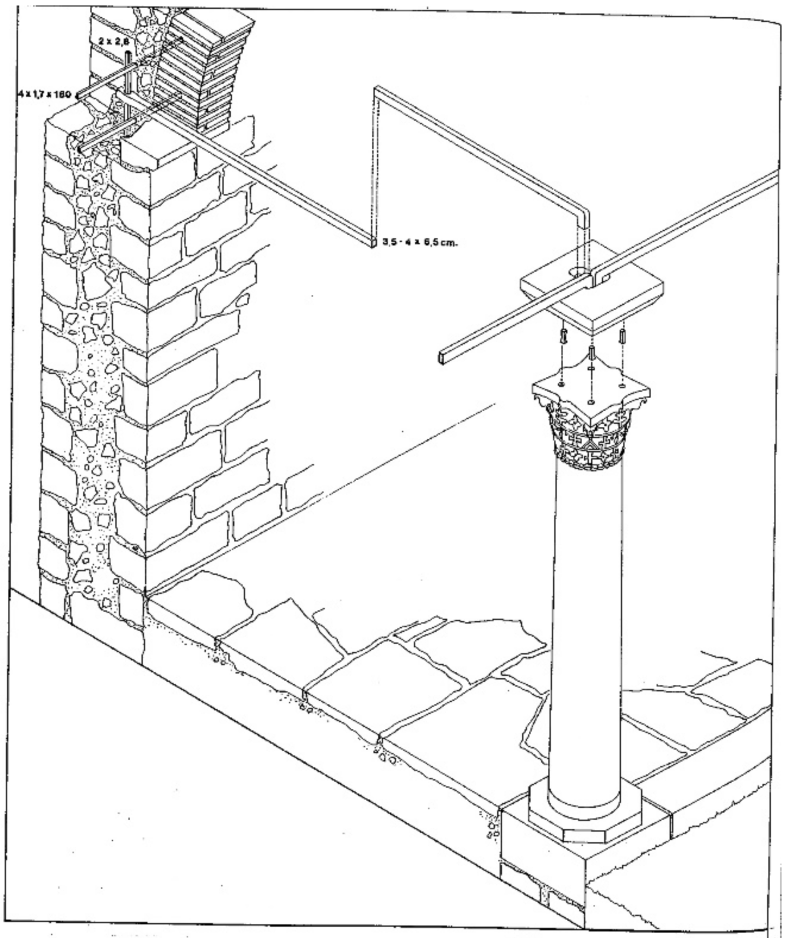


Figure 31: The column drawings of Azapkapı Sokullu Mosque and Üsküdar Atik Valide Sultan Mansion in İstanbul(Akıncı, 1998, p. 228)

The columns were generally used for bordering and constituting semi open spaces such as arcades, last prayer halls and the spaces (*yan sahın*)[45] under the *mahfil* floors and opening to the central space defined by the dome. Therefore, serial columns were placed on the same direction with specified intervals. They were connected to each other with iron ties as seen in the figure below (Figure 32), which are explained in the part about arches below. Like the walls, the construction technique of the columns in Mimar Sinan's buildings have the same principles with its pioneers and posteriors. It can only be said that the columns, which were composed of drums pinned with iron dowels, is hardly witnessed by the scholar.

[45] Although the term "side nave" and "side aisle" (Kuban, 2010) approaches "*yan sahın*" to define the formation of prayer halls surrounding the central space in the mosques, the lack of correspondence in the meanings of these terms should be acknowledged both historically and architecturally.



7. Davutpaşa Medresesi revak gergilerinin mesnetleme sistemi.

Figure 32: Ties anchoring the *arcades* of Davutpaşa *Medresesi* (Tanyeli G. , 1990, p. 239)

Staircases as Spanning Members

Spanning members of the buildings are defined as load bearing elements, which extend over the spaces. These load bearing elements transmit the load to the supporting members on which they sit. These members are flat ones such as staircases and slabs or curvilinear ones such as arches and vaults. For the purpose of this subchapter, it begins with the flat ones, which are mainly supported with curvilinear spanning elements. Afterwards, the curvilinear spanning members are explained. Thereby, the explanations go from the simplest constructional configuration towards the most complex spanning members.

The staircases, which are composed of steps, are used to reach the upper floors. Each step of the staircases is load bearing in masonry buildings. These steps may sit directly on the ground, but if they span a distance then they should be supported by being penetrated and fixed in the masonry walls or by vaults. For some cases, iron beams were used as stringers, as seen in the photograph (Figure 33) below (Tanyeli G. , 1990, p. 66).

Figure 33: The stringers supporting the staircase of Topkapı Palace Valide Sultan Dairesi ((Tanyeli G. , 1990, p. 240)

The staircases of the minarets are special cases. One side of these steps penetrate into the wall and fixed with clamps to the stone laying of the minaret. Then, the other side sit directly over the step below and anchored with dowels (Figure 34). The parts of these steps, which come on top of each other create a core in the middle. Thereby, the steps of the minaret staircases constitute the structure of the minarets. Each layer of the steps is called as course (*kur*). Each course has step with core (*çekirdekli basamak).* Besides, the courses might have steps without cores (*yedek basamak*) adjacent to the steps with cores. These steps without core (spare steps) enlarge the course that penetrate into the wall and make the minaret steadier (Kuşüzümü, 2010, p. 60).

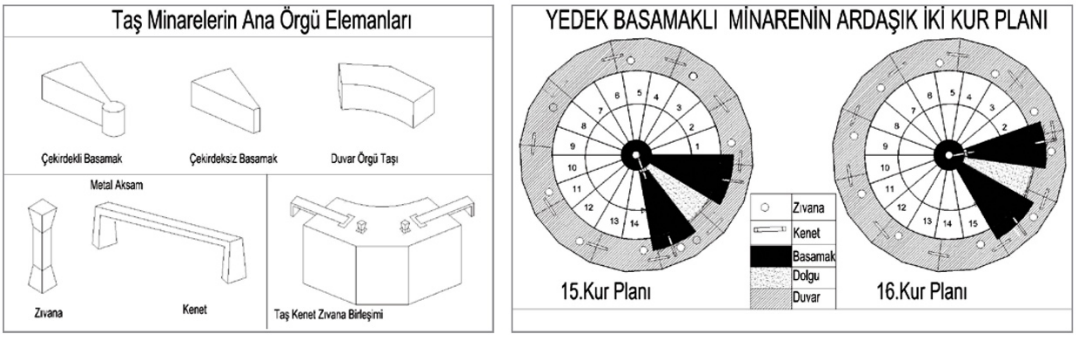


Figure 34: The masonry units of the minaret and the plans of the courses of the minaret staircase ((Kuşüzümü, 2010, p. 60)

Slab as Spanning Member

For the purpose of the thesis, slabs are defined as load bearing elements, which span over spaces and provide a walkable surface above. According to Ahunbay (1988, p. 535), the slabs were constructed in two techniques. In the first type, the slab consisted of large flat stone blocks (*düz atkı*), which directly sit on the supporting members and transfer the load as lintels. Tanyeli (1990, p. 68) states that, for some critical cases, this type of slabs was supported with auxiliary iron beams, which were adhered underlying surface of the flat stone blocks (Figure 35). The long surface of these beams was placed parallel to these blocks. These slabs were used generally for staircase landings and narrow circulation areas.

Figure 35: The auxiliary iron beams supporting the slab of the *mahfil* ((Tanyeli G. , 1990, p. 236)

The other types of slabs were supported by vaults. The upper surface of these slabs was brick (*şeşhane*) or stone flooring placed in horasan mortar bedding (Ahunbay Z. , 1988, p. 535). The inner parts between the vaults and the floorings should have been packed with rubble filled *horasan* mortar. The supporting vaults may have been barrel vaults, cross vaults, or vaults with depressed shouldered profile (*aynalı tonoz*).

These vaults that support the slabs were constructed with stone and/or brick masonry. The cross vaults and barrel vaults were made of stone and constructed on temporary timber formworks. For the vaults with depressed shouldered profile, as seen in the Kazasker İvaz Efendi Mosque below (Figure 36), iron beams might have been used in order to strengthen the brick masonry structure. (Tanyeli G. , 1990, p. 66).

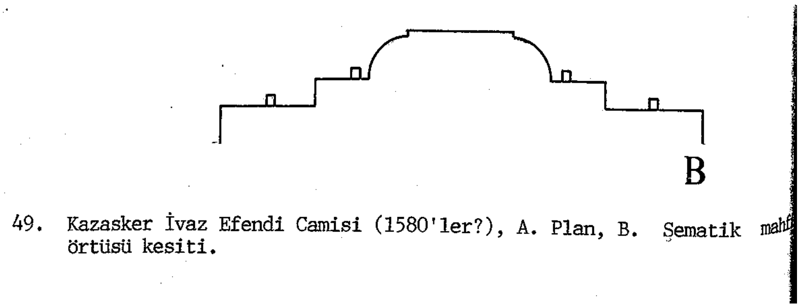


Figure 36: Schematic representation of Iron beams used in vaults with shouldered profile ((Tanyeli G. , 1990, p. 195)

Arch as Spanning Members

The arches are defined as the ones which span over spaces. The main arches, which support the superstructure and the arches of arcades and last prayer halls are the members of this upperstructure component. The arches were constructed with brick, stone and alternative rows of brick and stone by means of timber formworks. Besides, Ahunbay (1988, p. 536) claims that the arches which span large openings were made of stone in Mimar Sinan's buildings. According to Akıncı (1998, pp. 250-252), the voussoirs[46] of these arches should have been joined with dowels fastened with melted lead (Figure 37). The arches which have brick courses were built up with *horasan* mortar in the radial bed joints.

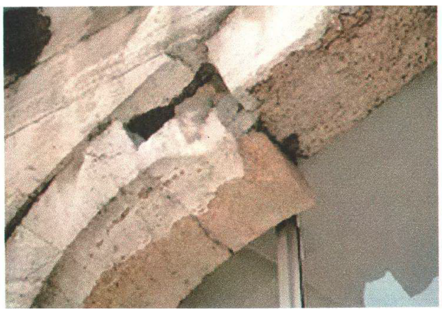


Figure 37: The joint detail with dowel in the arch of Kadırga Sokullu Mehmed Paşa *Medrese* (Akıncı, 1998, p. 252)

[46] Voussoirs: the stone blocks which constitute the form of the arch with their shapes as wedge and radiating joints. These blocks are the ones between the springing blocks and the keystone of the arches (Cowan & Smith, 2006, p. 327).

Furthermore, the arches were tied with iron bars at the level of the impost line or supported by a bracing on sides. Due to being a pure compression form composed of masonry units, a horizontal and inclined pushing force occurs inside the arch. This pushing force is exerted on the adjoining components, which are the imposts. Therefore, this force develops an outward push at the impost level, called thrust (Cowan & Smith, 2006, p. 310). In addition, the masonry units such as brick and stone, which have low tensile strength, cannot afford to restrain this thrust. Then, in order to withstand the thrust, maintain the arch form and prevent the disperse of the arch, an internal tie and/or an external abutment becomes sine qua non (Cowan & Smith, 2006, p. 3). Thus, as solutions, imposts were tied with iron tension bars and/or arches were braced with large piers and buttresses on sides in the 16th century Ottoman Architecture and in Mimar Sinan's buildings. The iron tie bars, which were used for this purpose, were folded down and placed in the gap drilled in the impost block and fastened with molten lead (Figure 38). For some cases, the gap was fastened with iron ring (*simit*), which circled the gap top (Figure 38). If one side of the arch sit on a wall, then the iron tie bar penetrated in the wall, folded over and another linear vertical iron bar (*kılıç*) was inserted in this fold and wall (Tanyeli G. , 1990, pp. 54-62).

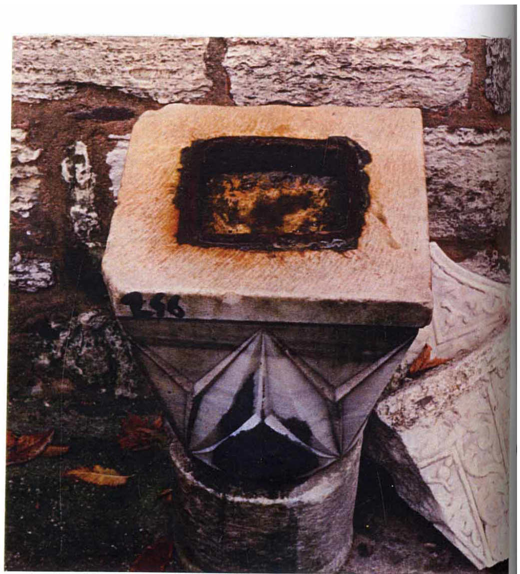


Figure 38: (Left) The tie surrounding the arcade of Davut Paşa *Medrese* and the iron ring of the column capital in the Topkapı Palace Kitchen's garden ((Tanyeli G. , 1990, p. 245)

2.3.4. Superstructure

The superstructure is defined as the constructions containing curvilinear components and roofing structures above the upperstructure. The phasing of the construction process is categorized according to the positions and the functions of these components. Transition elements, and covering members are the components of the superstructure.

Transition Elements

Transition elements are defined as the load bearing members that distribute the load transferred from the curvilinear covering members towards the linear upperstructure below. In other words, these transition elements convert the circular plan geometry to the rectangular or polygonal plan schema to provide a continuous load flow. These elements are squinches (tromps) and pendentives in Mimar Sinan's buildings.

The bands of Turkish triangles, which are also the transition elements, were hardly ever used as the transition elements in the Ottoman Architecture. With the 16th century, especially in Mimar Sinan's buildings, there cannot find any building having bands of Turkish triangles as the transition elements (Batur, 1980, p. 139). For constructing the squinches and pendentives; brick, stone and alternating rows of brick and stone were used in Mimar Sinan's buildings. She also mentions about the use of terracotta pots in the Lüleburgaz and Havsa Sokullu Mehmed Paşa *hamams* (Ahunbay Z. , 1988, p. 536). It can also be seen in the photograph below (Figure 39).

Squinch as Transition Element

The squinches were mainly used for relatively small buildings. The main load bearing component of the squinch is the arches (*baş kemer*) which convert the square plan to an octagonal plan. These arches sit on the corner at the 45-degree angle to the walls. The corner volume that is defined by these arches and walls are packed with masonry constructions built up either as a hemisphere or two slices of vaults intersecting in the middle (Akıncı, 1998, p. 268). In addition, the volume which left between the walls and extrados of this arch were most probably built up with secondary pendentives which can be seen in the photograph below (Figure 39).

Figure 39: The squinches and secondary pendentives of Havsa Sokullu Mehmed Paşa *Hamam* (by the author, 2015)

Moreover, pendentives were the foremost transition elements, which were used for the 16th century monumental buildings. They were constructed with corbelled horizontal courses of brick or stone units and the back volume between this corbelled facial masonry and the walls might be filled with horasan mortar filled with rubble stones (Figure 40). Terracotta pots or pipes (*sebû*[47]) might have been used in their back infill in Mimar Sinan's buildings (Ahunbay Z. , 1988, p. 537). Besides, auxiliary iron elements might have been used between the bedding of the courses[48] as it can be seen in the photograph below (Figure 41).

[47] *Sebû:* Empty terracotta pots or pipes which were placed in the courses of the domes in order to have an acoustical control (Sönmez N., 1997, p. 97). These terracotta elements were used for sound absorption, load discharge, illumination and ventilation (Çelik, 2009, p. 290).

[48] Unpublished Lecture Notes of the course RST510-Osmanlı Mimarlığında Yapım Teknikleri held by Assist. Prof. Dr. Gülsüm Tanyeli in İTÜ Faculty of Architecture.

Figure 40: Pendentives of Atik Valide *Medresesi* (by the author, 2014)

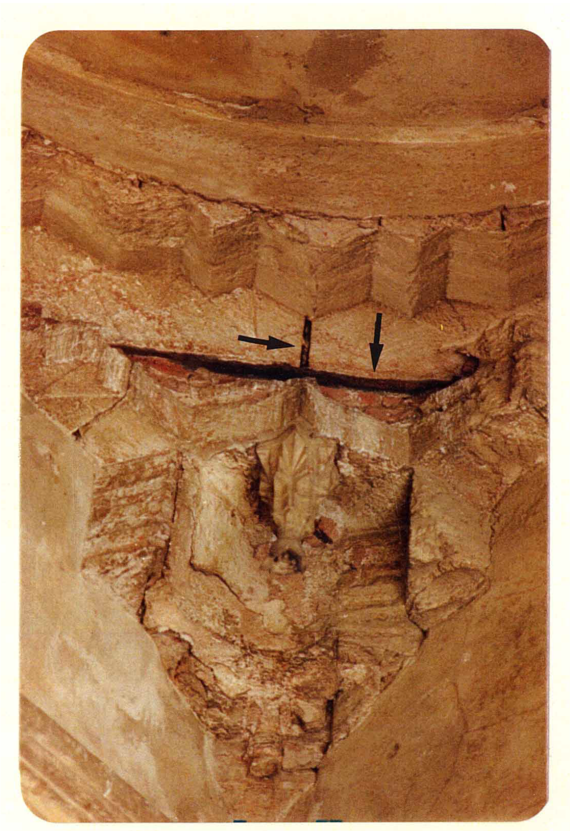


Figure 41: The auxiliary iron elements supporting the transition element of Hadım İbrahim Paşa Mosque's central dome's in the last prayer hall. (Tanyeli G. , 1990, p. 242)

Covering Members

Covering members are defined as the load bearing elements, which shelter the space below. These members are vaults and domes, which are curvilinear elements and the timber roofing for Mimar Sinan's buildings.

Vault as Covering Member

Considering the symbolic meaning of the dome, it can be said that domes were the main covering members of the Ottoman monumental buildings of Mimar Sinan (Kuban, 1997, p. 37). Whereas, vaults were the other superstructure members, which usually covered secondary buildings or relatively smaller spaces of the buildings. The vaults were constructed with bricks or stone blocks by laying on the temporary timber formworks. Barrel vaults, cross vaults, cloister vaults and vaults with shouldered profile were the main vault types that were used in the buildings of Mimar Sinan. Barrel vaults were constructed as the extended arches. In some cases of the barrel vaults with brick masonry (Figure 42), the topmost brick layer may have been placed perpendicular to the vault axis. Thus, this brick layer acted as a keystone at the crown (Akıncı, 1998, p. 277).

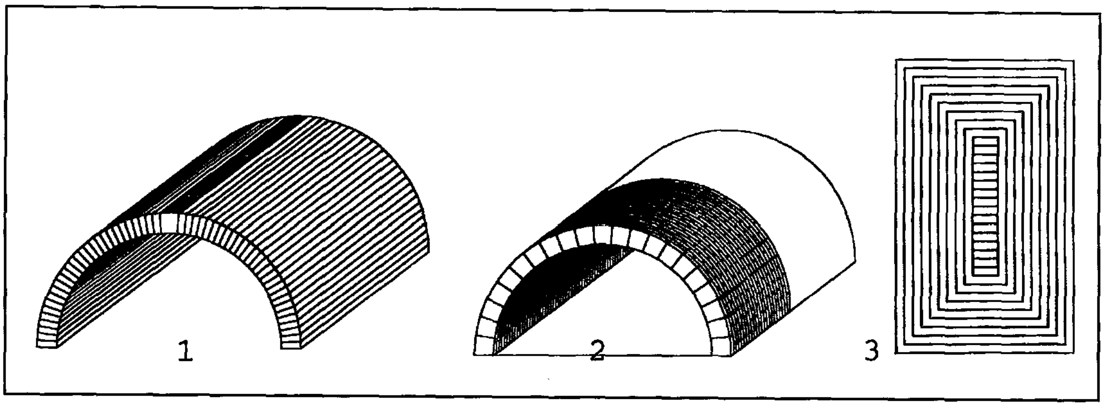


Figure 42: The schematic drawing showing the brick courses of barrel vaults (1-2) and vault with shouldered profile (3) (Akıncı, 1998, p. 277)

Cloister vaults were constructed as two barrel vaults springing from the two perpendicular edges of rectangular space underneath. These vaults intersect diagonally with concave recess by creating a cross in projection. The vaults with shouldered profiles were constructed like the cloister vaults with a flat surface (*ayna*) at the topmost of these barrel vaults. Cross vaults were composed of two intersecting barrel vaults extended through the perpendicular two axes (Ahunbay Z. , 1988, p. 537). They intersect at right angle by creating diagonal convex upwards, which constitute a cross shape in projection (Figure 43).

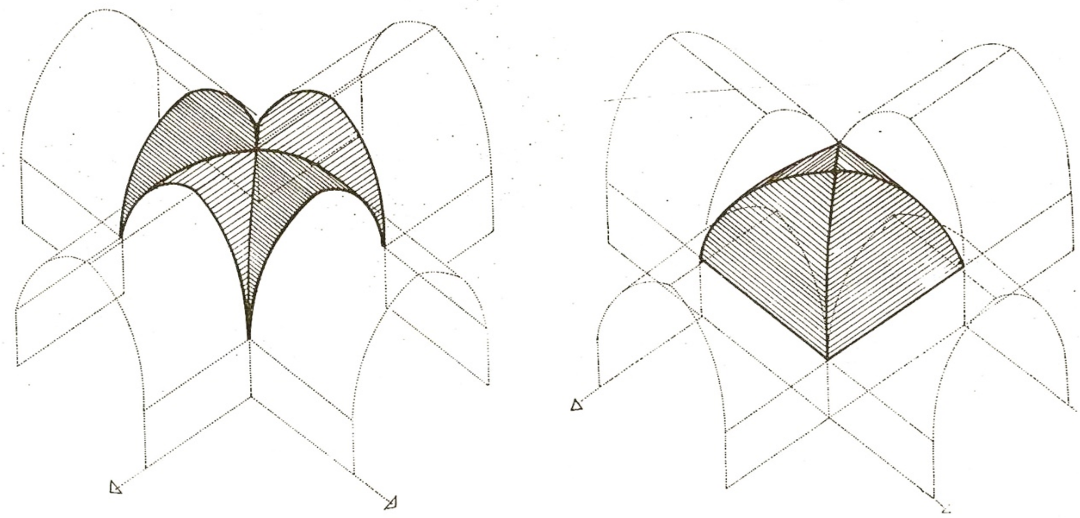


Figure 43: The schematic drawing of the masonry unit courses in cross vault (left) and cloister vault (right) (Yavuz, 1983, p. 47)

Dome as Covering Member

The domes, which were the main covering members of the Mimar Sinan's buildings, were principally constructed in brick with radiating joints (Figure 44). It is also known that the brick masonry units, which have been harvested in special dimensions, were used for the domes.

Figure 44: The dome of the Süleymaniye *Rabi Medresesi* in İstanbul (Sayka İnşaat Ltd Şti Archive, 2006)

The domes, which were constructed with stone masonry units, can be also encountered in the regions where the tradition of stonemasonry was predominantly employed and still prominent in the practices of construction. The large domes should have been constructed with temporary timber formworks, whereas the domes covering smaller secondary places might have been constructed without formwork. Without a formwork, the domes were constructed by the help of a rope or plank having the same length with the radius of the dome. One end of this rope or plank, a hinge was fastened at the geometric centre of the dome's interior surface. Then, the other end was used to follow the dimension and the sequence for laying the brick or stone units. For this purpose, the *horasan* mortar should have been stiffer than the normal mixture and there was a need to wait a bit for the mortar's set to lay the next course (Batur, 1980, pp. 110-111).

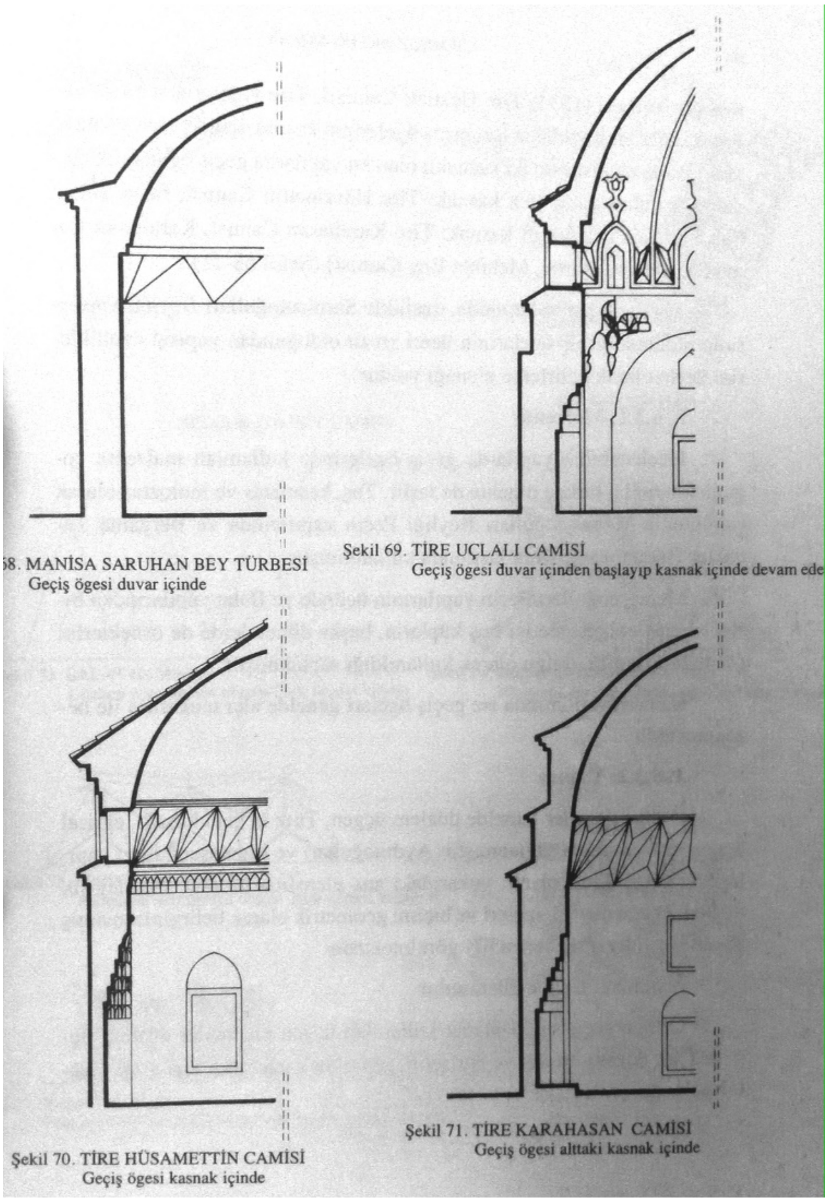


Figure 45: Relations among the transition elements, the drums and the impost level of the dome (Aktuğ-Kolay, 1999, s. 63)

According to Batur (1980, p. 112), the domes of the Ottoman monumental buildings, were mainly hemispheres, constructed with single course of brick laying, having parallel profiles in the inner and outer surfaces. The profile of the superstructure's outer surface is associated with the relationship between the drum and the impost level of the dome. Batur (1980, p. 112) states that there are 3 types of this relationship (Figure 45). In the first type, which is seen in the earlier examples, the dome was constructed over the drum, so that, the dome was stilted. The second type is the one in which the impost level of the domes was circumscribed by the drum. In this type, which became the main configuration for the 16th century and for Mimar Sinan, the dome seems depressed because the drum and dome was constructed interconnected at the impost level. In the last type, the level of the drum might have changed and so that, the dome seems depressed or hemispheric. It is thought that the second type which was used by Mimar Sinan, was preferred to be structurally on the safe side that was learnt from the experiences.

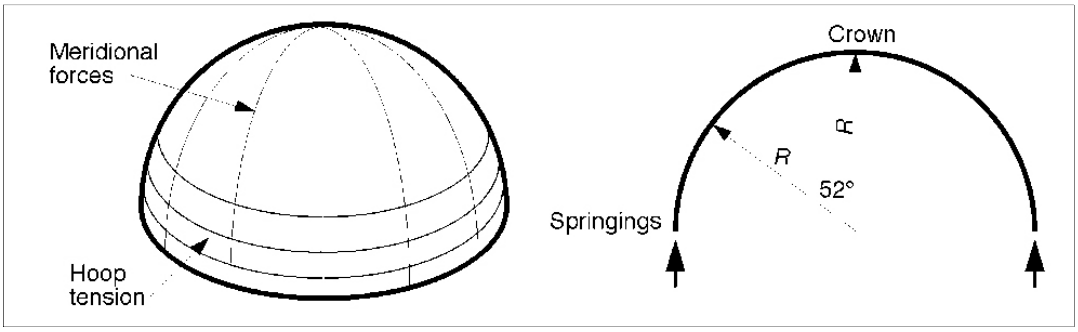


Figure 46: A hemispherical dome's compression and tension zones (Cowan & Smith, 2006, p. 94)

Due to being a vault with double curvature, the domes have the pure compression form composed of masonry units. Horizontal and inclined pushing forces, which are caused by the meridional forces, are developed and create an outward push at the lower portion of the dome, called hoop tension or thrust (Cowan & Smith, 2006, p. 152) (Figure 46). Additionally, this masonry structure, which is composed of brick and *horasan* mortar with low tensile strength, cannot afford to restrain these tension forces. Thus, in order to absorb the horizontal components of the hoop tension, maintain the dome form and prevent cracks and collapse of the dome; an internal ring and/or an external abutment become crucial. Therefore, the 16th century Ottoman Architecture solved this problem by girdling the domes in the tension zone with iron tension rings (Figure 47) and/or by bracing the domes with drums, buttresses and flying buttresses at the lower levels. Akıncı states that, the buttresses of the domes are most probably the later additions made in the 18th century due to the earthquakes, whereas the buttresses belong to Kılıç Ali Paşa Mosque was constructed with the own will of Kılıç Ali Paşa.

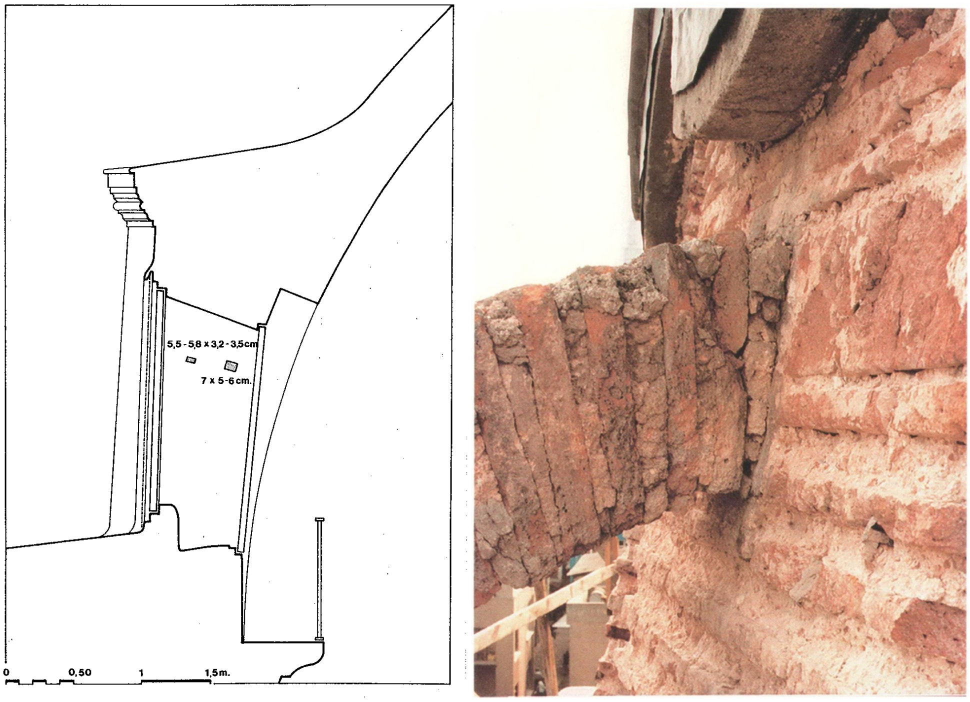


Figure 47: (Left) Zal Mahmut Paşa Mosque tension rings passing inside the dome windows (Tanyeli G. , 1990, p. 190). (Right) A later addition buttress to the Rüstem Paşa Mosque's dome ((Akıncı, 1998, p. 278)

Tanyeli (1990, p. 94) suggests that these tension rings were placed mainly at the impost level and at the level of *kafa tahtası*[49]. It is also recorded in the account books of the Süleymaniye Complex that, the wrought iron ring was ordered for this purpose. Barkan conveys that in order to counter the stress inside the dome skirts of the main dome, monolithic wrought iron ring was ordered (1979, s. 361). This record enhances that Mimar Sinan uses wrought iron rings for girdling the domes to resist the hoop tension. Moreover, there can also be witnessed in some buildings of Mimar Sinan, as it can be seen in the (Figure 47), Mimar Sinan might have been used more than one tension ring in the dome courses of his buildings.

[49] *Kafa tahtası:* Şenyurt states that this term is used as an architectural element which indicates the end or top of an architectural element. She adds that this term was used in all components of the building such as infrastructure, upperstructure and superstructure. (2014, p. 70). Therefore, the level of the *kafa tahtası* is interpreted as the top level of the outer drums or top of the windows in the domes. In addition, it is thought that *kafa tahtası* may indicate the levels, where the plan, in other words, the horizontal section of the building changes in terms of dimension, material, construction technique or structural components in the entire building.

Timber Roofing as Covering Member

According to Akıncı (1998, p. 279), the timber roofing was used for the secondary arcades of the last prayer halls, which encircle the domed ones. These roofs were mainly constructed with timber lintels directly siting on the masonry supporters. Additionally, she adds that it should be questioned whether they are original or later additions.

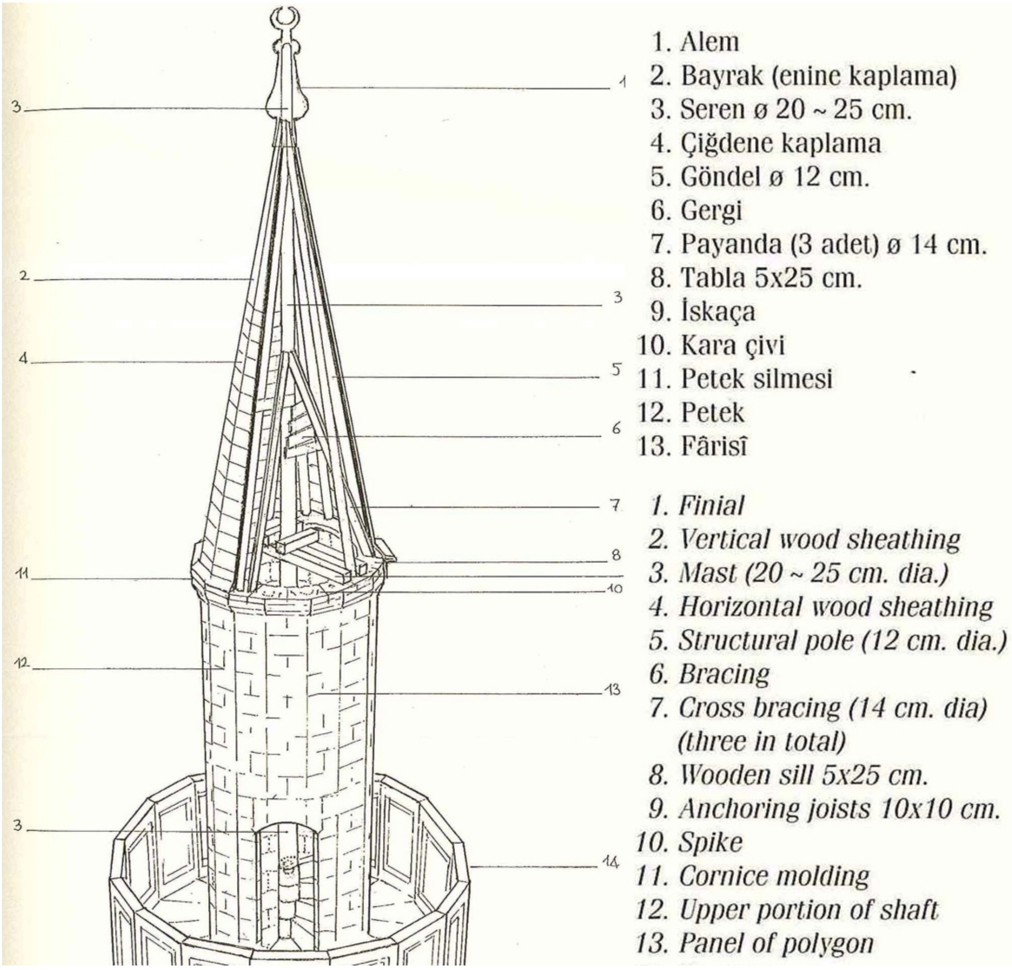


Figure 48: The components of the timber hood of a minaret (Uluengin, Uluengin, & Uluengin, 2010, p. 129)

As it can be seen in the image above (Figure 48), the hood of the minarets was constructed in timber framing predominantly composed of main vertical post called mast (*seren*) and diagonal posts called structural poles (*göndel*). The mast sits directly on the core of the minaret at the centre. It is fastened with anchoring joists (*ıskaça*) and braced with three cross bracings which sit on the upper portion of the shaft (*petek*). The diagonal structural poles also sit on corners of the upper portion of the shaft joining with the mast at the top. These poles are anchored to the mast with the bracing elements. Afterwards, the cladding timber elements were nailed on these structural poles. Consequently, the claddings were covered with lead sheets which were seamed by the weight of the finial (*alem*) (Uluengin, Uluengin, & Uluengin, 2010, pp. 127-132).

Akıncı (1998, p. 280) states that, like minaret hoods, the buildings were covered with lead sheets[50] in the 16th century, whereas it is known that terracotta roof tiles were also used for the early examples and secondary buildings. She also suggests that the roof, which had been covered with terracotta tiles should have been changed with the lead sheets after it became easier to obtain lead and making lead sheets was developed. The details of the lead covering or a dome can be seen in the drawing belong to Lemi Merey below (Figure 49).

[50] For further information about the lead covering see Merey, L. (n.d.). Osmanlı Mimarisinde Kurşun Kaplama Tekniği. In *Unpublished Lecture Notes of Lemi Merey*. İstanbul: ITU; and (Uluengin et al., 2010, pp. 104-109)

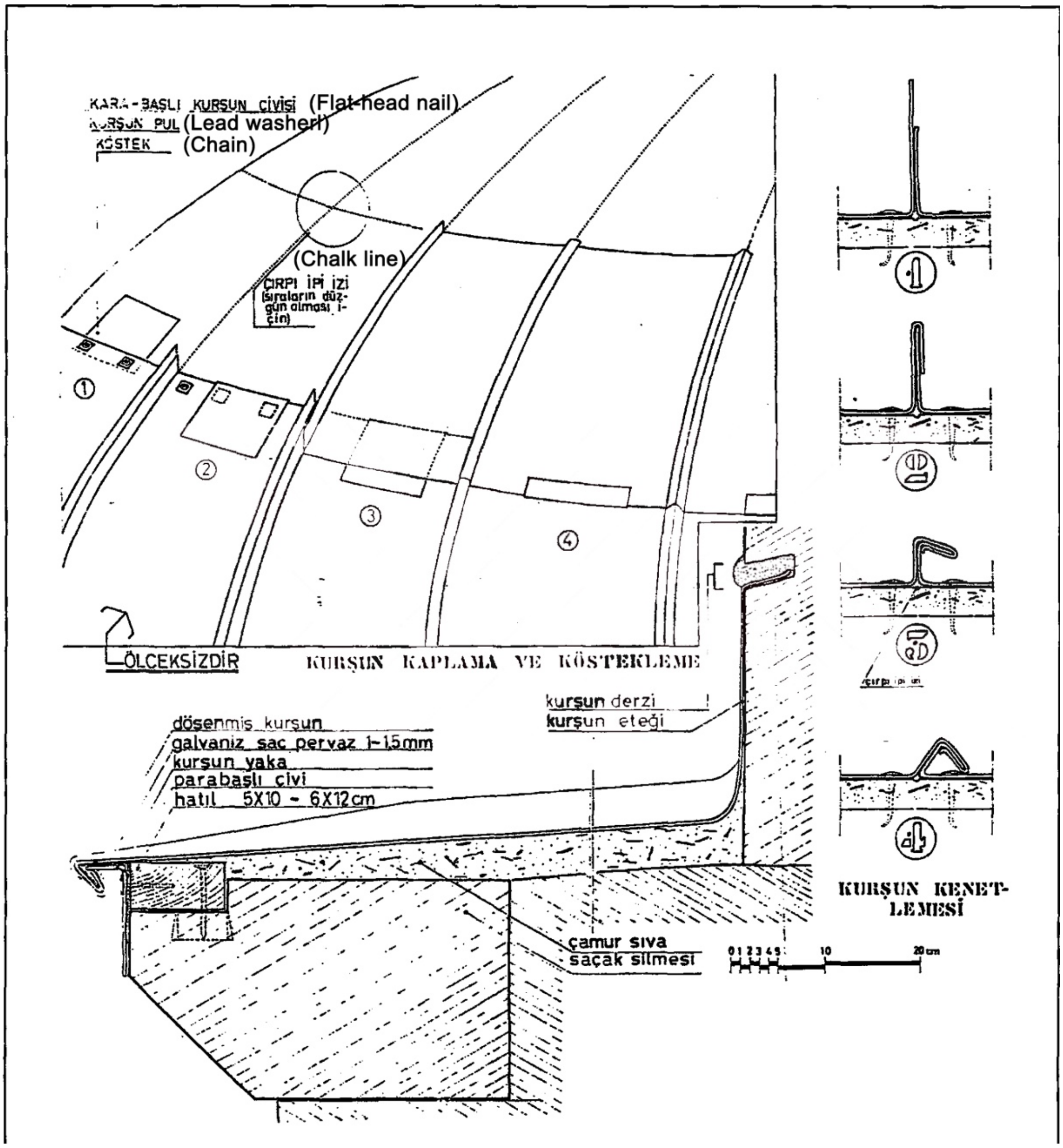


Figure 49: Lead Covering (*Ferşiye*) Details of a Dome Drawn by Lemi Merey (Osmanlı Mimarisinde Kurşun Kaplama Tekniği, n.d.); the terms in English are taken from (Uluengin, Uluengin, & Uluengin, 2010, p. 108)

2.3.5. Architectural Elements in the Load Bearing Members

This thesis mainly focuses on the architectural elements of the mosques of Mimar Sinan, which were inserted in the load bearing elements during the construction process. These architectural elements have vast amount of different details related to the woodwork[51], gypsum work[52], glasswork[53] and lead work[54]. However, these components of the architectural elements were most probably changed in time due to being less durable than the structural elements. Therefore, studying the craftsmanship of these architectural elements requires much more comprehensive and detailed studies. Therefore, the construction technique of these elements' structural components, which act on the main load bearing elements of the mosques, are included in the scope of this thesis. The portal, *mihrab*[55], door and window openings, niche and balustrade are the architectural elements that are discussed here.

The portals were constructed in the wall of the entrance façade by means of an arch system composed of three arches in a hierarchical order in Sinan's mosques. At the top, the opening of the portal was mainly constructed by a pointed or semi-circular arch. This main arch, which lifts the load of the upper part towards the walls on two sides, can be seen at the innermost. The second arch in the middle is decorated and carries the door wings. These two arches were built up mainly with limestone. The third arch at the outermost is the most decorated arch, which was usually constructed with two or more coloured joggled voussoirs in marble. Besides, this third arch was mainly built up with depressed profile and provides a door frame together with the stile and sill from the same material and joggles[56] (Figure 50). Moreover, on the façade,

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[51] For further information see (Bozer, 2007)

[52] For further information see (Merey, L. Ş. (n.d.). Alçı İşleri. In *Unpublished Lecture Notes of Lemi Merey*. İstanbul: YTU.)

[53] For further information see (Bakırer, 2000), (Bakırer, 1983)

[54] For further information see (Merey, L. Ş. (n.d.). Osmanlı Mimarisinde Kurşun Kaplama Tekniği. In *Unpublished Lecture Notes of Lemi Merey*. İstanbul: YTU.)

[55] *Mihrab:* A niche which indicates the direction of Kıbla and Mecca and therefore of prayer. (Goodwin, 1971, p. 459)

[56] (Unpublished Lecture Notes of the course RST510-Osmanlı Mimarlığında Yapım Teknikleri held by Assist. Prof. Dr. Gülsüm Tanyeli in İTÜ Faculty of Architecture)

the framed portal was placed in a rectangular niche which was bordered by mean of a rectangular cornice. This rectangular niche was also covered with a hood (*kavsara*) composed of corbelled rows of stalactites made up of limestone or marble (Uluengin, Uluengin, & Uluengin, 2010, p. 202). These corbelled rows of stalactites, which were constructed together with the wall, should have been anchored to the wall with clamps and dowels. The fine dressing of each component of the stalactites might have been held after they were placed to their places, but every component should have been roughly dressed previously (Akıncı, 1998, p. 316).

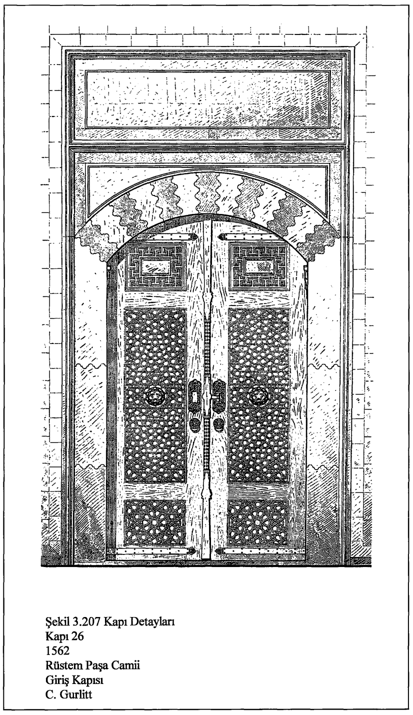

Figure 50: The portal of Rüstem Paşa Mosque (Akıncı, 1998, p. 200)

The *mihrab*s are the prayer niches, which are placed in the south wall, Kıbla wall, of the mosques. These niches were constructed with half octagonal, decagonal or dodecagonal geometry in plan in Sinan's mosques. These polygonal niches were topped with hoods with corbelled rows of stalactites, which were constructed together with the *mihrab* wall by being anchored to the back wall with clamps and dowels. According to Uluengins (2010, p. 114), in the early Ottoman examples, the *mihrab*s were covered with glazed tiles, whereas in the Classical Ottoman examples they were covered with marble cladding. Thereby, the *mihrabs* in Mimar Sinan's mosques should have been covered with marble cladding and the glazed tiles may be used around this main portal niche (Figure 51).

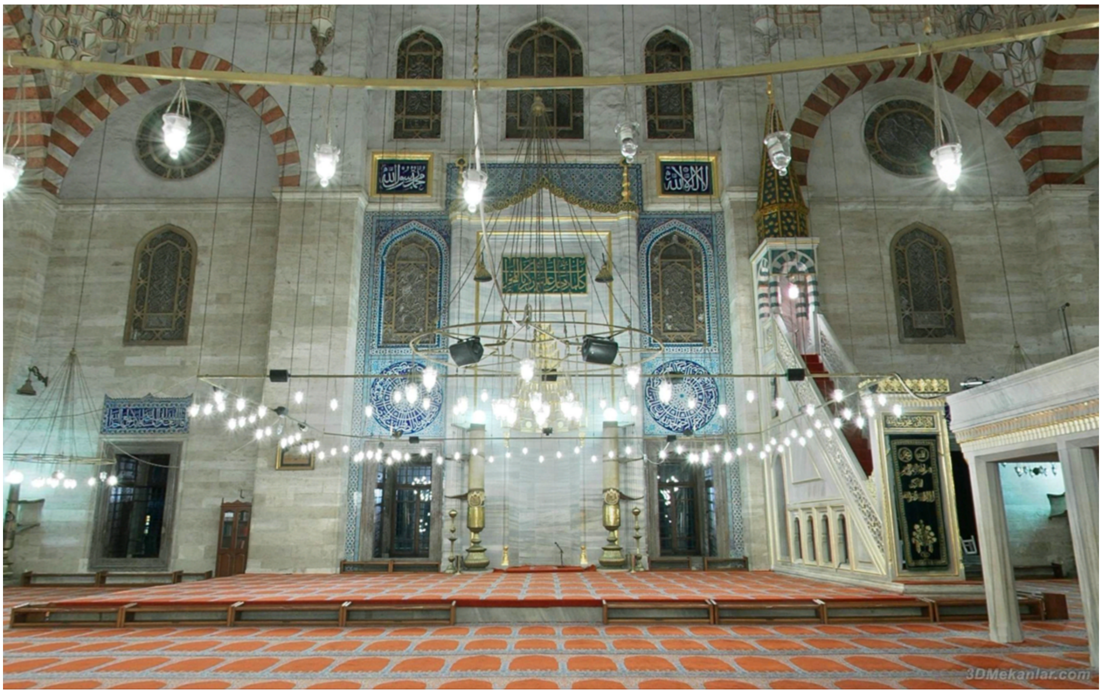

Figure 51: Portal of Süleymaniye Mosque in İstanbul (Retrieved October 05, 2017, from http://www.3dmekanlar.com/tr/ suleymaniye-camii.html)

The doors and windows were placed in the openings, which were spanned by means of arches and/or lintels in stone masonry load bearing elements, mainly in the walls, of the mosques. The interior door openings were mainly spanned with depressed arches constructed with stone (Akıncı, 1998, p. 173). The door openings on the outer walls have the same configuration with the window openings in the same row.

The windows, which are the prevalent components of the mosque facades, were mainly arranged in two or three rows. The windows of the lowest row usually have window frames (*söve*) made of marble or limestone. The window openings were spanned with lintels (Figure 52). Above these lintels, relieving arches (discharging arches) were constructed with pointed or two centred tangent profiles. The space between the lintel and these relieving arches were mostly filled and the tympanums may have been used for the inscriptions. The windows in the upper rows do not have window frames, thereby the openings were spanned only with arches mostly having two pointed tangent profile. For monumental mosques, the arches of the openings were generally constructed in stone; whereas, arches with brick or alternating rows of brick and stone were also used (Akıncı, 1998, p. 114).

Figure 52: Use of timber lintels for the window openings with relieving arches in the Atik Valide *Darülkurra* and *Medrese* (by the author, 2014)

The window frames were inserted to their places after the wall construction was finished. The window frames, which were composed of four stone blocks were anchored as a frame by means of the iron bars coming in the form of grills. Then, the window frame with grills with knots[57] were inserted to the opening (Figure 53). The lower blocks of these window frames act as a window sill and for some cases they might have been drilled for the raindrops (Akıncı, 1998, p. 115).

[57] For further information see (Uluengin, Uluengin, & Uluengin, 2010, pp. 110-113)

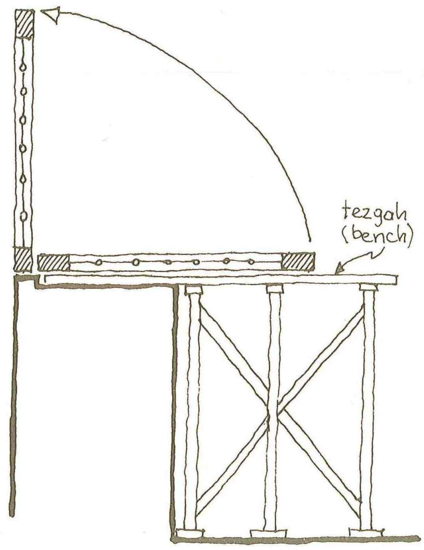

Figure 53: The schematic drawing showing how the window frame with knotted grills is located to its place ((Uluengin, Uluengin, & Uluengin, 2010, p. 111)

The leaves of timber doors or shutters were situated behind these window frames through the iron heels inserted in the grooves on the upper and lower surfaces of the opening (Sönmez N. , 1997, p. 85). The components of this joint can be seen in the drawing below (Figure 54).

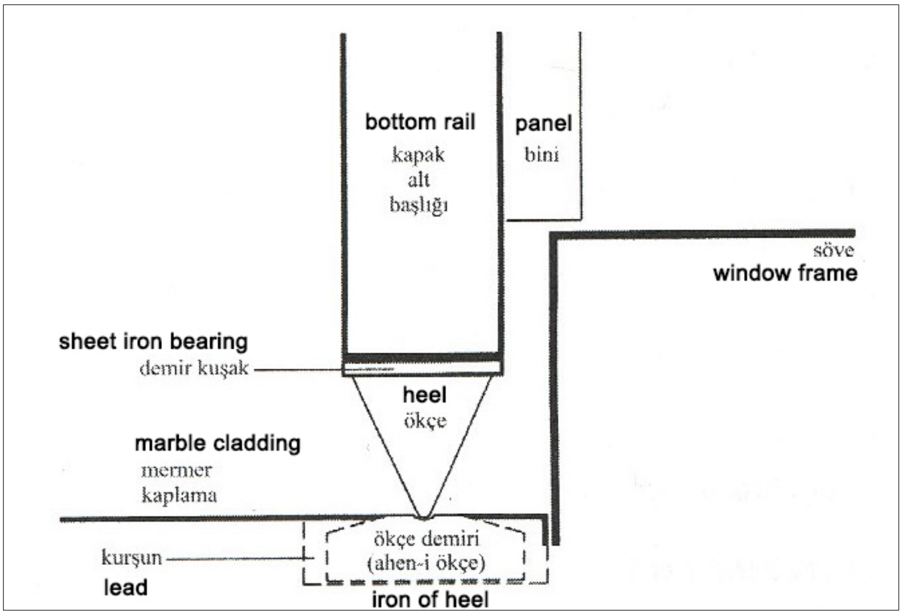

Figure 54: Detail showing the heel of the door or shutter leaf (Sönmez N. , 1997, p. 85)

The window openings which are in the upper rows were closed with windows, called *revzen*s[58]. The *revzen*s are gypsum panels having holes with glass insets. In the window openings, these panels were inserted both inside and outside of the wall. Therefore, there were inner panels (*içlik*) and outer panels (*dışlık*) in these openings (Figure 55). The inner panels were decorated with coloured glasses with floral or geometric forms, whereas the outer ones were the thicker panels having circular or elliptic holes. These panels were wedged with timber tools in the openings (Merey, Alçı Revzen).

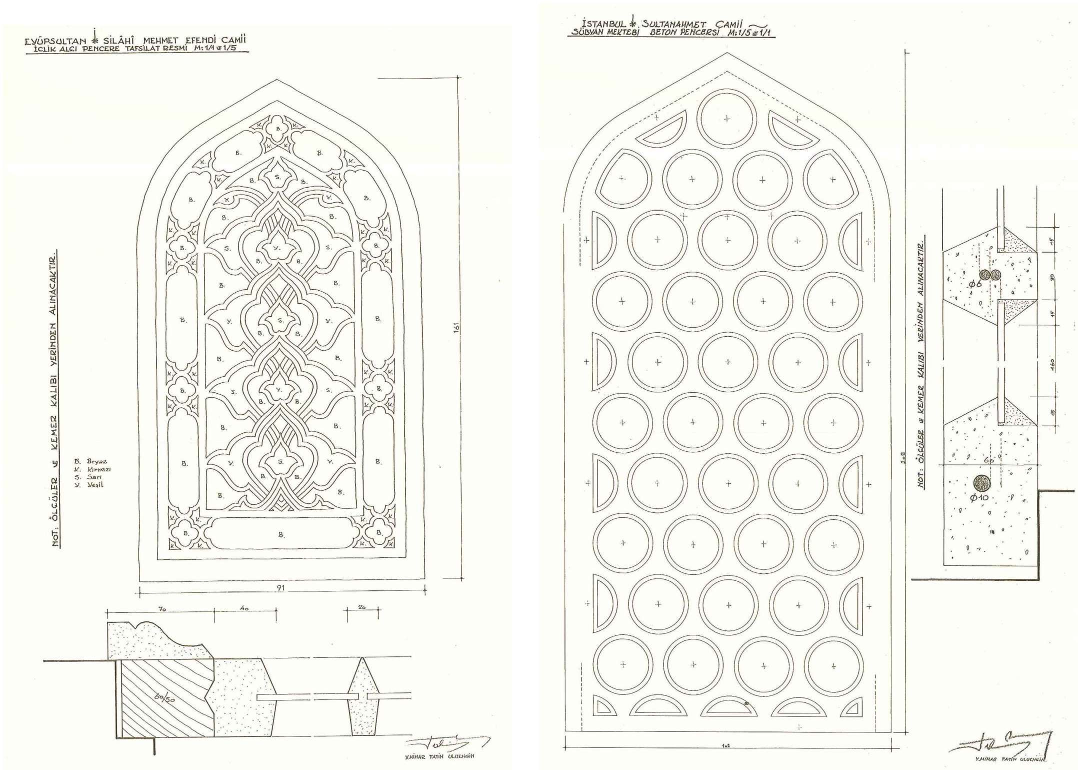

Figure 55: (Left) The inner window panel (*içlik)* of Eyüp Silahi Mehmed Efendi Mosque. (Right) The outer window panel of İstanbul Sultanahmet Mosque (Uluengin, Uluengin, & Uluengin, 2010, pp. 183,189)

Niches are the small alcoves in the walls. The niches inside the mosques are rectangular in shape and smaller in size. The openings of these niches, which come to exist via recess, was mostly spanned with stone lintels. The niches on the exterior,

[58] For further information see 232. Merey, L. Ş. (n.d.). Alçı Revzen. In *Unpublished Lecture Notes of Lemi Merey*. İstanbul: ITU.

generally in the last prayer halls, are decorated ones. They are the *mihrabiye* niches and the side niches of the entrance portal. They were usually constructed with a polygonal plan covered with corbelled rows of stalactites (Uluengin, Uluengin, & Uluengin, 2010, p. 152).

In the mosques, the balustrades (*şebeke*) are the hollowed panels like the traceries, which are made of marble, limestone, timber, brass or bronze. They were used as a barrier for security of the upper floor slabs or Sultan's *mahfil*. The balustrades of the *mahfil* floor on the upper floors were made of marble and they were decorated; whereas the balustrades placed on the *şerefe*s of the minarets were made of limestone with less decoration. The timber ones were built up together with the timber frame *mahfil* floors. Furthermore, the balustrades which were for the Sultan's *mahfil*s were in metal (Uluengin, Uluengin, & Uluengin, 2010, pp. 248-254). These balustrades were decorative components of the mosques with their geometric patterns (Akıncı, 1998, p. 327).

To conclude, the information regarding the structural system and construction technique of the 16th century Ottoman Architecture is briefly summarized based on the accumulated knowledge until now. The knowledge about the construction technique about Mimar Sinan's buildings, especially about his mosques, is declared as far as there is. This gathered information constitutes the base for the following phases and is utilized throughout the study in order to support and develop the research in the subsequent chapters of the thesis. It is important to state that, as it can be seen in the chart below (Figure 56), due to the technological limitations in the period of Ottoman Empire, the construction technique of mosques in 16th century and Mimar Sinan's era could not change much. The logic behind constructing the masonry buildings were almost the same until the Industrial Revolution which provide new technologies, materials, opportunities. Moreover, it can be deduced that Mimar Sinan ingeniously pushed the limits of the masonry system in his oeuvres to the extent permitted by materials, approved by the imperial and financed by the donor.

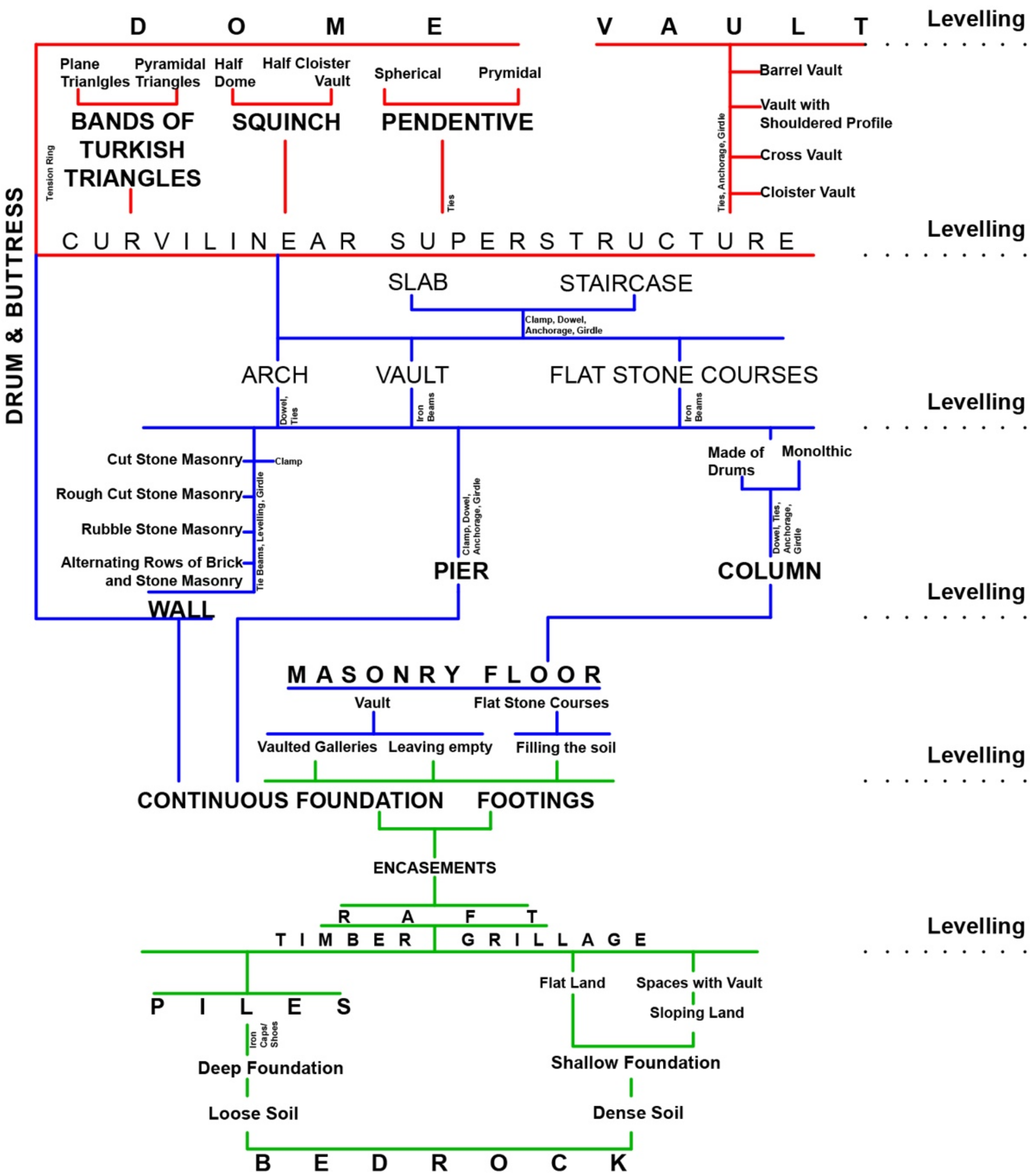

Figure 56: The flowchart showing the logic of the construction technique in 16th century and close periods Ottoman buildings with English terminology. (prepared by the author, 2014)

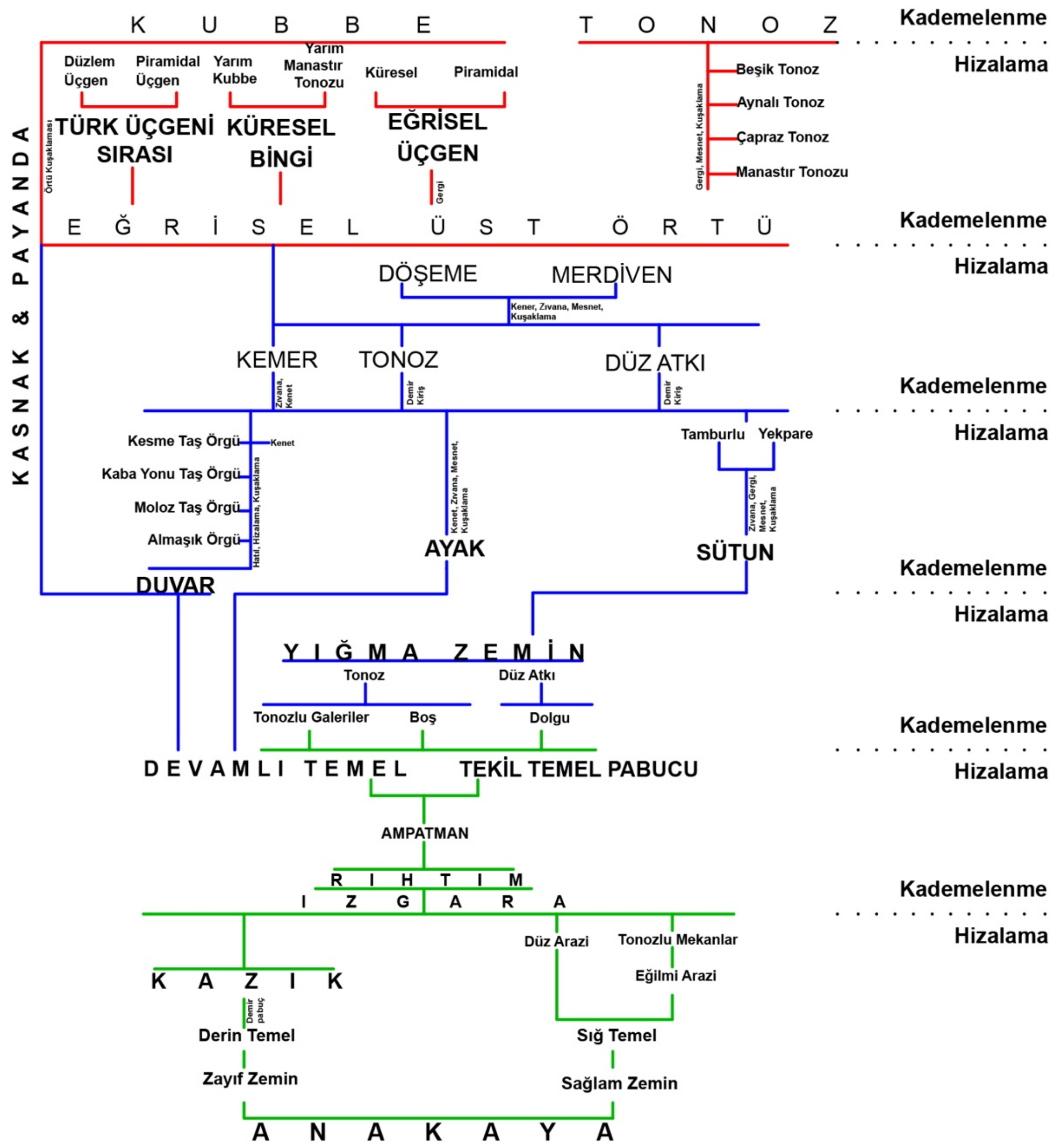

Figure 57: The flowchart showing the logic of the construction technique in 16th century and close periods Ottoman buildings with Turkish terminology. (prepared by the author, 2014)

CHAPTER 3

SOKULLU MEHMED PAŞA *MENZİL* MOSQUES (LÜLEBURGAZ, HAVSA, PAYAS)

Sokullu Mehmed Paşa was the grand vizier of the Ottoman Empire between 1565-1579 and served at the Ottoman Council for the three sultans. According to the scholars, Sokullu who had always overcome even the most demanding tasks had an extraordinary memory and a regular life style. Hence, he advanced in his career by his great sense of intelligence and these skills (Afyoncu, 2009, p. 357).

3.1. Information on Sokullu Mehmed Paşa And *Menzil* Complexes

Sokullu Mehmed Paşa was born as a Christian in the village of Sokolovići in Višegrad in 1505 as a Bosnian Serb with the name Bayo (Necipoğlu, 2005, p. 331). He was recruited into Ottoman service as a *devşirme* and brought to Edirne at the age of 18. Firstly, he was brought up in the Palace of Edirne and then Topkapı Palace in Istanbul. He had been given the name Mehmed after being converted into a Muslim and "*Tahvil" meaning* tall was his nickname (Afyoncu, 2009, s. 354).

Due to his successes, he rapidly rose through the ranks of chief gatekeeper in 1541, grand admiral in 1546, governor-general of Rumelia in 1546, third vizier in 1554, second vizier in 1561 and to grand vizier in 1565. Being married with the daughter of Sultan Selim II, Sokullu was a significant political figure especially for the reign of Sultan Süleyman I (Necipoğlu, 2005, p. 331). By means of his reputation and long lasting important governmental positions during this period, he gained extensive wealth. Together with his wife İsmihan Sultan, he supported numerous endowments of impressive monumental complexes and buildings at the significant locations all around the Ottoman territories. It is said that he was keeping about a thousand slaves whom he employed for his constructions. He gave importance to erect the complexes along the main route of the Empire reaching to Mecca including Havsa, Lüleburgaz and Payas (Necipoğlu, 2005, p. 345).

Sokullu Mehmed Paşa has comprehensive *vakfiye* with two shortened Turkish versions. The date of Sokullu Mehmed Paşa's *Vakfiye*[59] is 29 Zilhicce 981 (AH) / 21 April 1574. One of the Turkish versions of his *vakfiye* classifies his *vakıf*s according to building types and the other to the locations. The buildings cited in his *vakfiye* are the mosques in Azapkapı, Lüleburgaz, Beçkerek, Szigetvar, Kayapınarı, Bor and Payas; *mescid*s in Aleppo, Büyükçekmece, Balçık and Sokolovići; *medrese* in Kadırgalimanı and Lüleburgaz; *darülkurra* in Eyüp; *sibyan mektebi* in Azapkapı, Lüleburgaz, Kayapınarı, Sokolovići, Beçkerek, Bor, Payas and Medina; *tekke* in Kadırgalimanı, Szigetvar and Payas; *imarets* in Lüleburgaz, Szigetvar and Payas; a hospital in Mecca; fountains in Eyüp, Kadırgalimanı, Azapkapı, Lüleburgaz, Belgrade, Višegrad, Sokolovići, Payas, Aleppo and Medina; *alî kaldırım* (paved road) in Lüleburgaz; and bridges in Edirne and Višegrad (Figure 58).

Sokullu Mehmed Paşa's complexes which are recorded in Mimar Sinan's autobiographies are the ones in İstanbul (Kadırgalimanı, Eyüp), Lüleburgaz, Payas and Havsa (constructed for his deceased son Kasım Bey). Additionally, the *imaret* and *kervansaray* in Bosnia, the *mescid* in Büyükçekmece, the *kervansaray* in Aleppo, *hamam*s in Edirne, Mecca and Medina, bridges in Višegrad, Marmaracık and Hayrabolu are the other constructions commissioned by Sokullu and recorded in Mimar Sinan's autobiographies (Sâî Mustafa Çelebi, 2006, pp. 353-391).

Among these buildings mentioned above, the complexes on the main route of the Ottoman Empire are selected as the cases which are Lüleburgaz, Havsa and Payas. These complexes which are on the routes are generally referred to as *menzil* (terminal) complexes.

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[59] In the Archive of Directorate General of Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20. In the Turkish records, it is in the #2104 book on the 442-78 pages and in the queue of 323.

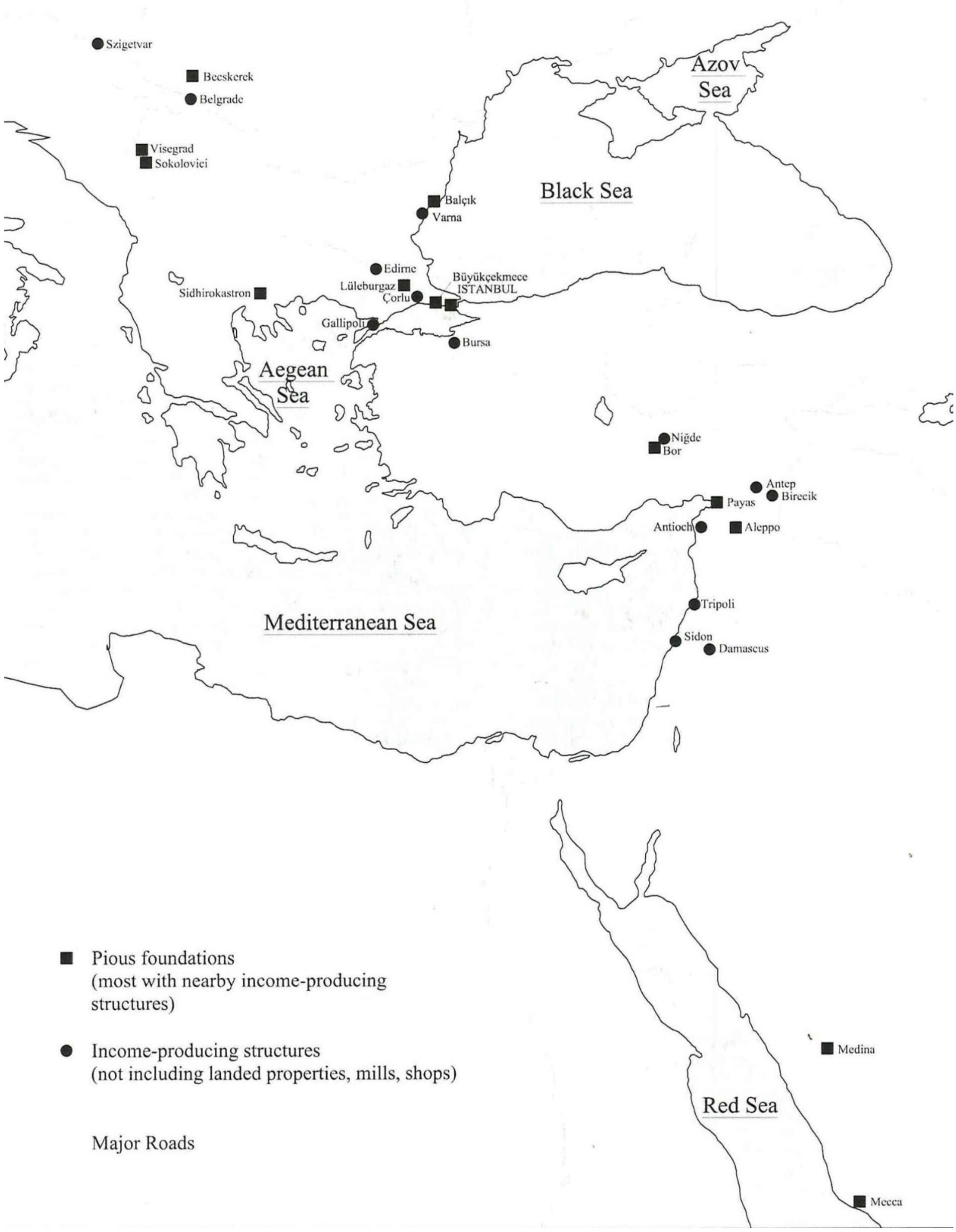

Figure 58: The map shows the location of the buildings which were commissioned by Sokullu Mehmed Paşa (Necipoğlu, 2005, p. 579)

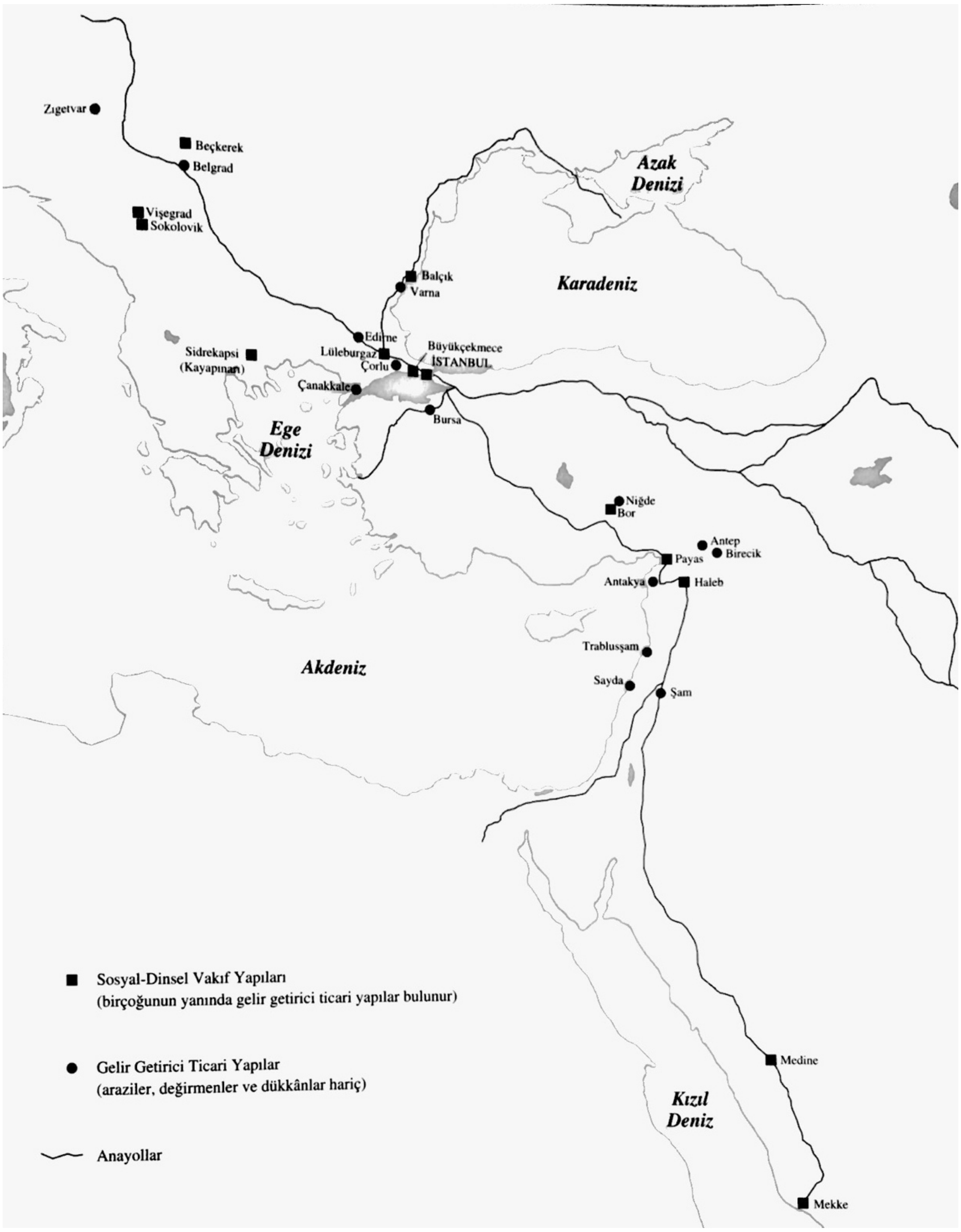

Figure 59: The map shows the location of the buildings which were commissioned by Sokullu Mehmed Paşa (Necipoğlu, 2013, p. 769)

Menzil[60] complexes are significant structures of the Ottoman *Menzil* Organization, which is part of the Ottoman route network. Likewise, this organization and road network had also been used in the ancient history known with different names and with buildings in different sizes and programs. For instance, during the Anatolian Seljuk period, instead broad architectural organization of the complexes, there were only *kervansarays* on these routes (Halaçoğlu, 1981, p. 124)

The Ottoman route network mentioned above was divided into two directions by taking Istanbul as the central station. The main road system on the west side of Istanbul called as *Rumeli Yol Şebekesi* (Rumelia Road Network) was divided into three branches, which were *sağ kol* (right branch), *orta kol* (median branch) and *sol kol* (left branch). The branch on the right was the route between İstanbul and Azak (Azov in Russia today), the median branch was between İstanbul and Belgrade, and the branch on the left was between İstanbul and Gördüs (Corinth in Greece today). Subsequently, the main road system on the east of Istanbul was called as *Anadolu Yol Şebekesi* (Anatolia Road Network), which was also divided into three branches that were right, median and left branches. The road on the right was between Üsküdar (İstanbul) and Şam-ı Şerif (Damascus), the median branch was between Üsküdar (İstanbul) and Baghdad, and the left branch was between İstanbul and Erzurum (Halaçoğlu, 2014, pp. 51-121).

The routes were used for military, pilgrimage, commercial purposes and mostly with the purpose of postal services. In order to secure these roads, *menzil*s, as terminals, were founded on the specific locations at particular intervals. Additionally, these *menzil*s provided equipage and accommodation services for the passengers. The *menzil*s which previously had been the buildings with small programs, were enlarged in the 16th century. In addition to the equipage and accommodation services, the commercial, social and religious buildings were added to the complexes. The purpose of this enlargement is related with the population policy of the Ottoman Empire. Some

[60] *Menzil:* A station-house, halting-place; a day's journey, or distance from post-house to post-house; a traveling post; a distance (Redhouse, 1861, p. 815). Place to stay overnight during the journey, mansion; the buildings where the *ulak*s (messengers, postal service) set up or where they exchange horses or spend the night; the buildings where *kervan*s (company of travelers and horses/camels) set up and spend the night (Pakalın, 1993, p. 479).

citizens were allocated to settle at the location of these *menzil*s. This population, named *derbentçi*[61], was also assigned to secure the territory for the passengers. The newly added buildings with abovementioned functions were for these new settlers and for the urban development of the settlement. Especially, the commercial buildings were added to these complexes by taking into account the economic return and commercial mobility of the trader passengers (Müderrisoğlu, 1993, p. 76).[62]

Consequently, Lüleburgaz and Havsa were the *menzil*s on the *orta kol* (median branch) of the *Rumeli Yol Şebekesi* (Rumelia Road Network) and Payas was on the *sağ kol* (right branch) of the *Anadolu Yol Şebekesi* (Anatolia Road Network). The buildings in these settlements were the complexes commissioned by Sokullu Mehmed Paşa with the purposes mentioned above.

[61] *Derbent Teşkilatı* in Ottoman Empire was a civil organization which was consist of civil and local people assigned to secure the trade and pilgrimage routes in addition to the official army of the Empire. In return of their service they were awarded by exempting from taxes or by land tenure of certain soil (Orhonlu, 1990, p. 13).

[62] For further information about the Ottoman routes, *menzil, derbent teşkilatı, derbentçi* see Orhonlu (1967), (1990); Halaçoğlu (1981), (2014); Müderrisoğlu (1993).

3.2. Lüleburgaz Sokullu Mehmed Paşa Mosque

Lüleburgaz Sokullu Mehmed Paşa Mosque is the main focus of this thesis for the understanding of the construction technique of the Ottoman architecture in the 16th century. The mosque is part of an important complex which is explained in detail below.

3.2.1. Lüleburgaz

As a county of Kırklareli, Lüleburgaz is in Ergene Basin in the Thrace Region where the south-east corner of the Balkan Peninsula is. Lüleburgaz is located on the north edge of Kırklareli neighboring Tekirdağ on its south and east sides. The town is bounded with Pınarhisar on the north, Hayrabolu, Muratlı on the south, Çorlu on the east and Babaeski on the west (Figure 60). Lüleburgaz is on the international high-way of TEM and D100 which connect Central Europe and the Balkans to Anatolia through Sea of Marmara and Bosporus. Additionally, the town is 77km far from Edirne and 158km far from İstanbul.

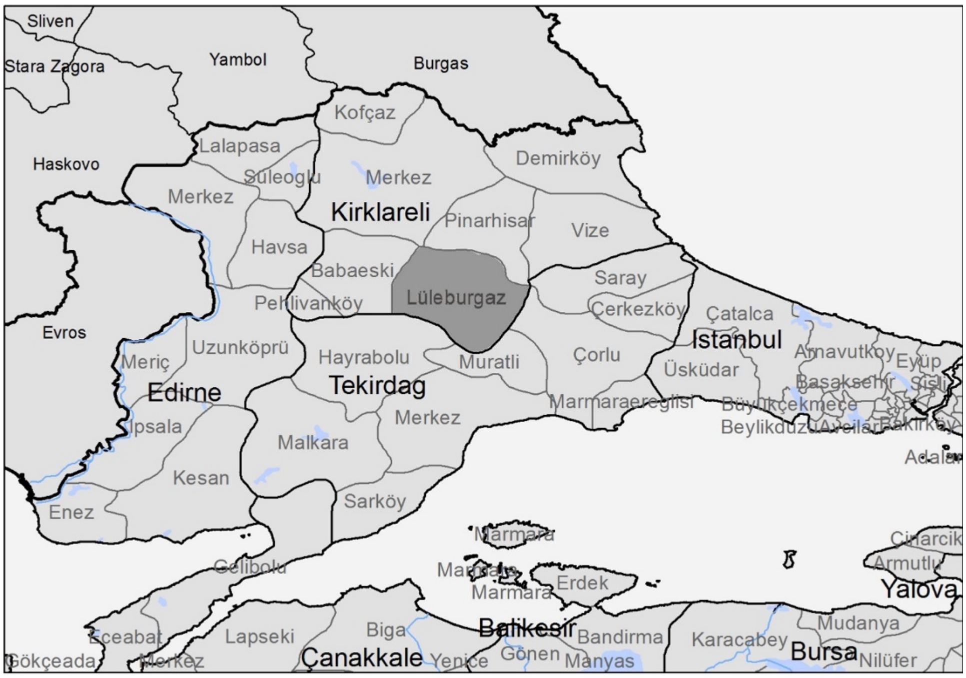

Figure 60: Location of Lüleburgaz

The topography of Lüleburgaz is almost flat and the altitude of city center is about 30m. The highest level of the town is Edirne Bayırı which is 100m above the sea level[63]. The surface area of the town is about 984 km^2 and its population 140.236 according to the population census results in 2014[64]. Due to its geographical features, the town has a favourable climate for agriculture and stockbreeding (Figure 61).

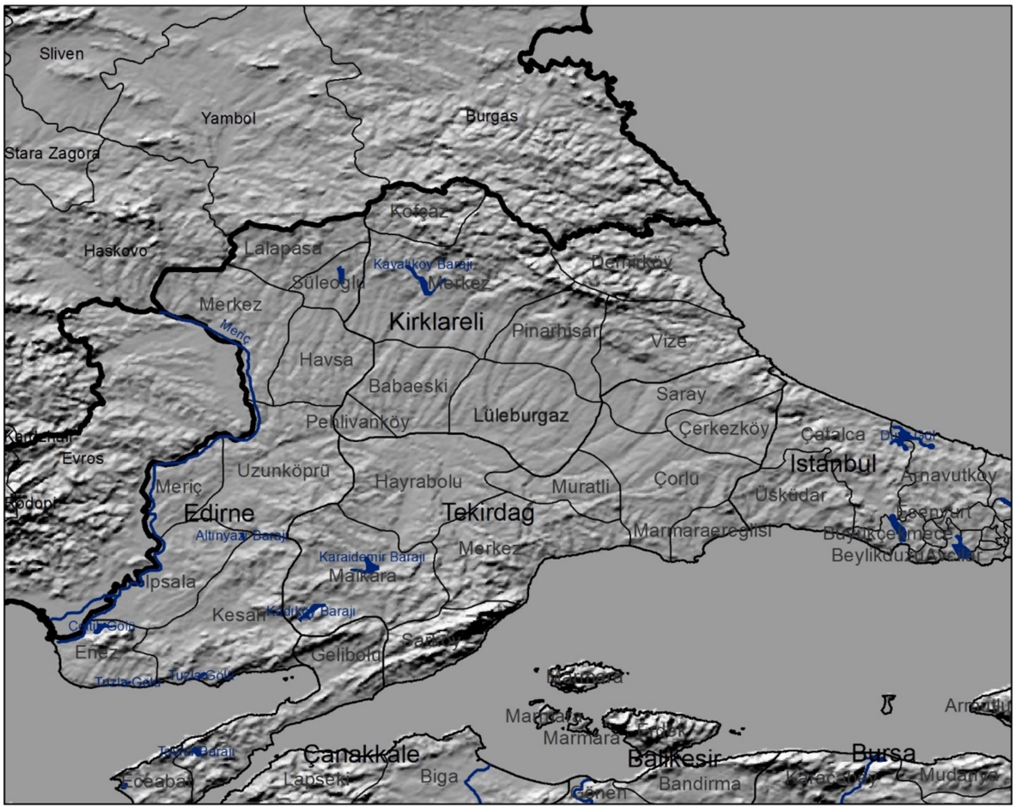

Figure 61: Topography of Lüleburgaz

As it is mentioned above being on the passage way of the important international routes and having fruitful flat cultivated lands for agriculture and stockbreeding, Lüleburgaz has always been an important settlement through history.

Due to the lack of archaeological and historical studies mainly focusing on Lüleburgaz, date of the first settlement and its first inhabitants are not known. By considering the ancient history of Thrace, the first settlement is dated back to 4200-

[63] Retrieved 04 12, 2015, from Lüleburgaz Belediyesi: http://www.luleburgaz.bel.tr/cografyasi.html

[64] Retrieved 04 12, 2015, from Turkey Statistical Institutes. The values are the results of Address Based Population Registration System in 2014. http://www.tuik.gov.tr/UstMenu.do?metod=temelist

4000 BC and established by Odrysians which is an important Thracian tribe (Suat, 2009, p. 13).

After Thracian tribes, Lüleburgaz was settled by Persians in the 6th century BC and joined to Satrapy of Thracian for a brief period. These short-dated occupancies continued by the Macedonian Kingdom in 440 BC until the Roman Empire acquired the town in 163 BC. Under the Roman rule the town was a castrum city on the military route of İstanbul-Belgrade. Today there are mounds and tumuli in the rural lands around the current town as reserve areas waiting for the researches to reveal the ancient history of Lüleburgaz. As a consequence of the division of the Roman Empire into two in 395AD, Lüleburgaz remained within the boundaries of East Roman Empire commonly referred as Byzantine Empire (Müderrisoğlu, 1997, pp. 17-21).

During the Byzantine period, the town was a religious center as a bishopric city and continuously destroyed by invasions of different communities such as Huns, Bulgarians, Avars, Visigoths and Ostrogoths. Therefore, there are no physical evidences from this period of the town. There are only the remains of a fortifications (Figure 62) and a bastion in the town from the Byzantine period. This extant bastion is known as *Zindan Baba* Tomb today (Müderrisoğlu, 1997, pp. 17-21). Due to being continuously used by its changing function, the edifice managed to survive at present. The remaining part of the fortifications is in ruinous section and dispersed among a residential area.

Figure 62: Remains of fortifications in Lüleburgaz. (By the author, 2014)

In 1360s, the Ottoman Sultan Murad 1 organized expeditions towards Thrace and the Balkans. So that during these campaigns Murat 1 annexed Lüleburgaz to the Ottoman territories in early 1360s. The population of Lüleburgaz was continuously raised during the Ottoman rule due to the population policies of the Empire. The main urban development was in the 16th century, by the help of the construction of the complex of Sokullu Mehmed Paşa in 1569 by Mimar Sinan. This construction was not only a group of buildings but it also contributed to the development of public works of the town (Müderrisoğlu, 1997, pp. 17-21).

Figure 63: Historical Edifices in Lüleburgaz city center (after Google earth, last accessed on 25.05.2015).

The complex was planned as an impetus for the urban development of the town and its commercial activities. Many travelers such as Evliya Çelebi, mention about a large bazaar and the commercial activities in Lüleburgaz in the 17th century (2006, p. 393). The town continued its development and active trade with its famous bazaar *(sığır pazarı)* in subsequent decades until the mid-19th century. After the second half of the 19th century, firstly the Greek and Bulgarian rebellions, secondly Ottoman-

Russian War in 1877-78 and thirdly the World War I in 1914-18 caused extensive destruction in Lüleburgaz. After the WWI, Lüleburgaz was ruled by the French and Greek forces until the War of Independence in 1919-22. These circumstances effected the town's physical condition and historical edifices. Some historical buildings were severely damaged and some were changed for the military or religious purposes.

On November 8, 1922 Lüleburgaz became a county of Kırklareli province. After the foundation of Turkish Republic, Lüleburgaz was again subjected to development and construction activities. As a consequence of the rapid development activities, some historical edifices were also damaged or destroyed (Müderrisoğlu, 1997, pp. 17-21).

Figure 64: Lüleburgaz City Map. (The whole map is assembled by taking the maps of the districts in Lüleburgaz from the Municipality's web site.)

Lüleburgaz has continuously developed since the establishment of the Republic. Today Lüleburgaz has ten quarters, three towns *(belde)* and 31 villages. It has been enlarging towards the south and east directions. The military lands and

Hamitabat Thermal Power Plant on the north and cemeteries and Turkish Petroleum Thrace District Management on the west create thresholds for the settlement. The historical city center of the town together with the Sokullu Mehmed Paşa Complex is now on the north-west side of the settlement (Figure 64).

3.2.2. Lüleburgaz Sokullu Mehmed Paşa Complex

Sokullu Mehmed Paşa Complex in Lüleburgaz is a *menzil* (terminal) complex which was constructed between 1565-70 by Mimar Sinan. Today it is composed of a *sıbyan mektebi* (primary school), mosque, a *medrese*, a *dua kubbesi* (prayer dome), remains of a *kervansaray, arasta* (aligned shops), a double *hamam* and a bridge. According to scholars such as Müderrisoğlu (1997), Necipoğlu (2005) and Küçükkaya (1990) the original complex had also an *imaret, tabhane,* public fountain, royal palace for the Sultan, residences for teacher, preachers, *imam* and the *muezzin*, pavement, road, water system, aqueduct (Figure 65).

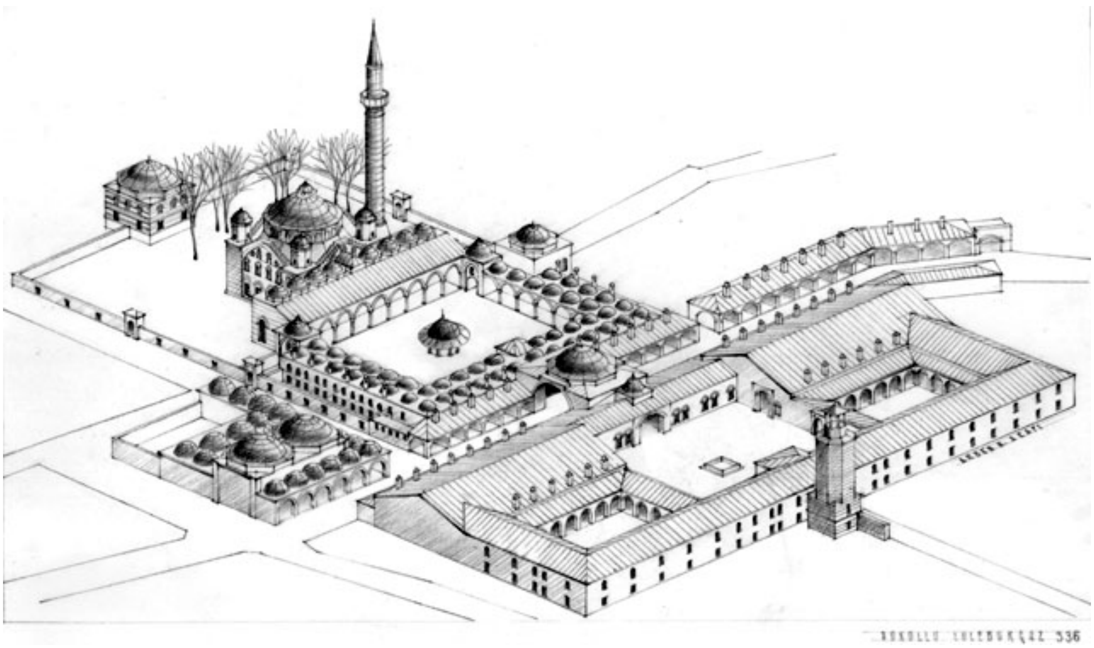

Figure 65: Restitutive axonometric drawing of Lüleburgaz Sokullu Mehmed Paşa Complex (Necipoğlu, 2005, p. 350)

3.2.2.1. Significance of the Complex

Lüleburgaz was not selected by Sokullu Mehmed Paşa as a coincidence for constructing his complex. The military, political, commercial, social, transportation and communication policies of the Ottoman Empire in the 16th century led Sokullu Mehmed Paşa to choose Lüleburgaz.

During the reign of Sultan Suleyman I in the 16th century, the campaigns towards the Balkans and Europe were increased. The campaign route was Istanbul-Edirne-Belgrade and it was directly passing through Lüleburgaz (Figure 66). Therefore, the ancient Roman military route should have been rehabilitated. Lüleburgaz was the most appropriate place for the army to stay and be equipped.

Accordingly, due to being on the important passage way from İstanbul to the Balkans and Europe, Lüleburgaz was a suitable terminal for the person who was charged with communication. In the 16th century circumstances, communication could only be managed by the *ulaks* (messengers) who conveyed the mail from sender to the receiver. *Ulaks* travelled by horses and after specific time they should have let their horse rest or change their horses. Thus, Lüleburgaz was a suitable terminal for these purposes.

Another factor was the financial and commercial activities. Lüleburgaz was very suitable to be a commercial terminal between İstanbul and the Balkan cities. The caravans that transported mainly wheat, grain, animal and cloth between İstanbul-Edirne-Belgrade could have accommodated in Lüleburgaz. Due to the fertile agricultural lands around the town, Lüleburgaz could have had a chance to have yearly bazaars where merchants and inhabitants sold their goods.

Moreover, the pilgrimage route for the Muslims who live in the Balkans was passing through Lüleburgaz. Therefore, the prospective pilgrims on the way to pilgrimage and on their way back home should have been in a secure terminal to fulfil their needs (Müderrisoğlu, 1997, p. 19).

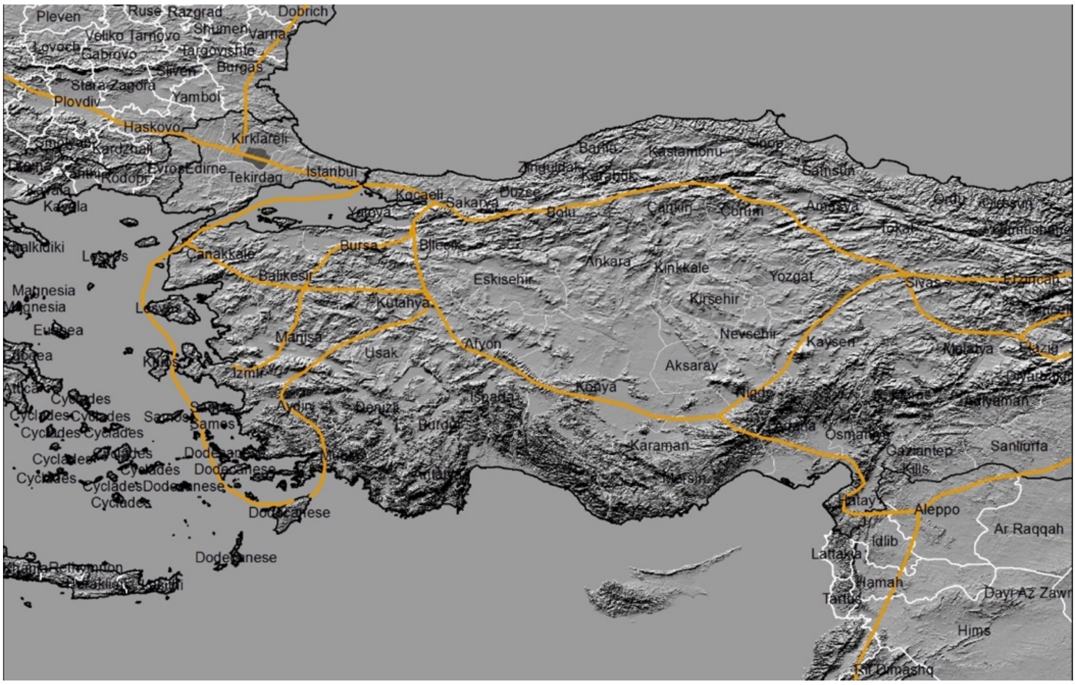

Figure 66: Military routes of Ottoman Empire in 16th Century. (This map is prepared in the light of the data taken from Orhonlu (1967))

In the light of these factors, Lüleburgaz was chosen as the location of the complex by Sokullu Mehmed Paşa. Although all the above-mentioned factors are related to convenient accommodation purposes, this complex was not only for the visitor and travelers but it also served the inhabitants of Lüleburgaz. In other words, Sokullu Mehmed Paşa constructed as a complex for the travelers, visitors and inhabitants.

3.2.2.2. Location of the Complex

Sokullu Mehmed Paşa Complex is located in the historical commercial town center. On the south and west, there is the Kocasinan Quarter as a residential area with a primary school. On the north, İnönü Street and Hükümet Square and on the east, İstanbul Street constitute the boundaries of the current complex area.

There is no accurate information about the selection of the area for constructing the complex which was about 40000 meter-squares in the original design. According to Müderrisoğlu, the complex may have been located outside the Byzantine fortifications. As it can be understood from the existence of one of the bastions of the Byzantine fortresses, *Zindan Baba* Tomb, on the north-west side of the current complex, the buildings of the complex may have been located next to and outside the Byzantine fortifications (Müderrisoğlu, 1997, p. 30).

Another factor that Müderrisoğlu mentions for the location of the complex within the city is the road and the bridge that links Lüleburgaz towards west. The complex together with its bridge controlled the entrances to and exits from the city and created a commercial axis by the help of the shops that are aligned on the road. Moreover, Müderrisoğlu states that this commercial axis also expanded in the area between the bridge and the complex. He adds that in this large and flat area the afore mentioned bazaar *(sığır pazarı)* was established every year (Müderrisoğlu, 1997, p. 30).

The complex sits on a flat land (Figure 67). The buildings of the complex are positioned according to the axis which is the historic road from İstanbul to Edirne. This axis, today's Kubbeleraltı Street, which is on the east-west direction formed the aligned shops called as arasta. This axis also divides the complex into two parts according to their service purposes. The mosque, medrese and sıbyan mektebi which serve the inhabitants of the town are located on the south side. The other buildings such as kervansaray, imaret, tabhane which serve the travellers and visitors are located on the north side of this axis. This axis, the historic road to Edirne, comes from south, turns to west, passes through arasta and dua kubbesi and is directed to the bridge on Lüleburgaz Stream. The hamam which serve both the inhabitants and travellers is located on the north-east side of the complex. The hamam is on the east side of the historic road to İstanbul, which is now İstanbul Street. On the north-south direction, there is a second axis which is the kıbla direction. This axis constitutes the symmetry axis of the complex and the buildings are arranged according to this kıbla direction. These two perpendicular axes intersect at the dua kubbesi. This structure, which has a baldachin form, provides entrances to the south and north sides of the complex (App.C, Catalogue 1 Site Plan).

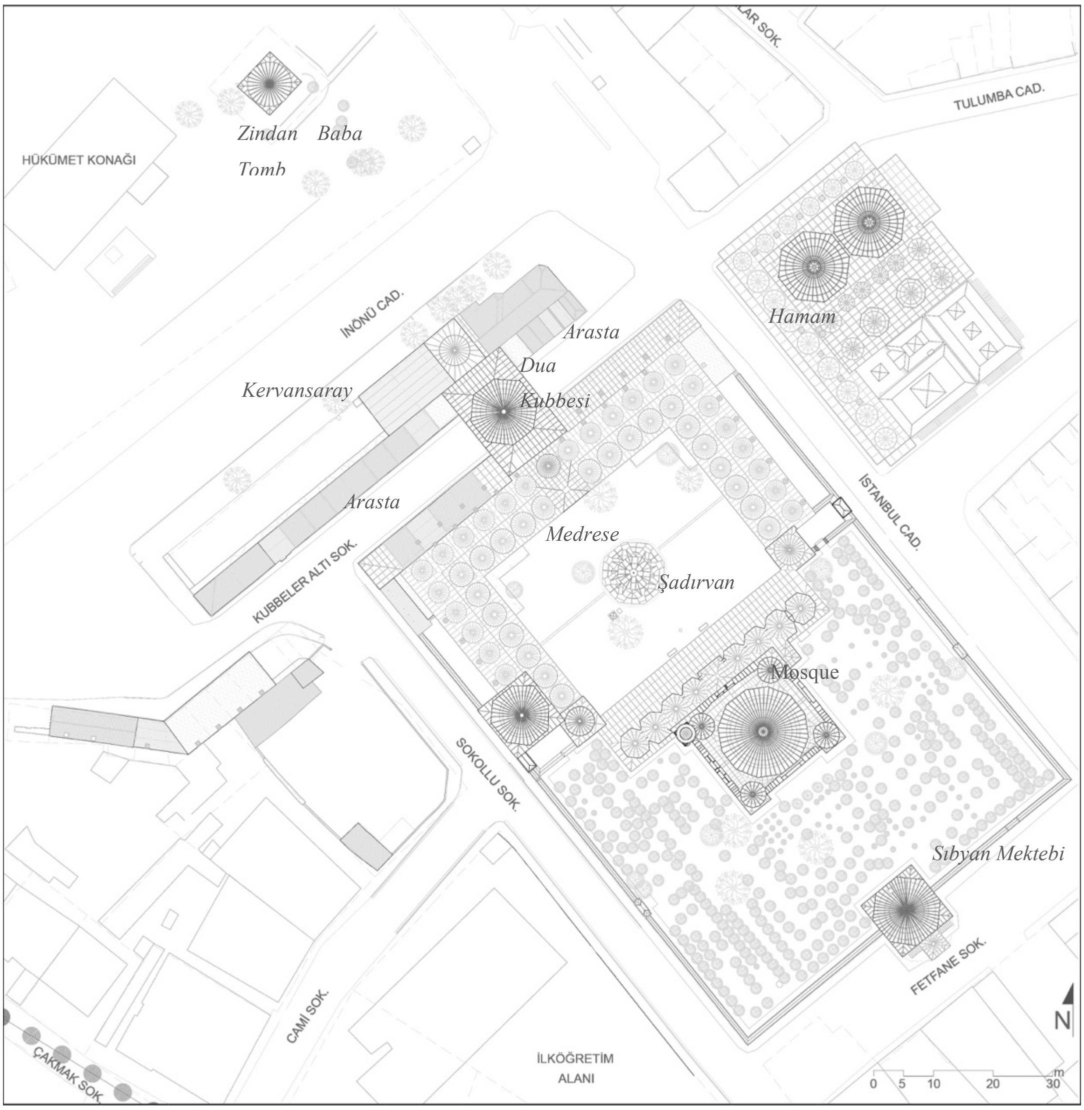

Figure 67: Site Plan of Lüleburgaz Sokullu Mehmed Paşa Complex (Drawn after the measured drawing taken from Yerdeniz Architecture Restoration Design Ltd. Co. and after the measured drawing of the *hamam* taken from ETUR AŞ Rölöve Restorasyon)

The rectangular south part of the complex is bordered by the courtyard walls on the east, south and west edges and shops on the north edge. The mosque is located at the centre of this section. The last prayer hall of the mosque borders the south side of the courtyard shared with the medrese. The U shaped medrese borders the common courtyard from the west, north and east sides. The sıbyan mektebi is on the south edge of this part of the complex. Between the mosque and sıbyan mektebi, the hazire, now comprised of trees, was located.

On the north side of the complex most of the buildings were demolished. Existing shops still border the south edge of the northern buildings of the complex. The domed entrance space, the space adjacent to the west side of the entrance space and the ruined back wall of the kervansaray are still standing edifices of the north side of the complex.

3.2.2.3. History of the Complex

Construction Period

According to Necipoğlu (2007, p. 820), the construction of the complex started in 1565. She mentions this date based on Gerlach's claims about construction of the foundations of the complex. Moreover, she mentions about Marcantonio Pigafetta's and Lambert Wyts's visit to Lüleburgaz and based on the information they give she designates the construction date of the complex between 1565-1570 (Necipoğlu, 2005, p. 565).

Imperial decrees also confirm these dates. There are five decrees that give information about the construction process of the complex. The first one is addressed to the *kadı* of Pınarhisar orders him to help for purchasing timber for the construction of Sokullu's *kervansaray*[65] in 1565. The second one is from 1567 and it is addressed to the *kadı* of Skopje and the copies of this decree were also sent to other *kadı*s of neighboring towns, ordering them to send *dülgers* (carpenters) together with their tools[66]. The remaining three decrees were all in 1568, respectively the earliest one orders enough masons (*benna)* together with their tools from Çorlu, Silivri and Rodoscuk (Tekirdağ) in July[67]. The latter two sent in August are orders for the lead from Bulgarian towns which should be kept in Sofia and then to be transferred to Lüleburgaz[68].

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[65] BOA. (1565). Date: 973 (Hicrî) File No: 527 Folder No: 210 Group Code: MD.5.

[66] BOA. (1567). Date: 975 (Hicrî) File No: 625 Folder No: 226 Group Code: MD.7.

[67] BOA. (1568). Date: 976 (Hicrî) File No: 1751 Folder No: 627 Group Code: MD.7.

[68] BOA. (1568). Date: 976 (Hicrî) File No: 1928 Folder No: 701 Group Code: MD.7. and BOA. (1568). Date: 976 (Hicrî) File No: 1940 Folder No: 706 Group Code: MD.7

Additionally, the building inscriptions on the panels inserted on the entrance arch of the *kervansaray* and the courtyard of mosque and *medrese* also confirm the date for the end of the construction. In the first inscription panel, in Arabic, it is written, that Sultan Selim II had the building constructed in 977 AH (1569-70). Additionally, with "*ebced hesabı*[69]" the same date is confirmed. Again, in Arabic, the second inscription mentions that the building was constructed in 977 AH (1569-70) and the date is given with "*ebced hesabı*" (Müderrisoğlu, 1997, p. 23).

Furthermore, Sokullu Mehmed Paşa who is one of the grand viziers of Sultan Sultan Süleyman I has a comprehensive *Vakfiye.* The date of Sokullu Mehmed Paşa's *Vakfiye*[70] is 29 Zilhicce 981 (AH) / 21 April 1574 and it was registered in the *kütük* on 3 Ramazan 1313 (AH) / February 1896. In the part, which is about Lüleburgaz, the *Vakfiye* gives information about constructions in Lüleburgaz and the buildings of the complex, the employees of the complex and their salaries, constant equipment of complex and viands for the imaret to be provided and finally the rules to be obeyed for the future administration. The mosque, *medrese, sıbyan mektebi, imaret, tabhane, kervansaray, hamam*, two water storages, aqueduct, water tower and *şadırvan* (ablution fountain), pavement, shops, WC, *mumhane, bozhane*, houses for the teachers and the imam and a royal palace for the Sultan are the recorded edifices in the *vakfiye* (App.C, Catalogue 1 Restitution).

Until Today

Apart from a 19th-century inscription panel about a repair of the complex on the entrance arch of the courtyard and the *tuğra* of Mahmud II on the *şadırvan*, there are not any information directly related to the complex which can be derived from primary written or visual sources. Only the secondary sources such as memoirs,

[69] *Ebced Hesabı*: Chronogram, A calculation system which gives the numerical values to the letters of the Arabic script. The letters have always the same value and the addition of several values gives the whole value which is generally the date (Redhouse & Wells, 1880, p. 384).

[70] In the Archive of Directorate of General Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20. In the Turkish records, it is in the #2104 book on the 442-78 pages and in the queue of 323.

drawings and engravings of travelers may shed light to the conditions of the complex during that time period.

Firstly, in 1632 Hıbrî Efendi mentions the existence of a mosque, a *medrese*, two *han*s, a *hamam*, a bridge and a royal palace and refers to the crowded and famous bazaar in Lüleburgaz (İlgürel, 1975, p. 114). İlgürel translates his mentioned delineation as follows:

> *"Ertesi kasaba-i Burgos -ki Baba ile bunun mabeyni dahi altı saattir- nuzul olundu. Bunda dahi merkum Mehmed Paşa'nın bir cami'-i şerifi ve medresesi ve bi-nazir cifte han ve hammamı ve kasabanın taşrasında cari olan nehr-i sagir uzerinde bir ali cisri vardır ve Mehmed Bey nam bir sancak beyinin bir camii vardır ve Hunkar sarayı vardır ve bir iki hurde hanları vardır ve bu kasabanın her sene vakt-i ma'hudda bazarı olup etraf u eknaftan cok adem cem' olur." (İlgürel, 1975, p. 114)*

Subsequently in the 17th century, Evliya Çelebi gives information about the physical condition and the history of Lüleburgaz and then explains the mosque with its interior and courtyard in glowing terms. Afterwards he mentions the other buildings of the complex such as *medrese, imaret*, sıbyan *mektebi*, *hamam*, 300 shops, and a bridge with nine arches. Finally, Evliya Çelebi mentions about a bazaar which is held on in May (when the pomegranates blossom) for 40 days and it is known as the cattle (*sığır)* bazaar. He adds that the income of this bazaar is used for the repair of the pious foundation (2006, pp. 391-395).

Furthermore, John Covel who is a clergyman, in his diaries written in 1675, gives information about the *kervansaray* which can host 1000 travelers and their animals and has a pool in the center. Then, he mentions about the *dua kubbesi* with four arches and a dome (Covel, 2009, p. 110).

In the 18th century İnciciyan and Andreasyan mention the mosque, *imaret*, and *kervansaray* giving meals to the travelers twice a day (1973-74, p. 36). While they give information about the location of Lüleburgaz, the river and the old names of the settlement, they once more mention the mosque, *imaret*, *medrese*, *hamam* and *kervansaray* (1975-76, p. 141).

Figure 68: *Dua Kubbesi* in Lüleburgaz engraved by Traversier after Vormser (Sevim, 2002, p. 124) (Jouanin & Gaver, 1840, pp. 260-261)

Figure 69: *Kervansaray* in Lüleburgaz engraved by S. Cholet after Vormser (Sevim, 2002, p. 125) (Jouanin & Gaver, 1840, pp. 300-301)

In the 19th century there are two engravings by Traversier and Cholet based on Vormser's engraving. In the first engraving, the *arasta, dua kubbesi,* the mosque and its minaret can be seen. In the second engraving, the courtyard of *kervansaray* and the pool in the middle can be seen and the *dua kubbesi,* mosque and its minaret can be observed in the rear (Figure 68,69).

For the early 19th century, the inscription panel that mentions about the repair of the complex, is inserted on the entrance arch of the courtyard of mosque and *medrese* above the building inscription. This inscription describes the repair which was held in 1255 AH (1839) during the reign of Sultan Mahmud II. Additionally, the *tuğra* of Mahmud II which is on the *şadırvan* mentions the restoration in 1839 during his reign.

For the late 19th century, study on the *firmans*[71] now in the collection of the Ottoman Archives of the Prime Ministry, may give information about the condition of the complex. These documents, called as *Sadaret Mektubi Kalemi Defterleri* are kept in the *Bab-ı Ali Evkaf Odası* and they all mention issues related to the repair of the complex.

The earliest one[72] is from 1895 and it is the petition of Mehmed Lütfü who is one of the teachers of the *medrese*. The petition asks for the repair of the mosque, *medrese* and *kervansaray* which were decayed due to the lack of a responsible *imam* and *muezzin* as well as income. The latter document[73] is from 1898 and mentions the costs of the repairs of Sokullu Mehmed Paşa Mosque, *medrese* and *kervansaray* in Lüleburgaz. The third one[74] prepared in 1898 is related with the conversion of "*Sadrazam* Sokullu Mehmed Paşa" Kervansaray into a military post. The fourth one[75], dating back to 1898 and contains the promulgation of *Evkaf-ı Hümayun Nezareti* (the

[71] *Firman:* A royal mandate or decree issued by a sovereign in Ottoman Empire

[72] BOA. (1895) Date: 20/M /1313 (Hicrî) File No :653 Folder No :48973 Group Code: BEO (Evkaf; 48973)

[73] BOA. (1898). Date: 24/M /1316 (Hicrî) File No: 1141 Folder No: 85567 Group Code: BEO (Maliye; 48973)

[74] BOA. (1898). Date: 02/C /1316 (Hicrî) File No: 1213 Folder No: 90921 Group Code: BEO (Maliye; 48973)

[75] BOA. (1898). Date: 22/Za/1316 (Hicrî) File No: 1289 Folder No: 96656 Group Code: BEO (Maliye;?)

Ministry of Imperial Foundations) about the repair of the "*Sadrazam* Sokullu Mehmed Paşa" mosque, *medrese, kervansaray* and aqueducts in Lüleburgaz. The last one[76] is from 1905 and gives information about the amount spent for the repairs of Sokullu Mehmed Paşa Mosque, *medrese* and aqueducts in Lüleburgaz.

In the light of these primary documents from the Ottoman Archives, it can be derived that some parts of the complex were damaged after the mid-19th century. The records related with the repair activities show that the aforementioned wars in the Ottoman territories effected the buildings of the complex. As a consequence of these wars, the functions of these buildings also changed in time. As Müderrisoglu states, the *kervansaray* was converted into a two-storey military post towards the end of the 19th century. Müderrisoğlu continues that with the 20th century during the WWI and the Greek occupation, the mosque was converted to a church, the minaret was damaged and converted to a bell tower and *sıbyan mektebi* was converted to Red Cross building (1997, pp. 31-32).

After the establishment of the Turkish Republic, like in other towns of born Republic, Lüleburgaz and the complex were also subjected to rapid development and construction activities[77]. The information about the interventions mentioned below are achieved from the documents in the archive of Directorate General of Foundations in Ankara. The major interventions which changed the complex are held in the 1930s. The demolished minaret was reconstructed in 1932 by the Directorate General of Foundations. In 1935, the *kervansaray* was demolished and the two bays of the bridge were closed by the Municipality with the purpose of constructing roads in the town. After these construction activities, the complex was continuously subjected to restorations at different intervals by the Directorate General of Foundations. The bridge was restored by German engineers in 1949. The rooms of the *medrese* were restored in 1952 and 1968. Subsequently, in 1975-76 the rooms of the *medrese* and the shops were restored once again this time by giving priority to their superstructure. In 1983, the wall ornamentations (*kalemişi)* of the mosque and *sıbyan mektebi* was

[76] BOA. (1905). Date: 02/M /1323 (Hicrî) File No: 2523 Folder No: 189157 Group Code: BEO (Maliye)
[77]

restored. Subsequently, in 1989 the demolished dome of the entrance space of the *kervansaray* was reconstructed. The space belonging to the *kervansaray* on the west side of the entrance was restored and converted into a restaurant in 1992. Afterwards, in 1994 the arcade of the last prayer hall (space for late arrives) of the mosque was closed with aluminium fenestrations after the community's demand. Finally, the *hamam* which passed to a private ownership in 1935 was restored in 2014.[78] Lastly, the restoration project process of the complex except the *hamam* was started in 2011 by the Pious Foundation of Sokullu Mehmed Paşa. This process has been carried out by Yerdeniz Architecture Restoration Design Ltd. Co since 2011.

Until today the complex was subjected to different monographic studies. These studies increased in the late 1980s especially after 1988 was designated as the International Mimar Sinan Year. The sources which give information about the complex are Gökbilgin (1952), Meriç (1965), Goodwin (1971), Sözen (1975), Cantay (2002), Kuran (1986), Aslanapa (2004), Özyurt (1989), Küçükkaya (1990), Müderrisoğlu (1993) (1997), Necipoğlu (2005).

Accordingly, there are sources which discuss only a specific building of the complex. Such as the mosque by Erzen (1981); *medrese* by Ahunbay (1988), Aşkun (1988); *arasta* by Özdeş (1954), Önge (1971), Cezar (1985); *kervansaray* by Cantay (1988); *hamam* by Önge (1988); bridge by Bozkurt (1952), Çulpan (1975), Tunç (1978) and Çeçen (1988). Additionally, there are studies which tried to achieve a restitution project and understand the whole complex. These studies are conducted by Ülgen (Yenişehirlioğlu & Madran, 1989, p. 27) in 1941, Arseven (1956), Küçükkaya (1990, s. 247) and Necipoğlu (2005, p. 349).

[78] (Müderrisoğlu, 1997, pp. 31-32), (Küçükkaya, 1990, s. 196-201), (Özyurt, 1989, pp. 37-41) and Archive of the Directorate General of Foundations in Ankara.

3.2.3. Lüleburgaz Sokullu Mehmed Paşa Mosque

The mosque is at the centre of the rectangular-shaped south part of the complex. On the north, a common courtyard shared with the medrese, on the east, south and west, the *hazire*[79] are located.

3.2.3.1. Architectural Features of the Mosque

The mass of the mosque is composed of almost a cubic *harim* topped with a single dome and a rectangular prism last prayer hall attached to the north (Figure 70). The dome sits on four main arches and it is circumscribed by the dodecagonal drum. On the corners, the main arches and the dome are supported with four dodecagonal weight towers topped by domical vaults. On the north-west corner, stands the high minaret with a slender polygonal shaft and a single *şerefe*. On the north-east corner, a rectangular prism, containing the staircases, creates the symmetry together with the prismatic minaret base. The last prayer hall which is attached to the north façade of the mosque protrudes on the east-west directions and enlarges the façade. It encloses a longitudinal last prayer hall with a double arcade. The arcade which is adjacent to the mosque has a central unit covered with a vault with a shouldered profile. The other units on the sides are topped with eight domes in the first arcade. The other arcade has a pent roof that slants towards the courtyard (App.C Catalogue 1.1 Mass).

The square planned main prayer place of the mosque has an entrance from the north through the rectangular last prayer hall (Figure 71). The dome of the square planned mosque sits on four main arches and spherical pendentives. On the corners of the single main space, there are four large piers embedded in the walls. Below the main arch on the south wall, the *kıbla* wall, the *mihrab* is placed. On both sides of this *mihrab*, there are half rectangular niche recessions which are topped by two cantered

[79] *Hazire:* an open area used for burial of special people especially in the courtyards of the mosques or sufi lodges. The gravestones in the *hazire* of Lüleburgaz Sokullu Mehmed Paşa Mosque were demolished during the Greek occupation. Now, the *hazire* was wooded.

tangent arches. Additionally, adjacent to the south wall, the *minber* and *vaaz kürsüsü* is placed. The *minber* is on the west side of the *mihrab* and the *vaaz kürsüsü* is on the east side.

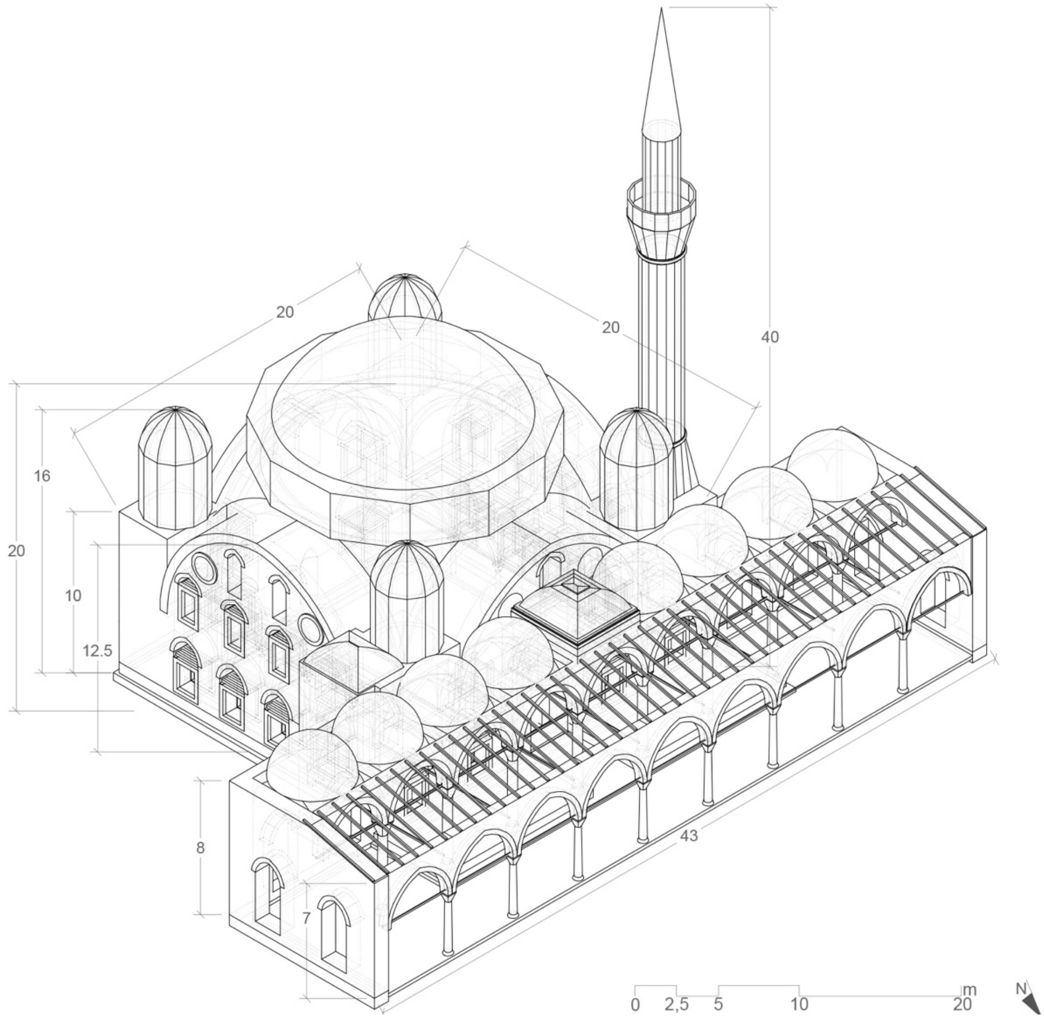

Figure 70: Axonometric Drawing of Lüleburgaz Sokullu Mehmed Paşa Mosque

On the east, west and north walls of the mosque, the main arches are widened. This widening gives these arches form of a vault. Under these extended arches, there is an upper floor, the *mahfil* floor which has a U-shaped plan. On the upper floor, the *mahfil* encircles the interior space from these three sides. This floor can be reached by the staircase on the north-east corner of the mosque. The direct passage to *mahfil* is also available by the door from the last prayer hall. Under the *mahfil* floor on east and west directions, there are spaces. These spaces are divided into 4 units by pointed arches supported by 3 columns. Each of these 4 units are covered with vaults with shouldered profiles. On the north side, under the mahfil, there is an entrance iwan at the centre and two other iwans flanking its sides. All three have vaults with two cantered tangent profiles. In front of the iwan which is on west side of the entrance iwan, there is the *müezzin mahfili*. It is a raised platform which can be reached by the staircase on its north-east corner (App.C Catalogue 1.2 Measured Drawings).

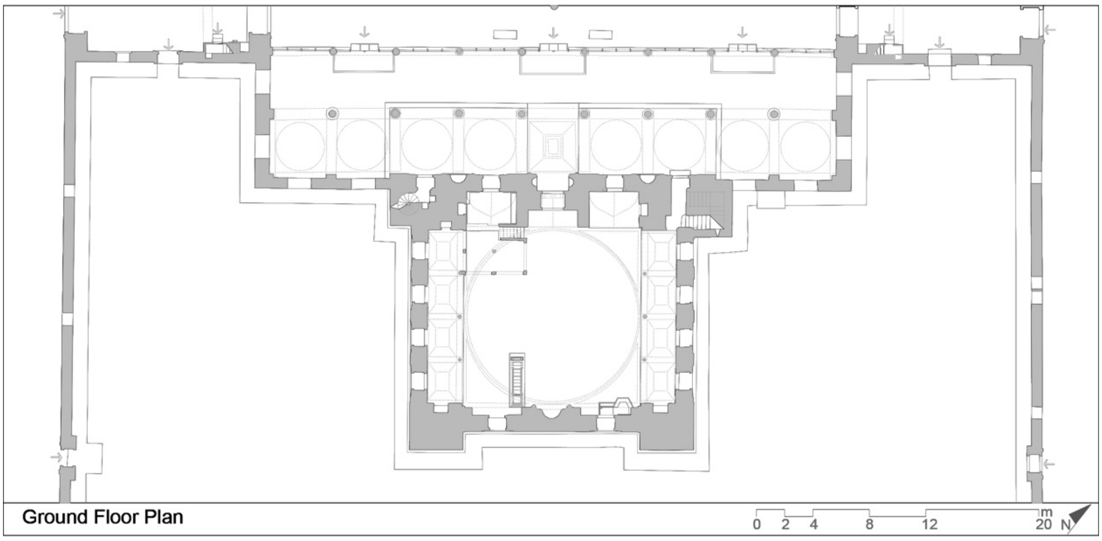

Figure 71: Ground Floor Plan of Lüleburgaz Sokullu Mehmed Paşa Mosque (Drawn after the measured drawing taken from Yerdeniz Architecture Restoration Design Ltd. Co.)

The rectangular planned last prayer hall is a semi open space attached to the north wall of the mosque. The east, south and west sides of this hall are defined by the walls. An open colonnade, now closed with a later addition aluminium fenestration, borders the north side of this hall. The last prayer hall which acts as a passage way to the mosque is composed of double arcading. The arcade which is closer to the mosque consists of nine square units divided by pointed arches supported by columns with stalactited capitals. The central square unit covered with a vault introduces the entrance of the mosque. The other units on each side of this entrance unit are covered with domes resting on spherical pendentives. Additionally, in this first arcade, the floor of the units that are in front of the mosque façade are raised, but the floor of the entrance unit is not. The second arcade following this first one is a longitudinal single space expanding towards east and west. This arcade is covered with a pent roof that leans towards north.

The façades of the mosque are composed of elaborated architectural elements. On all the facades, the windows are arranged in three rows under the main arches resting on large piers. Above the window arrangements, the framing main arches are topped with a cascaded eave. From the ends of the cascades, the vaulted weight towers of the mosque rise on each side. On the walls of these weight towers, there are small rectangular window openings. In between the weight towers, the dome and the dodecagonal drum are seen. The faces of the drum are ornamented in the shape of relieving arches in rectangular frames. Additionally, the minaret, attached to the north-west corner of the mosque, can be observed on all of the facades.

Figure 72: Lüleburgaz Sokullu Mehmed Paşa Mosque from the courtyard (by the author, 2015)

The north façade of the mosque, below the ends of the cascade, is hindered by the last prayer hall which is facing the courtyard (Figure 72). The north façade of the last prayer hall is composed of nine large openings topped with pointed arches carried by eight columns with *baklavalı* capitals[80]. The arched openings were closed with aluminium fenestration as a later addition. Above these arches, the pent roof is raised towards the domes of the first arcade of the last prayer hall. The eight domes and the vault of the first arcade can be observed from the north façade above the pent roof. The raised vaulted centre unit defines the entrance unit. Behind the stilted roof, the topmost window row of the north facade is placed. A window with two centred tangent arch and a circular window on each side can be observed. These windows have *dışlık* panels.

The lower section of the north façade, the entrance façade, of the mosque is within the last prayer hall. Thus, the rear wall of the last prayer hall forms the entrance façade of the mosque. It carries the entrance portal of the mosque in the middle. On both sides of the portal, there are two windows, arranged one above the other, and the *mihrabiye* niche and a door. The lower windows are rectangular in shape with relieving pointed arches. The upper windows are smaller and rectangular in shape. These windows have iron grills with knots. The rectangular door openings have relieving pointed arches. The door on the west side opens to the staircase leading to the minaret and the door on the east opens to mosque and the staircase leading to the upper floor (*mahfil*) of the mosque. The surface of the tympanums of the windows and doors are decorated with inscriptions. The inscriptions are gilded letters on a dark green background encircled with white washed frames.

The east and west facades are almost mirror image symmetry of each other. On these facades, the lowest row of the three-rowed window arrangement is composed of four rectangular windows with relieving pointed arches. The four windows on the second row are smaller rectangular ones with relieving two centered tangent arches. The windows at these two rows have grilles with knots. On the uppermost row, at the

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80 *Baklavalı* Capital: the column capital that converts the circular column top to a square plan by means of triangulation in the form of interlocking diamond shapes or chevrons. This form of capitals is also called as "٧٨" which are the Arabic digits of 7 and 8 due to their forms' resemblance.

center, there are two windows with two centered tangent arch. Those are flanked by two circular windows. The windows on the highest row have *dışlık* panels. The difference of the west façade from the east is because of the minaret attached to the north corner and its slit windows. On the other side, the difference of the east façade from the west is caused by the rectangular prismatic mass which contains the staircase attached to the north corner. On the east wall of this attached mass, there are two slit windows and over them a small rectangular window. Additionally, the side walls of the last prayer hall are also observed on these facades. On these walls, there are two large window openings topped with pointed arches and iron grills with knots.

The south façade, the *mihrab* wall, has a symmetrical organization. On the lowest row of the window arrangement, there are two rectangular windows with relieving pointed arches. The windows at this lowest row have grills with knots. On the second row, there are two narrow windows with two centred tangent arches. On the upmost row, there are circular windows on both sides of a window with two centred tangent arch which is at the centre. The windows on the higher two rows have *dışlık* panels. Outside of the framing of the main arch, the large main piers can be observed because they project from the wall surface. Likewise, the walls of the projected two units of the last prayer hall can be observed on each side of the south façade. On these walls, there are two large window openings with pointed arches and iron grills with knots.

As it is mentioned before, the mosque has elaborated architectural elements. The entrance portal constructed in marble is set in a high rectangular frame encircled by a cornice. It has a rectangular niche which is covered with seven rows of stalactited hood (*kavsara*). In this niche recession, above the door opening, there is the three-partite rectangular inscription panel with gilded Arabic letters on a dark green background. The door opening is topped with a two-coloured marble joggled arch with depressed profile. The *cümle* door is made of timber in *kündekârî* technique. Additionally, on the east and west walls of the portal recession, there are two niches with half decagonal plan and they are covered with a hood with four rows of stalactites. The portal niche is flanked by two attached columns.

The *Mihrabiye* niches that are constructed in limestone have half decagonal niches which are covered with five rows of stalactited hood. On the spandrels of the stalactited hood there are rosettes.

The *mihrab* that was covered with grey marble, seen in the photograph below (Figure 73), has a rectangular frame topped with a pediment. The *mihrab* has a plan of a half decagonal prayer niche which is covered with a hood made of seven rows of stalactites. On the spandrels of the stalactited hood there are rosettes. Above the hood, there is a rectangular inscription panel with gilded Arabic letters on a dark green background. The niche is flanked by two attached columns made of green marble.

Figure 73: The *Mihrab* wall of Lüleburgaz Sokullu Mehmed Paşa Mosque (by the author, 2015)

The *minber* which is made of marble is placed on the west side of the *mihrab* adjacent to the south wall. The *vaaz kürsüsü* which is made of marble is placed at the south-east corner of the interior adjacent to the south wall.

The *müezzin mahfili*, constructed in grey marble, is placed at the north-west corner of the interior, adjacent to the iwan on the west. The platform of this *mahfil* is carried by six columns with square cross section. On both sides of each column there are brackets that articulate and give the appearance of arches with shouldered profiles. The east and south sides of the *mahfil* have balustrades and the stairs are on the north-east corner.

3.2.3.2. Structural System and Construction Technique of the Mosque

Lüleburgaz Sokullu Mehmed Paşa Mosque has a square-planned prayer hall (*harim*) topped with a single dome, a rectangular last prayer hall with double arcade and a high minaret with a slender polygonal shaft. Principally, the mosque is built up with masonry structural system. As a consequence of the structural system, the vertical loads are transferred by means of load bearing elements such as walls and piers constructed with unit materials. In order to compensate the transverse forces developed in this building, these load bearing elements are bonded at significant levels by bracing elements that encircle the system (App.C Catalogue 1.3 System details).

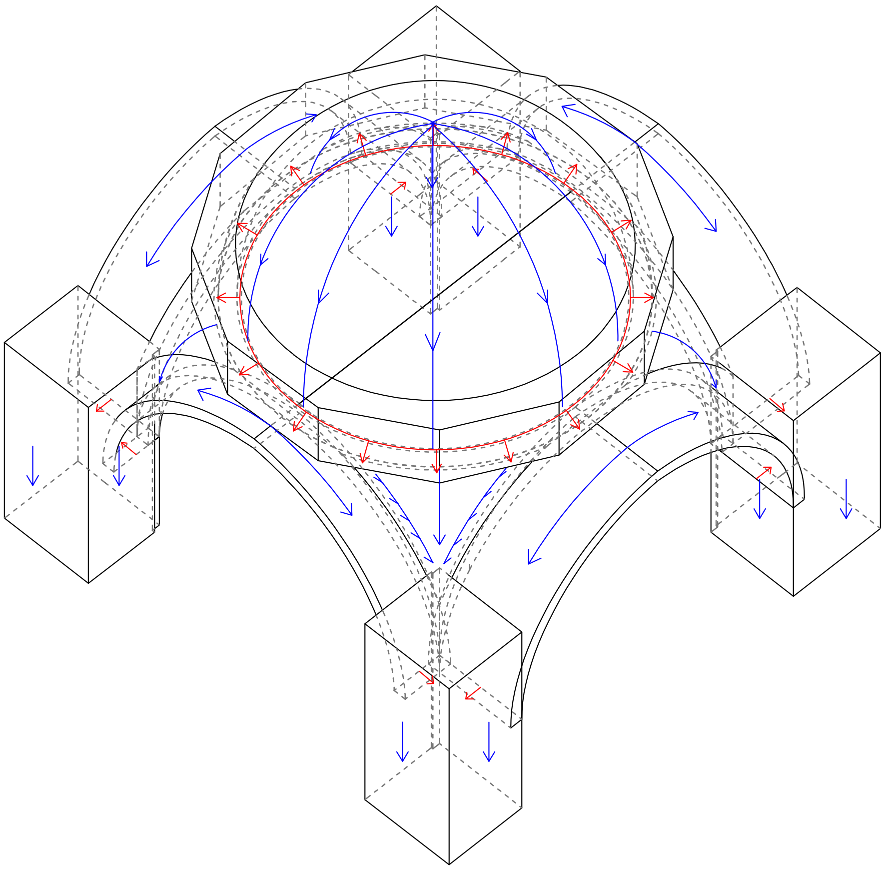

Figure 74: The Load Distribution of Lüleburgaz Sokullu Mehmed Paşa Mosque.

As it is seen in the figure above (Figure 74), the dome of the mosque sits on a circular base provided by an inner drum (*tambur*) and it is circumscribed by an outer drum. The outer drum restrains the tensile stress occurred in the tension zone[81] of the dome. In addition to the outer drum in the same zone, in the dome courses, there is probably an iron or timber tension ring to resist the hoop tension. The inner drum transmits the compressive loads to the spherical pendentives. These pendentives make the circular plan geometry fit to square plan below. These transition elements distribute the load over the main arches with corbelled courses of unit materials and probably with the tie beams. The arches convey the loads to the masonry piers which also bear against the thrust[82]. The name of the structure over these piers is weight tower, which is related to this issue. The piers are up to the level of the dome to provide more compressive force to resist the tensile forces of the arches and domes. Consequently, the loads are transferred to the ground by means of the foundation.

Accordingly, the masonry walls, that enclose the *harim* section, support the main arches and carry the architectural elements such as openings and niches. These openings are spanned by the arches, relieving arches and lintels in the walls. Furthermore, the walls bear the upper floor (*mahfil* floor) together with the columns. The *mahfil* floor which is below the widened main arches on the east, west and north sides is a masonry slab. The slab on the north sits on the barrel vaults of the iwans carried by the masonry walls. Whereas the slabs on the sides sit on the vaults with depressed shouldered profile. These vaults on the sides transmit their loads to the columns and the side walls by means of the arches. In order to maintain the thrust developed in these arches, they are tied at the level of impost line. Thus, the loads are conveyed to the ground by the foundation and the footings of the columns. Besides, the *mahfil* floor can be reached by the staircase on the north-east corner of the building. The staircase steps are built with stone slabs, which directly sit on the ground or walls. The stone units standing over the spans, are underpinned by the sheet irons (*lama*) as subsidiary beams.

The longitudinal last prayer hall which is attached to the north wall of the *harim* composed of double arcading. These arcades consist of nine square unit spaces divided

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[81] For further information about the tension zone see Chapter 2.; Section 2.2.

[82] For further information about the thrust see Chapter 2.; Section 2.2.

by the arches. The side units of the arcade which is closer to the mosque are covered with domes that are supported by spherical pendentives, which distribute the load on the arches. Whereas, the central unit is covered with a vault which rests on the arches. The outer arcade is covered with a timber roof which is constructed with timber lintels and joists. This roof sits on the walls constructed on the arches. The load on the arches are imposed on the columns and the walls. In order to eliminate the thrust and fasten the entire colonnaded masonry system, iron ties are placed at the impost level of all the arches. Likewise, the loads are transferred to the ground by the foundation and the footings of the columns.

The slender minaret is constructed with masonry system except the timber hood (*külah*) on the top. From top to bottom, the minaret is composed of the hood, the polygonal upper portion of the shaft (*petek*), the balcony (*şerefe*) with corbelled stalactites, polygonal shaft (*gövde*), the shoe (*pabuç/küp*) composed of bands of triangular faces and the base (*kaide/kürsü*). The minaret base is constructed interconnected with the pier at the north-west corner. It contains the step courses of the spiral staircase. The step courses (*kur*) that are laid on top of each other with a slight rotation are composed of spare steps and steps with core. These two steps are fastened together with iron clamps. Then, the courses are assembled to each other with iron dowels by means of the core. Besides, the step courses also rest on the walls by extending along the wall courses and binding with clamps. Thus, the spiral staircase bonds the entire structure by acting as a spine in order to resist the transverse forces developed in the high slender structure. The minaret shoe (*pabuç/küp*) acts as a transition element. It makes the square plan of the minaret base fit the polygonal plan of the shaft by means of the bands of triangular faces. Such like the minaret base, the shoe and the shaft are constructed interconnected with the staircase up to the level of the balcony (*şerefe*). The balcony which has a larger plan than the shaft below is constructed with the corbelled courses of stalactites. Above the balcony level, the upper portion of the shaft is built up with a smaller plan layout than the lower portion. It is only tied with parallel two iron tie beams in about the midst of its height. Furthermore, upon the core of the minaret, the timber mast (*seren*) is erected with an iron anchorage. This mast is the main post that carry the timber hood structure together with the upper portion of the shaft.[83]

According to the structural necessity of forming a unified structural system, the building and walls are bound and aligned by means of tie beams (*hatıl*) at significant levels. These significant levels are supposed to be the beginning and ending levels of the load bearing and architectural elements. These alignments are also necessary to stage the construction process. So that, the tie beams are thought to be located at essential intervals. These intervals are decided according to the height that a mason can conveniently lay the courses on a scaffolding. The tie beams, which are observed inside the window and door openings, are timber. Therefore, the tie beams are supposed to be timber. Taking into account all of these, the timber tie beams are thought to be located at two-*arşın* intervals.[84] The first levelling is thought to be just over the foundation level and the second can be seen inside the windows at the first row. The third level should correspond to the *mahfil* floor level. The upper one can also be seen inside the second-row windows. Further ones probably come above the arches of the second-row windows and above the circular windows.

The foundation of the building cannot be observed due to being under the ground level. Only the upper part of the stone units which belong to the first encasement of the foundation can be seen. Additionally, as it is discussed in the previous chapter[85], due to limited knowledge about the construction of the foundations, the foundation of the mosque below the ground cannot be drawn even by prediction. The depth of the foundation cannot be identified. However, according to the *vakfiye*[86]

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[83] The minarets are the first structures to be demolished when there is a threat. Likewise, as it is mentioned before the minaret of this mosque was demolished up to the level of the minaret shoe in 1910s. Although it is reconstructed in 1934, the construction technique is almost the same with the lower portions. The only difference is the used iron rings in the courses of the polygonal shaft instead of the iron clamps that fasten the stone units.

[84]The vertical interval between two tie beam in the courses of the wall is generally about 2 *arşın* means 151,5476cm. (The Lecture Notes of the course RST510-Osmanlı Mimarlığında Yapım Teknikleri held by Assist. Prof. Dr. Gülsüm Tanyeli in İTÜ Faculty of Architecture) 1 *arşın* = 75,7738 cm (Özdural, 1998, p. 113)

[85] For further information about foundations see Chapter 2; Section 2.2.;

[86] The *vakfiye* belongs to Sokullu Mehmed Paşa claims that the water is transported by the aqueducts from Küçükkaynarca and Büyükkaynarca rivers to the water tower next to *sıbyan mektebi.* Then, the *vakfiye* explains the route of the water supply system. In accordance with it, after leveling, the water is carried to the *şadırvan* in the common courtyard of *medrese* and mosque, then, to the *hamam, the imaret*

which addresses the water system passing under the mosque, it can be suggested that there can be vaulted galleries under the mosque. Additionally, when the soil quality[87] and the large area that the complex sits on are taken into account, this suggestion becomes stronger. Because the site which is said to be about 40000[88] meter squares should have been made suitable for construction. Thus, there should have been held a vast excavation work at the construction site during the initial phases. Especially for the mosque which is the most complicated structure of the complex, it seems to be more efficient to construct vaulted galleries under the building rather than filling the large area with soil. This suggestion is also supported by Bayraktar, who suggests that in the foundations of the Ottoman mosques, there are wells and galleries to prevent the dampness problems (2011, pp. 112-119).

Taking into account all of the discussions above, it is more likely that there are galleries under the ground level of the building between the foundations. Unfortunately, there are not any information about the depth and the encasement levels of the foundation. However, it can be suggested that in order to construct the foundation, there should have been formed a raft (*rıhtım*) as a base at the bottom. This raft, which is generally made up of wooden grillage (perpendicular timber ties) filled with mortar, make the footing and the foundation to be adapted to the ground and to distribute the load uniformly. It is important to add here that there are most probably piles below the wooden grillage of the raft. Because these piles are essential in order to anchor the foundation to the loose soil where the bedrock cannot be observed.

The ground floor of the mosque should have been constructed by laying the flooring unit materials such as brick or stone pieces on the filling over the galleries.

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and the ateliers such as *sabunhane, mumhane* and *debbağhane* near the bridge. In order to be directed to the *şadırvan,* it is recorded that the water passes through the pool behind the *mihrab* wall and passes under the mosque.

[87] According to the soil investigation report which is prepared for the restoration of Sokullu Mehmed Paşa *Hamamı,* the bedrock is not encountered in the boreholes which were drilled in 15,00m depth. There is a topsoil layer until the -0,30m. After that, till the -1,50m the brown medium stiff clay layer is found. In between the -1,50 and -3,00m there is the light brown very stiff clay layer. After the -3,00m there is the medium dense gravel till the -5,00m. Thereafter the -5,50m the dense gravel layer starts. On the authority of this soil investigation report, it can be said that the complex sits on a loose soil. (Güneş, 2011)

[88] (Müderrisoğlu, 1997, p. 30).

This flooring system with filling below should start at the level of the first encasement which can be seen on the ground. This is because of the fact act after this encasement level the walls and the piers of the building are started to be built up and there is a need to have a levelled site. The walls should be located on their exact location on top of the first encasement in order to construct the entire upperstructure with precise dimensions. Thus, the flooring unit materials are thought to be laid on the levelled site inside the building walls. This floor laying is constructed by pining down in a thick mortar layer which may also be reinforced by perpendicular timber ties to set a uniform base.

In conclusion, the main building material of the mosque is limestone[89]. The walls, arches and the vaults of the northern iwans are constructed with limestone units. Then, white marble is the second material which is widely used in the building. The portal, the *mihrab, minber, vaaz kürsüsü,* column capitals, bases and columns of the last prayer hall, window and door frames, *sultan mahfili,* balustrades, and edges of the upper floor slabs are constructed with marble. There are different types of stones which are occasionally used in the last prayer hall. There are granite columns in the northern arcade of the last prayer hall. Dark green marble is used for the inscription panel of the mosque on the portal. The stone flooring of this arcade has different colored stones. Maroon colored marble in a circular form is laid on the entrance axis of the mosque. Porphyry is another stone type which is partly used for flooring. Additionally, red stone units are used on the faces of the octagonal drum of the mosque. These red stones are configured in the shape of relieving arches in rectangular frames.

The second building material is brick which has a 4-cm thickness and a 30-cm length. Brick is generally used for constructing the superstructure of the mosque and floor laying of the *harim* section. The main dome and pendentives, domes and pendentives of the last prayer hall, as well as the entire vaults except the ones covering the northern iwans are constructed with brick. For the floor laying *şeşhane* bricks are used.

[89] In the technical report of material analysis of Lüleburgaz Sokullu Mehmed Paşa Complex Restoration Project, the limestone is defined as the mitric cemented "Oomicritic Limestone" which contains sporadic clay, small quantities of quartz, dense oolite. In other words, these stone blocks are the local micritic limestones (2017, p. 42).

The other construction materials are timber and iron which are used for jointing, aligning, anchoring and tying the masonry system. Timber is used as tie beams which have vital importance for the stability of the mosque. The timber is also used as lintel of the openings which are supported with reliving arches. In addition, the roofing system for the last prayer hall and the hood of the minaret is out of timber structural elements. Iron is used in the forms of tie beams, clamps, dowels, auxiliary beams as sheet irons (*lama*) and nails in essential locations. Moreover, there are binding materials such as lime mortar, mud mortar, *horasan* mortar and lead which are crucial components of the masonry system. Moreover, the finishing materials are mainly lime based plaster and white wash. The coloured paintings are applied on the white wash on the significant surfaces. There are more materials which do not have any load bearing function. These are brass used for the *alem* and column rings hiding the joints, lead sheets for roof covering, gypsum for *içlik* panels, glass for windows, timber for doors, window sashes and shutters.

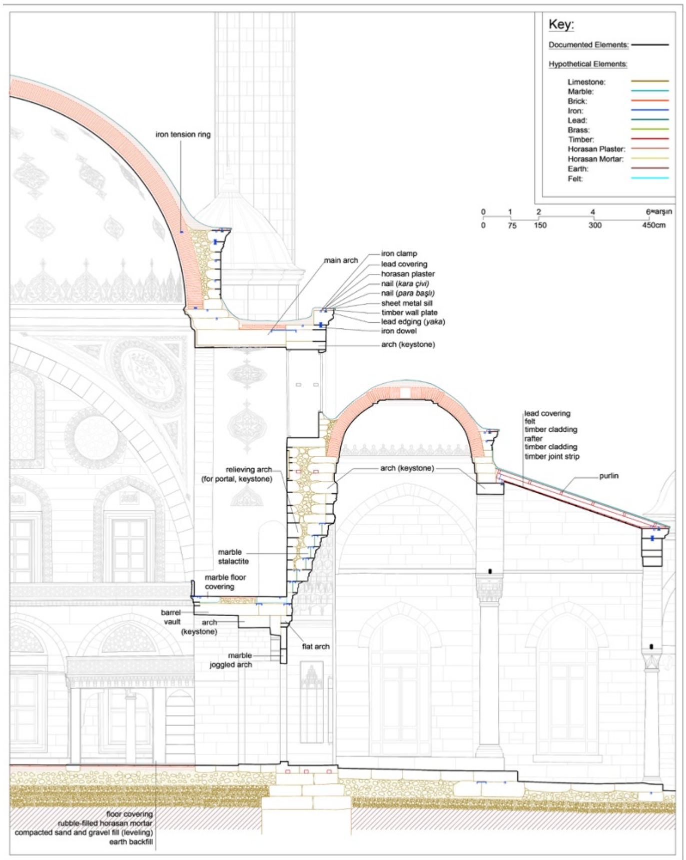

Figure 75: System Detail 3 of Lüleburgaz Sokullu Mehmed Paşa Mosque drawn by the author

3.3. Havsa Sokullu Mehmed Paşa Mosque

Havsa Sokullu Mehmed Paşa Mosque, which is also known as Kasım Paşa Mosque, is selected as a case in order to understand the construction technique of Lüleburgaz Sokullu Mehmed Paşa Mosque. Similar to the mosque in Lüleburgaz, the mosque in Havsa is also part of an important *menzil* complex which belongs to the same donor, Sokullu Mehmed Paşa, as in the case of Lüleburgaz. Being in the same geography makes this example significant for comparing the structural system and construction technique.

3.3.1. Havsa

Havsa as a county of Edirne, is situated in the Lalapaşa Plateau of the Thrace Region where the south-east corner of the Balkan Peninsula is. The town is located in the northern section of Edirne and it is surrounded by Uzunköprü on the south, Babaeski and Kırklareli on the east, Süloğlu on the north and Edirne city center on the west (Figure 76). Havsa is on the international high-way of TEM and D100 which connect Central Europe and Balkans to Anatolia through Marmara Sea and Bosporus. Additionally, the town is 27 km away from Edirne and 219 km away from İstanbul.

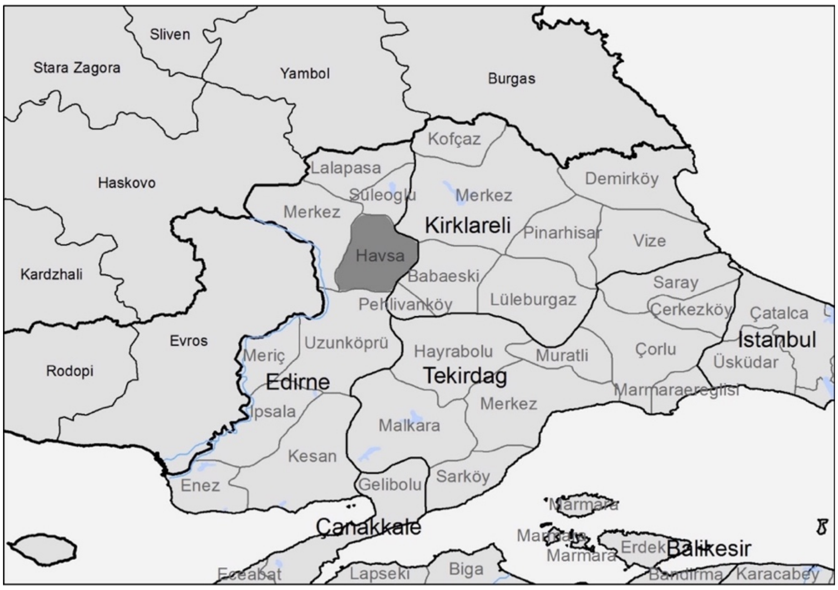

Figure 76: Location of Havsa

Havsa has a flat topography and the altitude of city centre is about 30m (Figure 77). The surface area of the town is about 454km^2 and unsettled area is entirely covered with agricultural lands due to its geographical features[90]. According to the population census results in 2014, the population of the town is 19.976[91].

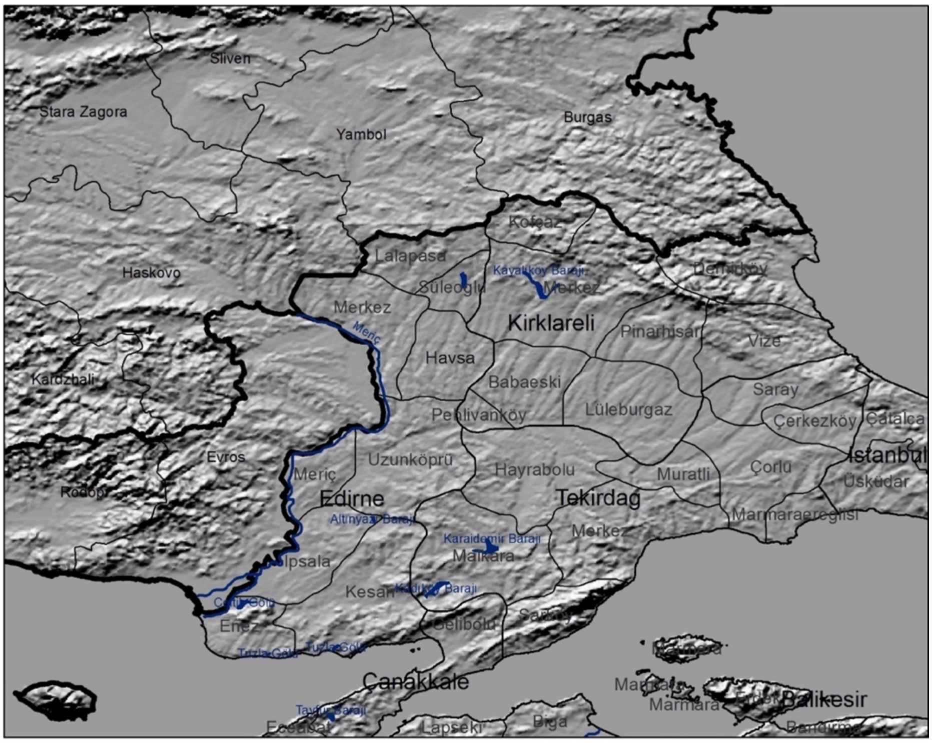

Figure 77: Topography of Havsa

As it is mentioned above, due to being on the passage way of the important international route links Anatolia to Balkans and have suitable lands for agriculture, Havsa has been an important settlement and station throughout history.

Due to the lack of archaeological and historical studies mainly focusing on Havsa, the beginning date of settlement and the first inhabitants of the town are not known. By taking into account the ancient history of Thrace, the first settlement is dated back to 4200-4000 BC and established by Odrysians, which is an important Thracian tribe (Erdoğan H. , 2000, p. 13).

[90] Havsa District Governorship's website. Retrieved 05 26, 2015, from Havsa Kaymakamlığı: http://www.havsa.gov.tr/default_b0.aspx?content=195

[91] Retrieved 05 26, 2015, from Turkey Statistical Institutes. The values are the results of Address Based Population Registration System in 2014. http://www.tuik.gov.tr/UstMenu.do?metod=temelist

Accordingly, Ertuğrul, who searched on the history of the region, mentions that Havsa, as a settlement, is seen at first in Tabula Peutingeriana, which is a Roman road map of 50 AD. He also states that the settlement shown as Hostizo which has become Ostudizus in later periods was not a city but rather a military camp. Another source, mentioned by him and showing Havsa, is the map associated with Ptolemeos, the ancient astronomer. In this map from the 2nd century, settlement is seen as Karputemum (Ertuğrul, 2014, p. 83). Jirecek (1990, p. 45) mentions about Havsa's name as Ostudizus in the 4th century. Additionally, Ertuğrul mentions about the existence of a church in the 5th century and he adds that during this period Havsa was a small settlement which was appropriate for military camps.

After the 5th century due to the wars in the Byzantine period, Havsa as a station lost its importance. This station was moved to Nikopolis which was a castrum. Nikopolis which is today's Hasköy, a village of Havsa today, was an important castrum during the Byzantine period. Nikopolis was one the most important cities in the Ergene basin until the Ottoman Empire. Afterwards in the 16th century, Havsa regained its importance (Ertuğrul, 2014, p. 89).

With the expeditions of Murad 1, towards the Thrace and Balkans in early 1360s, Havsa was annexed to the Ottoman territories. The population of Havsa was continuously raised during the Ottoman rule due to the population policies of the empire (Müderrisoğlu, 1993, p. 657). The main development was occurred in the 16th Century, by the help of the complex which is constructed by Mimar Sinan and founded by Sokullu Mehmed Paşa on behalf of his son Kasım Paşa in 1577. This construction did not mean only a group of buildings serve for the inhabitants but also catalysed the development of a town (Reyhanlı, 1976, p. 67).

The complex was planned as an impetus for development of the settlement and the commercial activities of the town and this complex led Havsa to regain its importance as a station on the historical routes (Ertuğrul, 2014, p. 82). In the 17th century, Evliya Çelebi mentions that Sokullu Mehmed Paşa built up this town and made it such a city with a beaten path (Evliya Çelebi, 2006, p. 623). Firstly, the Edirne earthquake in 1752, secondly in Ottoman-Russian War in 1877-78 and thirdly the World War I in 1914-18 caused substantial destructions in Havsa. Havsa became a town on November 23, 1922 and a county in 1954 of Edirne province of Turkish Republic (Sezen, 2006, p. 228). These circumstances effected the town's physical conditions and historical edifices. Some historical building was damaged and some were converted into other purposes. However, the old quarter names are still the same with the Ottoman town. Thus, the settlement still preserves its historical traces from its Ottoman period.

Figure 78: Havsa city center (after Google earth, last accessed on 31.05.2015)

Today, Havsa has 5 quarters and 22 villages. The town enlarges and develops beside the main two perpendicular roads. These roads are Fatih Street which is parallel to D100 international highway and passes through the town on the east-west directions and 23 Kasım Street which is on the north-south direction (Figure 78).

3.3.2. Havsa Sokullu Mehmed Paşa Complex

Sokullu Mehmed Paşa (or Kasım Paşa) Complex in Havsa is a *menzil* complex which was constructed in between 1573 - 1577 by Mimar Sinan. Today, it is composed of a mosque, a *dua kubbesi* (prayer dome), double *hamam* in ruinous condition and a wall remain with fireplaces and niches. According to the scholars such as Reyhanlı

(1976) Küçükkaya (1990) Müderrisoğlu (1997), Necipoğlu (2005) the complex had also an *arasta* (aligned shops), double *kervansaray, imaret, tabhane, tekke* , public fountain, and a bridge (App.C Catalogue 2 Restitution).

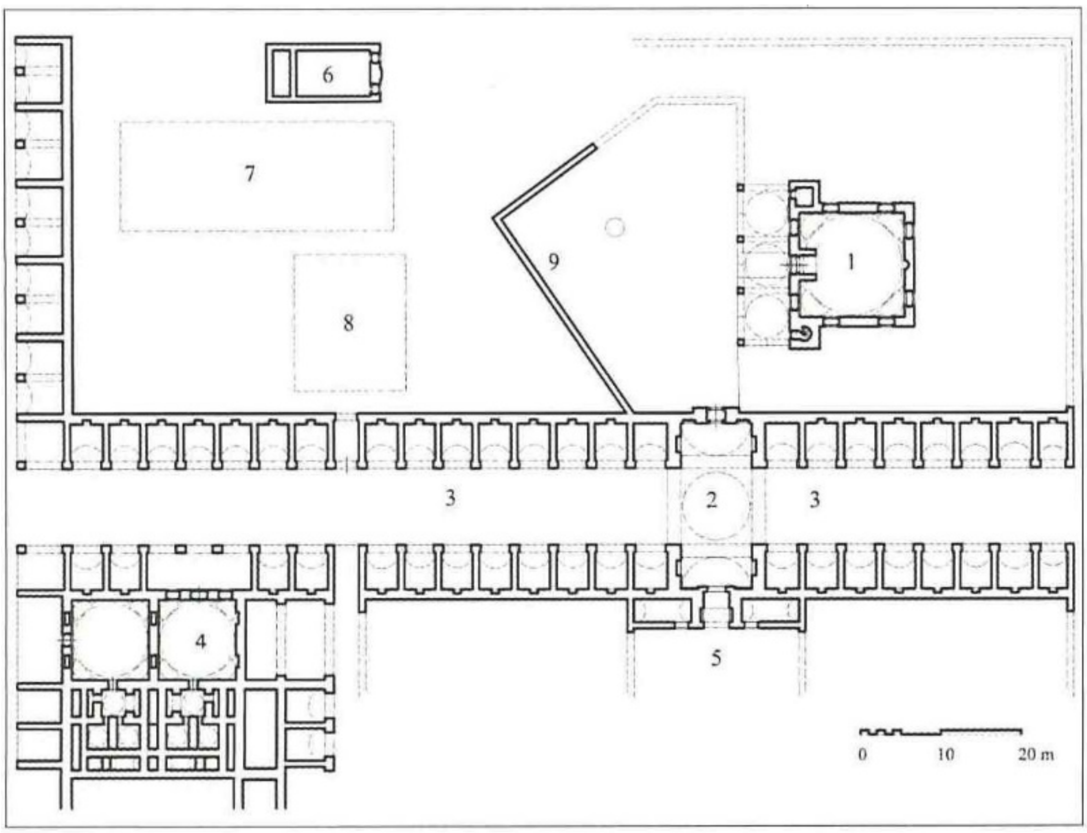

Figure 79: Restitutive floor plan of complex showing (1) mosque with missing portico (hypothetical restitution), (2) prayer dome, (3) restitution of arasta, (4) double bath with corner fountain, (5) site of double kervansaray with tabhane and imaret, (6) pre-existing masjid, (7) modern elementary school, (8) modern structure, (9) excavated wall with fireplaces and niches (Necipoğlu, 2005, p. 445).

3.3.2.1. Significance of the Complex

Sokullu Mehmed Paşa selected Havsa to construct the complex on behalf of his son. Havsa was on the important routes of Ottoman Empire. It was part of the route passing through İstanbul – Büyükçekmece – Silivri – Lüleburgaz – Babaeski – Havsa - Edirne (Orhonlu, 1967, p. 13). Therefore, the military, political, commercial, social, transportation and communication policies of Ottoman Empire and needs in the 16th Century made Sokullu Mehmed Paşa to choose Havsa.

In the 16th century, during the reign of Sultan Süleyman I, the campaigns towards the Balkans and Europe were increased. The campaign route was Istanbul-Edirne-Belgrade and Havsa was the fifth terminal on this route (Figure 80). Therefore, the ancient Roman military route which was shifted to Hasköy should have been rehabilitated.

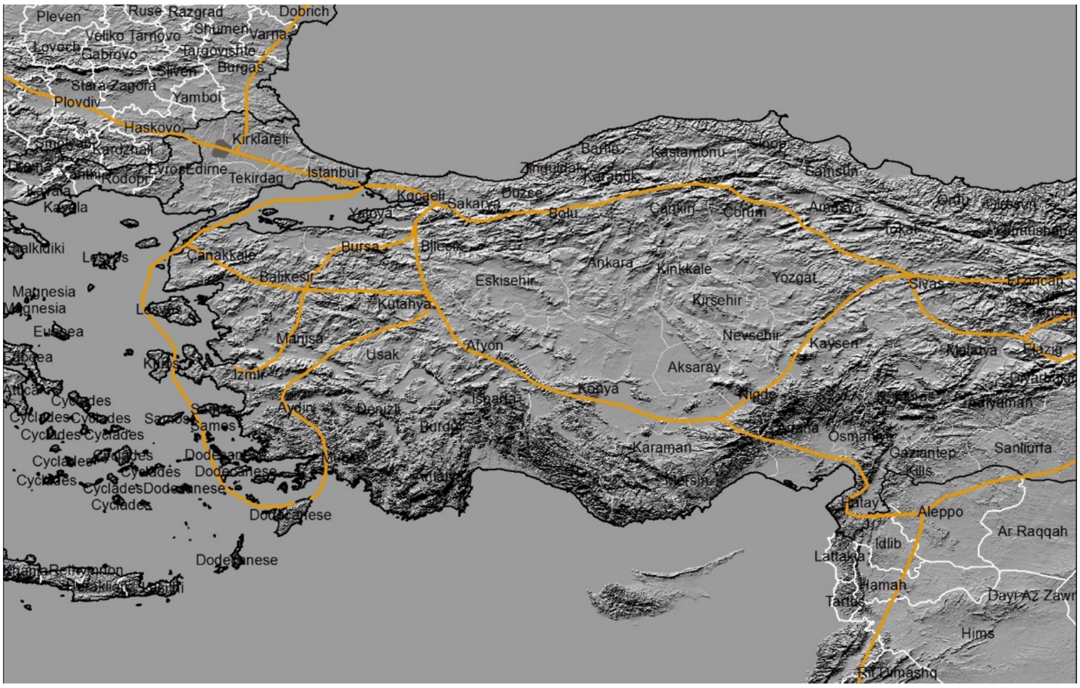

Figure 80: Military routes of Ottoman Empire in the 16th century. (This map is prepared in the light of the data taken from Orhonlu (1967)

Accordingly, the complex in Havsa was not serving only as a military purpose. With reference to the Ottoman *derbent* and *menzil* organization, these stations were also important for the communicational, financial, commercial and religious needs. Due to the 16th century circumstances, transportation for all purposes require such stations at certain intervals to stop and meet basic needs. *Ulaks* (messengers) who gets the mail and transport it to the receiver, merchants, pilgrims and prospective pilgrims should have needed a secure station for fulfilling their needs.

Moreover, as in the case of Lüleburgaz, the caravans that transported mainly wheat, grain, animal and cloth between İstanbul- Edirne-Belgrade had the chance to carry out trade activities also in Havsa . Due to the fertile agricultural lands around the settlement and by means of the shops in complex, merchants could buy goods from inhabitants and other merchants could sell their goods.

Eventually, Sokullu Mehmed Paşa preferred Havsa for the construction of the complex on behalf of his son. The abovementioned factors are mainly related to the accommodational convenience; however, this complex was not only serving the visitors and travellers but also the inhabitants. The complex became an impetus for the improvement of the small village into a developed town.

3.3.2.2. Location of the Complex

Sokullu Mehmed Paşa Complex is located in the city centre. The complex is surrounded by administrative and educational buildings. On the south Aşağıova Stream, on the east Havsa Municipality building, a recreational park and small shops, on the north 23 Kasım Street and on the west market place constitute the boundaries of the current complex area.

Any information about the selection of the area for constructing the complex cannot be achieved. But according to Müderrisoğlu, the complex may have been located on the riverside which also constituted the natural boundaries of the settlement. Thus, the river determines the southern edge of the complex and the complex goes towards the north (1993, p. 666).

The complex sits on a flat land (App.C Catalogue 2 Site Plan). The buildings of the complex were positioned according to the axis which is the historic road from İstanbul to Edirne. This axis, Mimar Sinan Street at present, which is on the north-south direction, was forming the demolished arasta. This axis, which passes through dua kubbesi, divides the complex into two parts according to their service purposes.

The western block which was probably composed of kervansaray, imaret tabhane and double hamam served the travellers and visitors. Today, only the ruinous hamam and the entrance iwan of the kervansaray exist, whereas the other buildings do not have any remains (Figure 81).

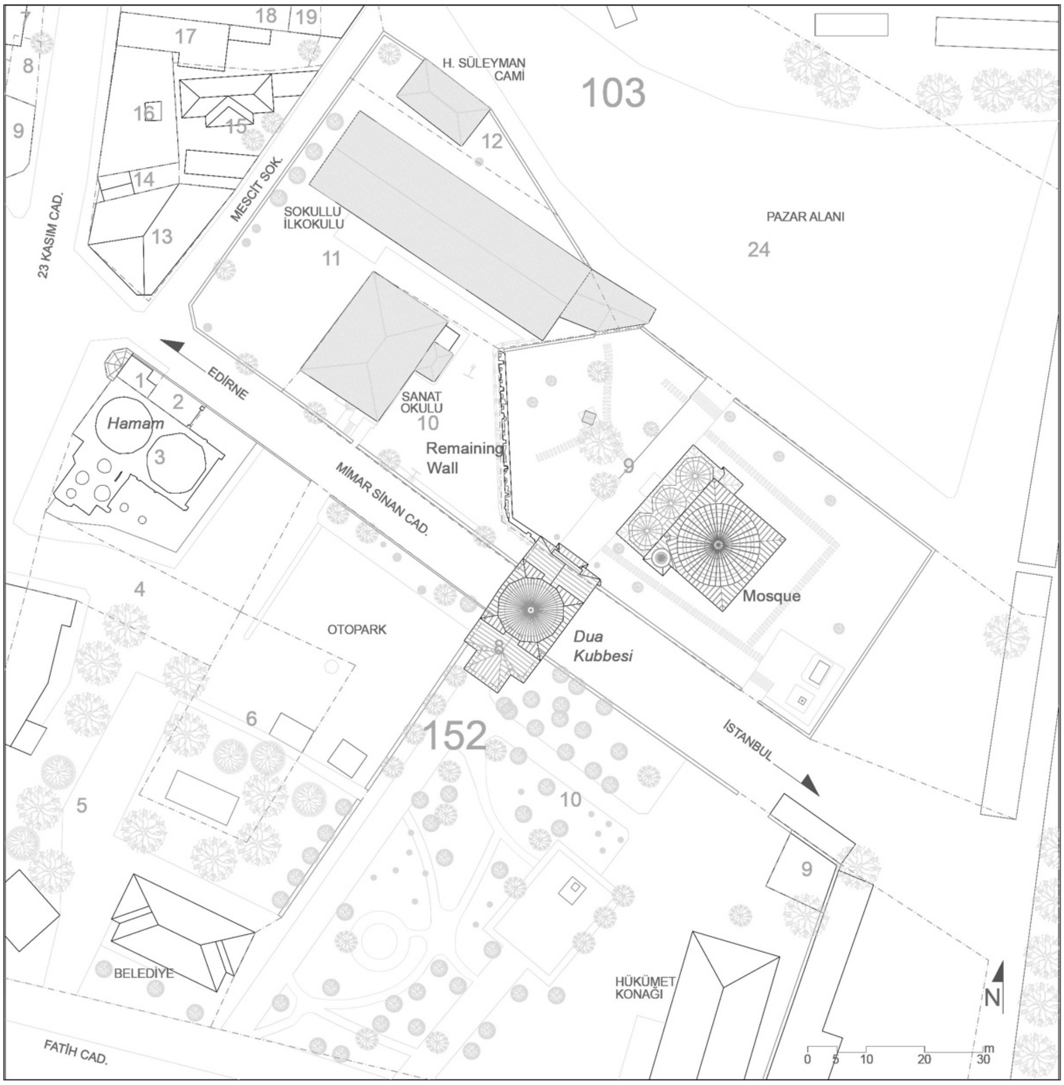

Figure 81: Site Plan of Havsa Sokullu Mehmed Paşa Complex (Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)

The eastern block which served the inhabitants was probably composed of mosque, *medrese* and *tekke*. Today, there is the mosque and a wall remains from this eastern block. This remaining wall forms the north border of the mosque's courtyard. On the north side of this wall remain there are traces of a series of fireplaces with niches. These traces indicate that this wall might have been part of the *medrese*.

The axis, the historic road to İstanbul, comes from north, passes through dua kubbesi and is directed to the bridge on Aşağıova Stream. Today, the physical evidences of the historic bridge can be seen below the contemporary bridge on the south.

The current complex cannot be perceived as a group of buildings due to the crowded contemporary buildings and recreational areas within the settlement area of the complex. Dua kubbesi, which was the core of the original complex, individually stands on Mimar Sinan Street today. This structure with baldachin form only defines the entrance to the courtyard of the mosque and unfortunately provides a shelter for car parking. The remaining wall which constitutes a diagonal border between the courtyards of the contemporary school and the mosque cannot be perceived even from Mimar Sinan Street. On the other hand, *Hamam* was separated from the other buildings. Due to *hamam*'s poor structural condition and security problems, the Municipality tried to hide it within the town by landscape elements. Therefore, the complex has lost its integrity by being fragmented in time. On the other hand, the location of the public fountain is impossible to predict due to the lack of any information from the sources or on-site physical evidences (Müderrisoğlu, 1993, p. 667). Additionally, the bridge on the north-west side of the complex defines the road to Edirne. There is a fountain adjacent to the north-east corner of the *hamam*, but it is known that this fountain dates back to the 18th century. The inscription panel of this fountain gives its construction date as 1780 (Reyhanlı, 1977, p. 242).

3.3.2.3. History of the Complex

Construction Period

According to Necipoğlu (2005, pp. 444-5), the construction of complex was started in 1573. She mentions this date based on an imperial decree about construction of the complex issued on May 13, 1573[92]. This imperial decree orders the *kadı* of Bulgaria to provide transportation of lead from Yanova and store in Sofia for the new construction of Kasım Bey *Kervansaray.* According to this decree, Necipoğlu suggests that *kervansaray-tabhane-imaret* blocks, *hamam* and shops should have been constructed at first to bring income for the construction of mosque. Another imperial

[92] BAO. (1573). Date: 11/M /981 (Hicrî) File No: 772 Folder No: 327 Group Code: MD.21.

decree issued in 1575 orders the transportation of the stored lead in Sofia to Havsa[93], which might indicate the completion of the *kervansaray-tabhane-imaret* blocks' construction. Jacopo Soranzo's memories in 1575 about his stay in Havsa Sokullu Mehmed Paşa *Kervansaray*, as it is also referred to by Necipoğlu (2005, p. 445) supports this idea. Moreover, Soranzo mentions that during his stay, constructions of mosque and *medrese* were going on.

Another imperial decree from August 1576 sent to *kadı* of Haskova, near Edirne, orders to help Mustafa Kethuda who is the supervisor of the construction (*bina emini*) to buy required materials such as brick, timber, wooden planks, stone, lime[94]. Necipoğlu (2005, p. 445) says that these materials should have been supplied for the newly started mosque construction.

The inscription panels on the entrance arch of the mosque courtyard from the *dua kubbesi* indicates the date of construction with "*ebced hesabı".* Unfortunately, today some parts of the panel are damaged but thanks to Evliya Çelebi we can complete the verses by the help of his records (Evliya Çelebi, 2006, p. 624). In the light of this information it can be suggested that the completion date of the construction is 1577.

There are two more inscription panels one of which is on the portal of the mosque. This panel mentions that Sokullu Mehmed Paşa constructed this building on behalf of his deceased son Kasım Paşa (Reyhanlı, 1976, p. 75). The third inscription panel was found in the basement of the primary school nearby the complex and published by Reyhanlı. This panel mentions about Kasım Paşa, Suleyman I's Rumelia *Defterdar* Abdüsselam who constructed a mosque in Havsa in 1520 and Koyun Baba, an unknown name (Reyhanlı, 1977, p. 244). This panel confirms the existence of a fountain in the complex.

Furthermore, Sokullu Mehmed Paşa, who is one of the grand viziers of Süleyman I, has a comprehensive *vakfiye.* The date of Sokullu Mehmed Paşa's

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[93] BAO. (1575). Date: M/982 (Hicrî) File No: 621 Folder No: 237 Group Code: MD.Zeyl2.

[94] BAO. (1576). Date: Early C/984 (Hicrî) File No: 214 Folder No: 90 Group Code: MD.28.

Vakfiye[95] is 29 Zilhicce 981 AH / 21 April 1574 and it was recorded on 3 Ramazan 1313 AH / February 1896 in *kütük.* In the part which is about Havsa, *Vakfiye* mentions about Havsa's importance location-wise and about the need of an accommodation for the travellers and visitors who pass through this settlement. Afterwards *vakfiye* explains the double *kervansaray* and its services.

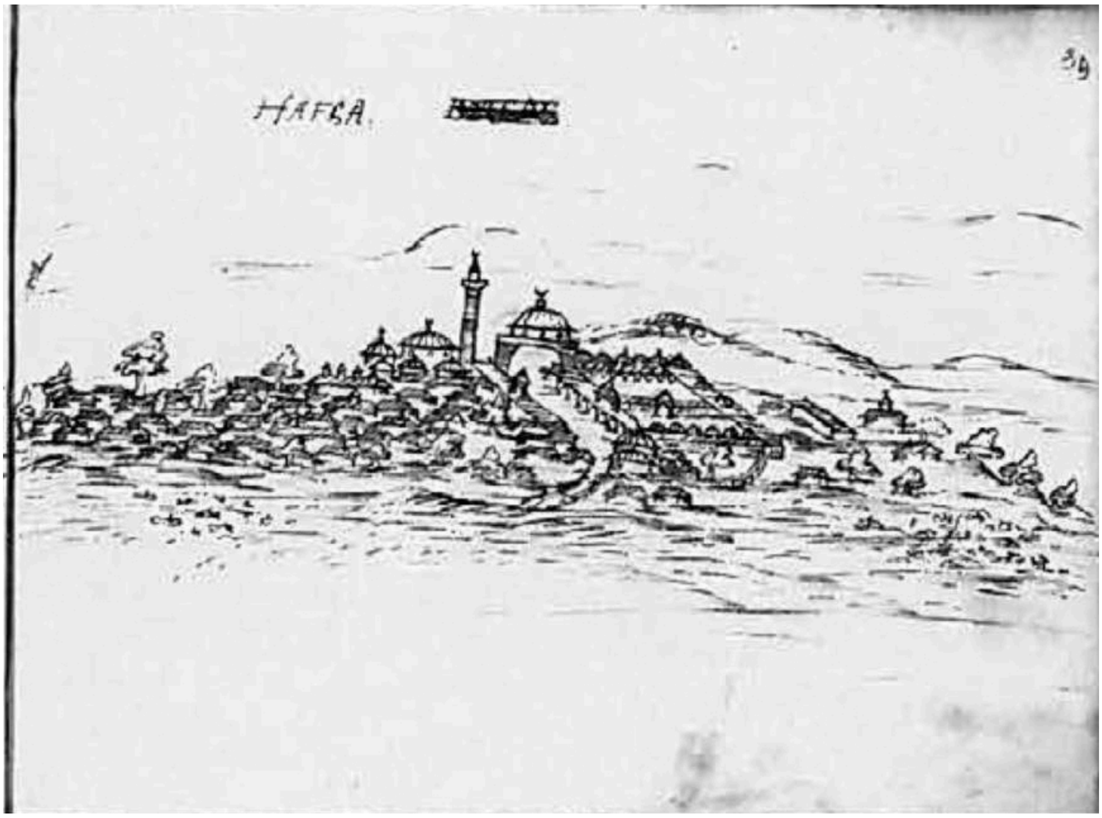

Figure 82: Havsa Sokullu Mehmed Paşa Complex in 1587 (Tufan Baş Digital Archive, original in Leiden Universıty in Holland)

Necipoğlu mentions that Kasım Paşa has also a *vakfiye*[96]. As Necipoğlu says, *Vakfiye* mentions about a bridge, a *kervansaray,* a masjid, a hot water source and pavements in Hersek; double *kervansaray* with pavements*, imaret* with kitchen, bakery, wood storage, toilets, water channel and a noble *mescid* in Havsa.

[95] In the Archive of Directorate of General Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20. In the Turkish records, it is in the #2104 book on the 442-78 pages and in the queue of 323.

[96] Süleymaniye Kütüphanesi, Lala İsmail 737, fols 74a-76a

Until Today

After the construction was completed, the first source pointed out by Necipoğlu (2005, p. 445) about the complex was Bailo Paola Contarini who describes the buildings of the completed complex. In 1632, Hıbri Efendi mentions the existence of double *kervansaray* and mosque (İlgürel, 1975, p. 114).

Subsequently in the 17th century, Evliya Çelebi (2006, pp. 622-625) gives information about Havsa and then explains the death of Kasım Paşa. Afterwards, he praises the mosque with its interior and courtyard and lists the other buildings of the complex such as *kervansaray, hamam, imaret*, and bridge. He also claims that Sokullu Mehmed Paşa had turned the small village into a flourishing big town.

In the 18th century İnciciyan and Andreasyan mention about mosque, *imaret*, *hamam* and double *kervansaray*. They also refer to the Abdüsselam Mosque and another *kervansaray* in Havsa (1975-76, pp. 140-141). Moreover, Ahmet Bâdî Efendi mentions about 1752 Edirne earthquake which damaged the mosque's dome, *kervansaray, hamam, imaret, sıbyan mektebi* and shops. He also adds that these ruined buildings were left as they were (2014, p. 1974). Moreover, Necipoğlu (2005, p. 446) claims that during the Balkan Wars in 1912 the dome and the last prayer hall arcade of the mosque was also demolished and the mosque is restored without an arcade and a lower dome with a tromp. (Süleymaniye Kütüphanesi, Lala İsmail 737, fols 74a-76a)

Figure 83: Sokullu Mehmet Paşa Complex in 1930s. (Taken from Archive of the Directorate General of Foundations in Ankara.)

After the establishment of Republic of Turkey, the remains of demolished buildings were left as they were for long years and subjected to further deterioration. From the photographs in 1930s (Figure 83), the walls of the shops can still be observed. The only information regarding the restoration of the complex dates back to 1988, when *Dua Kubbesi* was restored[97]. More recently, the arcade of the mosque was reconstructed by Havsa District Governorship in 2013. They reconstructed the mosque's arcade whose column bases and springers of the arches were still existing.

Until today, the complex was subjected to monographic studies. The sources which give information about the complex are Gökbilgin (1952), Reyhanlı (1976) and (1977), Sözen (1975), Cantay (2002), Kuran (1986), Aslanapa (2004), Küçükkaya (1990), Müderrisoğlu (1993), Necipoğlu (2005). In addition to these important sources, Reyhanlı and Küçükkaya tried to achieve a restitution plan of the complex.

3.3.3. Havsa Sokullu Mehmed Paşa Mosque

The mosque is in middle of the eastern part of the complex which is framed by courtyard walls. The north edge of this courtyard is defined by the remaining wall which stands diagonally. In the courtyard, on the north side of the mosque there is the well. Additionally, on the north and west sides of the mosque, there are the gravestones in the courtyard.

3.3.3.1. Architectural Features of the Mosque

The mosque's mass is composed of a square planned mosque topped with a single dome without a drum and a reconstructed rectangular planned last prayer hall attached to the north. On the north-west corner, stands the high minaret with a slender polygonal shaft and a single *şerefe*. On the north-east corner, a rectangular prism, topped with a cloister vault, creates the symmetry together with the prismatic minaret base in the mass. The last prayer hall is attached to the north façade of the mosque.

[97] Archive of the Directorate General of Foundations in Ankara.

From the south, it encloses the mosque, the prismatic minaret base and the rectangular prism which are attached on each side of the mosque. The semi-open last prayer hall is covered with three domes (App.C Catalogue 2.1 Mass).

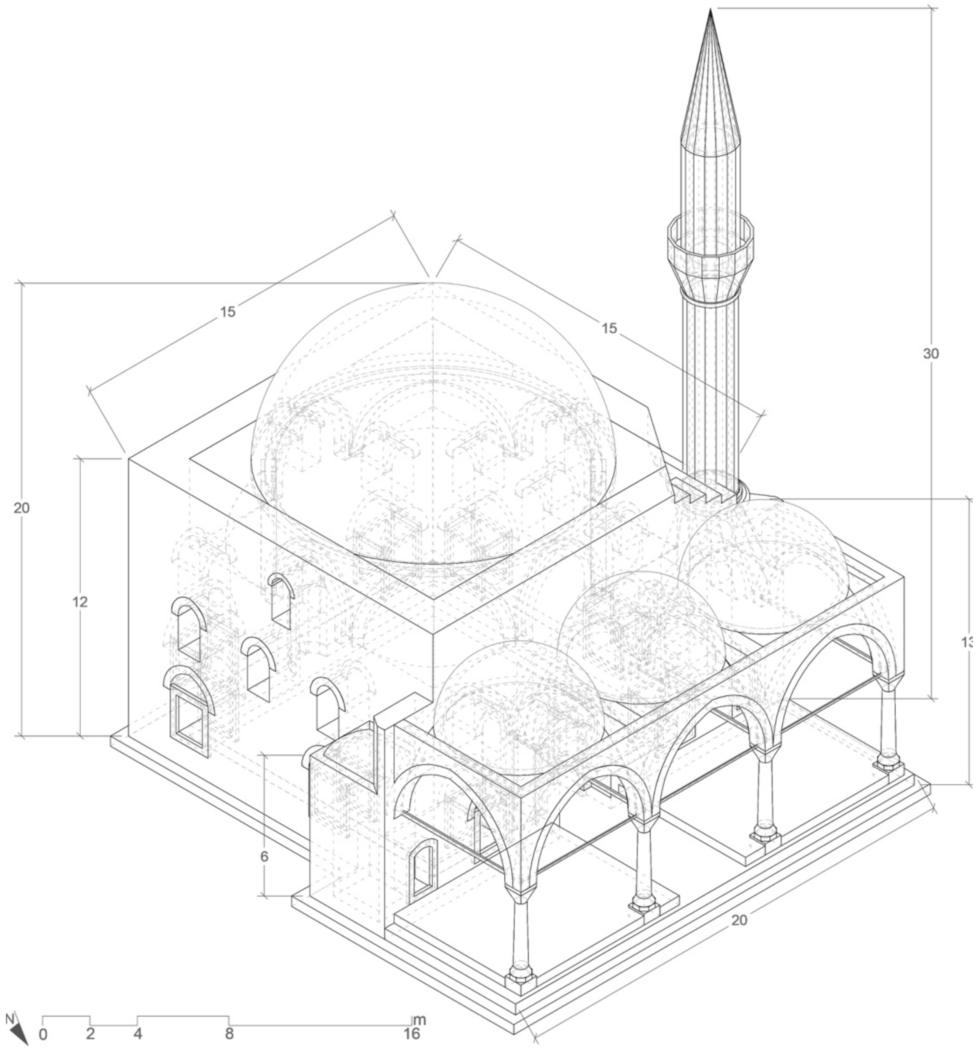

Figure 84: Axonometric Drawing of Havsa Sokullu Mehmed Paşa Mosque

The square planned main prayer hall of the mosque is entered from the north through the rectangular last prayer hall. The dome of the square planned mosque sits on four squinches and the four pointed arches between these squinches (Figure 85). These squinches and arches sit on the mosque walls and provides an octagonal base for the dome. Between these squinches and arches on the walls, there are spherical pendentives as transition elements. By means of these transitions the circular base of the dome is achieved (App.C Catalogue 2.2 Measured Drawings).

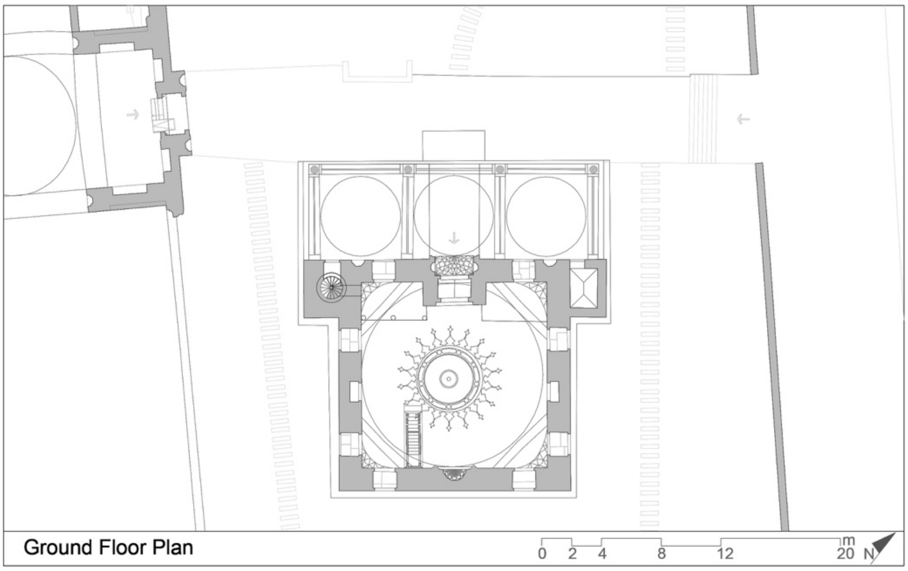

Figure 85: Ground Floor Plan of Havsa Sokullu Mehmed Paşa Mosque (Drawn by the author.)

Today the mosque has a single floor. But there are traces which indicate that there had been a *mahfil* floor. Adjacent to the north wall, the entrance door is organized as an iwan. On both sides of this entrance iwan the floor is raised about one step. On the edges of these raised floors, there are column bases without columns. On the north wall, there are traces of horizontal load bearing elements. Moreover, on the north-west corner, there is a door opening at the same level with these traces on the wall. This door opens to the staircases of the minaret. Additionally, above the entrance iwan on the west side, there are four steps. These steps start from the level of the load bearing elements' traces and then rise. Below the arch on the south wall, the *kıbla* wall, the *mihrab* is placed. Adjacent to the south wall, on the west side of the *mihrab* the *minber* is placed.

The rectangular planned last prayer hall, which was reconstructed in 2013, is a semi open space attached to the north wall of the mosque. On the other sides, this space is defined by the pointed arches supported by columns with *baklavalı* capitals. The east, north and west sides of the last prayer hall are open. Accordingly, it acts as a passage way to the mosque and is composed of three square units divided by pointed arches. These square units are covered with domes resting on spherical pendentives. The square unit space in the middle is the entrance to the mosque. The floor of the units that are in front of the mosque façade are raised, but the floor of the entrance unit is not.

There is an additional rectangular planned small space on the north-east corner of the mosque. This space which cannot be reached directly from the mosque, has an entrance from the last prayer hall. It has later additions such as a mezzanine floor constructed with timber posts and lintels and a cloister vault constructed with reinforced concrete. The originality, the form and the function of this space is questionable. Today, this space is used as a storage space.

The façades of the mosque are composed of modest architectural elements. The entire openings are arranged on the rectangular walls under the dome without a drum. On the elevations, the windows are simply arranged in three rows except the entrance façade that has two rows. Additionally, the minaret, attached to the north-west corner of the mosque, can be observed from its entire facades.

The north façade of the mosque is hindered by the reconstructed last prayer hall which is facing the courtyard. The north façade of the last prayer hall is composed of three large openings topped with pointed arches carried by four columns with *baklavalı* capitals. The three domes of the arcade and the dome of the mosque can be observed from the north façade. The floor level of the center unit is lowered, defining the entrance. Accordingly, due to the minaret attached to the north-west corner, top of this corner of the mosque is chamfered by cascading.

The entrance façade of the mosque is facing the last prayer hall. Therefore, the rear wall of the last prayer hall is the entrance façade of the mosque. It carries the entrance portal of the mosque in the middle. On both sides of the portal, there are two windows, arranged one above the other, and then comes the *mihrabiye* niche and a door. The lower windows are rectangular in shape with relieving pointed arches and iron bars with knots. The upper ones are smaller windows topped with pointed arches and containing *dışlık* panels. The rectangular door openings have depressed arches. The door on the west side opens to the staircase leading to the minaret and to the conceivable *mahfil* floor. The door on the east opens to the unidentified space which is used as a storage space now.

The east and west facades are almost mirror image symmetry of each other. On these facades, the lower two rows of the three-rowed window arrangements are shifted towards the south side of the mosque. Whereas the ones at the top are at the exact center of the mosque walls. This shift is caused by the minaret on the north-west corner and by the rectangular mass on the north-east corner. The lowest row of windows is composed of two rectangular windows with relieving pointed arches and grills with knots. The three windows on the second row are smaller in size with pointed arches. On the uppermost row, there is a window with pointed arch. The windows at the two higher rows have *dışlık* panels.

The difference of the west façade from the east is because of the minaret attached to the north corner and its slit windows. On the other side, the difference of the east façade from the west is caused by the rectangular prismatic mass attached to the north corner. Additionally, the rear arched openings of the last prayer hall are also observed on these facades.

Figure 86: West and south facades of Sokullu Mehmed Paşa Mosque (by the author, 2016)

The south façade, the *mihrab* wall, has a symmetrical organization. On the lowest row of the window arrangement, there are two rectangular windows with relieving pointed arches. The windows at this lowest row have grills with knots. On the second row, there are two windows topped with pointed arches. On the upmost row, at the center, there is a single window topped with pointed arch. The windows on the higher two rows have *dışlık* panels (Figure 86).

The entrance portal constructed in marble is set in a high rectangular frame encircled by a cornice. It has a rectangular niche which is covered with five rows of stalactited hood (*kavsara*). In this niche recession, above the door opening, there is the rectangular inscription panel with carved Arabic letters on a grey marble panel. The door opening is topped with a grey marble joggled arch with depressed profile. The *cümle* door, which is made of timber, is inserted into the door opening. Additionally, on the east and west walls of the portal recession, there are two niches with half decagonal plan and they are covered with 3 rows of stalactited hood (Figure 87).

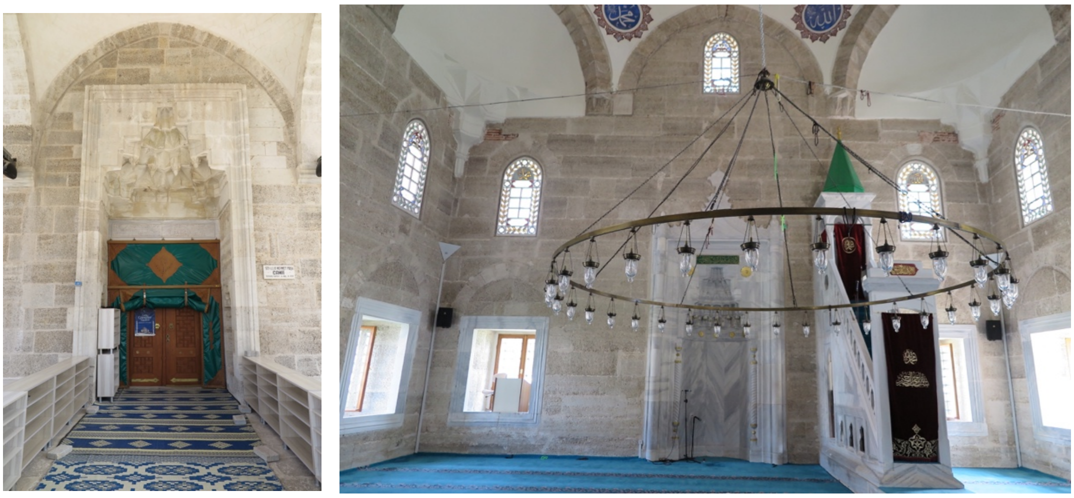

Figure 87: The portal and the *mihrab* wall of Sokullu Mehmed Paşa Mosque (by the author, 2016)

The *Mihrabiye* niches that are constructed in limestone have half decagonal niches which are covered with four rows of stalactited hood. On the spandrels of the stalactited hood there are rosettes.

The *mihrab* that was covered with grey marble has a rectangular frame topped with a pediment and a palmet. The *mihrab* has a plan of a half dodecagonal prayer niche which is covered with a hood made of five rows of stalactites. On the spandrels of the stalactited hood, there are rosettes. Above the hood, there is a rectangular inscription panel with gilded Arabic letters on a dark green background. The niche is flanked by two attached columns made of grey marble. The *minber* which is made of marble is placed on the west side of the *mihrab* adjacent to the south wall (Figure 87).

In the surrounding of the mosque, there are column bases made up of limestone. They belong to the last prayer hall of the mosque. They were removed and changed with the new ones during the reconstruction process in 2013. Two of them were placed outside of the courtyard wall on the east. The others were scattered around the courtyard.

3.3.3.2. Structural System and Construction Technique of the Mosque

Havsa Sokullu Mehmed Paşa Mosque has a square planned prayer place (*harim*) topped with a single dome, an attached rectangular last prayer hall and a minaret with a slender polygonal shaft. Mainly, the mosque is built up with masonry structural system. So that, the vertical loads are transferred by means of the load bearing elements constructed with unit materials such as brick and stone (App.C Catalogue 2.3 System Details).

The dome of the mosque, which was reconstructed after Balkan Wars in 1912, seems like sitting directly on the walls without a drum. The view of the dome which appears sunken in the walls make it uncommon and questionable. In these circumstances, it is difficult to evaluate the construction technique of the masonry dome. Whereas, by taking into account the structural necessity of eliminating the developed tensile stress in the tension zone[98], two possibilities can be suggested. Either the dome can be constructed with a thicker section in the tension zone or/and a tension ring can be located in this zone. Accordingly, within the building, the dome sits on a circular base provided by an inner drum. This drum transfers the compressive loads of the dome to the spherical pendentive like transition elements which convert the circular plan to the octagonal geometry. In addition, these pendentive like elements distribute the load by corbelled courses to the arches on the eight edges of the octagonal plan. All of these arches rest on the walls. Four of them are directly in the walls. The others span the corners of the mosque and they constitute the face of the squinches. The compressive loads developed on the corners are supported by these squinches. They are constructed as a half dome which bear down on the corbelled stalactites at the corners of the walls. Consequently, all the loads carried on the masonry walls are transmitted to the ground by means of the foundation (Figure 88).

[98] For further information about tension zone see Chapter 2; Section 2.2.

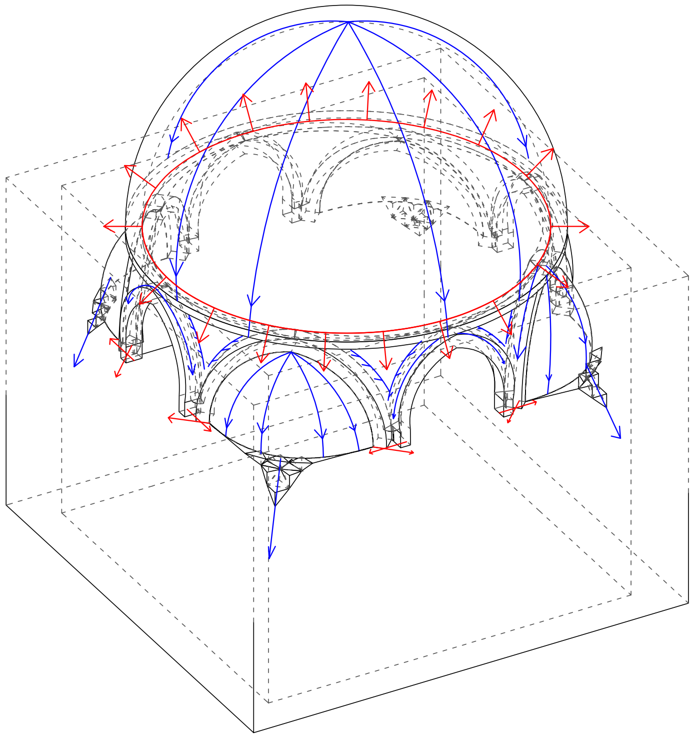

Figure 88: The Load Distribution of Havsa Sokullu Mehmed Paşa Mosque.

Additionally, the masonry walls, that support the arches, enclose the *harim* section and carry the architectural elements such as openings and niches. These openings are topped by the arches, relieving arches and lintels in the walls. On the north sides of the east and west walls, there are traces of a second floor. The traces are like the holes of horizontal spanning members such as timber lintels penetrating into the wall. In addition, on the floor on both sides of the entrance iwan, there are column bases aligned with the holes on the walls. Thus, it can be suggested that there were slabs of a *mahfil* floor flanking the entrance iwan. The slabs, which are thought to be carried by timber lintels should have been linked with the floor over the entrance iwan. This floor is laid on a barrel vault which sits on the masonry walls on both sides of the entrance door.

The rectangular planned last prayer hall, which is an arcade attached to the north wall of the *harim* section, was entirely reconstructed in 2013 with traditional construction techniques and materials. The arcade consists of three square units divided by the arches. These units are covered with domes supported by spherical pendentives that distribute the load to the arches. The load on the arches are imposed on the columns and the walls. In order to eliminate the thrust and fasten the colonnaded masonry system, iron ties are placed at the impost line level of all the arches. Similarly, the loads are transferred to the ground by the footings of the columns and the foundation of the walls. It is important to add here that the last prayer hall extends on the east and west directions from the mosque. Due to this extension on these sides, about half of the arches attached to the mosque's north wall project from the wall. Thus, additional masonry walls are built up at these portions to support and hide the projected sections of the arches. These details also bring questions into mind about the originality of the last prayer hall.

The slender minaret is constructed with the masonry system except the timber hood (*külah*) on the top. From top to bottom, the minaret is composed of the hood, the polygonal upper portion of the shaft (*petek*), the balcony (*şerefe*) with corbelled stalactites, polygonal shaft (*gövde*), the shoe (*pabuç/küp*) composed of bands of triangular faces and the base (*kaide/kürsü*). The minaret base is constructed interconnected with the wall at the north-west corner. It contains the step courses of the spiral staircase. The step courses (*kur*) that are laid on top of each other with a slight rotation are composed of spare steps and steps with core. These two steps are fastened together with iron clamps. Then, the courses are assembled to each other with iron dowels by means of the core. Besides, the step courses also rest on the walls by extending along the wall courses and binding with clamps. Thus, the spiral staircase bonds the whole structure by acting as a spine in order to resist the transverse forces developed in the high slender structure. The minaret shoe (*pabuç/küp*) acts as a transition element. It makes the square plan of the minaret base fit the polygonal plan of the shaft by means of the bands of triangular faces. Such like the minaret base, the shoe and the shaft are constructed interconnected with the staircase until the level of the balcony. The balcony, which has a larger plan than the shaft below, is constructed with the corbelled courses of stalactites. Above the balcony level, the upper portion of the shaft is built up with a smaller plan layout then the lower portion. Furthermore, upon the core of the minaret, the timber mast (*seren*) is erected with an iron anchorage.

This mast is the main post that carry the timber hood structure together with the upper portion of the shaft.[99]

In order to achieve an integrated structure, the masonry building and walls are need to be secured and aligned. At significant levels such as the beginning and ending levels of the load bearing and architectural elements, tie beams (*hatıl*) are set in the walls. This levelling is also necessary for stages of the construction process. Thus, the tie beams are thought to be located with essential intervals. Unfortunately, there are not any traces of these tie beams in the building. Therefore, it is not known whether the tie beams were timber or not. By taking the structural requisites into account, the first tie beam level is thought to be just over the foundation level. Based on Tanyeli's suggestions about the vertical interval between two tie beams[100], the second level should correspond to the windows in the first row. The third level is most probably over the arches of these windows. The upper level coincides the windows in the second row. Finally, the last level is presumably over the arches of these windows. This suggested last level is also the level where the squinches start.

The foundation of the building is under the ground level. Only the surface of the first foundation encasement can be seen all around the mosque. Therefore, the level where the foundation ends and the walls start can be deduced. The iron clamps, that joint the stone units belonging to this encasement, can also be identified. Unfortunately, there is no information regarding the foundation of the building and the soil where the complex sits on. Therefore, the form, the depth and the encasement levels of the foundation as well as the filling form under the building cannot be proposed.

The ground floor of the mosque is constructed with stone floor laying over the filling. This flooring system with filling below should start at the level of the encasement which can be seen from the exterior since the site can be levelled for the walls at this encasement level. Over the encasement, the walls should be precisely

[99] As it is mentioned before the minaret of this mosque was demolished during the Balkan Wars in 1912. After the war had been disengaged, it was reconstructed with the traditional construction techniques.

[100]The vertical interval between two tie beams in the courses of the wall is generally about 2 *arşın* means 151,5476cm. (The Lecture Notes of the course RST510-Osmanlı Mimarlığında Yapım Teknikleri held by Assist. Prof. Dr. Gülsüm Tanyeli in İTÜ Faculty of Architecture)

located for the construction of the upperstructure. Therefore, over the levelled site inside the building walls, the flooring unit materials are thought to be pinned down in a thick mortar layer. This thick mortar layer might also be reinforced by wooden grillage to set a rigid base.

The building is mainly constructed with limestone in the technique of cut stone masonry with *akçe geçmez derz*[101]. The walls, the arches, floor and the portal are constructed with limestone. The limestone blocks of the walls have heights changing between 40-60cm and lengths with a large variety. As structural necessary, the vertical jointings are shifted not to come on top of each other; whereas the horizontal jointings have slight depressions and rises which makes the horizontal jointing line seems like faulted. White marble is the second widely used stone material of the building for the *mihrab, minber* and the frames of the first-row windows and doors. The inscription panel on the portal is also from marble, too. The recently reconstructed last prayer hall has arches out of limestone and marble columns together with bases and capitals. Subsequently, brick is the main material for the superstructure of the mosque. The main dome, squinches and the domes and the pendentives of the newly reconstructed last prayer hall are constructed in brick.

Additionally, there are other materials such as timber and iron which are used for jointing, aligning, anchoring and tying the masonry system. One of these materials should be used as tie beams which have vital importance for structural durability of the mosque. The iron is used for structural purposes in the forms of tie beams, clamps and dowels in essential locations. Timber bracing elements are used for structural purposes such as the hood of the minaret. Moreover, lime mortar, mud mortar, *horasan* mortar and lead, which are the binding materials, are important components of the masonry system. There are other materials, which do not have any load bearing purpose. These are brass used for the *alem* and the rings to hide the joints of column with bases and capitals, lead sheets for roof covering, gypsum for *içlik* panels, glass for windows, timber for door and window sashes. Finishing materials are mainly lime

[101] *Akçe geçmez/gizlenmez derz* is a jointing type of which the stone blocks are so adjacent to each other that the mortar between them cannot be observed. Besides, this idiom means that the joint is so adjacent that even a coin cannot be hide in it.

based plaster and white wash. The colored paintings are applied on the white wash to accentuate significant surfaces.

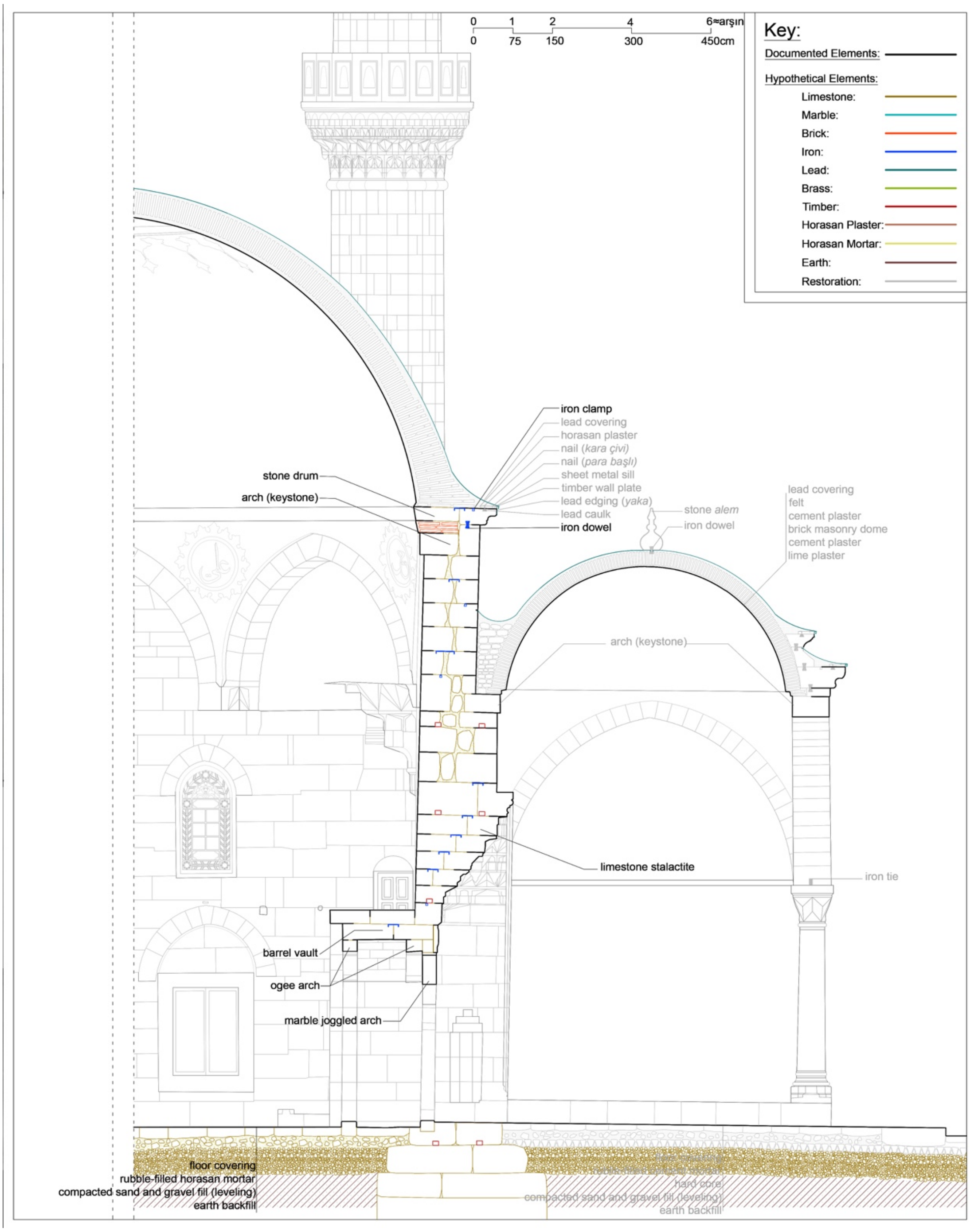

Figure 89: System Detail 2 of Havsa Sokullu Mehmed Paşa Mosque drawn by the author

3.4. Payas Sokullu Mehmed Paşa Mosque

Payas Sokullu Mehmed Paşa Mosque, which is also known as Sarı Selim or Selim II Mosque, is the selected as another case to understand the construction technique of Lüleburgaz Sokullu Mehmed Paşa Mosque. It is part of an important *menzil* (terminal) complex which belongs to the same donor like the cases of Lüleburgaz and Havsa. Being entirely in a different geography, this example is significant to compare the construction technique and the effects of the local materials and architects.

3.4.1. Payas

As a county of Hatay, Payas is located in the eastern part of Mediterranean Region. As a coastal town, it is located in İskenderun Gulf which is on the north-eastern edge of the Mediterranean Sea and is an important site between Anatolia and Syria (Figure 90).

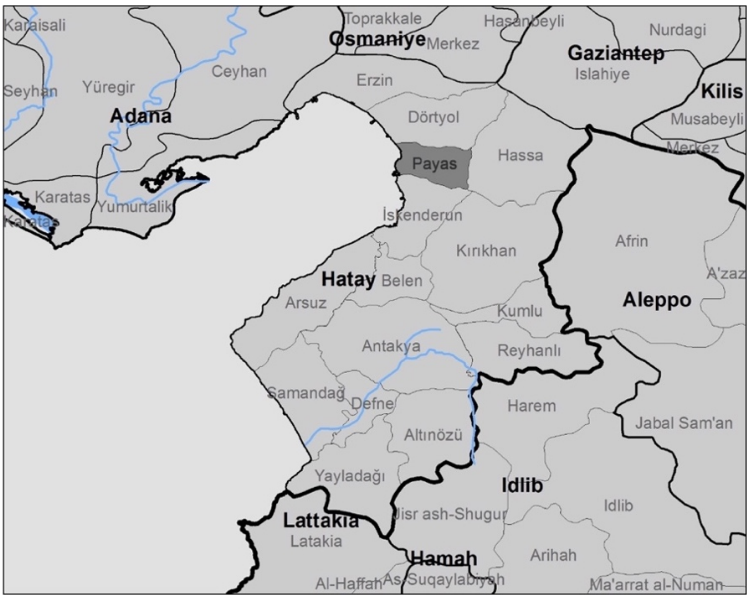

Figure 90: Location of Payas

Amanos Mountains whose altitude is about 2015 m on the east and Mediterranean Sea on the west form the natural borders of the county. Payas is neighbor to Dörtyol on the north, Hassa on the east and İskenderun on the south. The county is on the 107th km of E91 highway, which is also an ancient route connecting Adana and Hatay. It is 81km from Hatay and 110km from Adana.

The settled area of Payas is on the shore of Mediterranean Sea and bounded from east by Amanos Mountains. These chain of mountains, which are perpendicular to the Taurus Mountains, dispreads in north-south direction and constitutes a microclimatic and cultivated enclosed flat land where Payas is settled (Figure 91). Accordingly, the altitude of the flat town center is about 30m and remaining unsettled area is covered with fertile plains. Towards the east borders of the town where the steep Amanos Mountains rise, the altitude gets higher. The highest level in the borders of the town is Çağsak Hill which is about 1640m above the sea level[102]. The surface area of Payas is about 157km^2 and according to the population census results in 2015, the population is 40.434[103].

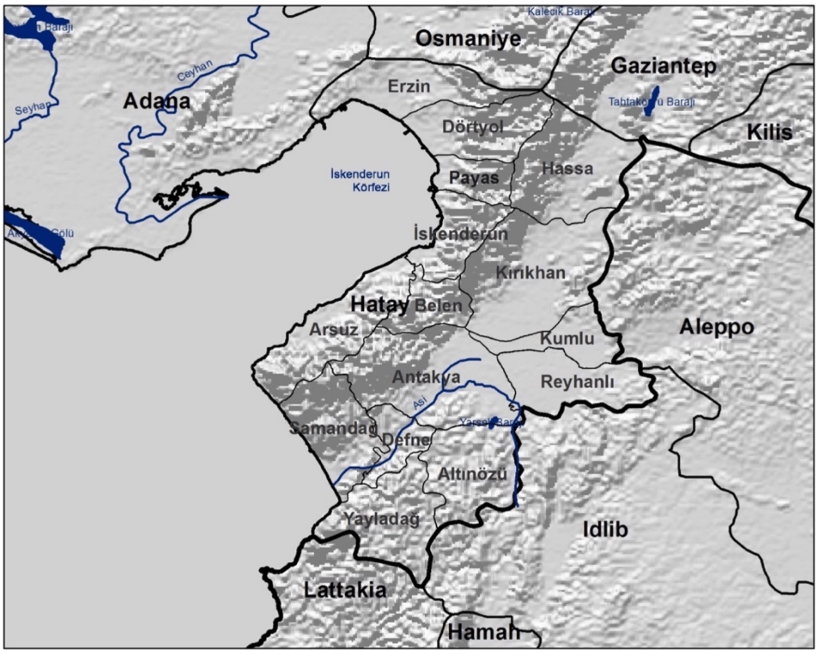

Figure 91: Topography of Payas

[102] These quantitative values giving the altitudes and distances are taken from the Geographical Data produced by Google Earth. Retrieved on 05 06, 2016.

[103] Retrieved 05 06, 2016, from Turkey Statistical Institutes. The values are the results of Address Based Population Registration System in 2015. http://www.tuik.gov.tr/UstMenu.do?metod=temelist

Being a coastal settlement in İskenderun Gulf, which has always been accommodating important and strategic ports in the area, Payas was among these important port towns. Besides, the tough geography neighboring Payas has made the town be an important location to stopover on the route from Anatolia to Syria in between Adana and Hatay. Moreover, having fertile plains has also made Payas as a favored settlement in the area. Thus, Payas has always been an important port, terminal and settlement through history.

Due to its strategic location, Payas and its nearby environment have been continuously settled by different cultures. Payas as a settlement mentioned in ancient sources as Baiae, Baiai, Bajassı, Beyyas and Bayas without giving the origin of the name (Darkot, 1988, p. 531). However, there is a lack of archaeological and historical studies mainly focusing on Payas. Thus, the beginning date of settlement and the first inhabitants are not known. Nevertheless, by taking into account the ancient history of Hatay, it can be said that the history of this region dates back to Neolthic Period (Hatay İl Yıllığı, 1973, p. 19). Being on the ancient route between the Middle East and Anatolia and being in an important gulf coast together with very important ancient coastal settlements such as Issus (in Erzin) on the north, Alexandreia (Iskenderun) and Rhosus (Arsuz) on the south and Aigaia (Ayas, Yumurtalık) on the opposite shore indicate that Payas's history dates back to ancient times (Darkot, 1988, p. 531) (Müderrisoğlu, 1993, p. 577).

Through the history, the region where Payas is has been dominated by civilizations of Hittites, Persians, Greeks, Hellenistic Kingdom, Romans, Byzantines, Armenians, Umayyads, Abbasids, Anatolian Seljuks, Crusaders, Principality of Antioch, Armenian Kingdom of Cilicia and Mamluks until the Ottomans (Darkot, 1988, p. 531). Although the region has always been settled, there are not any physical evidences in Payas until the 12th century, when the campaigns of Crusaders started. During this period, Crusaders constructed a castle in Payas in order to secure the pilgrimage route which passes through Payas (Molin, 2001, p. 182). We can understand that the razed castle was still existing in 1560s from the decrees ordering to renovate its ruins[104].

Additionally, the Italian colonies which were settled in Cilicia Region were economically developed during the Armenian Kingdom of Cilicia and Mamluk periods. Ayas (Yumurtalık), which is right across Payas in the İskenderun Gulf, was the most important trade capital of the region. This brings into mind that Payas might also have been an important settlement during this period in the 13th Century (Müderrisoğlu, 1993, p. 578) (İnalcık, 2013, p. 127).

In the second half of the 13th century, the region where Payas is located was conquered by Mamluks. With the population policies of Mamluks, Özer (Üzayr) tribes of Turkmens were settled in the frontier states of Mamluk lands and the population was increased during that period (Yurtsever, 2014, p. 6). However, Mamluks did not give emphasis to harbors and coastal cities resulting with a decline in trade and economy (Ayalon, 1977, p. 23).

After the Battle of Mercidabık between Ottomans and Mamluks in 1516 near Kilis, the territory of Payas and Hatay started to be ruled by Ottomans and became the center of the Üzeyr Sancağı of Arab State. It is known that during the Ottoman reign, Payas gained its urban identity and had more importance (Müderrisoğlu, 1993, p. 578). Payas which is between two mountain passes called Gülek Pass on the north of Adana and Belen (Bakras) Pass on the south of İskenderun became a junction of Anatolia and Syria. Moreover, being at a strategic location on the road from the capital İstanbul to the Middle East and pilgrimage to Mecca, Payas became a significant caravan terminal along this road (Necipoğlu, 2005, p. 376). This road known as “Anadolu Sağ Yolu” and/or “Şam-ı Şerif” was used for the military campaigns, pilgrimage, commerce, communication and transportation (Müderrisoğlu, 1993, p. 578).

By taking these into account, Selim II and his grand vizier Sokullu Mehmed Paşa made investments to Payas and constructed a dock, custom building, arsenal and watchtower and renovated the old castle on the eve of the Cyprus campaign. Payas provided the military needs during the Cyprus campaign and became the center of

[104] BAO. (1567). Date: 18/R/975 (Hicrî) File No: 372 Folder No: 146 Group Code: MD.7.

Üzeyr Sancağı of Halep State. Meanwhile, Cyprus was annexed to the Ottoman lands in 1571 and Payas gained more importance in terms of trade and became the trading port of Aleppo.

Seeing this potential, Sokullu Mehmed Paşa constructed a *menzil (terminal)* complex in Payas. After the construction of the complex, Payas was populated, developed and became a flourished town in the region (Necipoğlu, 2005, p. 356). By the population policy and *Derbent* organization of the Ottoman Empire, Muslim and non-Muslim households were settled in Payas. They were assigned as the *derbentçi* who were responsible for the security of the port, settlement, sea and land routes. As an encouragement and for the development of the settlement, they exempted these families from taxes (Necipoğlu, 2005, pp. 359-360).

Payas was an important port and station until the 18th century when the Ottoman Empire was started to weaken. The invasions and sieges have destroyed the settlement a lot. For a while after the 18th century the settlement was ruled by the Principality of Küçük Ali who could not secure settlement, the sea and land routes in Payas. Therefore, the settlement became a dangerous place for the travelers, pilgrims and merchants. Moreover, the destructive earthquakes in 1822 and 1872 caused many buildings to demolish (Hatay İl Yıllığı, 1973, p. 33). Due to all these circumstances, pilgrims and travelers started not to prefer the port of Payas. Although the Ottoman Army reconquered the town after several attempts, Payas could not gain its previous importance again (Müderrisoğlu, 1993, p. 579).

In the 19th century, due to the military and governmental struggles in the region, Payas changed its governmental statue frequently. Payas became the center of the Üzeyr Sancağı in 1846 and then became a district (*kaza)* of Cebel-i Bereket (Osmaniye) Sancağı in 1890 of Adana State.

During the French Mandate in 1918, Payas became a sub-district (*Nahiye)* of Dörtyol in Hatay. Payas was the frontier settlement between the Republic of Turkey and Republic of Hatay. In 1939, Hatay was annexed to Republic of Turkey and Payas became a sub-district (*Nahiye)* of Dörtyol County. For a while the settlement's name was changed to Yakacık. But in 2012, the settlement became a county of Hatay with its original name Payas (Sezen, 2006, p. 401).

Figure 92: Payas city center (after Google earth, last accessed on 12.06.2016)

After the second half of the 20th Century, in 1970, İskenderun Iron and Steel Factory was founded and the settlement started to transform into an industrial town (Müderrisoğlu, 1993, p. 580). Today the edifices contributing to the historic identity of the settlement are the castle, watchtower named Cin Kule and the Sokullu Mehmed Paşa Complex (Figure 92). The contemporary industrial town has been developing towards the skirts of the Amanos Mountains on the east spreading through the north-south axis.

3.4.2. Payas Sokullu Mehmed Paşa Complex

Sokullu Mehmed Paşa Complex in Payas is a *menzil* complex which was constructed in between 1569 -74 by Mimar Sinan. The complex almost conserves its original integrity and is composed of a mosque, *tekke (hanikah)*, *kervansaray, tabhane, imaret, hamam,* two fountains, bridge and service spaces such as toilet and kitchen (App.C Catalogue 3 Restitution).

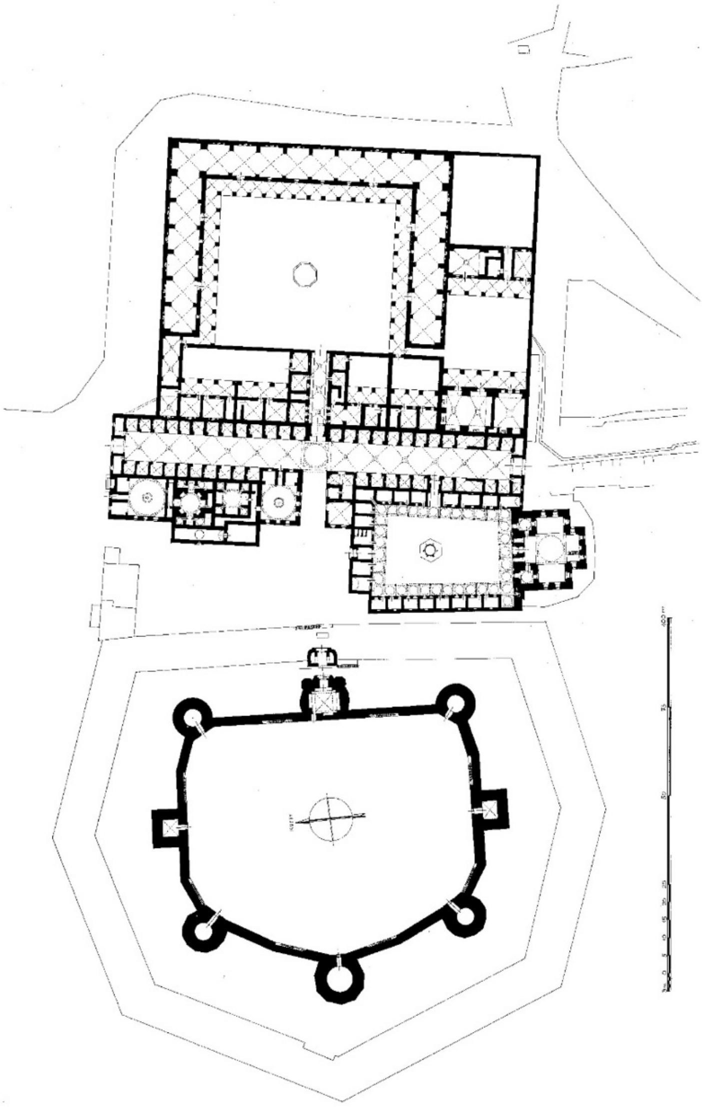

Figure 93: Restitutive site plan of complex drawn by Ali Saim Ülgen (Yenişehirlioğlu & Madran, 1989, p. 29)

3.4.2.1. Importance of the Complex

As a terminal, Payas was at a critical location between Anatolia and Middle East. It was at the junction of two important settlement which are Adana and Aleppo on the significant ancient pilgrimage route named "*Anadolu Sağ Yolu*" and/or *"Şam-ı Şerif"* in the Ottoman period. The strategic location of Payas, and the investments of the Empire in Payas for the port structures after the conquest of the eastern

Mediterranean coasts and the castle renovated for the Cyprus campaign made Sokullu Mehmed Paşa's selection of Payas to construct the complex predictable.

After the Battle of Mercidabık, in the first quarter of the 16th century, Ottomans started to control the land routes from İstanbul to Aleppo. Payas as a coastal town was a critical junction in between the Gülek Pass in Adana and Belen Pass in Antakya in the threatening topography (Figure 94). A need emerged to secure the passage and the accommodation of the military, trade, religious and communicational caravans.

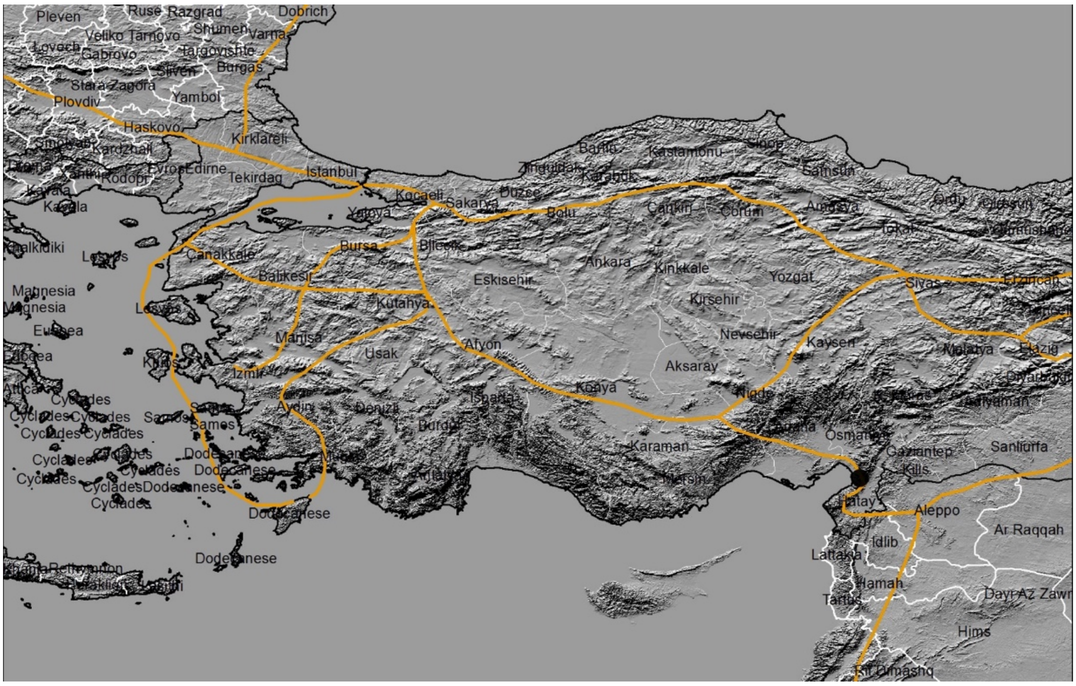

Figure 94: Military routes of Ottoman Empire in the 16th century. (This map is prepared in the light of the data taken from Orhonlu (1967)

Accordingly, the conquest of the Eastern Mediterranean has also provided the Ottoman Empire a strategic location for the navy in its territories. Seeing the opportunities in the area, the empire has invested and re-enforced its naval power towards the end of 16th century in order to compete with the other states (Tanyeli G. , 1996, p. 85). Payas, which was one of these ports for which the budget was used, became a crucial sea route terminal on the coast.

Towards the 1570s, the Ottoman Army held the Cyprus Campaign. The pre-existing Crusader castle in Payas was rebuilt and the Payas has played a critical role during this campaign (Necipoğlu, 2005, p. 356). The conquest of Cyprus in 1570-71 made Payas an important port for trade around the territory and meanwhile it became the trade port of Aleppo. In addition to the trade activities in the region, the fertile agricultural lands around the settlement constituted a potential for the settlement as a terminal.

In the light of these issues and due to military and security purposes, Payas was selected as coastal town for the construction of a complex by Sokullu Mehmed Paşa. Consequently, not only the complex was constructed but also Muslim and non-Muslim households were settled by the empire in Payas by assigning them to secure the lands. Thus, the complex became an impetus for the development of a coastal town and served both for the travelers and the inhabitants.

3.4.2.2. Location of the Complex

Sokullu Mehmed Paşa Complex in Payas is located in Kara Cami District outside the town center about 1km away towards the west, closer to the sea shore. The entire complex is located 700m away from the sea and sits on about a 13000m^2 settlement area. The complex is surrounded by Anıt Street on the east, Kale Street on the south and Inonu Street on the north and adjacent to the Payas castle on the west. Moreover, on the south side of the complex Payas Stream meanders.

According to Müderrisoğlu, the selection of the site for the complex has coherent reasons. Firstly, the complex should have been constructed close to the port to have a close relation with it. Secondly, to make use of the old castle, it was rebuilt again and the complex should have been constructed adjacent to it to have a comprehensive complex. Lastly, the complex should have been located on a coastal route coming from the north since the mountainous eastern parts of the settlement are dangerous and really difficult to secure (Müderrisoğlu, 1993, p. 596).

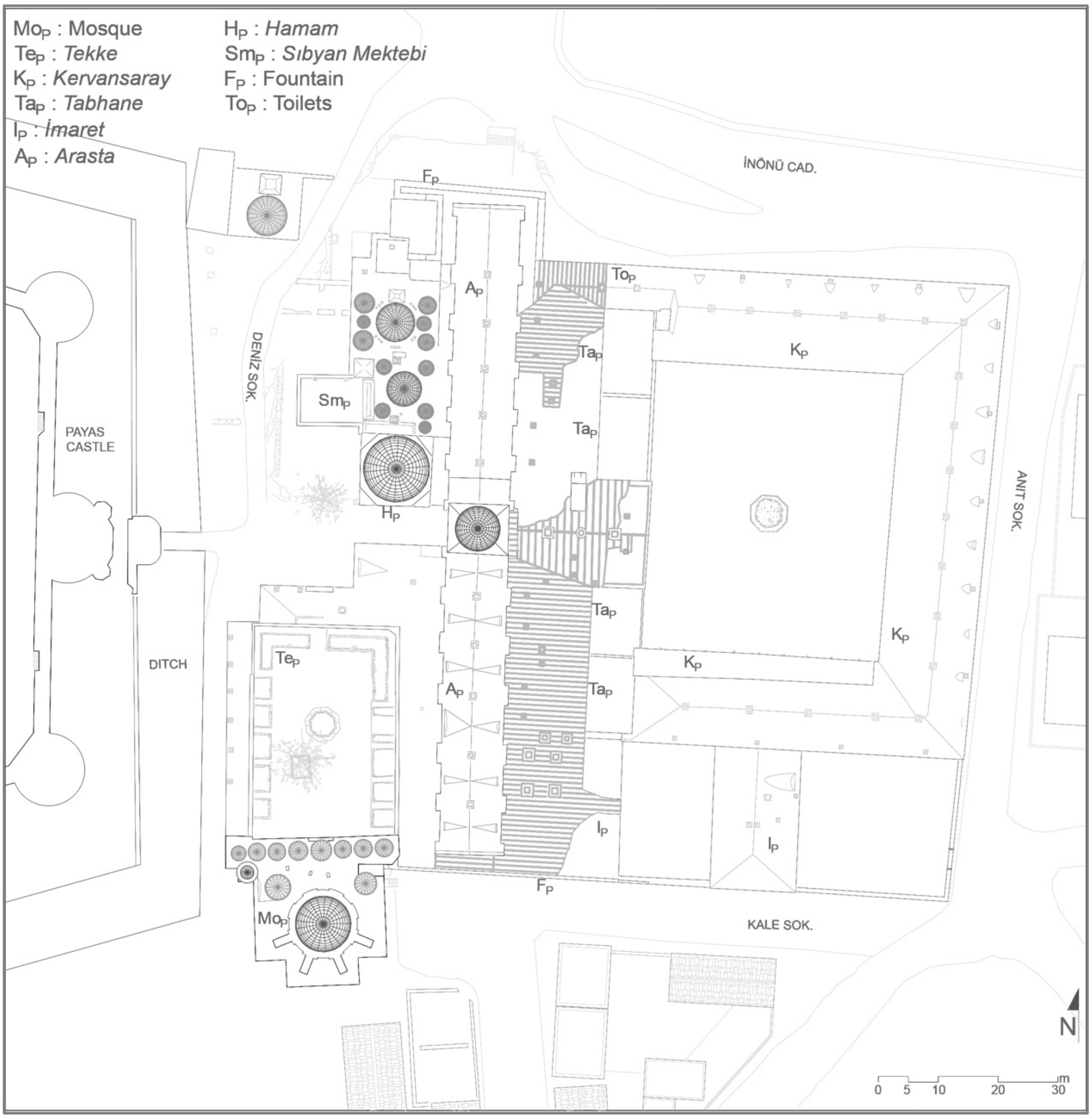

Figure 95: Site Plan of Payas Sokullu Mehmed Paşa Complex (Drawn after the measured drawings taken from BOAZ Eski Eserleri Koruma ve Mimarlık Ltd. and after drawings of the mosque and *tekke* taken from Işık Proje İnş. San. ve Tic. Ltd. Şti.)

The buildings of the complex are positioned according to the north-south axis which is the historic road on the route from İstanbul to Mecca (App.C Catalogue 3 Site Plan). All buildings of the complex are located in reference to this axis. The closed *arasta* is defined by this historic axis. In accordance with their service purposes, the buildings are grouped on the east or west side of the north-south axis. The buildings on the east side of the complex are *kervansaray*, *imaret* and *tabhane*. They serve the visitors with the purpose of accommodation facilities. The other service buildings for the lodgers such as toilets are concealed among the main buildings in the eastern side of the complex. On the other side, the western buildings are the mosque, *tekke*, *sıbyan mektebi, hamam* and bakery. They serve both the visitors and the inhabitants with the purpose of educational, religious, service and hygiene facilities. Additionally, the public fountains are located on the two entrance facades of the long *arasta*. The axis which has the closed *arasta* intersects perpendicularly with another axis directed by the entrance of the Payas Castle. This intersection is highlighted with the *dua kubbesi* which serves as a junction for the four directions. This structure provides entrances to the west and east parts of the complex. Additionally, the axis, the historic road to Mecca, comes from the north, passes through *dua kubbesi* and is directed to the bridge on Özer / Payas Stream.

The rectangular eastern part of the complex is adjacent to the closed arasta. The buildings of this part are also attached to each other by sharing common walls. From the south to north, the buildings adjacent to the arasta are the *imaret* and the tabhane rooms with their individual courtyards, and the toilets. Moreover, this eastern part is bordered on the south by the imaret and its courtyard walls. Then, the north and east sides of this part is bordered by *kervansaray* with its U-shaped plan around a central large courtyard. The entrance to this part is from the *dua kubbesi* towards this large courtyard of the *kervansaray*. The other edifices can be reached from the path next to the west edge of this large courtyard.

The west part is composed of two groups of buildings. The secondary axis perpendicular to the arasta separates these groups. On the south, mosque and the *tekke* constitutes a rectangular group by sharing a common courtyard. There is a *şadırvan* and a monumental olive tree within the courtyard. The mosque sits on the south side and the *tekke* with its U-shaped plan encircles the common courtyard from west, south and east. There are two entrances to this courtyard from the *arasta* and on the north from secondary axis. Adjacent to the north wall of the *tekke*, on the east side of the entrance, there is the bakery. On the north side of this secondary axis, the *hamam* sits lengthwise adjacent to the arasta together with the *sıbyan mektebi* on its west side. Accordingly, *sıbyan mektebi* has an entrance on the secondary axis, whereas the *hamam* has entrance from inside the *arasta* next to *dua kubbesi*.

In conclusion, *arasta* can be interpreted as a spine and the *dua kubbesi* as the centre of the entire design scheme of the complex and its buildings.

3.4.2.3. History of the Complex

Construction Period

Payas Sokullu Mehmed Paşa Complex, which is mentioned only in Tuhfetü'l-Mi'marin, was an important part of the investments done by Ottoman Empire in Payas on the eve of the Cyprus campaign after the conquest of the eastern Mediterranean (Sâî Mustafa Çelebi, 2006, pp. 354-69). These investments were the port and harbour structures, the arsenal, the rebuilt castle, and the complex. Imperial decrees starting from 1567 shed light to the construction chronology of these investments (Necipoğlu, 2005, p. 358).

The decree on October 22, 1567 orders the governor of Adana to renovate the ruined castle and rejuvenate the settlement with tax-exempt inhabitants.[105] A few months later, another decree on March 2, 1568 replies the Adana governor's report informing that the construction sites of the castle and the other buildings had laid down. The decree gives instructions to the governor about the financial organization, worker and material acquisition.[106] The other buildings mentioned in this decree should have been the buildings of Sokullu Mehmed Paşa Complex (Necipoğlu, 2005, p. 358). In the light of these sources, it can be suggested that the construction of the complex started in 1568.

Subsequently, the decrees were the correspondences about the construction processes of the castle and port structures up until 1573. The decree on April 26, 1573 connotes that the *kervansaray* may had been completed since it gives suggestions in order to set up a weekly bazaar in the *kervansaray* and encourage about 300 settlers to move in Payas.[107] The next decree that Necipoglu cited dates November 16, 1574. This

[105] BOA. (1567). Date: 18/R/975 (Hicrî) File No: 372 Folder No: 146 Group Code: MD.7.
[106] BOA. (1568). Date: 3/N/975 (Hicrî) File No: 964 Folder No: 335 Group Code: MD.7.
[107] BOA. (1573). Date: 23/Z/980 (Hicrî) File No: 654 Folder No: 276 Group Code: MD.21.

decree orders *kadı* of Üzeyr, *beylerbeyi* and *defterdar* of Aleppo to settle about 500 Muslim and non-Muslim residents in Payas.[108] In these circumstances, it can be interpreted that the construction process had almost finished and the population matters had been expedited.

The only inscription panel of the complex is on the *kervansaray's* portal facing towards the castle on the west and supports the claim above about the completion date of the complex. On this inscription, the completion date of the *kervansaray* is declared with *ebced hesabı* as 982 AH (1574). Necipoğlu (2005, p. 356) and Müderrisoğlu (1993, p. 581) state that this date can be regarded as the completion date of the entire complex.

Accordingly, another document that the complex was recorded is *Vakfiye*[109] of Sokullu Mehmed Paşa. In the section about Payas, *Vakfiye* mentions about the significance of the complex for Payas which was a dangerous and frightening place although it was a beaten track. Mosque[110], *tekke*[111], *sıbyan mektebi*, 48 shops (*arasta), imaret, fırın* (bakery), *kervansaray, tabhane, hamam* and toilets are the buildings which were recorded in the *Vakfiye.* Moreover, *Vakfiye* also mentions about the other buildings in Payas such as castle and port and gives detailed information about the salaries and the organization of the staff working in these buildings.

Until Today

After the construction was completed, Payas Sokullu Mehmed Paşa Complex had been the most important commercial harbour and terminal in the territory since the İskenderun port was constructed in 1590. Although it was eclipsed by the port of İskenderun, the settlement remained as a critical landing station until the 18th century

[108] BOA. (1574). Date: 1/Ş/982 (Hicrî) File No: 909 Folder No: 316 Group Code: MD.26.

[109] In the Archive of Directorate of General Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20. The date of v*akfiye* is 29 Zilhicce 981 (H) / 21 April 1574 (M). In the Turkish records, it is in the #2104 book on the 442-78 pages and in the queue of 323.

[110] *Vakfiye* mentions the building both as mosque and masjid confusingly.

[111] It is clearly declared in the *Vakfiye* that the building should never be converted to a *medrese.*

(Necipoğlu, 2005, p. 356). The 16th century travelers Tayfel[112] and Fynes Moryson, who visited Payas in 1590s, remark a strategic port and a developed settlement (Moryson, 1907, p. 69).

An earlier traveller mentioning about this terminal was Hasan Beyzade, who is *defterdar* of Aleppo, in the beginnings of the 17th century. He mentions about the castle, mosque, *kervansaray, hamam* and shops (Hasan Beyzade, 2004, p. 225). Subsequently, Hıbri Efendi who visited Payas in 1632 mentions about the port, mosque, *kervansaray* and castle while complaining about its bad air (İlgürel, 1975, p. 120). Another 17th century traveller was Yemshel, who stayed for one day in Payas in 1640s. Yemshel mentions that merchants come to Payas for trade because the town is the trade port of Aleppo and there are many shops for merchandise (Lewis, 1956, p. 101). Moreover, Evliya Çelebi, the famous traveller of the 17th century, explains many details about the complex and the settlement itself. He stayed for two days in Payas, while he was on the road to Mecca in 1648. He comments that the populace who live in 850 dwellings secure the terrain and the visitors. He gives the architectural dimensions of the buildings and informs about the silted harbour, which was still being used. Besides, Evliya Çelebi praises Sokullu as the constructor of bridge, castle, *hamam*, bazaar, *kervansaray,* mosque and *medrese*[113] and he claims that the complex in Payas is the most salutary one among his *vakıf*s (Evliya Çelebi, 2006, pp. 60-65). In addition, Katip Çelebi also mentions about the complex and the busy port of Payas in the 17th century (Katip Çelebi, 2008, p. 102).

In the 18th century, the settlement was continuously changed hands due to the weakening of Ottoman Empire; resulting with the abandonment of the port, the settlement and the complex. During this time period, there are not any travelers mentioning about Payas and the complex. In the 19th century, Ainsworth (1842, pp. 91-92); Allom and Bartlett[114] visited Payas. They mention the settlement as a small village and they also mention about the conditions of the buildings.

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[112] Cited in (Necipoğlu, 2005, p. 362), (Tayfel, 1598, pp. 47-51)

[113] It can be deduced that *tekke* should have been converted to a *medrese* after a while although it was sharply stimulated in *Vakfiye.*

[114] Cited in (Müderrisoğlu, 1993, p. 592) (Bartlett & Allom, 1845, pp. 38-39)

Figure 96: "Ruins of mosque in Payas" (Magasin Pittoresque, 1843)

In the mid 19th century, Ahmed Cevded Paşa (1986, p. 223), who was assigned to review the area as a governor, informs that the complex had been totally abandoned and gives the number of the inhabitants in the town as 5089. Moreover, he states that with effort of Payas governor the complex was tried to be repaired in 1865 (1986, p. 225). Consequently, in the 19th century, Müderrisoğlu[115] refers to the notes of travellers such as: Cuinet on the number of population; Mehmed Süreyya mentioning the existing buildings such as castle, mosque, *han* and *hamam*, and Wilson briefly explaining the history of the neglected town together with its ruinous buildings. Additionally, Müderrisoğlu[116] tells about Sisouan, who clearly observed the town,

[115] Cited in (Müderrisoğlu, 1993, pp. 593-594): (Cuinet, 1891-1894, pp. 105-107). (Süreyya, 1890-1894, pp. 39-40) (Wilson, 1895, pp. 191-192)

[116] Cited in (Müderrisoğlu, 1993, pp. 593-594) (Alishan, 1899, pp. 495-497)

published the gravures of mosque and complex and mentions about the mosque, bazaar, guesthouse and fountains. Along with the abandonments, two destructive earthquakes also affected the buildings in Payas. The first one was in 1822 and the epicentre was İskenderun and intensity was about 10. The second one was in 1872 and its epicentre was Samandağ (Hatay İl Yıllığı, 1973, p. 49).

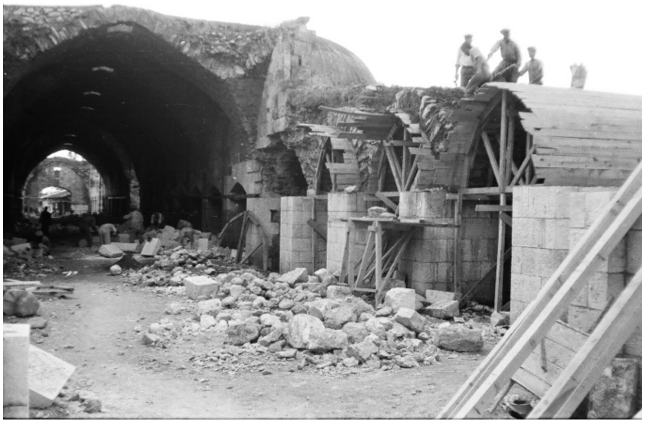


Figure 97: Sokullu Mehmet Paşa Arasta in 1964 on the left, in 1965 on the right. (Taken from the Archive of the Directorate General of Foundations in Ankara.)

In beginning of the 20th century during the French Mandate Period, Payas was the frontier settlement between the Republic of Turkey and the Republic of Antakya. Due to the political tension in the terrain, Payas should probably have lost its population and the buildings of complex have been left to their own fate since the restoration works of Directorate General of Foundations in 1960s (Işık & Ergeç, 2006, p. 81). Due to the long period of time that the complex has remained abandoned, there had been losses of its structural elements. About twenty years after the reunion of Hatay to the Turkish Republic, the restoration works, supervised by Yılmaz Önge, started in 1960 and continued until 1982 by the Directorate General of Foundations (Figure 97). During this period, the restoration works adopted the principle of completing the demolished and missing parts just as they were in the complex's original phase. (Işık & Ergeç, 2006, p. 98).

After 2000s the complex was subjected to further restoration activities. The restoration project of mosque, *tekke* and their common courtyard was prepared by Işık

Proje İnş. San. ve Tic. Ltd. Şti. in 2005. Subsequently, these edifices were restored in 2006 by Restorasyon Yapı Mimarlık Ofisi. The restoration project of the rest of the complex was prepared by BOAZ Eski Eserleri Koruma ve Mimarlık Ltd & Oğuz Ergeç Mimarlık and finished in 2007. Afterwards, Aydınlar Pet. Ür. Otm. Turz. Kuy. İnş. Nak. Ltd. Şti. San. implemented the project with the consultancy of BOAZ Eski Eserleri Koruma ve Mimarlık Ltd, which was completed in 2013. After the completion of the complex's restoration, the Municipality has been executing a project named *"Payas Şenlendirme Projesi"*[117] in collaboration with ÇEKÜL Vakfı[118]. This collaboration aims to integrate the complex into the current life of Payas as the heart to flourish the county. At present, certain buildings of complex are used for various purposes such as governmental, commercial, educational, cultural, ceremonial and artistic activities.

Until today, the complex has been subjected to different studies. The sources that are about the İskenderun Gulf Coast in Eastern Mediterranean, Payas and the complex are: Akyel (1966), Tekin (2000), Ayalon (1977), Şakiroğlu (1991) Goodwin (1971), Sözen (1975), Kuran (1986), Kuban (2007), Aslanapa (2004), Orhonlu (1990), Halaçoğlu (1982), (2014). The monographic sources which gives the detailed comprehensive information about the history, architectural features and the nearby environment of the complex are Müderrisoğlu (1993) & (1997) and Necipoğlu (2005) & (2013).

3.4.3. Payas Sokullu Mehmed Paşa Mosque

The mosque is at the south-west corner of the entire complex adjacent to the west side of the arasta. On the north, there is the common courtyard encircled by the rooms of the *tekke*. On the west, the deep ditch of the castle declines and on the south, there is an empty space covered with natural vegetation.

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[117] The Project of Flourishing Payas

[118] ÇEKÜL: Çevre ve Kültür Değerlerini Koruma ve Tanıtma Vakfı - Foundation for the Protection and Promotion of the Environment and Cultural Heritage

3.4.3.1. Architectural Features of the Mosque

The cross-in-square planned mosque is topped with a single dome in the middle and two small ones on the north corners. The main dome circumscribed by a drum that is articulated with eight windows and supported by four flying buttresses on the south. The south part of the cross-in-square plan protrudes towards the south from the façade with an iwan containing the Kıbla wall. At the north-west corner, stands the low and thick minaret with cylindrical shaft and a single *şerefe*. The asymmetrical last prayer hall is attached to the north facade of the mosque. The longitudinal hall is enclosed by walls on three sides and is open on the north facade. It is topped with eight domes. The dome, which is over the entrance unit, is stilted and the dome on the very west is smaller than the others. Additionally, over the north- east corner of the mosque, there is a trapezoidal protrusion which provides an access to the roof (App.C Catalogue 3.1 Mass).

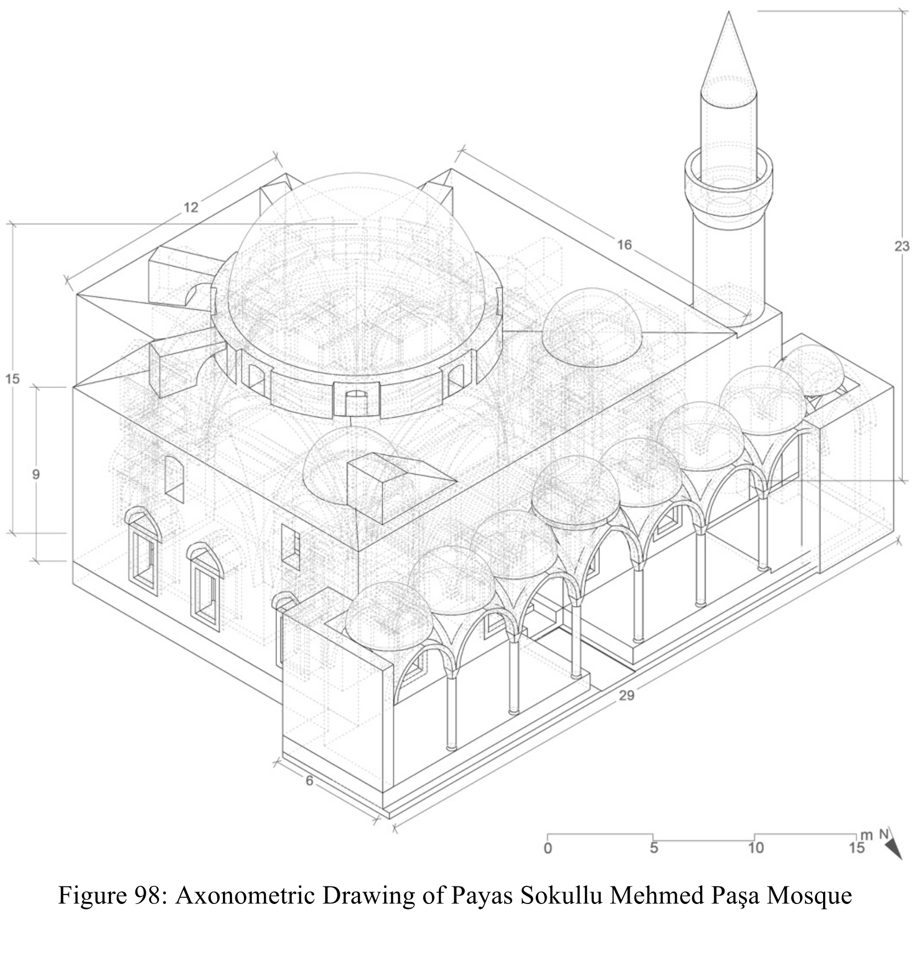

Figure 98: Axonometric Drawing of Payas Sokullu Mehmed Paşa Mosque

The domed central prayer space of the cross-in-square planned mosque is enlarged towards four directions by four iwans. At the north corners of the cross-in-square plan of the mosque, there are small unit spaces with two storeys, whereas the south corners are hollowed. The central dome rests on four main arches and pyramidal pendentives. These transition elements create an octagonal base for the inner drum. Consequently, the inner drum which has eight window openings provide a circular base for the dome (App.C Catalogue 3.2 Measured Drawings).

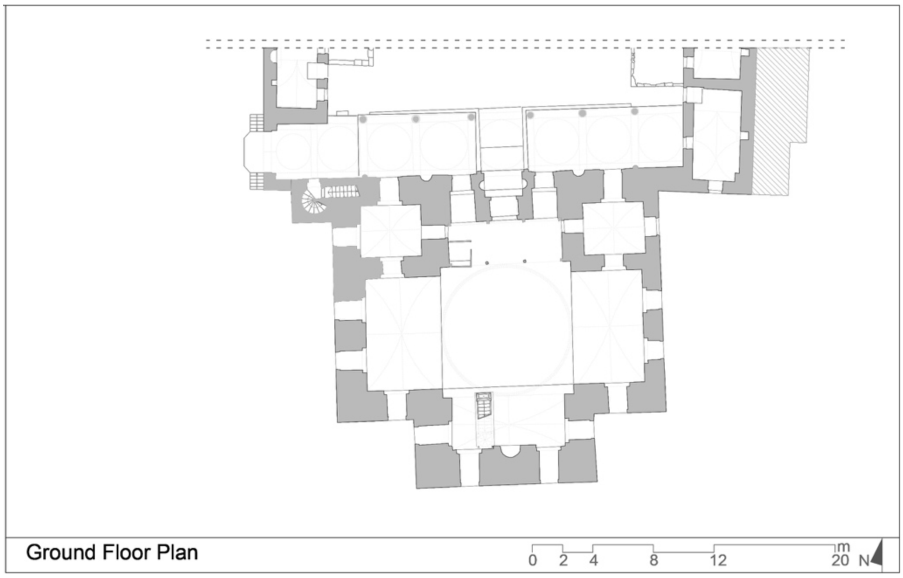

Figure 99: Ground Floor Plan of Payas Sokullu Mehmed Paşa Mosque (Drawn after the measured drawings taken from Işık Proje İnş. San. ve Tic. Ltd. Şti.)

The iwans on four directions are topped with cross vaults. The iwan on the south contains the kıbla wall on which the *mihrab* is placed. Adjacent to the kıbla wall, on the west side of the *mihrab,* the timber *minber* is placed on the one step raised floor of the iwan. Additionally, the timber *vaaz kürsüsü* is placed at the corner of the south and east iwans. The iwans on the east and west sides are mirror image symmetry of each other. They are raised one step from the central prayer space. The iwan on the north constitutes the entrance to the mosque and provides entrances to the small unit spaces at the north corners. In this iwan, over the portal there is a second floor which is constructed with timber posts, joists and flooring (Figure 100).

The unit spaces at the north corners of the mosque flanks the sides of the north iwan. These spaces are separated from the main prayer hall by the walls containing windows. The ground floors are one step raised such as the iwans on the west, east and south sides. The second floors of these spaces, the *mahfils*, rest on the cross vaults that cover the first floor. Then, the second floors are topped with domes resting on pendentives. The *mahfil* floor can be reached from the staircase which is located inside the large north wall of the mosque. This staircase starts from the minaret base, goes up through the north wall, leads to *mahfil* floors and the roof.

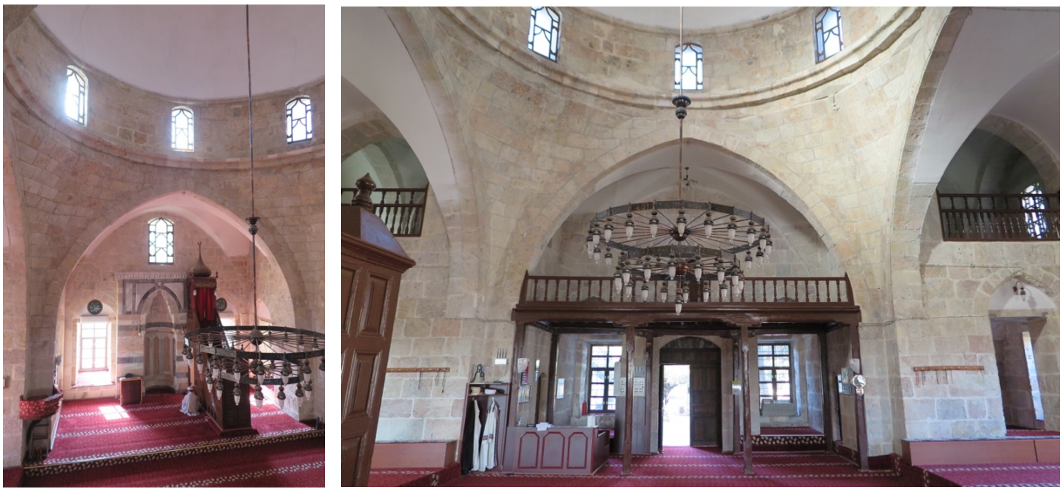

Figure 100: The photographs showing the interior of Payas Sokullu Mehmed Paşa Mosque (by the author, 2016)

The rectangular planned last prayer hall, which is reconstructed in 1982, is a semi open space attached to the north wall of the mosque. The east and south sides of this hall are defined by the walls. On the west side, there is a large door opening with pointed arch leads to the outside of the complex. An open colonnade, composed of six columns, borders the north side of this hall together with the adjacent wall of the *tekke* on the west. The last prayer hall which acts as a passage way to the mosque is composed of eight square units. These units are covered with domes resting on pendentives and divided by pointed arches supported by columns and walls. The square unit space in front of the portal is covered with a larger and stilted dome and introduces the entrance of the mosque. The dome on the far west side, in front of the arched large opening, is smaller than the others. Accordingly, in this hall, the floor of these units that are in front of the mosque façade are raised, but the floor of the entrance unit and the far west unit are not.

The façades of the mosque are composed of modest architectural elements. On all the elevations, the windows are arranged in two rows under the central dome except the entrance facade that has a row. The dome is confined by an octagonal drum arranged as a clerestory with window openings on each face. In addition, the four flying buttresses, that support the drum from the south, and the minaret, attached to the north-west corner of the mosque, can be observed on all of the facades.

The north façade of the mosque is hindered by the last prayer hall which is facing the courtyard. The north façade of the last prayer hall is composed of seven large openings topped with pointed arches carried by six columns. However, eight domes are observed on the facade. The west wing of the *tekke*, that is attached to the north facade, closes the west side of the façade. On this façade, these eight domes and the arcade can be observed below the two small domes of the corner units and the central main dome with drum. The central unit of the arcade, which defines the entrance, has a larger arch and a stilted dome; whereas the unit falling behind the demolished arcade of the *tekke* on the west, has a smaller arch.

The rear wall of the last prayer hall is the entrance façade of the mosque. Due to the attached *tekke* on the west side of the north facade, the facade of the harim section of the mosque is shifted a bit towards the east. This section on the facade is expressed by articulated impost stones of the arches. This entrance facade carries the portal of the mosque in the middle of the harim section facade. On both sides of the portal, there are two windows, having *mihrabiye* niche in between. The windows are rectangular in shape and topped by arches with depressed tangent profile. They have iron bars with knots. In addition, there are slit windows flanking on both sides of the portal. They illuminate the staircase, inside the north wall, leading to the *mahfil* floor. There is a door on the west side of the entrance facade of the mosque. It opens to the minaret and the staircase of the *mahfil* floor. This door opening is placed in a rectangular frame and topped with a depressed arched composed of white, pink and black marbles.

The east and west facades are almost mirror image symmetry of each other. On these facades, the cross-in-square organization can be observed. The two-rowed windows are grouped according to their corresponding spaces. There are three windows that open to iwans. They are arranged one above the other two and in the middle of them. In addition, there are two windows each of which opens to the storeys of the northern corner unit spaces. The windows on the first row are rectangular in shape topped by relieving arches with two centered tangent profile. These windows have grilles with knots. The second-row windows that open to iwans are small in size with depressed arches. The windows opening to the *mahfil* floor are rectangular. These upper windows have *dışlık* panels. Additionally, the windows on the side walls of the south iwan can be observed on the east and west facades. They are at the same level and configuration with the windows on the first row. The difference of the west façade from the east is because of the minaret attached to the north corner and the last prayer hall's door opening with pointed arch. Accordingly, on the east facade, the staircase exit projecting out from the roof creates the difference.


Figure 101: South façade and portal of Payas Sokullu Mehmed Paşa Mosque (by the author, 2016)

The south facade has a symmetrical organization. The projected south iwan, the *mihrab* wall, has three windows in a similar manner with the east and west iwans. Likewise, the side walls of the east and west iwans can be observed on each side of the south facade. There are two rows of single windows on each wall. The windows on the first row are the same with the other facades. The upper ones are circular in shape with *dışlık* panels (Figure 101).

The entrance portal, constructed in pink, white and black marbles, is set in a high frame topped with a pointed arch. It has a niche, rectangular in plan, with six rows of stalactited hood. In this niche recession, above the door opening, there is a void in the white marble covering which should have been the place of the inscription panel. The door opening is topped with three-colored marble joggled arch with depressed profile. The *cümle* door which is made of timber is inserted into the door opening. Additionally, on the east and west walls of the portal recession, there are two niches with half decagonal plan and they are covered with four rows of stalactited hood. The portal niche is flanked by two attached columns constructed in white marble.

The *mihrab*, that was covered with pink, white and black marbles, has a rectangular frame topped with two rows of stalactites in white marble. It has a plan of a semicircular prayer niche which is covered with a hood made of seven rows of stalactites. The spandrel of the stalactited hood is framed by black marble bands. On the east side of the prayer niche, Arabic letters are inscribed on the white marble.

The *minber,* which is made of timber, is placed on the west side of the *mihrab* adjacent to the south wall. The *vaaz kürsüsü,* which is made of timber, is placed at the south-east corner of the central domed prayer place.

3.4.3.2. Structural System and Construction Technique of the Mosque

Payas Sokullu Mehmed Paşa mosque has a cross-in-square planned prayer place (*harim*) topped with a large dome in the middle, cross vaults on the four iwans and two small domes at the northern corners. It has also an attached rectangular last prayer hall with an arcade and a low minaret with a thick cylindrical shaft. Principally, the mosque is built up with masonry structural system except the *mahfil* floor over the entrance iwan. As a consequence of the masonry structural system, the vertical loads are conveyed by means of the load bearing elements constructed with unit materials such as stone and brick (App.C Catalogue 3.3 System details).

Accordingly, the central dome of the mosque rests on a circular base provided by a drum. This drum has eight windows and supported by four flying buttresses from the south side. This supported drum resists the tensile forces developed in the tension zone of the dome.[119] In addition to this drum, there might be tension ring in the dome courses of the same zone. The possible levels may be the starting and the ending levels of the drum. Afterwards, the drum transfers the compressive loads to the pyramidal pendentives which are constructed with corbelled unit materials. These pendentives make the circular plan geometry fit to central square plan below and distribute the load conveyed from above towards the arches. These arches transmit the loads to the corners of the masonry walls which intersect due to the quadrivial cross-in-square plan layout. By the same token, lateral walls of iwans, which are extended on the axis of the tensile forces developed in the main arches, bear against the thrust[120] occurred in these arches. Consequently, all developed loads are transferred to the ground by means of the walls and the foundation (Figure 102).

Furthermore, the iwans of the four-way plan are covered with cross vaults. These vaults transfer their dead load to the corners of the rectangular planned iwans through the ribs that are formed by intersecting courses of two perpendicular barrel vaults. Besides, the domes at the north corners of the cross-in-square plan cover the small unit spaces which have two storeys. These domes covering the upper floors (*mahfil* floors) rest on spherical pendentives. These pendentives distribute the loads towards the arches in the walls. The masonry slabs of these *mahfil* floors are laid on the cross vaults which are also the superstructure of the lower spaces. As in the case of iwans, the loads are transmitted to the wall corners of the square unit space by means of the ribs. The *mahfil* floor has also one more space between the northern ones. The rectangular floor over the entrance iwan is constructed with timber post and lintel system. Timber floor rests on the timber joist and the joists transfer load to the lintels which are on the long edges of the rectangular plan. These both lintels are supported by four posts which are directly sitting on the flooring of the entrance iwan.

[119] For further information about tension zone see Chapter 2; Section 2.2.

[120] For further information about thrust see Chapter 2; Section 2.2.

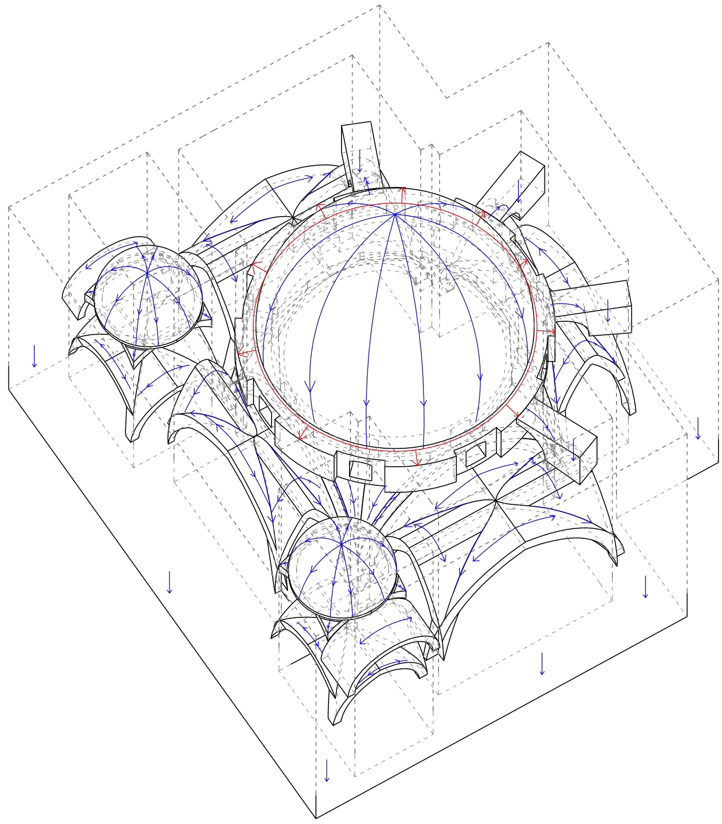

Figure 102: The Load Distribution of Payas Sokullu Mehmed Paşa Mosque.

Moreover, the masonry walls that enclose the *harim* section, carry the architectural elements such as openings and niches. In the walls, these openings are spanned by arches, relieving arches and lintels. Thus, the walls support the entire structure and transfer the loads to the ground through the foundation. Additionally, the north wall, which is thicker than the others, contains the linear staircase leading to the *mahfil* floors. The stone steps rest directly on the masonry wall; whereas the ceiling of the staircase is formed with the spanning stone blocks supported by the wall.

The rectangular last prayer hall, which is an arcade attached to the north wall of the *harim,* was reconstructed in 1982 by General Directorate of Foundations. This hall is composed of eight square units topped with domes. The domes sit on the spherical pendentives which distribute the load to the arches. These arches, which also divide the unit spaces, are imposed by columns on the north and the walls on the east, south and west. Distinctively, the dome on the far west, which is smaller than the others, is supported by the walls due to being behind the western wing of the *tekke.* In fact, this space seems like an added expansion of the last prayer hall. Because the north wall of the *harim* section finishes after the arch of the seventh unit space and there is an expansion joint. The minaret base also defines this border. This expansion joint is on the axis of the keystone of the arch of the seventh unit space. Moreover, in order to eliminate the thrust and fasten the entire colonnaded masonry system, iron ties are placed at the impost level of all the arches. Likewise, the loads are transferred to the ground by the foundation and the footings of the columns.

The minaret, which had been demolished and reconstructed many times, was lastly restored in 2006. The low minaret with a thick cylindrical shaft is constructed with masonry system except the timber hood (*külah*) on the top. From top to the bottom, the minaret is composed of the hood, the cylindrical upper portion of the shaft (*petek*), the balcony (*şerefe*), cylindrical shaft (*gövde*), the shoe (*pabuç/küp*) with chamfered corners and the base (*kaide/kürsü*). The minaret base is constructed interconnected with the walls of the *harim* section. It contains the step courses (*kur*) of the spiral staircase. The step courses that are laid on top of each other with a slight rotation, are formed with single steps with core. These courses are thought to be assembled to each other with iron dowels through the core. Besides, the step courses also rest on the walls by extending along the wall courses and binding with clamps. Thus, the spiral staircase bonds the entire structure by acting as a spine in order to restrain the transverse forces developed in the structure. The minaret shoe (*pabuç/küp*) makes the square plan of the minaret base fit to the cylindrical plan of the shaft by corner chamfers. The minaret shoe and the shaft are also constructed interconnected with the staircase up to the level of the balcony. The masonry upper part is composed of a balcony with a larger plan and the upper portion of the shaft built up with a smaller plan layout than the lower portion. Then, the hood structure is supported by the walls of the upper shaft and the mast (*seren)* which sits on the core.

For the structural necessity of structural integrity, the building and walls are bound and aligned at significant levels by tie beams (*hatıl*). These significant levels are supposed to be the beginning and ending levels of the load bearing elements in order to stage the construction process. So that, the tie beams are thought to be located at essential intervals. In these circumstances, the first tie beam row is most probably at the beginning level of the walls after the foundation. The second might correspond to the windows in the first row. The upper one should be under the impost line of the vaults of the iwans. The last tie beam level might be under the windows of the second row. Unfortunately, there are not any traces about the tie beams in the building. Therefore, it is not known whether these tie beams are metal or timber ones.

The foundation of the building is totally under the ground level. Therefore, the building does not give any clue about its foundation as well as its infrastructure soil properties of the site. The technical report of the structural system, which is prepared for the restoration project of the entire complex, mentions a few information that should be questioned. The report states that the walls go down about 1,5-2m below the ground level (Işık & Ergeç, 2006, p. 76). Due to lack of information, the foundation and the infrastructure of the mosque cannot be identified. But taking into account the castle's ditch, it can be said that the foundation should be so firm and deep with an extensive infrastructure since the ditch has about 10m depth and is only 6m far from the minaret on the west. Furthermore, on the north façade of the mosque over the ground level of the courtyard, there is a step under the last prayer hall's floor. This stone masonry step may be the first encasement of the mosque. The level of this step also corresponds to the cornice on the east, south and west facades. This cornice defines the ground floor level of the *harim* section. In view of these, this level can be thought as the end of the foundation and beginning of the walls.

The ground floor of the mosque is constructed with stone flooring units, possibly pinned down in a thick mortar layer. This floor laying is just over the level of cornice on the east, south and west facades.

Accordingly, the principal building material of the mosque is limestone[121]. The walls, arches, pendentives, vaults and slabs and floors are constructed with limestone units. Based on the material analyses and measured drawings held by Işık Project, the

[121] In the technical report of Payas Sokullu Mehmed Paşa Restoration Project, it is recorded that there are two types of limestone used in the building. The first one is "Conglomeratic Limestone" which are composed of yellow, orange and pinkish colored particles. These particles can be easily noticed by eye. The second one is the "Anglomeritic Limestone" which is a singly greyish yellow color. Additionally, the report says that, both are the local lacustrine fine porous neritic limestones. (2006, p. 68)

domes are built up with limestone too[122]. Unfortunately, no information can be reached regarding the material of the dome in the archives and the dome is plastered even in the old photos. The other stone material is marble, which is generally used with the purpose of decoration in white, black and pink colors. The walls are constructed with cut stone blocks adjacent to each other as if there is no jointing (*akçe geçmez derz*). The walls are built up in pseudo-isodomic masonry. The heights of the stone blocks vary between 35-50cm. The portal and the *mihrab* are built up with alternating rows of these three-colored marble courses.

Timber is another building material, which is used also for the *minber* and *vaaz kürsüsü.* The slab of the *mahfil* floor in the entrance iwan is constructed with timber posts and lintels. There are not any traces on the building or any information in the archives regarding the tie beams in the walls of the mosque. But taking into account the other buildings of the complex, it can be suggested that they are timber. Due to the same reasons, there is no information about the usage of iron in the walls and courses of dome, whereas due to the structural necessities, iron is most probably used as clamps and dowels.

Furthermore, the binding materials such as lime mortar, mud mortar, *horasan* mortar and lead are used as the crucial components of the masonry system. On the superstructure of the building, the lime based plaster and white wash are used as the finishing materials. There are more materials which the architectural elements are made up of. These are the brass used for the *alem* and column rings hiding the joints, lead sheets for roof covering, lime for *içlik* panels, glass for windows, timber for doors, window sashes and shutters.

Necessary to add here that, the previous building material of the reconstructed last prayer hall was brick for the domes and limestone for the columns and arches. It can be seen from the photographs in which the last prayer hall had been partly demolished. Then, this hall was built up with traditional techniques and new materials in 1982. The documents in the Directorate General of Foundations explain the restoration implementations. The columns, bases and capitals are out of stone imitating

[122] (Işık M. P., Işık Proje İnş. San. ve Tic. Ltd. Şti. Archive)

the original ones and they are fastened with tie beams. The arches and the domes were constructed with compressively moulded imitation bricks. The north façade of the last prayer hall is covered with stone cladding. Lastly, the roof of the last prayer hall together with the roof of the *harim* section had been covered with reinforced concrete (*mozayik)* which was removed during the last restoration implementations. Moreover, over the *harim* section, there is about 1m filling made up of cement mortar filled with rubble stones, under the reinforced concrete layer. This thick layer still exists below the lead sheeting on the roof.

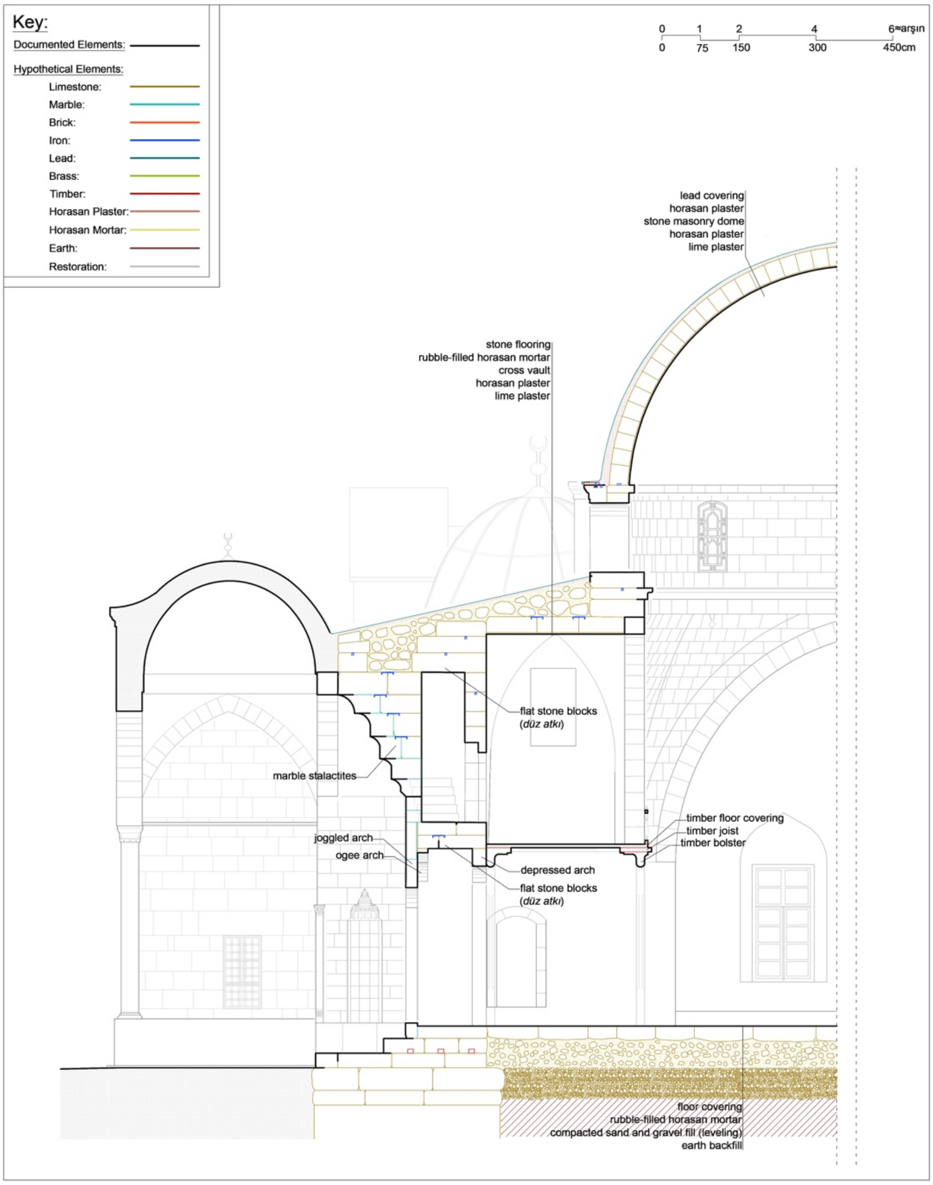

Figure 103: System Detail 3 of Payas Sokullu Mehmed Paşa Mosque drawn by the author

CHAPTER 4

UNDERSTANDING THE CONSTRUCTION TECHNIQUE AND PROCESS OF LÜLEBURGAZ SOKULLU MEHMED PAŞA MOSQUE

In this section, Lüleburgaz Sokullu Mehmed Paşa Mosque is systematically decomposed into its components in order to understand its construction technique and process. For this purpose, the building components, the load bearing and architectural elements of the mosque, are classified based on the information gathered and analyzed in the system details. This classification was done in accordance with the coding system assigning a code for each type of element of which the construction technique changes. These types of the load bearing and architectural elements are tried to be examined one by one through the detailed drawings (App.C Catalogue 1.4 Element Details). For this purpose, these drawings, which are mainly based on the system details, are generated in the unseen parts by using the information gathered from literature survey and oral explanations. Therefore, to increase the reliability of the study and avoid speculations, the documented and hypothetical parts are separated and the sources which are used for drawing these details are referred for each case by number coding shown below (Table 7).

Table 7: The table showing from where the referred information is gathered for generating the detail drawings

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents regarding the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

The traces of the building include the documented information during the site survey and the archival materials such as old photographs, drawings and technical reports gathered from the personal and institutional archives. The information derived from the other buildings of the complex also include the site survey documents and the archival materials regarding these buildings. The referred information about the construction technique of Mimar Sinan's other buildings contains knowledge which is gathered from various sources such as related books, dissertations, journal papers, symposium papers, research reports and technical reports. The information regarding the construction technique of Ottoman Architecture is the data gathered from the published of unpublished creditable sources and documents which are accumulated until now and named above. The structural and architectural necessity is derived from the information suggested in again the above-mentioned sources. The oral knowledge includes the experience driven information obtained from established scholars in the field such as late Ali Emre Madran, Gülsün Tanyeli and Cansen Kılıççöte[123].

[123] Assoc. Prof. Dr. Ali Emre Madran (1944-2013) was an academic member of Middle East Technical University, Faculty of Architecture, Graduate Program in Cultural Heritage Conservation.

Assist. Prof. Dr. Gülsün Tanyeli is an academic member of İstanbul Technical University, Faculty of Architecture, Graduate Program in Restoration.

Cansen Kılıççöte is a conservation architect who used to work in the Directorate General of Foundations as a controller of the restoration interventions.

4.1. Classifying the Building Components of Lüleburgaz Sokullu Mehmed Paşa Mosque

The components of the mosque are classified and explained by following the sequence of the construction process. They are categorized firstly according to their functions and then to their positions. Primarily, the load bearing elements are considered regarding their positions such as infrastructure (I1), upperstructure (U1) and superstructure (S1). Subsequently, the architectural elements are examined.

4.1.1. Load-Bearing Elements

The load bearing elements, including the structural members of infrastructure, upperstructure and superstructure, start from the foundation; whereas, the foundation of the mosque is under the ground level. Only the first encasement of the foundation can be observed. In addition, due to limited knowledge about the construction of the infrastructure, the foundation of the mosque, below the ground, cannot be drawn even hypothetically. Thereby, the classification starts from this encasement level.

4.1.1.1. Infrastructure

The infrastructure is defined as the constructions below the ground floor level of the mosque. Thereby, the foundation walls (U1fw) and the footings (U1fo), which can be interpreted, are the components of the infrastructure under/on the ground level.

Foundation Walls

The foundation wall is defined as the masonry wall which was constructed between the observed encasement level on the exterior and the interior ground floor level where the interior wall surface start. There are two types of foundation walls which are observed and documented in Lüleburgaz Sokullu Mehmed Paşa Mosque (Figure 104) (Catalogue 1.4.I1fw).

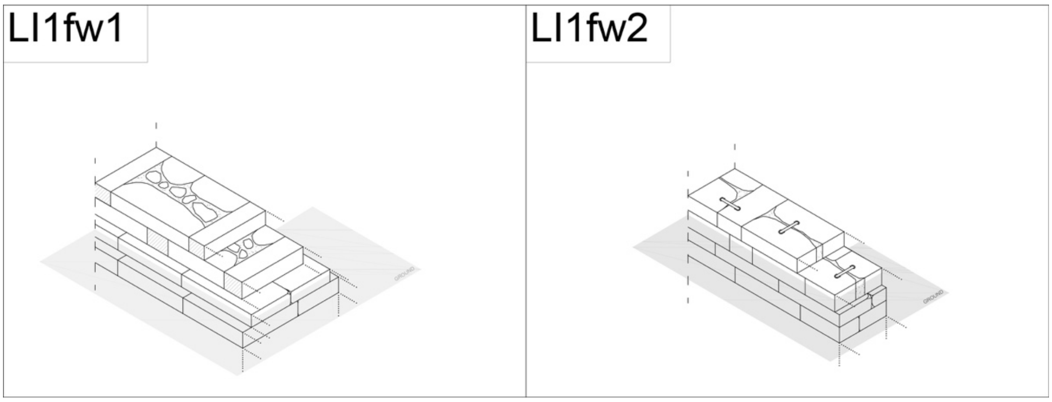

Figure 104: Types of foundation walls in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LI1fw1)

The first type of the foundation wall is encountered on the mosque's east, south and west façades where the first encasement can be seen just over the ground. The foundation below this encasement is interpreted based on the information gathered from the mentioned sources regarding the foundations in the 2nd chapter. This part of the foundation is thought to be constructed with rough-cut stone blocks without mortar but with iron clamps by progressively enlarging rows of encasements towards the deep.

Figure 105: West Façade of the Lüleburgaz Sokullu Mehmed Paşa Mosque (By the author, 2015) The stone blocks, having nearly square shaped faces and located with similar intervals, can be also observed on east and south facades.

Accordingly, the foundation wall, above the encasement level, rises with two rows of limestone courses until the interior ground floor level. These rows, on the exterior, were constructed with fine-cut stone masonry; whereas the interior face of this wall, under the ground floor level, are supposed to be constructed with rough-cut stones. On the mentioned façades, the stone blocks, located with similar intervals with nearly square shaped faces, are recognizable among these courses (Figure 105). They are thought to be the bond headers[124] which are the stones extending the full thickness of the wall. These bond headers should also provide a bed for the tie beam of which the necessity is discussed previously. The tie beams, which are for levelling the structure while passing from the foundation to the components of the upperstructure, are thought to be fixed by means of these bond headers.

- Type 2 (LI1fw2)

The second type is considered as the foundation walls of the last prayer hall's walls which enclose the projected parts of this hall. Although these walls were constructed adjacent to the mosque's walls, the encasement, which can be observed all around the mosque, does not continue on the ground level of these walls (Figure 106). Thereby, this foundation wall is interpreted as a different type. Due to the structural necessity, there is a possibility to have an encasement under the ground level but it cannot be seen.

[124] Bond header: (or through stone) The stone block which extends the full thickness of the wall (Dictionary of Engineering, 2003, p. 69)

Figure 106: The walls which enclose the western projected parts of the last prayer hall. (Left: By the author, 2015; Right: VGM Archive, 1984)

Consequently, it is supposed to be constructed with rough-cut stones masonry at the interior and the fine-cut masonry can be seen on the exterior. The thickness of the wall allows for two face stones with mortar infill between them. In addition, this foundation wall also borders the last prayer hall's flooring. By taking these issues into account together with the example seen below in the Havsa Sokullu Mehmed Paşa Mosque, it is assumed that iron clamps were used to fasten the stone blocks together with the mortar (Figure 107).

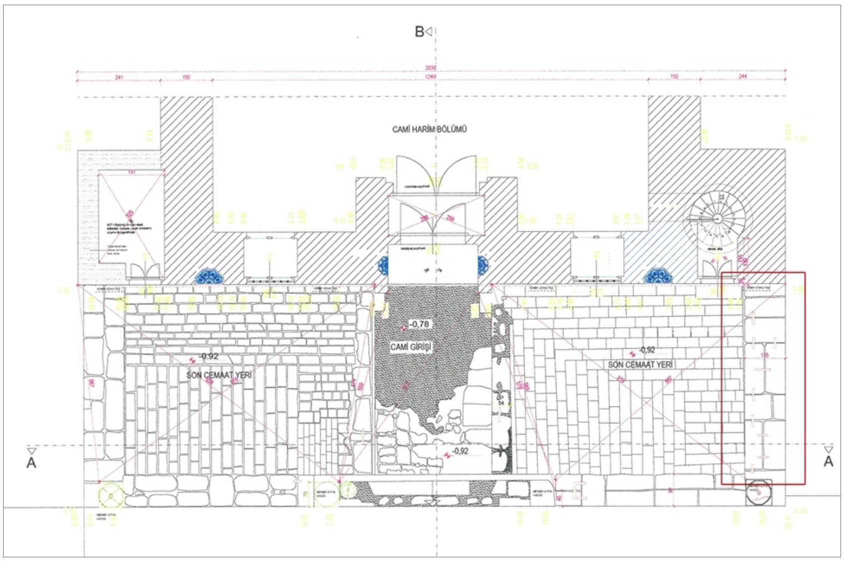

Figure 107: Measured plan drawing of the last prayer hall of Havsa Sokullu Mehmed Paşa Mosque, drawn by Etur A.Ş. in 2012, and taken from the Archive of the Havsa District Governorship.

Footings

The footing is defined as foundation underneath the columns that are the single supporting members. The column bases are component of these footings. There are three types of footings which are interpreted based on their configuration (Figure 108). (Catalogue 1.4.I1fo).

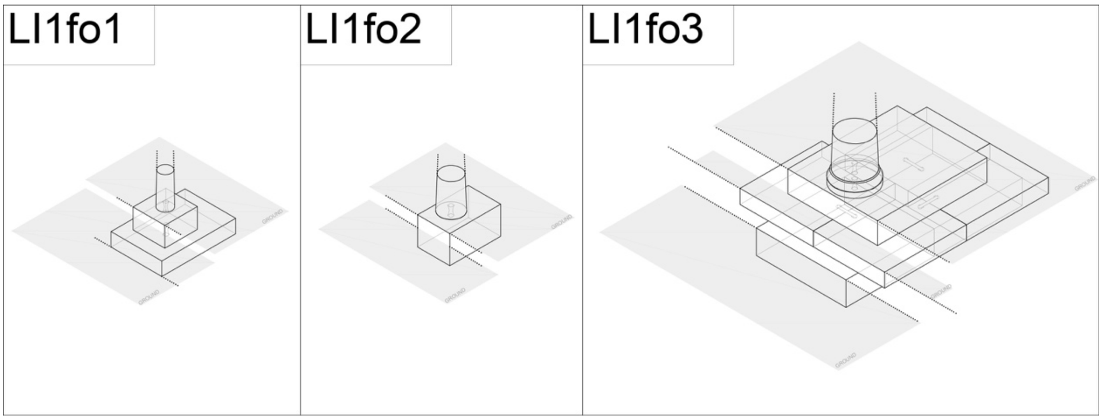

Figure 108: Types of footings in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LI1fo1)

The first type constitutes the footings under the columns which support the *mahfil* floor in the *harim* section. They are thought to have shallow foundations over the filling layer of the infrastructure. The columns sit directly on the stone blocks which also borders the one-step-raised flooring of the *yan sahın.* Under this stone block, there is supposed to be another stone block, which is larger than the upper one, in order to reach the filling level and expand the load pressure surface area. As it is mentioned before, the column shafts were most probably anchored to their bases through the dowels which are fixed with molten lead. Thus, the column shafts are assumed to be anchored to the footings by means of dowels and so the stone block to each other (Figure 109).

Figure 109: The photograph which shows the base of the column supporting the *mahfil* floor (VGM Archive, 1982)

- Type 2 (LI1fo2)

The second type is the footings under the columns which borders the north façade of the mosque and at the second arcade of the last prayer hall. They are thought to have shallow foundations over the filling layer of the infrastructure, like the previous one. Likewise, the columns also sit directly on the stone blocks which also borders the one-step-raised flooring of the second arcade (Figure 110). For this case, these stone blocks are supposed to sit directly on the filling level of the mosque. Because the height between the top level of this stone block and the filling level which is the top level of the first encasement of the mosque, only one stone block was able to be placed. Again, the column shafts must have been anchored to the footings by iron dowels.

Figure 110: The photograph showing the footing of the column of the second arcade (VGM Archive, 1988)

- Type 3 (LI1fo3)

The third type is the footings under the columns belonging to the last prayer hall's first arcade which is closer to the mosque. These columns support the superstructure over them. Thereby, they are supposed to have relatively more stable foundations. These columns sit on the column bases which also sit on the stone courses which were most probably constructed by fastening with clamps. In the old photographs, three courses of stone blocks can be seen under the column bases (Figure 111). As it is mentioned in the 2nd chapter, column shafts are anchored to column bases by iron dowels. Accordingly, the column base is thought to be fixed to the footings in a similar manner. It is important to state here that; the column bases have slight differences in their heights. These height differences are thought to be related to the precise adjustments of the heights of the columns which carry the superstructure.

Figure 111: The photograph showing the footing of the columns of the first arcade (VGM Archive, 1950s)

4.1.1.2. Upperstructure

Upperstructure includes the building components above the ground level until the level where the curvilinear components and the roofing structures of the superstructure start. Thus, the components of the upperstructure are the floors (U1f); supporting members such as walls (U1w), piers (U1p) and columns (U1c); and spanning members such as arches (U1a), vaults (U1v), slabs (U1sl) and staircases (U1st).

Floors

Floors are defined as the walkable surfaces which sit on the ground level of the buildings. Thus, ground floors grouped in two types related to their construction technique arisen from their locations (Figure 112)(Catalogue 1.4.U1f).

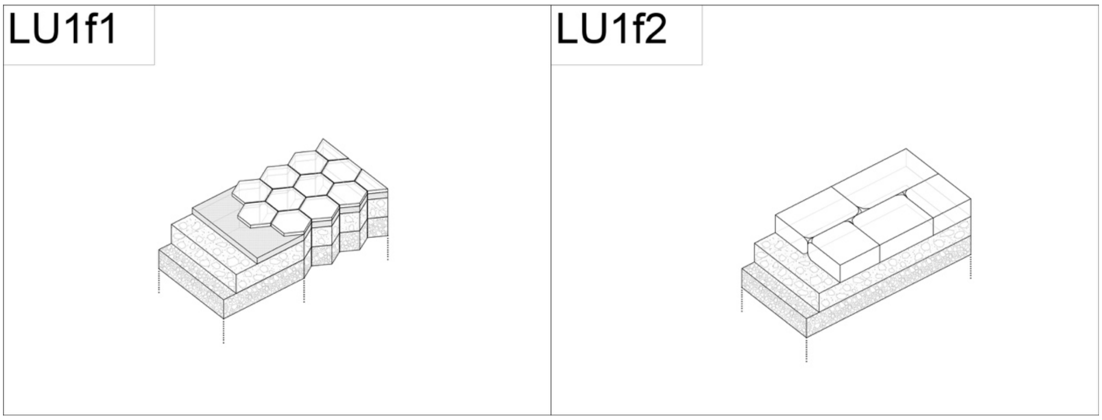

Figure 112: Types of floors in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU1f1)

The first type of the floors is the ground floor inside the *harim* section of the mosque. By taking into account the discussions related with the floors in the subchapter 2.3, it can be said that the floor construction starts with the level of the first encasement. The height interval, between the top of the filling layer of the infrastructure and the floor covering, is supposed to be packed with horasan mortar filled with rubble stone. The floor covering units are thought to be pinned down into this thick mortar layer, which should provide a levelled base.

Figure 113: The photograph showing the floor coveting of the *harim* section (VGM Archive, 1982)

As it can be seen in the old photograph above (Figure 113), the floor covering material is the *şeşhane* bricks; whereas there are stone coverings in the *yan sahın* and strips of stone coverings that can be observed in line with the columns. It is necessary to note Dr. Gülsün Tanyeli's oral explanations here. She suggests that the floor laying, constructed by pining down into a thick mortar layer, might be also consolidated by the timber grillage (*iskare)* to set a uniform base.

- Type 2 (LU1f2)

The second type of the floors is ground floor of the last prayer hall. The raised floor of this hall was constructed by being bordered by stone blocks which encapsulate the filling composed of mortar filled with rubble. The edges of these floors were most probably constructed with stone blocks which were laid on top of each other and fastened by iron clamps, as it is seen in the Havsa case (Figure 107). The surface between these stiff edges and the mosque's north wall is supposed to be entirely covered with stone plates pinned in the mortar layer (Figure 111). Likewise, the rest of the floor is also covered with stone plates pinned into the mortar layer (Figure 114). It is important to add here that, Bakırer (1996, p. 45) states that there is a maroon coloured disc placed on the floor of the second arcade on the entrance axis.

Figure 114: The photograph showing the floor covering of the last prayer hall (VGM Archive, 1950s)

Walls

The walls are the supporting members which are defined as above-ground load bearing elements enclosing the interiors spaces. Theses masonry walls which transfer the load directly to the foundation are mainly constructed with fine-cut stones. According to their construction technique, the walls are grouped in three types (Figure 115) (Catalogue 1.4. U1w).

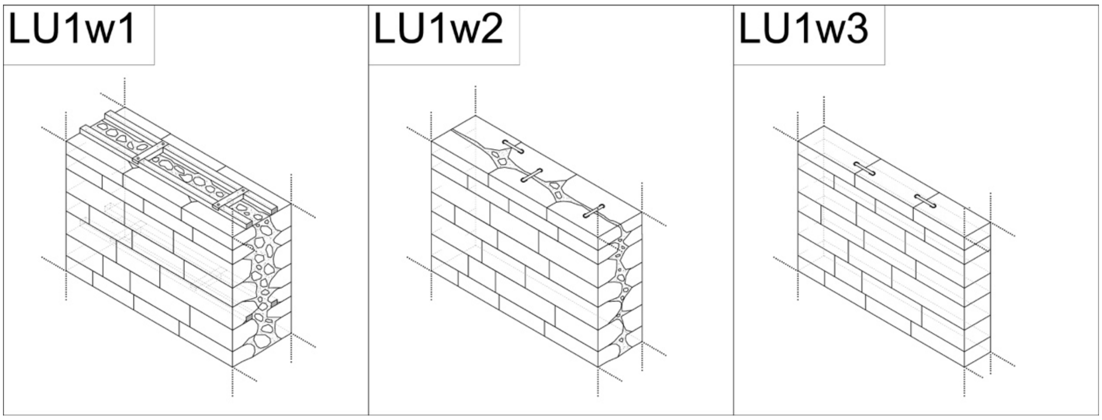

Figure 115: Types of walls in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU1w1)

The first type of the walls is the main walls of the *harim* section of the mosque. These walls were constructed with two faces composed of fine-cut stone blocks which were laid up in masonry fashion with adjacent jointing and then, the space between these faces was filled with rubble stone and pieces of stone and brick adhered by *horasan* mortar. As it is discussed previously, these stone blocks were dressed fine on full front face and their four lateral faces and roughly shaped on the rear face inside the wall. These rectangular prism stone blocks, with roughly shaped rear faces, supposed to penetrate about 30-45cm towards the inside of the wall by creating an adhesive texture. Accordingly, the lateral faces, which meet adjacently, are supposed to be dressed fine about in 15cm depth towards the inside of the wall. On the front faces, the height and the length of the stone blocks vary between 20-43cm, but the height of the stone blocks on the same row are the same. Thus, it can be said that the walls were built up in pseudo-isodomic masonry. Besides, the jointing levels on the exterior and interior façades of the walls do not correspond to the same level, which is a thought-provoking issue. They only correspond at the level of the tie beams which can be observed inside the window and door openings. So that, the levels of the tie beams, which fasten two faces of these walls, can be checked (Figure 116).

Figure 116: The photograph showing walls of *harim* section (By the author, 2015)

- Type 2 (LU1w2)

The second type of the walls includes the walls of the last prayer hall and the walls of the prismatic mass including stairs to *mahfil* floor, on the north-east corner. Like the first type, these walls were also constructed with two faces composed of fine-cut stone blocks which were laid up in masonry fashion with adjacent jointing. The distinction of this type is the thickness of the wall, which allows for two face stones with mortar infill between them. Additionally, the iron clamps, which can be seen through the openings, were used to fasten the stone blocks together with the mortar (Figure 117).

Figure 117: The wall of the mass including the staircase leading to the *mahfil* floor (By the author, 2016)

- Type 3 (LU1w3)

The third type can be observed on the walls of the weight towers, the south wall of the space above the *mahfil* stairs and the walls over the arches of the last prayer hall's second arcade facing to the courtyard. These walls are simply composed of single stone blocks which were laid on top of each other with adjacent jointing. The same stone block is able to be followed both from outside and inside. These stones blocks, which are on the same course with the same height, are thought to be fastened with iron clamps. On the deteriorated wall surfaces, where the stone pieces were broken off, the iron clamps can be observed (Figure 118).

Figure 118: The wall of the weight tower fastened by iron clamps (By the author, 2015)

Piers

There are four piers in the Lüleburgaz Sokullu Mehmed Paşa Mosque. Two of them which are on the south corners of the mosque are the mirror symmetry of each other; whereas the other two are distinct. The pier, at the north-west corner and adjacent to the minaret base, includes the entrance and the staircases of the minaret. Thereby, this pier is supposed to be co-constructed with the minaret. Subsequently, the pier, at the north-east corner of the mosque, is also thought to be built together with the entrance and the staircases of the *mahfil* floor. Although, these four piers' mass configurations change due to the openings and volumes inside, the construction technique of these piers are the same. Therefore, the piers are grouped in a single type (Figure 119) (Catalogue 1.4. U1p).

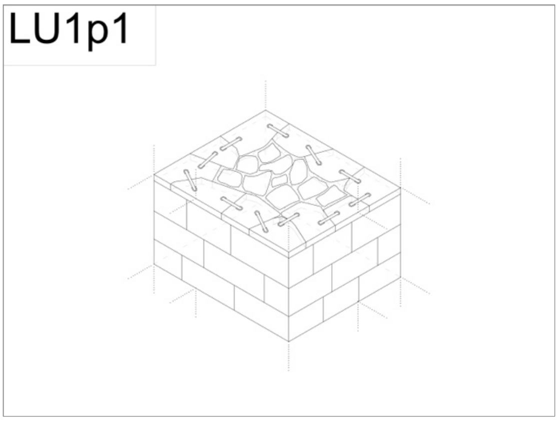

Figure 119: Types of piers in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU1p1)

As it is mentioned in the chapter 2, the piers are the stone masonry structures built by the same technique with the fine-cut masonry walls. Thereby, these structures are suggested to be constructed with facing cut-stone courses of which the inside is packed with roughly shaped stones blocks adhered with *horasan* mortar.

Figure 120: The floor of the weight tower and the top level of the pier at the north-west corner. The stones, having the form of irregular polyhedron, engaging to each other, and fastened with clamps can be observed (By the author, 2015).

The construction technique of these piers is interpreted, by taking into account the information conveyed by Kılıççöte, who is introduced above. The facing stones of these piers are thought to be the large irregular polyhedrons engaging to each other and fastened with clamps (Figure 120). Besides, whatever the cross section of the pier is, the facing stones or surfaces are suggested to encase the interior infill of the piers. Thus, the arches, against which the piers abut, constitute the facing surface of the piers inside the mosque. Additionally, like the walls, the tie beams, which brace the entire structure at certain height intervals, are also supposed to penetrate into the piers, as only then the mosque is thought to behave as an entire structure.

Columns

Columns are the slender single supporting members of the mosque. They are composed of a base as a footing, a cylindrical monolithic marble or granite shaft and a marble stalactited or *baklavalı* capital. The bases as footings of the columns are discussed previously in the infrastructure topic. Thus, here, the evaluation about the construction technique of the columns of the mosque include the column shafts and the capitals and it is assessed in one type (Figure 121) Catalogue 1.4. U1c).

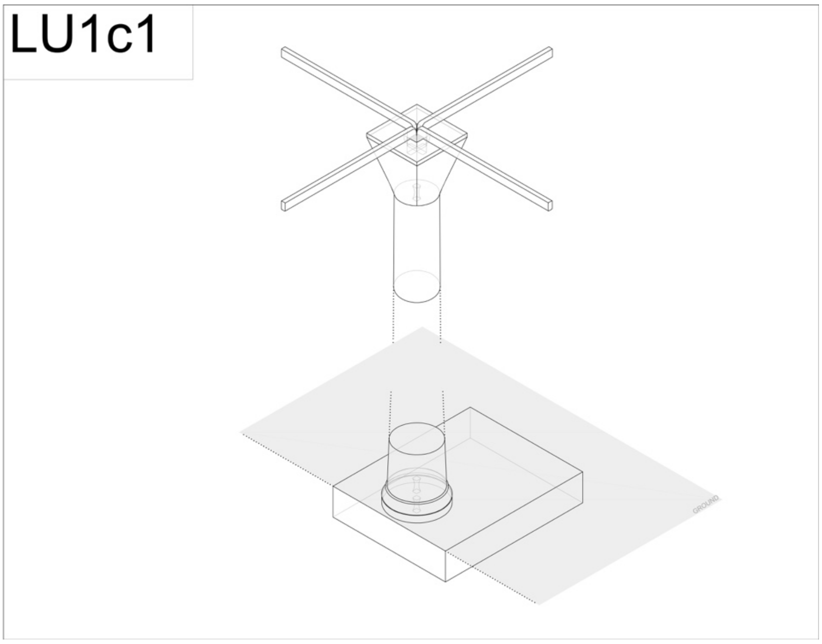

Figure 121: Types of columns in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU1c1)

The columns are located in a row carrying the arches above and constituting arcades. These rows of columns border two *yan sahın*s of the *harim* section and constitutes two arcades of the last prayer hall. Most of the column shafts are made of marble, except the granite ones which are on the north façade, on two sides of the entrance axis. Subsequently, the capitals of the second arcade's columns are *baklavalı*; whereas the others are stalactited. Consequently, there are columns shafts in different sizes and materials and different types of capitals, however the construction technique does not change. Accordingly, the columns are classified in one group. As it is discussed previously, it is a well-known issue that the capitals are anchored to the columns by iron dowels and molten lead.

Additionally, the columns of the arcades are braced by iron tie bars by means of the column capitals at the impost line level of the arches above (Figure 122). These iron tie bars, which are for resisting the thrust of the arch and connect the entire system, were folded down and placed in the gap drilled in the column capital and fastened with molten lead. Additionally, the gaps are supposed to be fastened with iron rings (*simit*), which circle the gap top and the capitals are fastened with iron rings which circle the capital top in order to have a steadier capital as impost block. Additionally, as it is discussed previously, it is a well-known issue that the capitals are anchored to the columns by iron dowels and molten lead.

Figure 122: The iron tie bar of the Havsa Sokullu Mehmed Paşa *Hamam*'s arcade (By the author, 2015)

Arches

Arches are defined as the spanning members which span over spaces by excluding the arches which span over the openings in the walls. The arches spanning the openings are discussed in the subtopic of the architectural elements. Thereby, the arches of the mosque are classified in three types (Figure 123) (Catalogue 1.4 U1a).

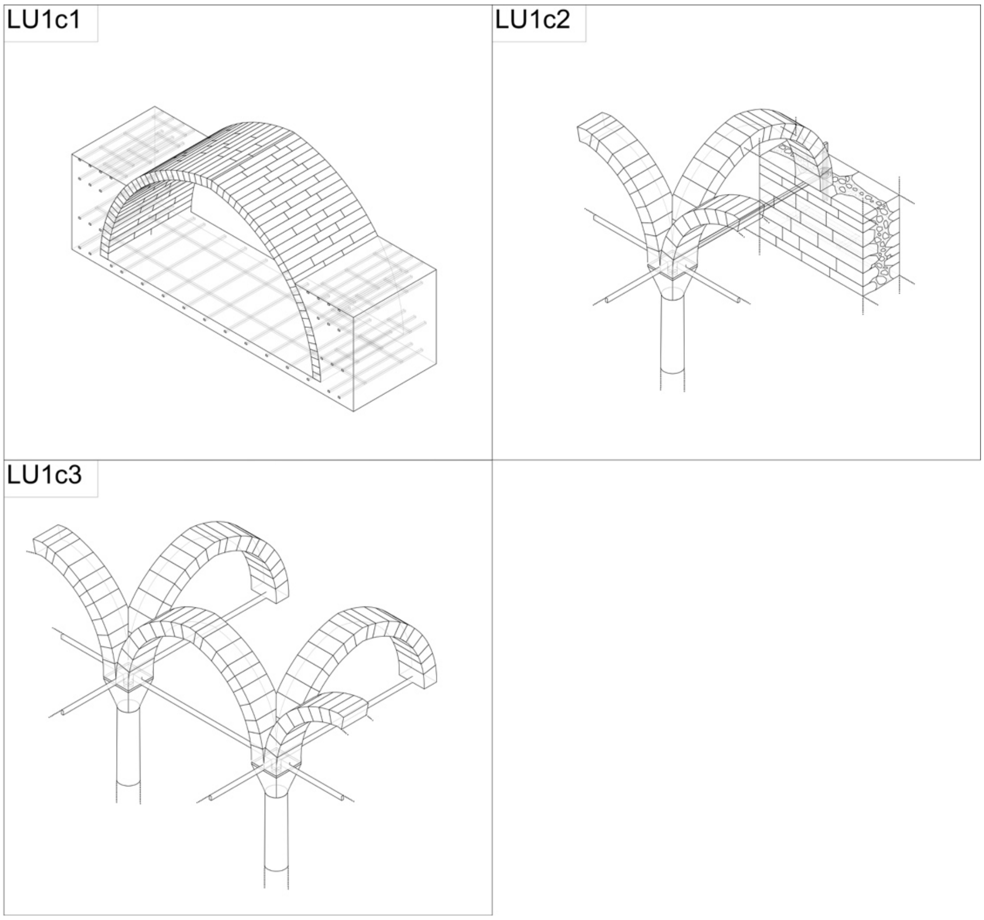

Figure 123: Types of arches in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU1a1)

The main arches which support the mosque's dome on four sides with 12m span are the first type of the arches. As it is discussed in the chapter 2, the arches, spanning large openings and supporting heavy structures, are most probably constructed with stone blocks due to the structural necessities. In addition, it is suggested that the voussoirs of these arches are supposedly jointed with iron dowels fastened with melted lead. Besides, the widened main arches might be composed of more than one stone block on the same course. Therefore, these voussoirs are thought to be fastened with iron clamps in order to have regular radiating courses of stones. Furthermore, in order to maintain the thrust developed in these arches, the piers, mentioned above, act as abutments. Whereas it is not possible to determine or interpret whether there are iron tie bars, passing through the walls and the slabs which are on the impost line level of these arches. However, it is supposed that the suggested tie beams of the walls and the timber grillages of the slabs might provide resistance to withstand the tension force developed in these arches.

- Type 2 (LU1a2)

The second type and the third type are the arches of the last prayer hall's arcades and the arches in the *yan sahın*s of the *harim* section (Figure 124). They are constructed with stone blocks. The difference between these two is the supporters of these arches. The second type includes the arches which are supported by a column on one side and by a wall on the other side. The arch's impost stones and the skewbacks[125] of the side, where the wall is, are laid within the walls. Whereas, on the other side of these arches the impost stones are the capitals of the columns and the skewbacks can be entirely seen.

[125] Skewback: arch's last stones which sit horizontally over the impost stone and act as a kneeler by means of their bevelled or inclined form on their one face. Besides, kneeler is the stone which is cut to provide a break in the vertical-horizontal orientation to begin the curve or angle of the arch and vault. (Licker, 2003, p. 504, 314)

Figure 124: Arches of type 2. The photo on the left is from the last prayer hall (by the author, 2015). The photo on the right is from the *yan sahın* on the east side (by the author, 2014)

The tie bars, which are for withstanding the thrust, maintaining the arch form and preventing the collapse of the arch, are anchored in different ways in these supports. On the side, where the column is, the tie bar is supposed to be folded down, placed in the gap drilled in the column capital and fastened with molten lead. The gap, in the column capital, is supposed to have an iron ring at the top in order to strengthen the anchorage. On the other side, the tie bar is suggested as penetrating in the wall, folding over and another linear vertical iron bar (*kılıç*) being inserted in this fold and the wall (Figure 122).

- Type 3 (LU1a3)

The third type includes the arches which are supported by two columns on two sides (Figure 125). The construction and the configuration of the supporting components are the same for both sides of these arches. These arches' supporters, which are the column on both sides, are similar to type two. The impost blocks are the capitals of the columns and the skewbacks can be entirely seen. Besides, the skewbacks of these arches may provide supporting for two, or three arches coming from any four directions and sitting on the same column. Thus, two or three arches may meet on the same column on their one sides; if so, their tie bars are folded down, placed in the same gap drilled and fastened with molten lead in the column capital.

Figure 125: Arches of type 3. The photo on the left is from the last prayer hall (by the author, 2015). The photo on the right is from the *yan sahın* on the west side (by the author, 2014)

Vaults

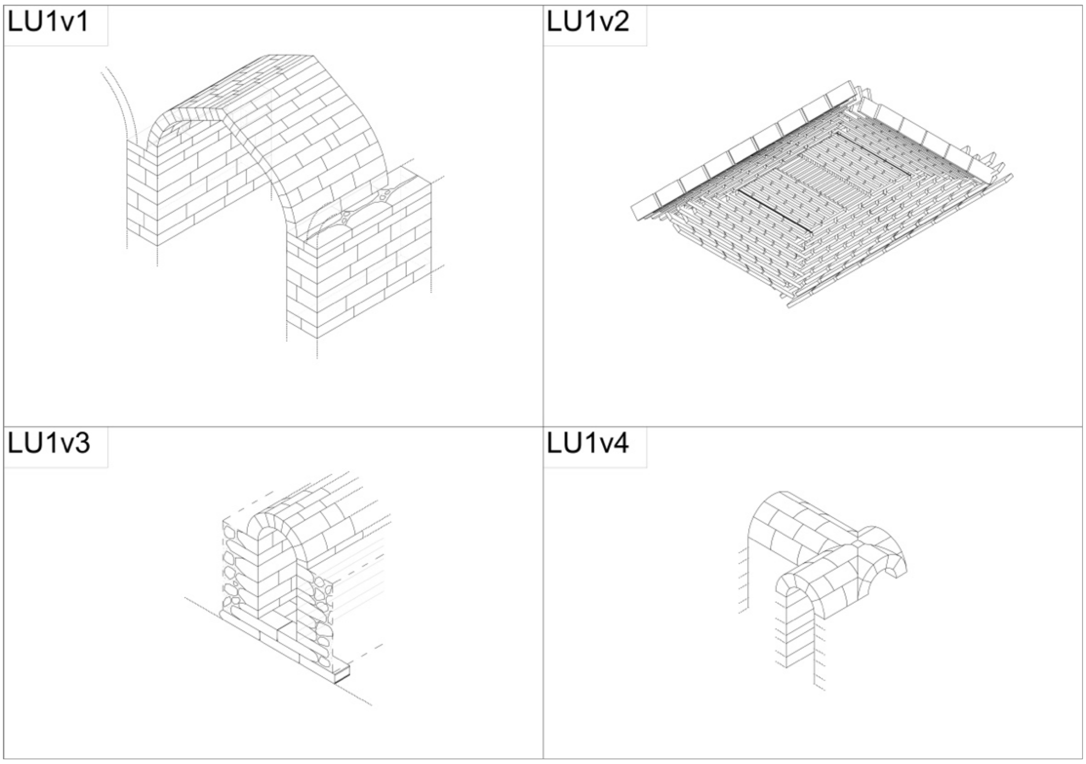

Figure 126: Types of vaults in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

Vaults, belonging to the upperstructure, are defined as the spanning members which span over spaces and/or support the slabs of the *mahfil* floor. Therefore, there are four types of vaults two of which support the *mahfil* floor and the other two span over the passageways (Figure 126) (Catalogue 1.4 U1v).

- Type 1 (LU1v1)

The first type of the vaults is the barrel vaults which are adjacent to the north wall of the *harim* section and carry the *mahfil* floor (Figure 127). There are three barrel vaults which constitute three iwans with an entrance iwan at the center. These vaults were constructed with stone blocks with radiating joints. They are supported with masonry walls and they transfer the load of the upper *mahfil* floor to these walls. Besides, it can be seen that each course of these vaults is composed of more than one stone block. These consecutive courses were constructed by paying attention not to align the vertical jointings between these stone blocks. Moreover, these stone blocks are thought to be fastened with iron clamps on the extrados in order to have regular radiating courses of stones.

Figure 127: Vaults of type 1. On the left the entrance iwan, on the right the east iwan (by the author, 2014).

- Type 2 (LU1v2)

The vaults which span over the *yan sahın*s and carry the *mahfil* floors on the sides are the second type (Figure 128). On both sides of the *harim* section, there are four vaults with shouldered profile. These vaults are supposed to be constructed with brick, as it is explained in the chapter 2. Again, as it is mentioned before, iron beams might have been used in order to strengthen these brick masonry structures. Thus, taking into consideration the depressed profile of these vaults, they are supposed to be supported with iron beams placed in the courses of the bricks. Furthermore, again due to the depressed profile of the arches, the first brick courses, where the vault profile springs, lean on the skewbacks with an almost right angle.

Figure 128: Vault of type 2. (by the author, 2014)

- Type 3 (LU1v3)

The third vault type is the barrel vaults which span over the passageway to the staircases leading to the *mahfil* floor on the north-east of the mosque. These barrel vaults were constructed with stone courses with more than one large block as the first type. They void the pier at that corner, pass over the load of the pier towards the side walls and provide a narrow passageway to the staircases (Figure 129).

Figure 129: Vaults of type 3. (by the author, 2016)

- Type 4 (LU1v4)

The fourth type includes the vaults spanning over the L shaped passageways on the second floor, *mahfil* floor (Figure 130). These passes are in the piers at the north-east and north-west corners of the mosque. Therefore, these vaults withstand tons of loads with their large stone blocks. Due to the L shaped plan of the passageways, the vaults intersect at the corner in a manner of a cross vault.

Figure 130: Vaults of type 4. (by the author, 2016)

Slabs

The slabs are defined as load bearing elements, which span over spaces and provide a walkable surface above on the upper floors. Two types of slabs are identified in the Lüleburgaz Sokullu Mehmed Paşa Mosque (Figure 131) (Catalogue 1.4 U1sl)

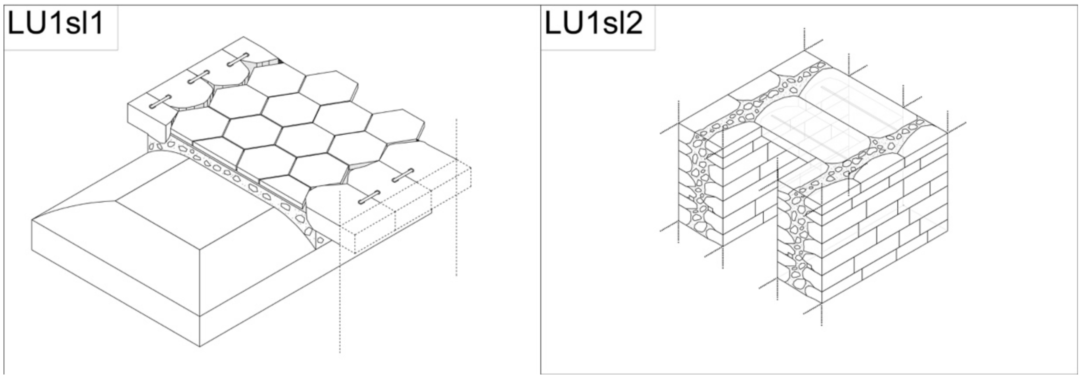

Figure 131: Types of slabs in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU1sl1)

The slabs which are carried by vaults constitute the first type of the slabs. These slabs belong to the *mahfil* floor on the west, north and east side of the mosque. Although there are two different types of vaults mentioned above, the construction technique of the slabs over these vaults does not change. Thereby, these slabs evaluated as the same type (Figure 132).

Figure 132: The slab of the *mahfil* floor. (by the author, 2016)

Over these vaults, there is supposed to be a filling layer composed of rubble filled *horasan* mortar and fastened with timber grillage. This timber grillage is suggested based on the information conveyed from Bayraktar and Tanyeli about layering the structure at certain height intervals in the chapter 2. These rectangular planned floors were constructed by being bordered at the long edges by stone blocks which encapsulate this filling. The long edges of these rectangular floors were constructed with stone blocks which were laid on top of each other and fastened by iron clamps, as seen in the (Figure 132). The surface, between these stiff edges and the mosque's main arches, were covered brick (*tuğla-ı şeşhane*[126]), by embedding them in this mortar bedding, again seen in the same figure.

- Type 2 (LU1sl2)

The second type slabs consist of large flat stone blocks (*düz atkı*) acting as lintels sitting directly on the walls with fixed supports at their two edges. This type of slabs is encountered at the north-east corner of the mosque.

Figure 133: The stone slabs which are supported by auxiliary iron beams (by the author, 2016)

[126] The dimension between opposite edges of these bricks is 46,5cm. Thereby, regarding the standardized dimensions of these bricks in the 16th century Ottoman Architecture, bricks indicate that they are the *kebir* (bigger) ones,

These slabs span over the staircases at that corner and provide a floor for the space above these staircases. In addition, the auxiliary iron beams, which were adhered underlying surface of this flat stone blocks, are supposed to be for supporting these single stone blocks. As it can be seen in the (Figure 133), the long surfaces of these auxiliary beams were placed parallel to these blocks.

Additionally, these stone blocks are also fastened with iron clamps on their upper surfaces (Figure 134). The iron clamps which were bonded to the stones by melted lead can be seen on the floor surface of the space on the north-east corner.

Figure 134: The floor surface of the space which is over the staircases at the north-east corner of the mosque (by the author, 2015)

<u>Staircases</u>

In the mosque, there are two types of staircases, which span over the spaces. They are the staircases of the minaret and staircases leading to the *mahfil* floor (Figure 135) (Catalogue 1.4 U1st).

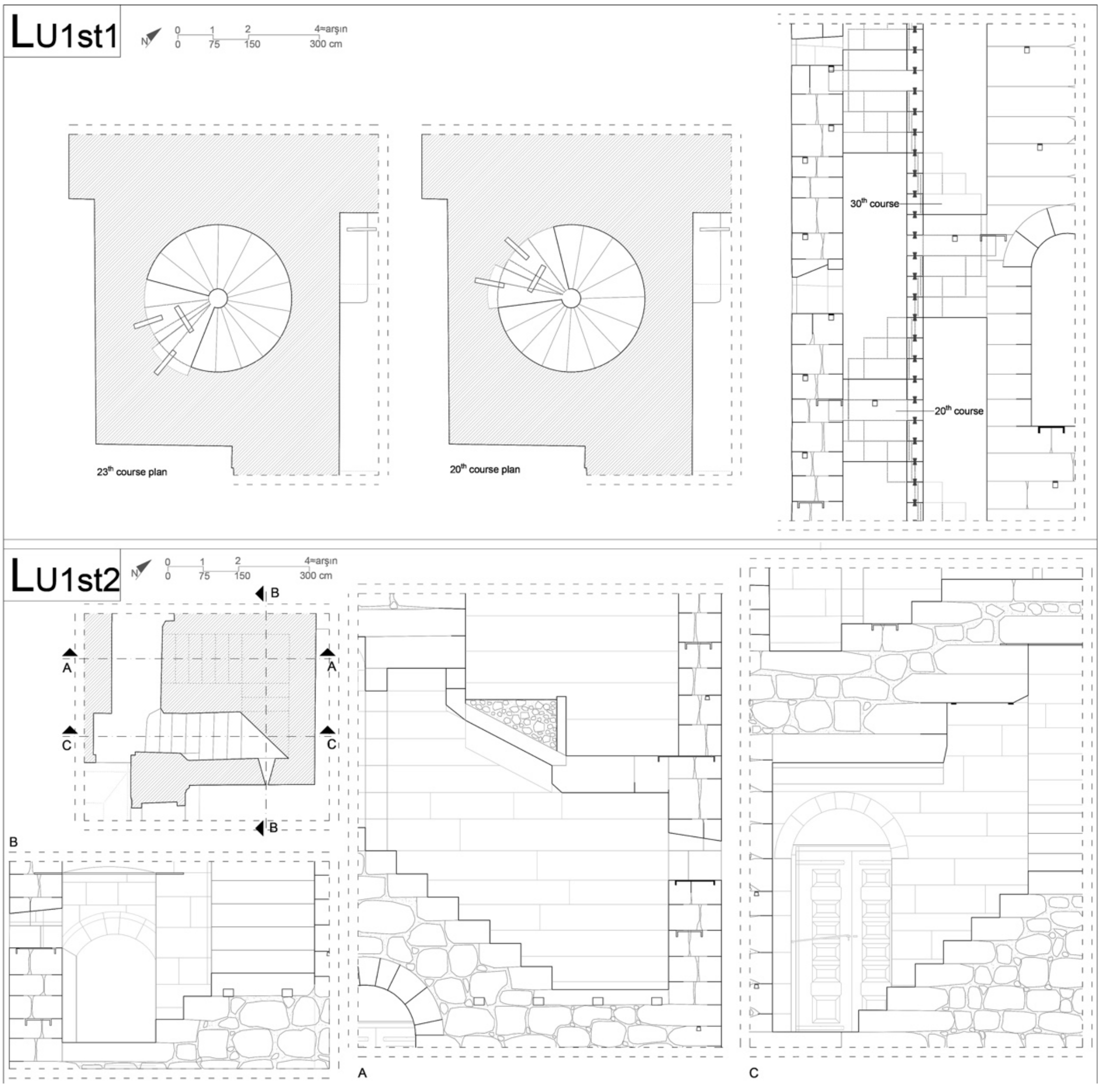

Figure 135: Types of staircases in in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU1st1)

The first type is the minaret's staircases which are the special cases, as it is explained in the Chapter 2. By reflecting upon the explanations presented in chapter 2, it can be said that the minaret staircases are composed of courses. The courses of the mosque's minaret have steps with cores and steps without cores (*yedekli basamak*). It can be followed by measuring the height difference between the top and bottom faces of the same step. Furthermore, the last step of which the top surface can be observed indicates that there are spare steps (steps without cores) in the courses (Figure

136). It is important to note down that, the minaret was reconstructed after the WWI; whereas the construction technique of these courses was maintained the same. Therefore, these courses penetrate into the wall and are fixed with clamps to the stone laying of the minaret walls. The steps with cores come on top of each other and are placed directly over the core of the step below and anchored with dowels.

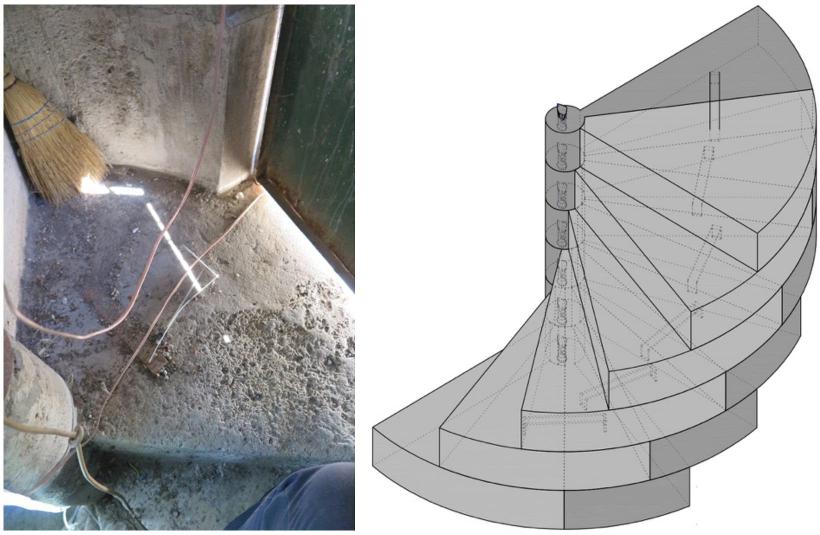

Figure 136: (Left) One course of the minaret's staircases (by the author, 2015). (Right) the model of the courses (by the author)

- Type 2 (LU1st2)

The second type of the staircase is the one leading to the *mahfil* floor and the space at the north-east corner of the building. The steps of the staircase leading to the *mahfil* floor rest directly on the filling layer which is supposed to be composed of *horasan* mortar filled with rubble stones. Since, the staircase, which have three steps, spans over the space below and provides entrance to the space over the staircases. These steps are carried by the walls on two sides by penetrating and fixed in the wall courses, like the stone slabs. Likewise, it can be observed that they were fastened with iron clamps on their upper surfaces (Figure 137).

Figure 137: The steps provide entrance to the space over the staircases at the north-east corner of the mosque (by the author, 2015)

4.1.1.3. Superstructure

Superstructure is defined as the constructions containing curvilinear transition elements, the covering members and all sorts of roofing structures which shelter the upperstructure. Thereby, the components of the superstructure are the pendentives (S1p) as transition elements; covering members such as domes (S1d), domical vaults (S1dv), vaults (S1v) and timber roofing (S1r).

Pendentives

In the Lüleburgaz Sokullu Mehmed Paşa Mosque, pendentives were used as transition elements. There are two types of pendentives in the mosque one of which support the main dome of the *harim* section and the others support the domes, covering the last prayer hall’s first arcades (Figure 138) (Catalogue 1.4 S1p).

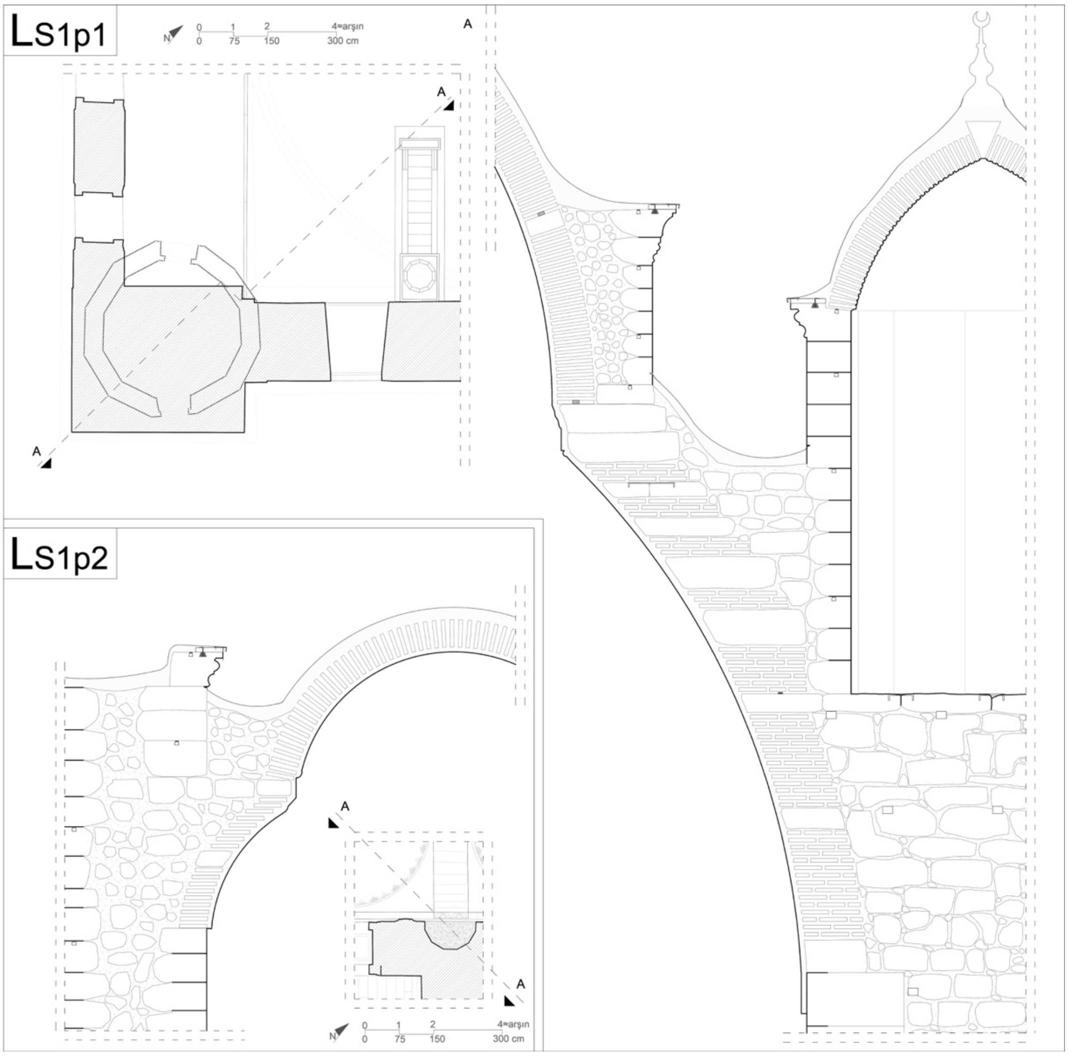

Figure 138: Types of pendentives in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LS1p1)

The first type of the pendentives are the transition elements of the main dome that covers the main prayer hall (harim) of the mosque. These pendentives distribute the load of the dome towards the main arches. The pendentives are thought to be constructed with corbelled courses of alternating rows of brick and stone blocks. It is interpreted based on the old photographs of the *dua kubbesi* which have nearly similar diameter with the main dome of the mosque (Figure 139). Moreover, in the light of the information got from Tanyeli, it is supposed to be fastened with tie bars approximately at the half height over the stone courses. As it is seen in the photograph below (Figure 139), the corbelled brick and stone courses of the pendentives were placed over two rows of brick laying on the extrados of the main arches. This is most probably for providing an appropriate bedding for the corbelled courses of the pendentives. The back infill, between the pendentives and the weight towers' walls, is thought to possibly contain terracotta pots (*sebû*); whereas due to the scarcity of the knowledge about their forms and lack of examples it cannot be configured.

Figure 139: The pendentives of the *dua kubbesi* (VGM Archive, 1984)

- Type 2 (LS1p2)

The second type of the pendentives include transition element which convert the square plan of the first arcade's unit spaces of the last prayer hall to a circular plan. These pendentives were mainly constructed with brick as it is seen in the photograph below (Figure 140); whereas one row of stone can be observed among the corbelled courses. The back fill between these pendentives and the north wall, facing to the *harim* section, are supposed to be packed with *horasan* mortar filled with rubble stones as it can be seen in the photographs showing the other mosques of Sokullu Mehmed Paşa (Figure 140).

Figure 140: (Left) The pendentive and the dome of the last prayer hall in Lüleburgaz Sokullu Mehmed Paşa Mosque (VGM Archive, 1950s); (Mid) The back fill of the pendentive of Havsa case (VGM Archive, 1980s); (Right) Demolished pendentive and dome of the last prayer hall in Payas case (VGM Archive, 1984).

Domes

Domes are the main covering members of the mosque. The main prayer hall (*harim*) and the unit spaces of the last prayer hall's first arcade, except the entrance unit, are covered with domes. Therefore, there are two types of domes in the mosque. (Catalogue 1.4 S1d)

- Type 1 (LS1d1)

The first type of domes is the main central dome of the *harim* section of the mosque (Figure 141). This dome is supposed to be constructed with bricks with special dimensions. The photograph, which was taken during the restoration process of the Lüleburgaz Sokullu Mehmed Paşa *Hamam*'s dome in 2012, show that these bricks were used for constructing the main domes of the complex in Lüleburgaz.

Figure 141: The special brick which belongs to the demolished dome of the Lüleburgaz Sokullu Mehmed Paşa Hamam (Lüleburgaz Municipality Archive, 2012)[127]

This dome which should have been constructed with temporary timber formworks, sits on a circular base provided by an inner drum and it is circumscribed by an outer drum. The inner drum, which is suggested as rows of stone blocks, provides an adaptation band between the main arches with pointed profile and the dome with circular profile. The outer drum, of which the outer face was constructed with stone masonry probably fastened with iron clamps, restrains the tensile stress occurred in the tension zone of the dome. Accordingly, the infill between the dome and the drum's facing stones were offered as *horasan* mortar filled with rubble stone (Figure 144).

Figure 142: The circular plaster cracks which may indicate the level of the tension ring (VGM Archive, 1982)

[127] Taken directly from page 14 of the technical report of material analysis of Lüleburgaz Sokullu Mehmed Paşa Hamam. This technical report, which had been submitted to the Lüleburgaz Municipality in 2016, is obtained from Directorate of Technical Works in Lüleburgaz Municipality.

In addition to the outer drum in the same zone, in between the dome courses, iron tension rings are suggested to resist the hoop tension (Figure 142). The levels of these tension rings are proposed based on the information explained in the Chapter 2. They are supposed to be placed on the impost level and at the level where the outer drum top is (which may be the level of *kafa tahtası*[128]) (Figure 143).

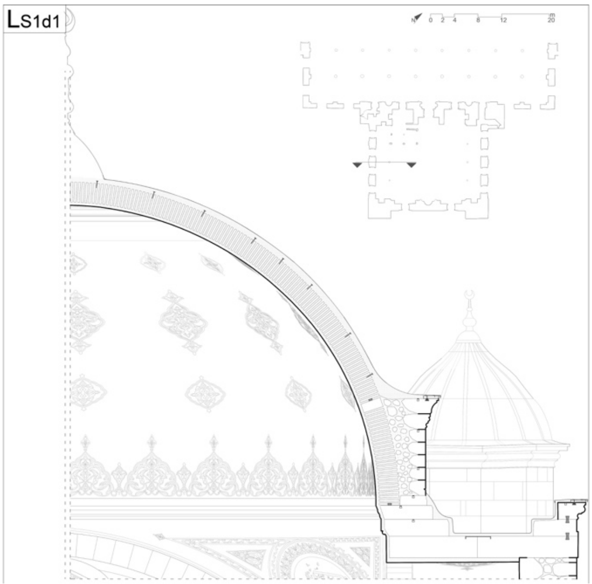

Figure 143: Type 1 of domes in in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

Figure 144: The top surface of the drum of the Lüleburgaz Sokullu Mehmed Paşa *Hamam*'s dome during the restoration process. Photograph showing the clamps some of which were changed with new ones. (Lüleburgaz Municipality Archive, 2013)

[128] For further information about *kafa tahtası* see Chapter 2. Section 2.2.

- Type 2 (LS1d2)

Domes of type two include the domes covering the unit spaces belong to the first arcade of the last prayer hall (Figure 140). They are the smaller ones built up with brick with depressed profiles (Figure 146). They most probably resist the hoop tension occurred in the tension zone by leaning on to each other or leaning on the north wall of the mosque; whereas on sides where these domes are exposed to out, stone masonry abutments were constructed. These abutments can be observed on the north, east and west façades of the mosque.

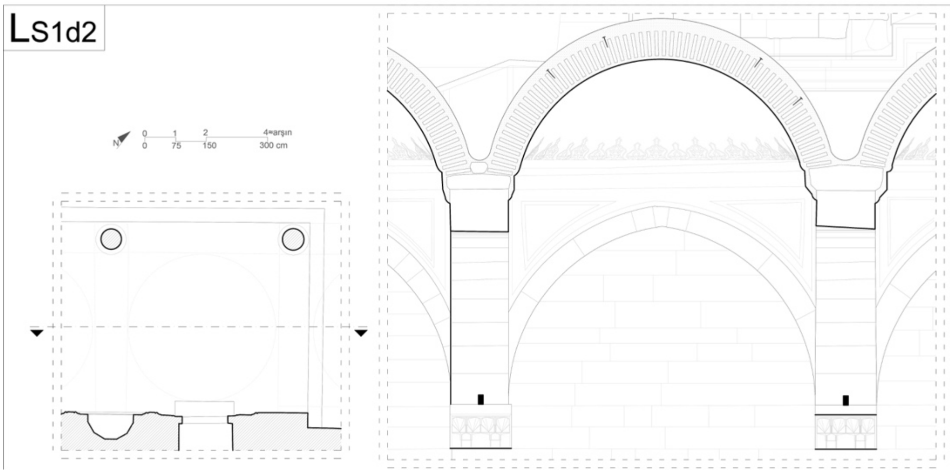

Figure 145: Type 2 of domes in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

Figure 146: The domes from the minaret (by the author, 2015)

Domical Vaults

Domical vault is defined as a component of superstructure which was constructed in the manner of a cloister vault. Since these cloister vaults are composed of six way intersecting vaults with pointed profile, they seem like a conic dome (Figure 148). Therefore, they are named as domical vaults and classified as an element between the domes and vaults (Figure 147) (Catalogue 1.4 S1d)

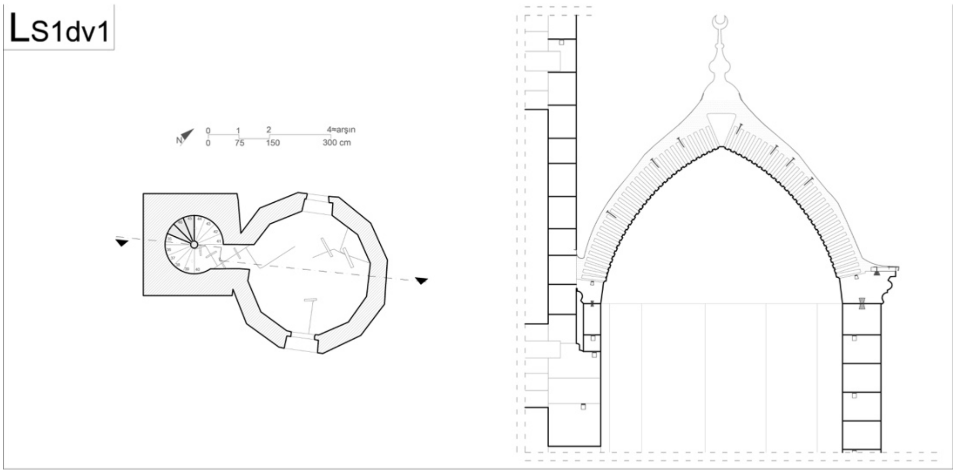

Figure 147: Domical vault in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

Figure 148: The domical vault covering the weight tower at the north-west corner (by the author, 2015)

- Type 1 (LS1dv1)

The domical vaults are the covering members of the weight towers at the four corners of the mosque. They were composed of brick masonry vaults springing from twelve top edges of the weight towers' walls (Figure 148). These vault segments meet at the top and a keystone was placed at the crown. In addition, the recessed mortar jointings give clues about the construction process of these domical vaults. They are supposed to be constructed without a formwork.

Vaults

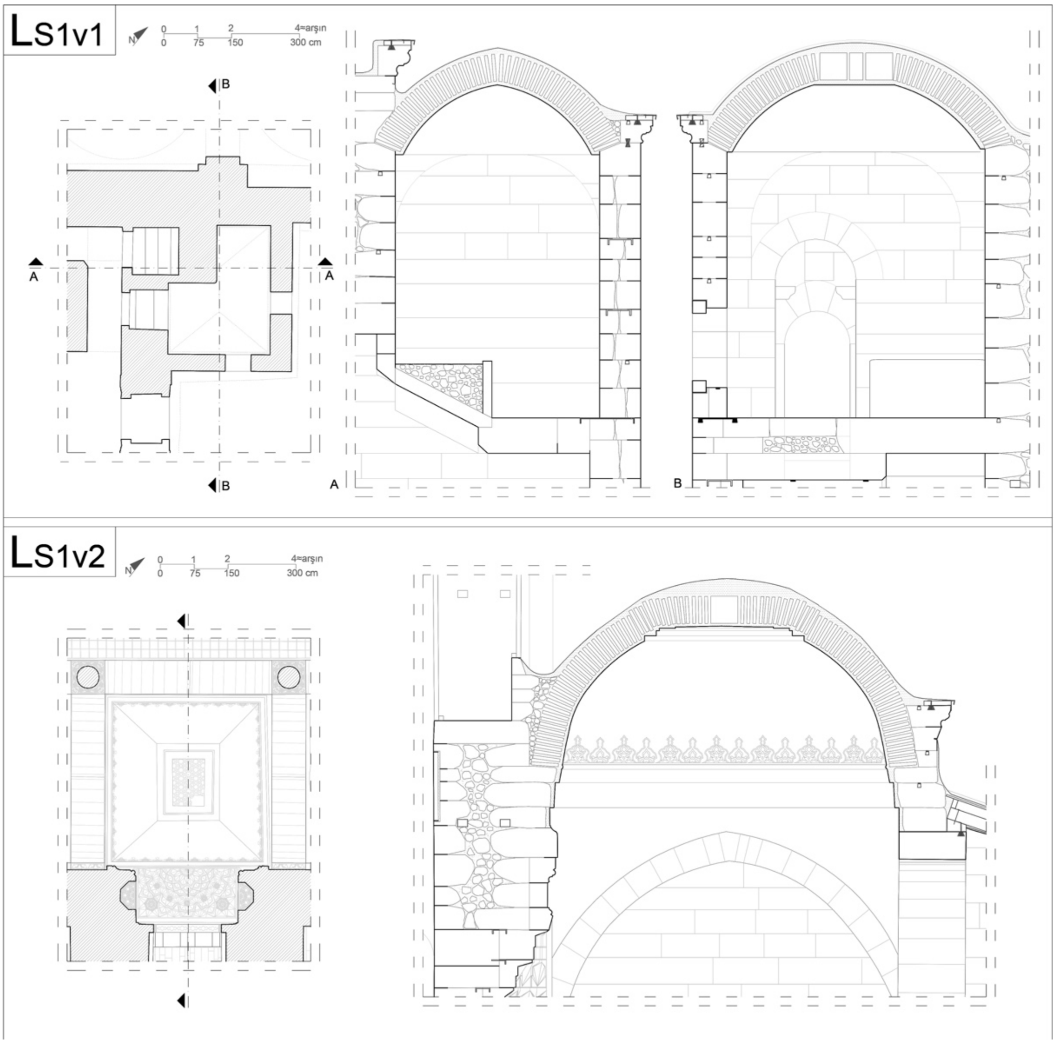

Figure 149: Types of vaults in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

The vaults are encountered as covering members over the entrance unit of the last prayer hall's first arcade and over the space on the north-east corner of the mosque. Thus, there are two types of vaults used as a superstructure in the mosque (Figure 149) (Catalogue 1.4 S1v)

- Type 1 (LS1v1)

The fist type of vaults is the covering member of a secondary space over the staircases on the north-east corner of the mosque (Figure 150). This vault is a cloister vault which is supposed to be constructed with brick masonry by means of a timber formwork. As it is discussed in the chapter two, this cloister vault was constructed as two barrel vaults springing from two perpendicular walls of rectangular space underneath. These vaults intersect perpendicularly and create diagonal concave recess at the junctions; whereas due to the rectangular planned space below, one of these vaults, which springs from the long edges of this space create a linear recess at top. In addition, the first brick courses of these vaults are supposed to be leaned on the inclined surfaces of the stone skewbacks on the walls. It is important to say here that, the traces of pendentives, on the walls at the upper corners of this space, cast doubt on the originality of this superstructure.

Figure 150: The cloister vault covering the space over the staircase leading to the *mahfil* floor (by the author, 2015)

- Type 2 (LS1v2)

The second type of the vaults is the one with shouldered profile. This vault covers the entrance unit of the last prayer hall. It is supposed to be constructed like the cloister vaults with a flat surface (*ayna*) at the topmost. This topmost flat brick layer is supposed to be constructed by laying the bricks in vertical direction with slight radiating *horasan* mortar jointing. In addition, the brick course, in the middle, is suggested to be placed perpendicular to the rest, because it is thought to act as a keystone at the crown (Figure 151). Furthermore, this vault is slightly raised in order to enhance the entrance unit. This stilted vault is supposed to rest on the corbelled rows of stone units which also serve for reducing the span. Like the domes of the first arcade, in order to restrain the thrust, this covering member is also supported by the north wall of the mosque and by the flanking domes; whereas on the exposed sides, an abutment out of stone masonry serve for this purpose.

Figure 151: The reconstruction process of the vault with shouldered profile in Süleymaniye Rabi *Medresesi* by using traditional materials and techniques (Archive of Sayka Construction and Architecture, 2008)

Timber Roofing

The roofing structures which are composed of timber skeleton system are defined as the timber roofing. This skeleton system, which is composed of linear timber elements such as purlins, rafters, joists, masts and braces, was used for covering the secondary arcade of the last prayer hall and the minaret of the mosque. Therefore, there are two types of timber roofing in the building (Catalogue 1.4 S1r)

- Type 1 (LS1r1)

First type of timber roofing is the pent roof sheltering the second arcade of the last prayer hall. This roofing is supposed to be mainly constructed with timber rafters directly siting on the masonry walls, built up on the arches of this arcade. Due to the structural and architectural necessity, these rafters should have been fastened to these walls. Rafters are supposed to be anchored with nails (*kara çivi*) on the walls.

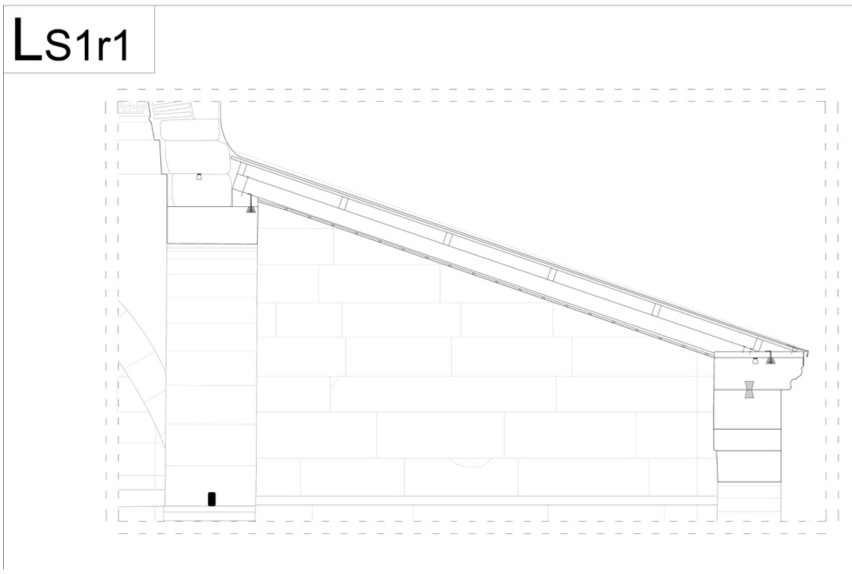

Figure 152: Type 1 of roof in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

Over these rafter series the purlins are thought to be placed. Afterwards, the timber cladding covered with lead sheets is suggested as the covering. Besides, underneath this timber structure, the timber cladding which is assembled by means of the timber joint strips can be observed (Figure 153).

Figure 153: The timber roofing of the second arcade of the last prayer hall (by the author, 2016)

- Type 2 (LS1r2)

The second type of timber roofing is the hood of the minaret (Figure 155). It is known that the minaret was partially reconstructed starting from the level where the polygonal shaft starts. But, by the virtue of continuity of the traditional techniques in construction of the minaret hoods, they are classified as the traditional construction. As seen in the photograph, the hood is predominantly composed of main vertical post called mast (*seren*) and diagonal posts called structural poles (*göndel*). The mast sits directly on the core of the minaret at the center. It is anchored to the core with an iron belt which is thought to be a newer component. In addition, this mast is fastened with anchoring joists (*ıskaça*) and braced with three cross bracings which sit on the upper portion of the shaft (*petek*). The diagonal structural poles also sit at the corners of the upper portion of the shaft by joining with the mast at the top. These poles are anchored to the mast with the bracing elements. Afterwards, the cladding timber elements were nailed on these structural poles. Consequently, the claddings were covered with lead sheets which were topped and seamed by the weight of the brass finial (*alem*).

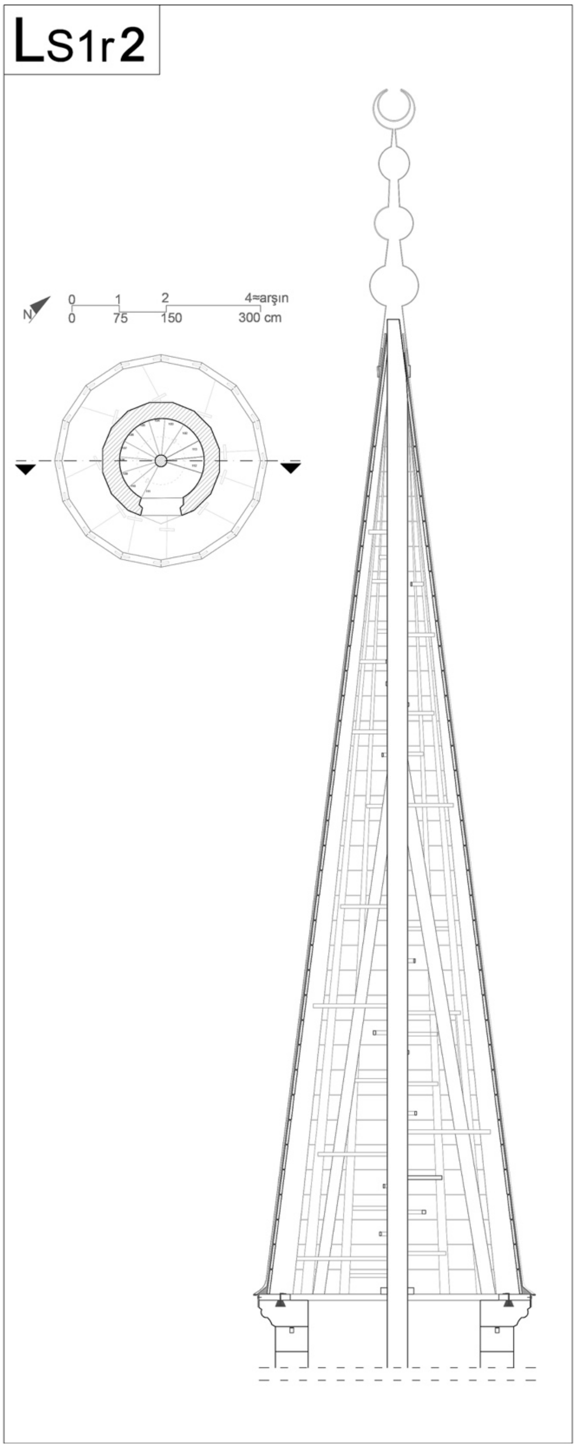

Figure 154: Type 2 of roof in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

Figure 155: The hood of the minaret (by the author, 2015)

4.1.2. Architectural Elements

The classification of the architectural elements of the mosque is limited with the elements which were inserted in the load bearing elements during the construction process. Therefore, the construction technique of these elements' structural components, which act on the main load bearing elements of the mosque, are included in the scope of this thesis. The portal, *mihrab*, door and window openings, balustrades, niches and eaves are the architectural elements that are discussed here in terms of their construction technique.

Portal

The framed portal is in a rectangular niche which is encircled by a rectangular cornice. This rectangular niche is covered with a hood (*kavsara*) composed of corbelled rows of limestone blocks dressed as stalactites (Figure 156). These corbelled rows of stalactites, which are supposed to be constructed together with the wall, are also supposed to be anchored to the wall courses with clamps and dowels. The fine dressing of each component of the stalactites might have been held after they laying them, but every component should have been roughly dressed previously (Figure 158) (Catalogue 1.4. U2p).

Figure 156: The portal of the mosque (by the author in 2015)

The door opening of the portal was constructed in the wall of the entrance façade through an arch system which was constructed under the vault of the entrance iwan. This arch system is composed of three arches placed in hierarchical order. At the top, the opening of the portal was mainly constructed by a pointed arch built in limestone. This pointed arch, which can be seen at the innermost, passes over the load of the upper wall towards the walls on its two sides. The second arch, which is in the middle, is composed of three voussoirs in limestone. The intrados of this arch was shaped as an ogee arch and carries the grooves of the door wings' heels. The third arch, at the outermost is the most decorated one, which is joggled arch constructed with two colored marble voussoirs (Figure 157). This joggled arch has a depressed profile and provides a door frame together with the stiles and sill from the same material and joggles. The voussoirs of this joggled arch have radiating joints in the middle; whereas the outer and inner facings are dressed as joggles. The upper spacing between this joggle arch and the level where the hood starts contain the stone plate which carry the inscription panel.

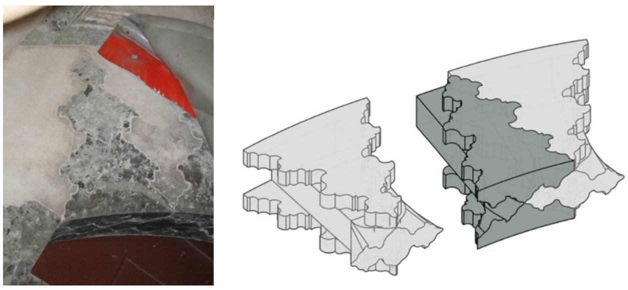

Figure 157: Voussoirs of the Joggled arch of the portal (by the author, 2014)

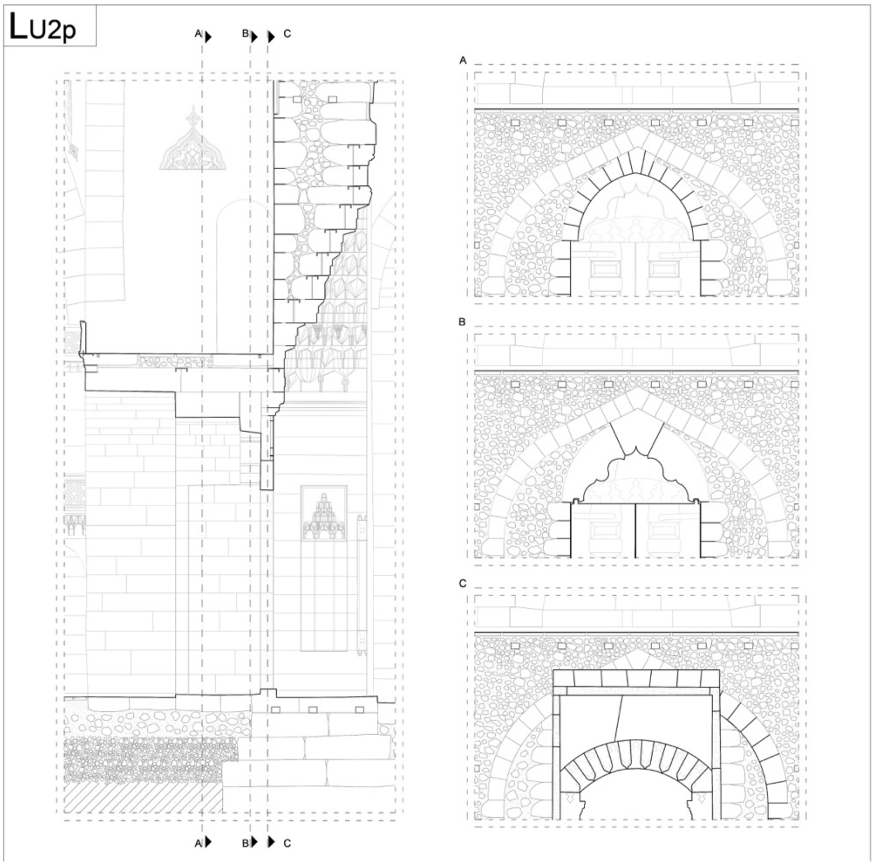

Figure 158: Portal in in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

In addition, on the interior surface of the north wall, an arch is observed over this portal over the *mahfil* floor. The mediocre construction details of this arch cast doubt on its originality; whereas it should have been constructed as a relieving arch for discharging the load above the portal.

Mihrab

The *mihrab* of the mosque was constructed in grey marble, with a prayer niche and a rectangular frame which is topped with a pediment on the south wall (Figure 159). The prayer niche of the *mihrab* placed in the south wall, Kıbla wall, has a half decagonal plan. The walls of this polygonal niche are cladded with grey marble as the rectangular frame of the *mihrab*. This niche is topped with a hood composed of corbelled seven rows of grey marble blocks carved as stalactites. Like the portal, the hood of the *mihrab* is also supposed to be constructed together with the *mihrab* wall by being anchored to the back wall with clamps. The marble claddings are thought to be applied on the wall surface by means of the adhesive lime mortar (Catalogue 1.4. U2mi).

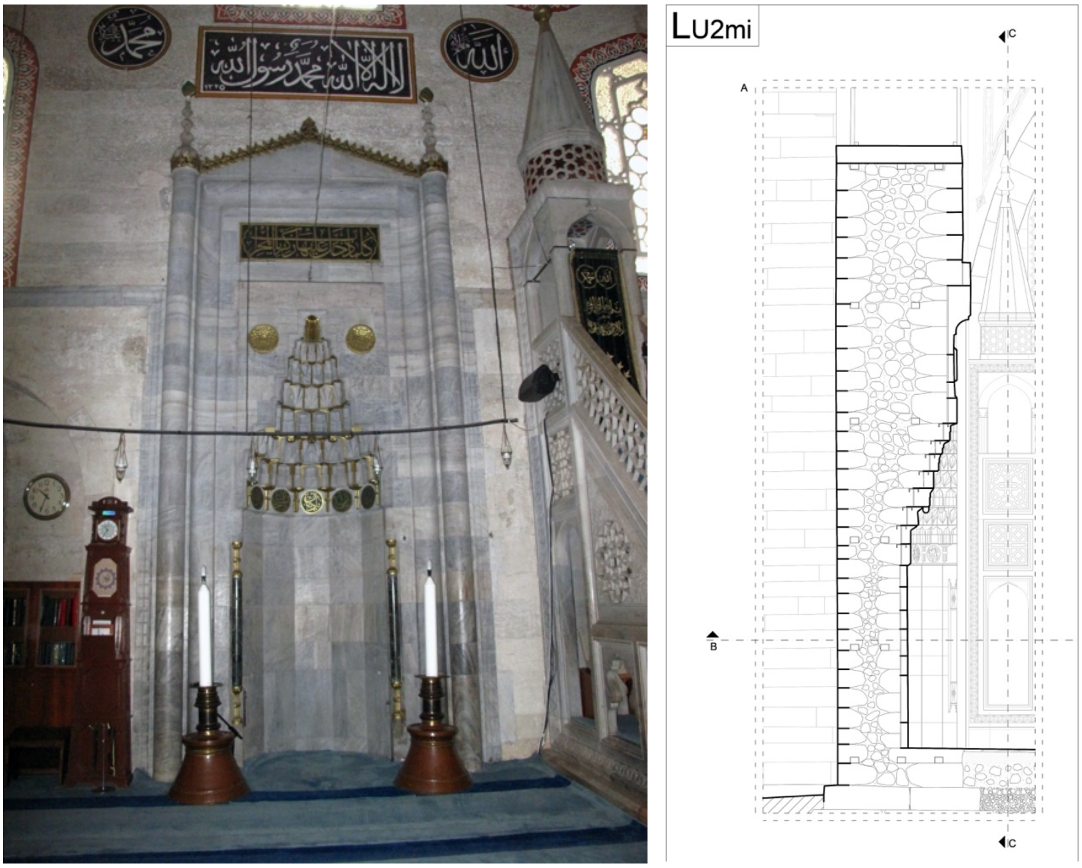

Figure 159: *Mihrab* of Lüleburgaz Sokullu Menmed Paşa Mosque (by the author,2014; drawn by the author)

Doors Openings

The doors openings are spanned by means of arches and/or lintels within stone masonry walls of the mosque. There are door openings in the exterior and interior walls of the mosque. According to their construction technique in the walls, they are classified into three types two of which are the interior doors (Figure 160) (Catalogue 1.4. U2d).

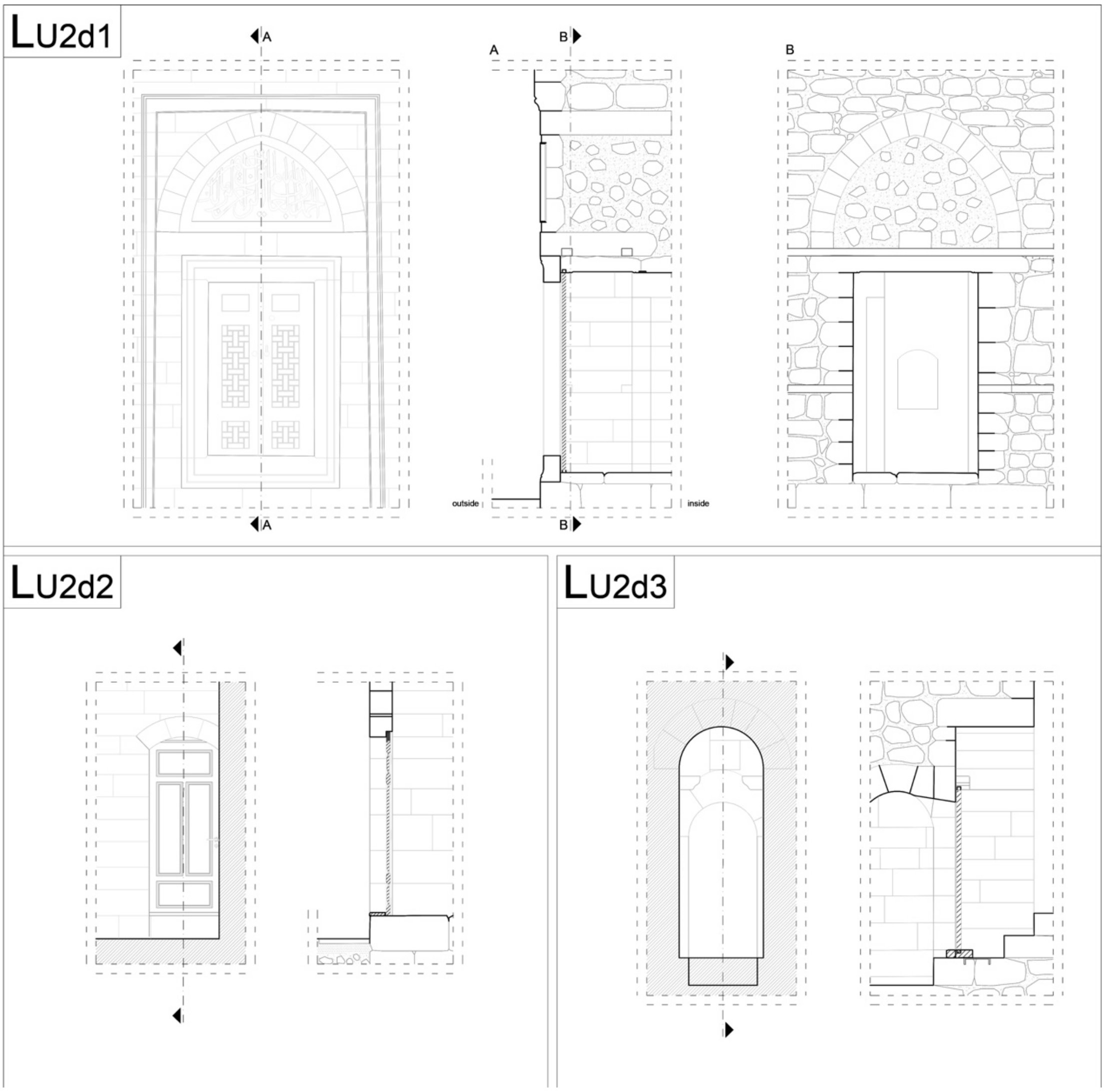

Figure 160: Types of door openings in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU2d1)

Type one includes the exterior doors, opening to the minaret and the *mahfil* staircases from the last prayer hall (Figure 161). The openings of these doors are spanned by stone lintels and on these lintel blocks, the suggested level of the timber tie beams corresponds. Over these openings, there are also relieving arches in limestone for discharging the load towards the side walls of the openings.

Figure 161: The exterior doors openings, type 1 (by the author, 2016)

The spacing between the stone lintels and these relieving arches are supposed to be packed with *horasan* mortar filled with rubble. Moreover, on the exterior, these openings have door frames which are composed of four marble blocks and fixed into their places by adhesive lime mortar. Behind these door frames, the leaves of timber doors are situated by the iron heels inserted in the grooves which were drilled on the upper and lower surfaces of the openings. In addition, relieving arches' tympanums, facing to the last prayer hall, are used for the inscriptions.

- Type 2 (LU2d2)

The second type is the door which opens from the entrance space of the *mahfil* floor to the *yan sahın* on the east side (Figure 162). This narrow door opening is spanned by a depressed arch composed of three voussoirs. The newly added door case is inserted behind this arch.

Figure 162: The door of type 2 (by the author, 2014-2016)

- Type 3 (LU2d3)

The third type of the doors is the on the upper floor and opens to the space which is over the staircases at the north-east corner of the mosque. This door opening is spanned by an arch which perpendicularly slits the vault of the L shaped passageway. The grooves, for the upper iron heels of the door leaves, are on the cantilevered stone blocks on two sides of the opening. The lower ones were drilled on a timber sill (Figure 163).

Figure 163: The door of type 3 (by the author, 2015)

Window Openings

The windows are the main components of the mosque's façades. In the *harim* section, they are arranged in three rows for all of the façades. These three rows are in hierarchical order. The windows in the first row are the most elaborate ones. Accordingly, the upper ones are more modest. Furthermore, there are also windows on the last prayer hall's side walls and on the walls which enclosing the staircases. These windows have six types regarding construction technique and architectural configuration (Figure 164, 167) (Catalogue 1.4. U2w).

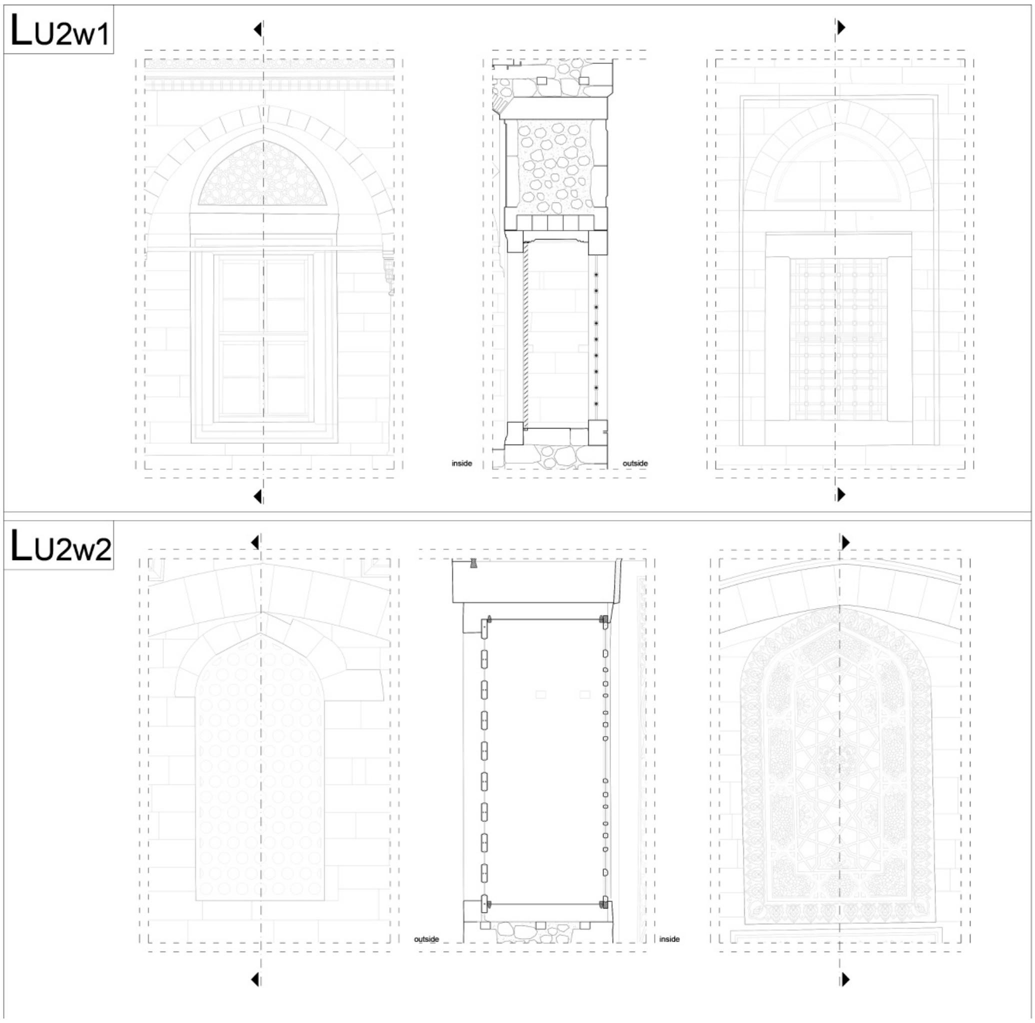

Figure 164:: Type 1 and 2 of window openings in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 1 (LU2w1)

The windows of the first and second rows of all of the facades except the second row of the south, constitute the first type. On the façade, these windows are arranged in a rectangular frame having inside a relieving arch in limestone and a marble window frame with knotted grills (Figure 165). The window openings are supposed to be spanned with timber lintels. These timber lintels are also at the level of the suggested tie beams which brace around the entire building. The spacing between the timber lintels and the relieving arches is supposed to be packed with *horasan* mortar filled with rubble. The facings of these filled spacing, the tympanums, are stone plates on both side; whereas on the interior face these stone plates are plastered and have colored ornamentations (*kalemişi)*.

Figure 165: Windows in the first row and type 1 (by the author, 2015)

As it is discussed in the chapter 2, the window frames should have been inserted to their places by lime mortar after the wall construction was finished. The exterior ones are composed of four marble blocks anchored by means of the iron bars coming in form of grills. The lower blocks of these window frames act as a window sill and they have holes supposedly for the raindrops. The interior door frames are also composed of four marble blocks applied into wall by lime mortar. The leaves of timber shutters are situated behind these interior window frames through the iron heels placed in the grooves on the upper and lower surfaces of the opening

- Type 2 (LU2w2)

The second type of windows include the arched second-row windows on the south façade and the arched third-row windows of all four facades. These window openings are topped with arches constructed with limestone. The window openings are closed with window panels (*revzen*s) inserted both inside and outside of the wall. The interior panels (*içlik*) are gypsum panels decorated with floral and geometrical holes with colored glass insets. The outer panels (*dışlık*) are renewed with concrete panels having circular holes. These panels are supposed to be wedged with timber tools in the openings and sealed with lime mortar (Figure 166).

Figure 166: Arched and circular windows with gypsum *içlik* panels on the *mihrab* wall (by the author, 2015)

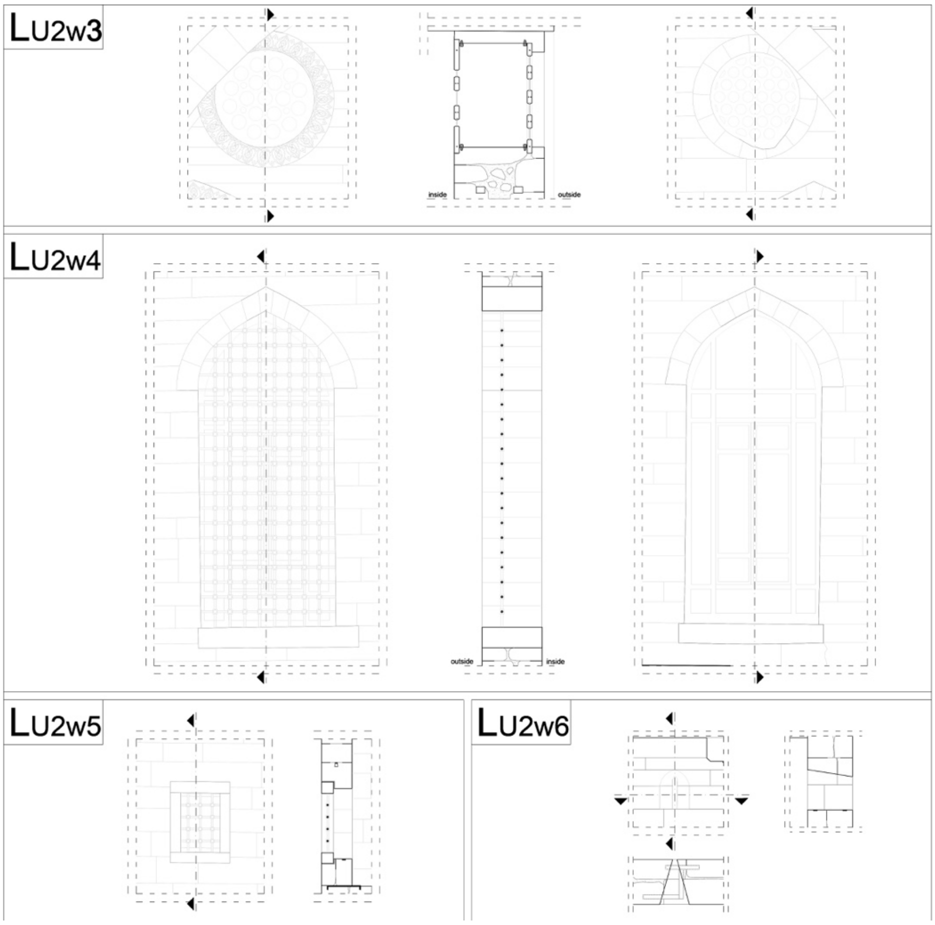

Figure 167: Type 3,4,5 and 6 of window openings in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

- Type 3 (LU2w3)

The third type is the circular windows in the third row of all four facades. The openings of these circular windows are circumscribed by limestone blocks on the exterior façade. These stone blocks with radiating joints are thought to be non-structural components. These circular opening are just below the main arch which make them useless and in the old photographs below, the main arches spanning the openings can be seen. The circular facial stone blocks are supposed to serve for containing the *dışlık* panels (Figure 168). Additionally, these windows have also outer (*dışlık*) and inner (*içlik*) panels as the second type windows. Only the *içlik* panels of the south wall are gypsum, the other *içlik* and *dışlık* panels are renewed concrete ones.

Figure 168: Mosque converted into a church during the Bulgarian Rebellions in 1910s (Mustafa Gültekin Archive)

- Type 4 (LU2w4)

The fourth type windows are the large openings on the walls which border the projected parts of the last prayer hall (Figure 169). They are arched openings having iron grills with knots. The iron bars of the grills directly penetrate in the building stones of the walls and the voussoirs of the arch above.

Figure 169: Windows of type 4 on the walls of the last prayer hall (by the author, 2015)

- Type 5 (LU2w5)

The fifth type of the windows contains the small rectangular two windows of the space which is above the staircases leading to the *mahfil* floor (Figure 170). The window openings are spanned with stone lintels. These windows have a limestone window frame with knotted grills. The window frame is attached to the exterior surface of the wall which is composed of single stone blocks which were laid on top of each other.

Figure 170: Small rectangular window of the space over the *mahfil* staircases (by the author, 2015)

- Type 6 (LU2w6)

The sixth and the last type of the windows are the slit openings which illuminate the staircases of the minaret and *mahfil* floor (Figure 171). They are narrow on the exterior façade and get wider through the inside. These openings are topped with an arch form which is achieved by carving stone blocks, over the opening, as they are forming an arch.

Figure 171: The slit window of the staircases leading to the *mahfil* floor (by the author, 2015)

Balustrade

The balustrades are the carved panels like the traceries (*şebeke*). There are interior balustrades on the edges of *mahfil* floor which is an upper floor, *müzezin mahfili* which is also a raised floor (Figure 172). They are made of marble panels and carved on with the same geometric pattern. In addition, there is an outer balustrade on the edges of the minaret balcony (*şerefe*). This balustrade is made of limestone panels which have the same geometric pattern with the interior marble ones and reconstructed in 1937 with the same material and traditional techniques. The construction techniques of these balustrades are the same, since their materials and locations are different. They are anchored with iron clamps to the stone slab and to each other. The clamps, used for fastening the balustrade panels to each other are usual iron bars with folded down two ends; whereas the clamps, used for fastening the balustrades to the stone slab, is supposed to have an end folded down and the other has a forked end (*çatal kenet*). The one of the forked end is folded down for pinning inside the stone slab and the other is folded up for pinning in the balustrade panel. Likewise, these clamps are also adhered in the holes by means of molten lead (Figure 173) (Catalogue 1.4. U2b/n).

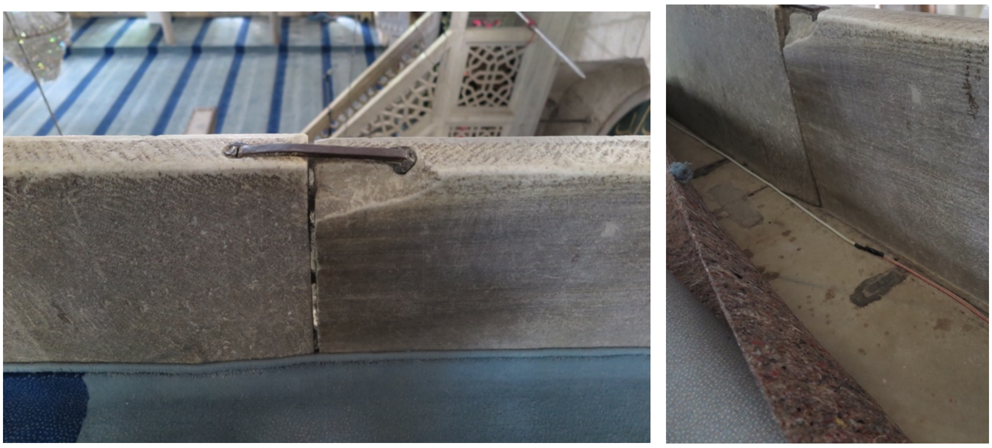

Figure 172: The balustrade of the *mahfil* floor on the west side of the mosque (by the author, 2014)

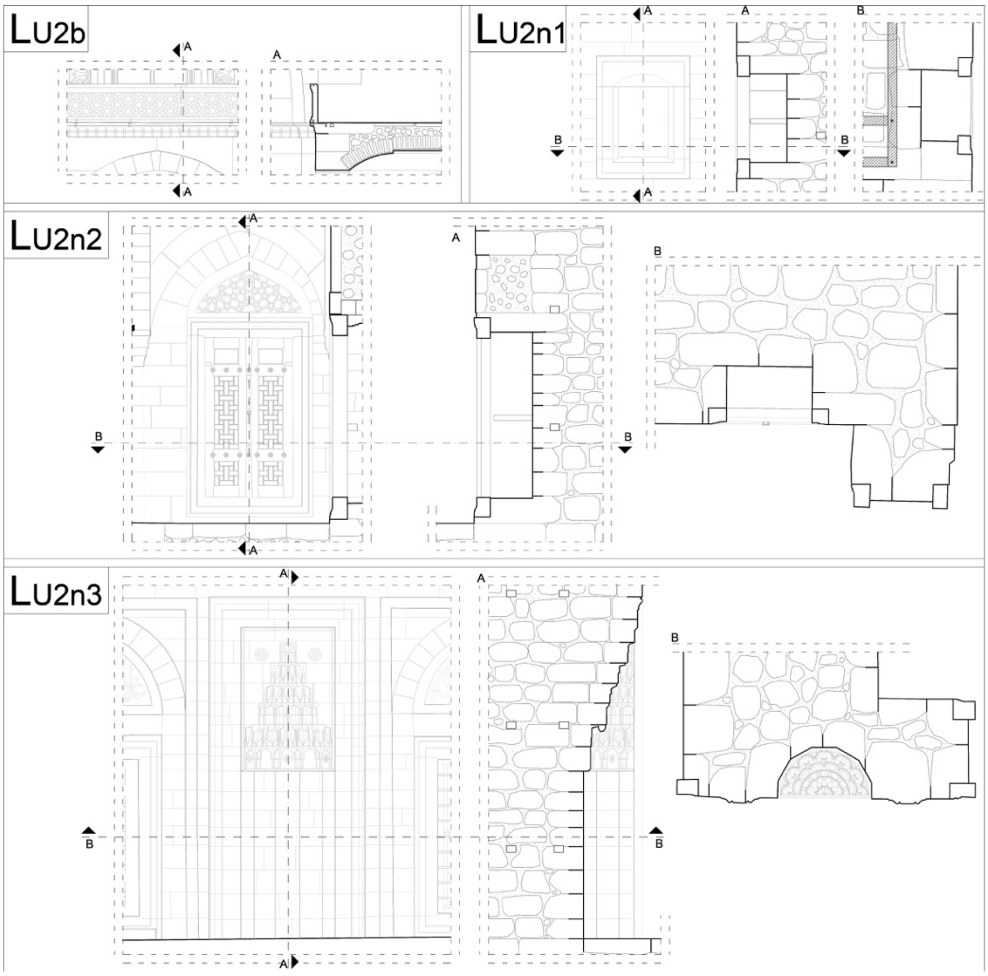

Figure 173: Types of balustrade and niches in Lüleburgaz Sokullu Mehmed Paşa Mosque (drawn by the author)

Niche (U2n)

Niches are the alcoves in the walls. There are interior niches used as cupboards and exterior niches serving as prayer niche named *mihrabiye* and side niches of the portal recess. These niches are grouped into three types according to their construction in the wall (Figure 173) (Catalogue 1.4. U2b/n).

- Type 1 (LU2n1)

The first type of the niches is inside the mosque and is the simplest and the smallest ones. These niches are on the north wall of the west *yan sahın* of the *harim* section and exterior walls of the iwans flanking the entrance iwan on the north side of the mosque. The niches' openings, which come to exist with recess, are spanned with arches having depressed profile (Figure 174). Additionally, inside this type of niches there is a shelf made of stone and they have marble frames on the wall surface. These frames are composed of four marble stones

Figure 174: The niches of the type 1 (by the author, 2014)

- Type 2 (LU2n2)

The second type is also the interior one which have the same configuration with the first-row windows. There are two of them being used as cupboards on the south walls of the *yan sahın*s.

Figure 175: The niches of type 2. The ornamentation of the tympanum, in the photograph on the right, is said the original ornamentation of the Mimar Sinan Period. (by the author, 2014)

They have timber shutters inserted in marble frames. The niche openings are spanned with lintels and the relieving arches discharge the load acting on the niche (Figure 175). As the windows, the spacing between the reliving arches and the lintels are supposed to be packed with rubble filled *horasan* mortar. The tympanum of the arch is composed of stone plates which are ornamented with coloured geometric patterns on the lime plaster.

- Type 3 (LU2n3)

The exterior niches on the north wall, facing to the last prayer hall, are the third type of the niches. There are 4 of them two of which are the *mihrabiye* niches located between the windows and the doors of the north facades of the mosque. The other two are also the side niches situated in the side walls of the portal niche. These niches have polygonal plans topped with corbelled stone blocks shaped as stalactites (Figure 176). The edges of the polygonal plan and the numbers of the stalactite rows change; whereas the construction technique does not change. Therefore, they are grouped in the same type.

Figure 176: The niches of type 3 (by the author, 2015)

4.2. Constructing Lüleburgaz Sokullu Mehmed Paşa Mosque

This subchapter of the thesis recomposes the construction of the Lüleburgaz Sokullu Mehmed Paşa Mosque which is surveyed, documented, analyzed and evaluated in previous sections. For this purpose, the information, obtained from the studies on the Sokullu Mehmed Paşa *Menzil* Mosques, is evaluated together with the information gathered from literature reviews. Additionally, this section attempts to explain the circumstances under of which construction details change and whether there are typical or specific construction principles. It also examines the construction process and in which sequence the works should have been done in 16th century Ottoman Architecture. Thereby, recomposing the construction of the Lüleburgaz Sokullu Mehmed Paşa Mosque is tried to be explained, by also taking the possibilities into consideration, beginning from the preliminary works before construction and ending with finishing works as if the building is being constructed from the foundation until the roof.

First of all, as it is discussed before the military, political, commercial, social, transportation and communication policies of the Ottoman Empire in the 16th century led Sokullu Mehmed Paşa to choose Lüleburgaz. It was a significant *menzil* on the *orta kol* (median branch) of the *Rumeli Yol Şebekesi* (Rumelia Road Network). Thereby, Sokullu Mehmed Paşa ordered such a comprehensive complex to Mimar Sinan that it became a driver for the urban development of the town and its commercial activities.

There is no accurate information about the reason for selecting the area of the complex which was said about 40000 meter-squares in the original design. According to Müderrisoğlu (1997, p. 30), the complex was most probably located outside the Byzantine fortifications. As it can be understood from the existence of one of the bastions of the Byzantine fortresses, *Zindan Baba* Tomb, which was adjacent to the demolished *kervansaray* on the north, the buildings of the complex might have been located next to the Byzantine fortifications.

Accordingly, there is not also any information about the design process of the complex; whereas as Tanyeli and Tanyeli (1993, p. 126) state, Mimar Sinan should have been send his architects for measurements and the topographical map of the selected building site. Afterwards, regarding the architectural program, functions and purposes Mimar Sinan is supposed to have designed a complex and prepared grid-based ground floor plans with sketchy elevations for guiding the construction (Necipoğlu, 1986, p. 243). Unfortunately, there is no drawings in the archives. Besides, any creditable information could not be reached whether Sokullu Mehmed Paşa has interfered in the design process. But taking into consideration the similarities of the Sokullu Mehmed Paşa *Menzil* Complexes such as site organizations and *dua kubbesi*, it can be thought that Sokullu's effects might have played role on the design process.

Subsequent to the project designing, the site should have been prepared for the construction. As Müderrisoğlu (1993, p. 527) states, there had been remains of Byzantine fortifications and edifices in the construction site. Therefore, these pre-existing edifices might have been removed for arranging the site based on the drawings and regulations. Concurrently, the site and construction management regarding the materials, crafts and workers should have been planned. The imperial decrees related to these issues shed light on some obscurity.

There are five decrees that give information about planning the preliminary works and during construction works. The first decree[129] is addressed to the *kadı* of Pınarhisar orders him to help for purchasing wood for the intended construction of Sokullu's *kervansaray* in 1565. The second[130] is in 1567 and it is addressed to the *kadı* of Skopje and other *kadı*s of neighboring towns, ordering them to send at the amount of *dülgers* (carpenters) together with their tools. The remaining three decrees were all in 1568, respectively the earliest one[131] orders enough masons (*benna)* together with their tools from Çorlu, Silivri and Rodoscuk (Tekirdağ) in July. The latter two[132] sent in August are the orders for the lead from Bulgarian towns which should be kept in Sofia and then to be transferred to Lüleburgaz. These few decrees show that the construction management was an important issue, which was planned before the construction, for the buildings in such scale. In addition, the decree ordering masons in 1568 may show that, the preliminary works including the site arrangement, worker and material supply and infrastructure works should have last for years before the masonry construction was started.

After the site arrangement procedures, the excavation works were undoubtedly started. According to the aforementioned soil investigation report which is prepared for the restoration of Sokullu Mehmed Paşa *Hamamı,* the complex sits on a loose soil (Güneş, 2011). Therefore, as it is mentioned above the foundation works should have also last for a long period of time. It is impossible to propose a depth for the foundation without an inspection well; but it would not be wrong to state that there should have been used timber piles for strengthening this loose soil. The mentioned first decree, which orders purchasing wood, may also enhance this idea. Moreover, by taking into

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[129] BOA. (1565). Date: 973 (Hicrî) File No: 527 Folder No: 210 Group Code: MD.5.

[130] BOA. (1567). Date: 975 (Hicrî) File No: 625 Folder No: 226 Group Code: MD.7.

[131] BOA. (1568). Date: 976 (Hicrî) File No: 1751 Folder No: 627 Group Code: MD.7.

[132] BOA. (1568). Date: 976 (Hicrî) File No: 1928 Folder No: 701 Group Code: MD.7. and BOA. (1568). Date: 976 (Hicrî) File No: 1940 Folder No: 706 Group Code: MD.7

account the *vakfiye*[133] which explains the water supply system passing through the pool behind the *mihrab* wall and passes under the mosque towards the *şadırvan,* it can be suggested that there are vaulted galleries under the mosque floor. Considering all these together with the large area where the mosque sits on, there should have been held a vast excavation work at the construction site during the initial phases.

After the excavation, the soil should have been strengthened by wooden consolidating piles and the top of these piles should have been anchored with wooden grillage which also provide a reinforcement for the raft. This raft, which was composed of a thick layer of *horasan* mortar, was an obligatory to make the foundation to be adapted to the ground and to distribute the load uniformly to the soil. Over these raft layer, the continuous foundation is thought to be started to constructed with rough cut *odtaşı* and/or limestones, anchored with iron clamps and molten lead, with progressively narrowing layers of encasements until reaching to the ground level. As it is discussed before, the spacing between these continuous foundations are suggested to be reached to the ground level by means of the vaulted galleries.

After the last encasement level which reaches to the surface of the ground, a levelling should have been done. Because the main supporting members of the mosque such as the walls and the piers were started to be built up and there was a need to have a levelled site. These supporters should have been located on their exact location on top of the foundations in order to construct the entire upperstructure with precise dimensions. Thereby, over the vaulted galleries a filling layer of mortar should have been laid, the foundation walls should have been leveled and the footings of the columns inside the *harim* section should have been constructed. For this reason, the foundations of the walls and the piers are supposed to be braced and aligned by means of tie beams (*hatıl*) at the level where the construction passes from the foundation to the upperstructure. At that level, the stones, which are thought to be the bond headers in two rows, take attention. As it is discussed before, they are suggested as the bond stones which extend the thickness of the wall over and under the tie beams by providing bedding for them.

[133] The *vakfiye* belongs to Sokullu Mehmed Paşa (In the Archive of Directorate of General Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20)

Subsequently, the construction of the entire upperstructure should have been continued simultaneously. Because, according to the structural necessity of forming a unified and steady structural system, the entire building is suggested to be tied all around the upperstructure by means of tie beams (*hatıl*) at significant levels. Until the first-row windows, the walls, the piers and the *mahfil* staircases should have been constructed with facing cut stones which were laid up in masonry fashion by filling inside with rubble stone adhered with *horasan* mortar by leaving empty the places of the main entrance door, the *mihrab* and the niches. In addition, together with the *harim* section and the minaret base with the stairs, the last prayer hall's walls with window openings should have been also constructed with facing cut stones by filling inside with *horasan* mortar.

After this level, the upperstructure construction has continued by opening the places of the windows and the doors until the level of the second tie beam. The second tie beam level which is about 2 *arşın* (151,6 cm) above the first tie beam level, can be observed in the first-row window and exterior door openings of the *harim* section. For construction above this level, the construction was continued with the same manner; but it is supposed to be needed the scaffolding. The third tie beam level should correspond to the level where the top of the window and door openings is. Because at this level, the window and door openings' lintels, the impost levels of the relieving arches of these openings, the springing line of the arches of the *yan sahın* arcades, the landing of the *mahfil* staircases and the starting course of the stalactites of the *mihrab* are existing. In these circumstances, aforementioned necessary aligning and staging of the construction can be clearly understood.

After the third tie beam level, the arches and the vaults, which carry the *mahfil* floor, and the corbelled rows of stalactites covering the *mihrab,* together with ongoing constructions of the walls, piers and staircases, are supposed to be started to be constructed. Therefore, the columns and the walls, supporting these arches and vaults, should have been already constructed over the foundations. In the meanwhile, the tympanums of the relieving arches of the openings should have been also constructed with facing stones by filling inside with rubble aggregated mortar. At this stage, before constructing the arches, the column bases, which directly sit on the column shafts and act as impost blocks of the arches, should have been tied to nearby columns and to the side walls by iron bars. The arches of the *yan sahin*s and arch of the main entrance door, the relieving arches, which are all in limestone are thought to be concurrently constructed over the temporary timber formworks. Subsequently, the *mahfil* floors' slabs are thought to be constructed by the same way on formworks. The vaults carrying the lateral *mahfil* floors were constructed with shouldered profile in brick and supposedly reinforced by iron beams; whereas the barrel vaults on the north were constructed with limestone.

Over these main spanning members, the vaults, of the *mahfil,* slab of this upper floor is thought to be built. A rubble aggregated mortar layer which might have been consolidated with timber grillage is suggested over these vaults as slab. Accordingly, the fourth tie beam level is thought at this level. Again, at this level, on the facades, the stone blocks resembling the ones at the first tie beam level, take attention in between the windows. They are also thought to be the bond headers that provide bedding for the tie beams in fourth level.

At the level of the fourth tie beam, there is the impost level of the main arches which support the main central dome. Hence, after this level, these main arches were most probably constructed by means of temporary timber formworks and by anchoring the voussoirs with iron clamps and dowels. The piers which abut these arches are thought to be also constructed together with these arches, by using these arches as the facings on two sides for the inner infill.

During the construction of these main arches, the walls of the *harim* section should have been also continued. At the level of the fourth tie beam, the stalactite rows of the *mihrab* end, whereas the rows of the stalactites covering the portal start. In addition to the portal's stalactites, on the north wall, the impost blocks of the arches belonging to the last prayer hall's first arcade can be observed in this level. Thus, the columns that support the arches of this arcade should have been built up over their footings. Additionally, the stone floorings which border the last prayer hall's floor should have been already constructed. Before the arches, the column capitals should have been tied with iron bars in order to resist the thrust developed in the arches. The column capitals as the impost blocks should have been tied to the nearby column capitals and the north wall of the mosque and the north wall of the second arcade by means of this iron bars. It is important to say here that the north wall of the second arcade is composed of single stone blocks put on top of each other and supposedly anchored with iron clamps. The stones, to which the iron bars are tied, can be noticed with their sizes and rhythmic intervals.

Subsequently, above this fourth level, the walls continue as the lower levels. The second-row window openings on the facades were constructed with the same manner as the first-row windows, except the ones on the south wall. The second-row windows on the south wall have the openings spanned with arches of which the impost levels are at same level with the arches on the other facades. Subsequently, the fifth level of the tie beams which is supposed to brace the entire structure can be observed in these second-row openings.

Afterwards, the construction of the piers and the walls continues until the sixth tie beam level where is suggested as corresponding just above the relieving arches of the second-row windows. Contemporaneous to the walls, the arches of the last prayer hall are supposed to be also constructed by means of the temporary timber formworks. Thereby, the proposed sixth level of the tie beams matches with the levels where the third-row windows start. At this level, the stalactite rows of the portal end and the dome courses start over the crown of the arches belonging to first arcade. The third-row windows, having arches, should have also constructed as the windows on the second row of the south wall. Furthermore, just above the circular windows of the third-row windows, another tie beam level is suggested based on the information about the height intervals between tie beams; but there is no trace or clue which is indicative of the existence of this tie beam level.

The construction of the piers, which abut the main arches and are thought to be constructed together with the arches at the corners of the mosque, raises until the half height of these arches. Unfortunately, there is no information about the construction sequence of the pendentives over these arches. The pendentives, which were constructed by corbelled alternating courses of bricks and stone blocks, might have been constructed concurrent with the main arches or they might have been constructed after the construction of the main arches had been finished. On the other hand, if the piers are thought to be constructed with the main arches, then the pendentives should have been also constructed with them at least to the level where the piers end. Just below this level, where the last stone courses of these piers are, there is suggested a timber grillage which fastens the piers from the top. This level is also supposed to be the level where the pendentive was tied to the piers. Thereby, this course of the pendentive is thought to be a stone course and over this stone course an iron tie bar is suggested in order to fasten this transition element.

Over the level, where piers end, the weight towers can be observed. They are simple polygonal rooms topped with domical vaults. They are only for covering the space above the piers without any structural purpose. Besides the weight towers, the minaret also raises adjacent to the north-west corner of the mosque by continuing the same construction technique explained above. After the level where the weight tower's wall ends, the thickness of the minaret wall decreases and is composed of single stones put on top of each other by anchoring with iron clamps and dowels. As it is mentioned before, the minaret was also demolished until this level and reconstructed in 1934 with the traditional materials and construction technique. This collapse should have been related to the decrease in the thickness of the minaret walls and the single raised slender minaret shaft.

Besides the minaret, over the level, where the piers end, the rest of the pendentives also raises by purportedly corbelled courses of alternating rows of brick and stone. The back filling between the pendentives and the weight towers' walls are thought to be packed with *horasan* mortar filled with rubble after the pendentives and weight towers had been constructed. The back filling may also contain terracotta pots in order to lighten the load applied on the pendentives. On the top level of the pendentives, stone courses are suggested based on the old photographs. They are thought to be constructed as an inner drum which may have acted as bands for adapting the top-level geometry of the pendentives, sitting directly on the main arch which have pointed profile, to the circular plan geometry of the dome base. Therefore, these stone courses are supposed to be constructed as a circular base for the dome construction. Additionally, by considering the persistently mentioned cruciality of aligning and staging the construction, the structure is supposed to be entirely leveled and tied at this level where dome courses start over the stone inner drum. This tie is proposed not only based on the purpose of staging the members of the structure but also to the purpose of restraining the hoop tension developed at the tension zone of the dome. For these purposes, an iron ring is suggested as tied over the stone course which also narrows down the span of the dome.

Afterwards, on a temporary timber formwork, the construction of the dome is thought to be started by laying the bricks, having special trapezoidal forms. Together with the dome's brick courses in lower portions, a dodecagonal drum was constructed with stone courses supposedly anchored with iron clamps. This drum circumscribes and abuts the dome in the zone where is critical in terms of the tension forces developed due to the form of the dome. In addition to this drum, one more tension ring is suggested at the level where the drum ends. This level is interpreted based on the old photographs in which a continues crack on the plaster can be observed. This is thought to be a trace indicating the existence of an extra iron ring at this level. Then, the brick laying of the dome is thought to be continued course by course by checking the radius with a rope or a plank tied at the geometric center of the dome until the dome was totally closed.

The construction of the last prayer hall's pendentives, domes and the vault with shouldered profile, covering the entrance unit, should have been held over the built arches. They might have been constructed in parallel with the *harim* section's superstructure. Firstly, the pendentives, with corbelled courses of brick and stone blocks, are thought to be constructed. The spacing between these pendentives and the north wall of the mosque are supposed to be filled with rubble aggregated *horasan* mortar. When the pendentives reached the level where a circular plan is provided for the dome, the dome's brick courses are thought to be laid by the way of a temporary timber formwork, until the space was covered. The central entrance unit which is covered with vault with shouldered profile is supposed to be constructed by being stilted with a few courses of stone blocks. Over these stone courses the vault's brick courses are proposed to be built up by laying them on a temporary timber formwork.

Last but not least before the finishing works, the woodwork should have been started in the mosque construction. The second arcade's pent roof, which was constructed mainly with timber beams and joists, is supposed to be anchored on the arched colonnade which separates the first and second arcade and on the north colonnade which constitutes the north façade of the last prayer hall. Moreover, the minaret’s hood, which is constructed mainly with timber mast, posts and bracings, should have been anchored on the upper portion of the minaret’s shaft. For the rough construction, the door and window frames should have been inserted to their places by lime mortar after the wall construction was finished. The exterior ones are composed of four marble blocks anchored by means of the iron bars coming in the form of grills.

Consequently, the finishing works are thought to be started after the load bearing elements of the related part of the entire building were completed. It is thought that they might have been done simultaneously. Because these works include different crafts which could have been done by different specialized craftsmen in different parts of the mosque. Additionally, the construction works at the high levels on the building were able to be only done with the scaffolding. Thereby, before disassembling this scaffolding the finishing works at these levels should have been done.

These finishing works include the roof covering works, floor covering works; wall cladding works; inserting the window and door frames; assembling the shutters, the doors, *içlik* (inner) and *dışlık* (outer) panels; stone dressing; plaster works; whitewash; and finally, colored decorations and ornamentations.

The roof covering includes coating the top surface of the of the superstructure’s components. The roof covering material was lead sheets which are supposed to be laid on a *horasan* plaster layer. These lead sheets are supposed to be applied on the surfaces and jointed by lead riveting in order to protect the structure against the external effects. Moreover, on the dome of the mosque and hood of the minaret, these lead sheets were topped with the *alem*s which are not only for the religious purposes but also for creating a load that keep these lead sheets on their place. After the load bearing elements of the superstructure was completed, it is thought that these protecting roof coverings should have been done as a first work, for protecting the structure against the external effects, The floor coverings which were the hexagon bricks (*şeşhane*) are suggested to be laid on a thick *horasan* mortar layer. They should have been applied after the heavy construction works were completed in order not to be damaged.

Wall cladding works includes the marble panels of the *mihrab* and the marble inscription panels on the main portal and on the tympanums of the relieving arches on the north wall. They should also have been applied after the heavy construction works were completed in order not to be damaged.

The window and door frames including the joggled frame of the portal should have been inserted to their places by adhering with lime mortar after the wall construction was finished at that section. Additionally, the exterior window frames which are composed of four marble blocks anchored by means of the iron bars coming in the form of grills are supposed to be prepared on the ground and then placed into their places.

The wings of the shutter and the doors of the windows and the cupboards are the timber panels which were situated behind the window and doorframes through the iron heels inserted in the grooves on the upper and lower surfaces of the opening. These timber panels, which were usually manufactured with *kündekârî* technique, should also have been applied after the heavy construction works were completed in order not to be damaged.

The inner and outer panels which close the windows in the second and third row on the walls are supposed to gypsum panels decorated with floral and/or geometrical holes with colored glass insets. These fragile panels are supposed to be wedged with timber tools in the openings and sealed with lime mortar after the load bearing elements were completed.

The fine dressing of each component of the stalactites in the portal, *mihrab*s and *mihrabiye* niches might have been held after they were placed to their places; whereas every stone block should have been roughly dressed previously. There are also surface treatments as carvings and moldings on the stone units of the components belonging to load bearing or architectural elements such as cornices, frames or walls. Again, these stone blocks should have been roughly dressed previously and then after they were placed to their places, the fine dressing should have been held in order to have perfect precision.

Finally, the plaster works and the colored ornamentation applications are the works held inside the building. Plaster is thought to be applied on the surfaces with the purpose of the aesthetical concerns and/or protecting the surface and the materials against the deteriorations. The surface of the domes, pendentives and the main arches of the mosque were plastered. The plastered surfaces of these elements were also whitewashed with lime and over this whitewash layer the colored figures of the ornamentations were applied. The tympanums of the relieving arches and the upper windows' peripheries, creating frames, were also whitewashed and ornamented with colored paints. These works of plastering and ornamentations are thought to be the last applications on the mosque.

Conclusively, the construction process of the Lüleburgaz Sokullu Mehmed Paşa Mosque is tried to be recomposed by using the information, obtained from the studies on the Sokullu Mehmed Paşa *Menzil* Mosques together with the literature reviews. The construction technique and the processes of the components are tried to be clarified by following the sequences of the works by also taking the possibilities into consideration, beginning from the preliminary works before construction and ending with finishing works.

CHAPTER 5

CONCLUSION

The thesis is an attempt to understand the construction technique of the buildings of Mimar Sinan and his era. A systematic holistic approach, which documents the selected buildings, the mosques of Sokullu Mehmed Paşa Menzil Complexes, in detail, is developed in order to gather comprehensive and accurate information. This systematic documentation of these mosques is interpreted together with the knowledge about construction technique in Ottoman architecture accumulated until now as well as the written and visual archival sources related to these buildings. Consequently, this systematic documentation and evaluations are used for figuring out an assessment about construction technique and process of the selected building, Lüleburgaz Sokullu Mehmed Paşa Mosque.

For this purpose, initially, an enquiry into the buildings attributed to Mimar Sinan is held in order to understand which buildings might have been personally constructed by Mimar Sinan. The possible buildings which can have been personally constructed by Mimar Sinan are discussed with regard to his life and constructions. This discussion concluded that the buildings, which were in Istanbul and its vicinity close to Istanbul and ordered by the sultan and his family and/or commissioned by grand viziers, grand admirals, provincial governors and administrators and for military officers of the imperial council, were most probably constructed by Mimar Sinan himself.

Subsequently, an important contribution of this thesis is the research and inventory about the sources regarding the construction technique and including not only the 16th Ottoman architecture but also the close periods. These different sources, which are accumulated until now, are tried to be gathered in a table by giving their contents. The building sections and the time period which they search for are depicted in these tables. Furthermore, this knowledge about the construction technique in 16th century Ottoman architecture with an emphasis on Mimar Sinan, is tried to be explained and the terminology is tried to be developed in English. As an important outcome of this research and study on the construction technique, a glossary is tired to be developed in order to elucidate the terminology and contribute the field. The terms which are used in Turkish are tried to be defined in English and if there are different definitions in the sources by different scholars, they are all conveyed in order to be academically creditable.

The abovementioned research and reviews conclude that the construction technique of 16th century Ottoman Architecture almost means the construction technique in Mimar Sinan's buildings. As it is discussed, the technological limitations in the Classical Ottoman Empire did not allow any major change in the construction technique in the Classical Ottoman Architecture. The principles in constructing the masonry buildings were almost the same until the Industrial Revolution which lead to new technologies, materials and opportunities. Even so, Mimar Sinan pushed the limits of this masonry system in his ingenious oeuvres to the extent permitted by materials, approved by the imperial and financed by the donor.

Accordingly, it can be said that this thesis constitutes a first study which documents the selected 16th century Ottoman monumental buildings in such detail with a systematic holistic approach. Likewise, considering these buildings as an entire structural system, this systematic holistic approach also put forth the significance of this thesis.

Besides, this study is not only the initial in this respect, but also it can be said that it is the first study which also tries to interpret the unseen details of the construction techniques in these buildings. For this purpose, the thesis tries to read the traces and the clues on the buildings and then, hypothetically interprets the unseen details by utilizing the gathered and previously conveyed knowledge about construction technique in 16th century Ottoman Architecture. The clues and traces on the buildings, experiences, the gathered bibliographical and oral information, the archival verbal and visual documents and acquired structural flair are melted in the same pot and the invisible parts of the details are hypothetically drawn by considering the old measurement units such as *arşın,* and *parmak*. In addition, while interpreting the construction techniques of these invisible parts, the study also tries to find out the possible alternatives in terms of their details or materials.

While interpreting and generating the drawings of these hypothetical details of construction technique, the section planes are taken vertically, horizontally and diagonally. In order to understand and convey the construction technique accurately in all elements, different section planes in different directions are used. Thereby, drawing the horizontal sections meaning plans showing the details inside the components is also an important contribution of this thesis. Additionally, sections having a diagonal section plane is also another important issue for this thesis.

Within this context, findings are got with regard to both the entire structural system and specific structural elements of Mimar Sinan's mosques. Firstly, the essentiality of staging the construction process and levelling the entire structure is found out as an important output and suggestion of this thesis. The trial to understand the construction technique by following the stages in the Sokullu Mehmed Paşa Mosques built by Mimar Sinan gives chance to clarify obscurities related to the construction process. The levels of these stages crystallize the structural and architectural reasons behind the used elements, details and materials. Additionally, the thesis insistently defends that these masonry structures are the entire systems of which the components are interdependent to each other. Therefore, as the previous studies of a few scholars such as Tanyeli (1993) and Bayraktar (2011), this study also supports that these masonry structures constructed by Mimar Sinan are entire structural systems composed of masonry components integrated by means of tension elements such as tie beams and ties at certain levels.

Another important finding, which is the first in the literature and significant for this thesis is related to the bond headers in the masonry structural systems. These bond headers or stone bonds, which can be followed on all of the facades on Lüleburgaz Sokullu Mehmed Paşa Mosque and documented and defined in this thesis, give clues about the inside of the wall where it is used and shed light on the invisible details such as the levelling by means of the tie beams in the building. The existence and the purpose of the bond headers as a structural element was an ambiguity in the field of construction technique in Ottoman Architecture. Through this thesis this uncertainty is solved. The existence of bond headers is evidenced and the purpose of it is identified in Lüleburgaz Sokullu Mehmed Paşa Mosque.

Furthermore, one more important finding is about the usage of the structural elements made of iron such as clamps, dowels and beams in any such critical detail for aiding the main masonry components of Mimar Sinan's buildings. For all three studied Sokullu Mehmed Paşa Mosques, clamps and dowels as the bonding elements made of iron are observed and documented. The iron beams which are observed and documented in Lüleburgaz Sokullu Mehmed Paşa Mosque constitute another purpose of the iron usage. Thereby, it can be deduced that Mimar Sinan did not hesitate to use iron elements as bonding members or axillary members for making the structure sturdy. Therefore, the asseveration of Tanyeli (1993) about the structural use of iron in the Ottoman Architecture is demonstrated once more for Mimar Sinan's buildings.

Accordingly, the most important contribution of this thesis can be assessed as the produced documentations and gathered knowledge showing and explaining the details of the construction techniques belonging to structural elements in Sokullu Mehmed Paşa *Menzil* Mosques. This documents and knowledge, which contribute to the knowledge about the construction technique of buildings belonging to Mimar Sinan and his era, provide a base study for further studies and the conservation interventions. It can be stated that the practitioners, who undertake the conservation interventions, may get relatively more benefit from this thesis. This thesis may help them to understand and interpret the construction techniques and accurately evaluate the structural problems and the reasons behind the problems in the building. Thereby, the historical buildings belonging to Mimar Sinan and his era may be restored and conserved with appropriate techniques.

According to the produced documentations and gathered knowledge about these three mosques associated to Mimar Sinan and commissioned by Sokullu Mehmed Paşa, different implications are made about the construction technique of Mimar Sinan. Thus, another important derivative contribution of this thesis is also the deductions rising due to the resemblances and differences among these studied three mosques. As it is previously mentioned, Havsa case is in the same geographical region with Lüleburgaz case. Additionally, they are so close to İstanbul that the construction technique and the used materials in these cases does not include any specific major local influences. On the other hand, Payas case is in a totally different geographical region. Therefore, Payas Sokullu Mehmed Paşa Mosque has many distinctive character in terms of mass configuration, interior organization, constructional details and material usage caused by the local influences.

The main difference between the two mosques in Havsa and Lüleburgaz is the mass organizations of them. It is important to declare here that as it is mentioned before Havsa Sokullu Mehmed Paşa Mosque was partially demolished and reconstructed in 20th century, so that the differences in terms of superstructure and last prayer hall may be caused by these later interventions. Other than mass organization, plan and façade organizations and the construction technique with regards to their walls have some distinctions. Havsa Sokullu Mehmed Paşa Mosque has more modest dimensions and simple geometry in the plan organization. It has a central prayer place with a single floor covered with a dome, whereas Lüleburgaz has a central prayer place encircled with *yan sahın* and second *mahfil* floor. Likewise, the façade organization of Havsa is also more modest than the Lüleburgaz has. Again, it should be always in a corner of mind that these differences may be produced by the later interventions.

Moreover, these two mosques, Havsa and Lüleburgaz, were mainly constructed with limestone which were most probably extracted from the same quarry. The interesting issue is that the limestone units which were used in Havsa Sokullu Mehmed Paşa Mosque have bigger dimensions than in the Lüleburgaz case. Additionally, the wall thicknesses of Havsa case are also much thicker than Lüleburgaz. The reason behind these dissimilarities may be the endowed budget. Because, it is known that Havsa Sokullu Mehmed Paşa Complex was Sokullu Mehmed Paşa's only endowment which is built with all assets of his son on behalf of his death. On the other hand, Lüleburgaz was one of the numerous endowments which Sokullu Mehmed Paşa commissioned by his own budget. Another reason behind these large stone blocks of Havsa case may cause by reused materials which might have been gathered from the earlier periods' buildings in Havsa, which is said to be a military camp having churches in 5th century (Ertuğrul, 2014, p. 89).

Accordingly, the pseudo-isodomic wall courses cannot be seen in the Havsa Sokullu Mehmed Paşa Mosque, whereas Lüleburgaz was built up in pseudo-isodomic masonry. There are slight shifts in the wall courses on all facades. These shifts in the courses misgive the originality of the constructions of the walls. There bear two possibilities in the mind that these walls might have had a comprehensive conservation intervention or the stone blocks are spolias which were reused as they were. Consequently, if these slight shifts are the original constructions, which is never witnessed in Mimar Sinan's buildings, it can be supposed that the Havsa Mosque was constructed by local architects or by his *kalfas* while the Selimiye Mosque was being constructed in Edirne.

When Payas Sokullu Mehmed Paşa is compared with the Havsa and Lüleburgaz cases, the local influences get the attention immediately. The mass configuration, interior space organization, constructional details and used materials have distinctive features in Payas Sokullu Mehmed Paşa Mosque. Firstly, the mosque has a more articulated mass configuration due to the different plan layout from Havsa and Lüleburgaz. The mosque has a totally different plan layout which is a cross-in-square plan. The central main prayer place also exists in this mosque, but there are iwans covered with cross vaults jutting out from this main space on four directions. Additionally, there are northern corner spaces which have two storeys also covered with cross vaults, and there is a timber frame *mahfil* floor again on the north over the entrance iwan. The location of the *mahfil* floor in Payas case somehow resembles with Lüleburgaz Sokullu Mehmed Paşa Mosque, whereas the space organization, the circulation patterns and the construction technique of this floor is completely different.

The façade organization in terms of the window openings does not changed much in all three mosques. There are two or three rows of window openings with the same configuration on all facades in all three mosques. Besides, the Payas case can be separated from the other two examples with regard again to its plan layout. The facades have fluctuating surfaces getting in and out together with their window openings.

The reasons behind the differentiations of the Payas case in construction technique are the used structural elements for extensive spaces as iwans and materials which are different than the other two. For instance, cross vaults with stone and timber frame *mahfil* floor are only detected in this mosque. Moreover, the dome of the mosque was constructed with stone units, whereas the domes of Havsa and Lüleburgaz are built up with brick. The main constructing material, which is entire structure, is also limestone in Payas, but with an orange-like colour, while the limestone units of Lüleburgaz and Havsa are greyish yellow. Besides, different coloured marbles, such as black, red and white, were used on the portal and *mihrab* for Payas Sokullu Mehmed Paşa Mosque. However, Lüleburgaz has grey marble on portal and *mihrab* and Havsa has limestone on portal and grey marble on *mihrab.*

Consequently, if these all distinctive qualities are taken into account, the local influence on the mosque of Sokullu Mehmed Paşa in Payas can be observed easily. It can be also said that there are Memluk influence on the architectural character of all components. Accordingly, when it is considered that Mimar Sinan might have not visit this construction, it is thought that he could only send his *kalfa*s or his design proposal to Payas. Thereby, it would not be wrong if it is suggested that the local architects and constructors might have had a more impact on the construction of Payas Sokullu Mehmed Paşa Mosque.

When we turn back to the contributions of this thesis, the developed method, used for producing the knowledge about the construction technique in Mimar Sinan's buildings, is another significant achievement. On the line of the mentioned aim of the thesis, a method, which is based on the studies held by Şahin and then by Diri[134], is introduced and improved. This proposed method establishes a catalogue system which documents the complexes and the buildings by giving information in every aspect including the measured drawings, models, system details and element details. The measured drawings, as the orthographic set, include the site plan of the complex, plans, elevation and sections of the mosques. The models are the axonometric drawings of the mosques. The system details, which show all the interior details of the cut components in the sections, are produced to document all possible different architectural details. The element details, which show how these elements were

[134] The site survey methodology is an interpretation of the methodology developed by Neriman Şahin Güçhan in her Ph.D. Thesis (Şahin, 1995). Subsequently, Filiz Diri improved and utilized this methodology in her M.Sc. Thesis (Diri, 2010).

constructed, are the partial plan and section drawings having section planes in different directions.

Accordingly, this catalogue system gives chance to document different types of buildings with the same principles. Thereby, a comprehensive inventory may be developed by using this catalogue system which documents different types of buildings from different periods. By means of this inventory a database may be founded in order to shed light on the further studies and further conservation interventions.

The difficulties regarding this method is caused mainly by the unseen parts of the buildings. The selected buildings are in use and they were restored many times. Therefore, the details of some parts, which were restored or covered with the purpose of the maintenance and/or conservation, create difficulties to read the original construction technique. The traces and the clues on the buildings are tried to be interpreted in the light of the literature survey studies and related archival documents. Especially, Havsa Sokullu Mehmed Paşa Mosques was restored many times. As it is mentioned above, there are many parts which cannot be determined whether they are later interventions and/or restorations or original. Thereby, the mosque in Havsa is the most difficult case with its ambiguities. Payas Sokullu Mehmed Paşa Mosque was also restored many times, but there are archival materials and documents recorded during these interventions. Thus, it is much easier to determine the restored parts. The easiest one is the Lüleburgaz Sokullu Mehmed Paşa Mosque in terms of this issue. Because it was intervened less than other mosques. Furtherly, it has the archival verbal and visual documents about these interventions, so that Lüleburgaz Sokullu Mehmed Paşa Mosque is the least problematic case.

Another difficulty is again related with the buildings' unreachable parts. Due to being large structures, the details on the higher parts where are inaccessible, are puzzling to see and interpret. Thus, documenting the building with a systematic holistic approach, from bottom to top, becomes challenging in this respect.

Another challenge, which constitutes the most problematic issue for this thesis, is drawing the sections' insides which are invisible and unpredictable. To the purpose of this thesis, it is studied by always sketching and drawing the details for numerous times with their exact dimensions by considering the Ottoman measurement units. The separately scaled drawings which show system details and element details are tried to be entirely generated for every time. In order to solve the sections' insides vast amount of drawings and sketches were produced in different scales. Like trying to solve a puzzlement, every possibility is tried to be evaluated in the light of the site surveys which are held in many times seeking the traces and the clues. Additionally, previous studies and archival documents are used together with the consultancies of scholars such as Tanyeli and Kılıççöte in order to determine the details. Consequently, the invisible and unpredictable parts of the details are drawn hypothetically by referring the source used for generating the detail in every aspect.

On the other hand, the difficult method of this study has also many advantages. The most important advantage of the method is documenting the building with a holistic manner which evaluates the entire structure as an integral system. The other most important advantage is also the systematic approach which tries to solve systematically this integral structure to its components with regard to their technique, details and materials. Related to the method again, the selected buildings belonging to complexes, which have also partially demolished buildings, create advantages for understanding the unseen and unreachable parts of the selected mosques. Moreover, archival materials and the documents which belong to the previous interventions and documentations also give chance to see clues about the original construction techniques.

With regard to the archival materials belong to Directorate of Ottoman Archives[135], Lüleburgaz Sokullu Mehmed Paşa Mosque has more documents than the other two mosques have. Similarly, Lüleburgaz has also more documents in the archives of the Directorate General of Foundations. Likewise, Payas Sokullu Mehmed Paşa Mosque has also almost the same amount of archival materials in the Directorate of Ottoman Archives and in the archives of the Directorate General of Foundations. Moreover, the complexes in Lüleburgaz and Payas were documented and the restoration projects were prepared. Therefore, the documents of these project

[135] There were found five imperial decrees about the construction of Lüleburgaz Sokullu Mehmed Paşa Mosque, whereas for Havsa has three and for Payas four imperial decrees were found.

processes also provide information to this thesis. Unfortunately, Havsa Sokullu Mehmed Paşa Mosque has less archival documents in both archives and it has not been comprehensively documented since it was documented by the author of this thesis in 2016.

Furthermore, in this thesis, some topics are unfortunately excluded due to the scope and purpose of the thesis. Although the source of the material supplies such as stone quarries and the material technologies of the buildings are important issues to understand the construction technique of a building as a whole. They are not within the scope of the thesis. Nevertheless, the essential data are tried to be gathered from the archives and previous studies which contain the characteristics of building materials and analytical research and experiments related to the materials. Similarly, the studies related to the soil properties of the construction site are tried to be achieved from again archives and previous studies as far as is known. As it is mentioned above, the restoration projects of Lüleburgaz and Payas Sokullu Mehmed Paşa Complexes were prepared, so that this essential information are gathered from the reports of these projects.

Other topics, which are also left out, are the construction techniques and craftsmanship, including the details of the architectural elements related to woodwork, gypsum work, glasswork, smithery and lead work. Because these work types of architectural elements have vast amount of different details which exceed the scope of this thesis. Additionally, due to being fragile components of the buildings, these elements are most probably changed ones. Thereby, craftsmanship of these architectural elements necessitates much more comprehensive and detailed studies. As a further study, a research may be conducted on the construction techniques of these architectural elements based on the information which is provided by this thesis.

When all the above-mentioned excluded issues are considered, it can be said that each of them can be a further study grounded from this thesis. The material properties of these buildings may be studied. The information provided may be included in the catalogue system for having a more comprehensive documenting system serving the proposed database. Moreover, the catalogue system may be developed by adding also the construction technique of the architectural elements. The craftsmanship may be added to the catalogue system, again for having a much more comprehensive database about the documented buildings.

Furthermore, the other buildings of Lüleburgaz Sokullu Mehmed Paşa Complex can be evaluated as the mosque is done. They can be evaluated together with the mosque and the types of the structural elements of these buildings can be classified together with the mosque's. The same study can be held by evaluating the Payas and Havsa Sokullu Mehmed Paşa complexes. The examples can be enumerated by adding Sokullu Mehmed Paşa's other complexes which are located in the city centres.

As a further outcome and study of these enumerated examples the hypothetically drawn parts may be determined and evidenced. By collecting much more evidenced traces on different buildings, having more experiences, gathering more bibliographical and oral information, reaching more archival documents and acquiring more structural flair, more creditable knowledge will be provided. Additionally, there may be a chance to clarify many obscurities about the Classical Ottoman Architecture in the Ottoman archival documents such as the ambiguity in the old measurement units, complexity in the unit material dimensions and geometries for purchase order.

As it is mentioned before, by using the same method and catalogue system, the examples belonging to different periods and having all sort of types, can be increased and a database can be established. This database may provide an enormously important knowledge about the construction technique of the historical buildings. This accumulated knowledge may serve the researchers in order to develop their studies and the practitioners in order to make appropriate interventions during the restoration processes. Conclusively, the significant historical structures may be accurately understood, properly restored and conserved long-continued.

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APPENDICES

A. TIMETABLES SHOWING MIMAR SINAN'S LIFE AND BUILDINGS

- There are 11 timetables. The first one shows the relation of the Mimar Sinan's life and his complexes of which the dates taken from Necipoğlu (2005) and Günay (2012, p. 32).
- The other ten timetables related the recorded buildings' construction dates and their locations. The buildings recorded by Sai Çelebi and listed and arranged by Necipoğlu are taken from the appendices of her study (2006, pp. 353-391) and the construction dates of these buildings are added from Kuran's study in the appendices (Kuran, 1986, pp. 271-405). For a brief introduction brackets [] are added by Necipoğlu for the sake of clarity and again parenthesis () are gives extra information about the location and the names. Lastly the asterisk * depicts that the building is a part of a complex.
- The buildings of which the construction date is not known are omitted from the timetables.
- Some building types, which are close to each other in terms of their function, are put together for the sake of the clarity.

Table 8: Timetable of Mimar Sinan's Life and His Complexes (Dates taken from Necipoğlu, 2013)

			1488-9 1512-3	Ağırnas Kayseri			Childhood	Bayezid II
			1512	İstanbul Acemi Ocağı (Dülgerlik)			Acemioğlan	Selim II
			1514	Çaldıran Camp.				
			1517	Cairo Camp.				
			1521	Belgrade Camp.			Jannisary	Süleyman I
Gebze	Çoban Mustafa Paşa Comp.	1523-24	1522	Rhodes Camp.				
			1526	Mohachs Camp.			Atlı sekban	
			1532	German Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	
			1533	Baghdad Camp.				
			1534 -5	Persian Camp.				
			1536	Corfu & Pulia Camp.			Haseki	
Halep	Hüsreviye Complex	1537	1538	Moldavia Camp.				
İstanbul	Haseki Complex	1539	1538			İstanbul	Mimar Başı	
İstanbul	Şehzade Complex	1543-48	1543	Şehzade Sultan Mehmed Mosque*				
Üsküdar	Mihrimah Sultan Complex	1543-48	1548					
Şam	Süleymaniye Complex	1550-54	1550					
İstanul	Sinan Paşa Complex	1555	1554	Sultan Süleyman Mosque*	Kırkçeşme Water Supply System			
İstanbul	Süleymaniye Complex	1550-57	1557					
İstanbul	Kara Ahmet Paşa Complex	1558-65						
Karapınar	II. Selim Complex	1563						
Edirnekapı	Mihrimah Sultan Complex	1562-65	1564					
			1965		B.Çekmece Bridge			
			1966					
Lüleburgaz	Sokullu Mehmet Paşa Complex	1569	1568			Edirne		Selim II
Edirne	Selimye Complex	1568-75		Sultan Selim [II] Mosque*				
Kadırga	Sokullu Mehmet Paşa Complex	1572						
Payas	Sokullu Mehmet Paşa Complex	1574	1574					
İstanbul	Atik Valide Sultan Complex	1570-79				İstanbul		Murat III
İstanbul	Zal Mahmut Paşa Complex	1577						
İstanbul	Şemsi Ahmet Paşa Complex	1580						
İstanbul	Kılıç Ali Paşa Küllliyesi	1580						
Ilgın	Lala Mustafa Paşa Complex	1584	1584	Mecca (Hac)				
			1588					

Table 9: Timetable of Mimar Sinan's Life and His Mosques (Dates taken from Necipoğlu 2013)

Sultan	Position	Place / Event	Date
Bayezid II	Childhood	Ağırnas Kayseri	1488-9 1512-3
Selim II	Acemioğlan	İstanbul Acemi Ocağı (Dülgerlik)	1512
		Çaldıran Camp.	1514
		Cairo Camp.	1517
Süleyman I	Jannisary	Belgrade Camp.	1521
		Rhodes Camp.	1522
	Atlı sekban	Mohachs Camp.	1526
	Yayabaşı Kapıyayabaşı Zenberekçibaşı	German Camp.	1532
		Baghdad Camp.	1533
		Persian Camp.	1534 -5
	Haseki	Corfu & Pulia Camp.	1536
		Moldavia Comp.	1538

Sultan	Position	Place	Project	Dates
Süleyman I	Mimar Başı	İstanbul		1538
			Şehzade Sultan Mehmed Mosque*	1543 – 1548
			Sultan Süleyman Mosque*	1550 – 1557
			Kırkçeşme Water Supply System	1554 – 1564
			Büyük Çekmece Bridge	1565 – 1566 – 1568
Selim II		Edirne	Sultan Selim [II] Mosque*	1568 – 1574
Murat III		istanbul		
		Mecca		1584
				1588

Location	Mosque	Date
[İstanbul]	Sultan Selim [I] Mosque*	1522
Gebze	Mustafa Paşa [Çoban] (Mîrimirân-ı Mısr) Mosque*	1523
[[İstanbul]]	Kasım Paşa [Güzelce] Mosque*	1533
Van	Sultan Süleyman Mosque	1533
Baghdad	Abdülkadir Geylani (Şeyh) Mosque*	1534
Diyarbakır (Âmid)	Ali Paşa (Hadım) Mosque*	1534
Baghdad	[Sultan Süleyman] Imam-ı Azam [Abu Hanifa] Mosque	1534
[[İstanbul]]	Huma Hatun (Bâlî Paşa Hâtûnı) Mosque*	1538
[İstanbul]	Haseki [Hurrem] Sultan Mosque*	1538
[[İstanbul]]	Mahmud Ağa (Çavuşbaşı) Mosque	1538
[Svilengrad]	Haseki [Hurrem] Sultan Mosque	1540
[[İstanbul]]	Yunus Bey (Dıragömân) Mosque	1541
[[İstanbul]]	Muhyiddin [Mehmed] Çelebi (Müfti) Mosque	1542
[[İstanbul]]	[Hanım Sultan] Osman Şahın validesi Mosque	1543
Basra	Ayas Paşa [Maktul] Mosque	1546
Aleppo	Husrev Paşa [Deli] Mosque*	1546
Bolvadin	Rüstem Paşa Mosque	1546
[[İstanbul]]	Mihrümah Sultan (Rüstcm Paşa sultânı) Mosque*	1547
[İstanbul]	[Sultan Süleymanl Şehzade Sultan Mehmed Mosque*	1548
[[İstanbul]]	İbrahim Paşa (Hâdım) Mosque	1551
Diyarbakır (Âmid)	İskender Paşa [Çerkeş] Mosque*	1551
Tekirdağ	Rüstem Paşa Mosque*	1552
[[İstanbul]]	Şah Sultan (Merkez Efendi) Mosque	1552
Yevpatoriya	Tatar Han [Devlet Giray I] Mosque*	1552
[[İstanbul]]	Ebulfazl Efendi (Başdefterdâr) Mosque*	1553
[İstanbul]	Mahmud Aga (Oapu ağası) Mosque*	1553
[[İstanbul]]	Abdurrahman Çelebi (Qadı-asker) Mosque*	1554
Damascus	Sultan Süleyman Mosque*	1554
[[İstanbul]]	Sinan Paşa (Qüpûdân) Mosque*	1555
[[İstanbul]]	Şah Sultan Mosque*	1555
Mostar	Mehmed Paşa (Şöfi) Mosque	1557
[İstanbul]	Sultan Süleyman Mosque*	1557
[[İstanbul]]	Ahmed Paşa [Kara] (Vezîr-i a'zam) Mosque*	1558
Kastamonu	Ferhad Paşa (Vezir) Mosque	1559
[[İstanbul]]	İskender Paşa (Bostancıbaşı) [Gazi] Mosque*	1559
[[İstanbul]]	Şehzade Cihangir Mosque	1559
[[İstanbul]]	Ahmedi Efendi (Mevlana Qadı-asker) Mosque	1560
Babaeski	Ali Paşa [Semiz] Mosque	1560
[[İstanbul]]	Hurrem Çavuş Mosque	1560
Ereğli [Tekirdağ]	Ali Paşa [Semiz] Mosque	1561
İsparta	Firdevs Bey Mosque	1561
Jerusalem	[Haseki Hurrem Sultan] Mosque*	1561
[[İstanbul]]	Molla Çelebi (Qâdîl'asker) Mosque	1561
[[İstanbul]]	Ferruh Kethüda Mosque	1562
Erzurum	Mustafa Paşa [Lala] Mosque	1562
[[İstanbul]]	Odabaşı [Behruz Ağa] Mosque	1562
[[İstanbul]]	Rüstem Paşa Mosque*	1562
Karapınar	Sultan Selim [II] Mosque"	1563
Kirkuk	Sultan Süleyman Mosque	1563
Ankara	Cenabi Ahmed Paşa Mosque	1565
[[İstanbul]]	Mihrümah Sultan (Rüstem Paşa sultânı) Mosque'	1565
Kütahya	Hüseyin Paşa [Lala] Mosque*	1566
Buda (Büdin)	Mustafa Paşa |Sokollu| Mosque*	1566
Van	Husrev Paşa [Köse] Mosque*	1567
Lüleburgaz	Mehmed Paşa [Sokollu] (Vezîr-i a'zam) Mosque*	1569
Baghdad	Murad Paşa Mosque	1570
[[İstanbul])	Mehmed Paşa | Sokollu) (Vezîr-i a'zam) Mosque*	1571
Diyarbakır (Âmid)	Behram Paşa Mosque	1572
İzmit	Pertev Paşa Mosque*	1573
Payas	Mehmed Paşa [Sokollu] (Vezîr-i a'zam) Mosque1*	1574
Edirne	Sultan Selim [II] Mosque*	1574
Çatalca	Ferhad Paşa (Vezir) Mosque	1575
Hafsa	Kasım Paşa (veled-i [Sokollu] Mehmed Paşa) Mosque	1576
Edime	Mustafa Çelebi (Defterdar) Mosque	1576
[[İstanbul]]	Mehmed Paşa [Sokollu] (Vezîr-i a'zam) Mosque	1577
[[İstanbul]]	Piyale Paşa [Kaplıdan] Mosque	1579
[[İstanbul]]	Ali Paşa (Qılıç) [Kapudan] Mosque*	1580
[[İstanbul]]	Şemsi Ahmed Paşa Mosque*	1580
([İstanbul]]	Zal Mahmud Paşa Mosque*	1580
[[İstanbul]]	Valide [Nurbanu] Sultan Mosque*	1583
Ilgın	Mustafa Paşa [Lala] Mosque*	1584
Kayseri	Ahmed Paşa [Hacı] (Qızıl Ahmedlu, Şam Beylerbeyi) Mosq	1585
[[İstanbul]]	Hacı Evhad Mosque	1585
[[İstanbul]]	Husrev Çelebi (Hoca, Ramazan Efendi) Mosque	1585
[[İstanbul]]	Mehmed Ağa [Darüssaade Ağası] Mosque*	1585
[[İstanbul]]	Mesih [Mehmed] Paşa (Vezîr-i a'zam) Mosque*	1585
Manisa	Sultan Murad [III| Mosque	1586
[[İstanbul]]	Mehmed Paşa (Nişancı. Vezir) Mosque*	1588
Diyarbakır (Âmid)	Ahmed Paşa (Melek) Mosque	1591

Table 10: Timetable of Mimar Sinan's Life and His *Mescid*s (Dates taken from Necipoğlu 2013)

			1488-9 1512-3	Ağırnas Kayseri			Childhood	Bayezid II
			1512	İstanbul Acemi Ocağı			Acemioğlan	Selim II
			1514	Çaldıran Camp.				
			1517	Cairo Camp.				
			1521	Belgrade Camp.			Jannisary	Süleyman I
			1522	Rhodes Camp.				
İstanbul	Saraçhane (Ahür) Mescidi	1526	1526	Mohachs Camp.			Atlı sekban	
İstanbul	Üçbaş mescidi	1530	1532	German Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	
İstanbul	[Muhsine Hatun) (İbrahim P. Zev.) mescidi	1532	1533	Baghdad Camp.				
[İstanbul]	Abdi Çelebi (Rüznâmeci) mescidi	1533	1534 -5	Persian Camp.				
			1536	Corfu & Pulia Camp.			Haseki	
			1538	Moldavia Camp.				
İstanbul	Abdi Subaşı mescidi	1539	1538			İstanbul	Mimar Başı	
[İstanbul]	Mehmed Çelebi (Defterdâr-ı mal) mescidi	1540						
			1543 1548	Şehzade Sultan Mehmed Mosque*				
Istanbul	Davud Afca (Saray Ağası) mescidi	1554	1550	Sultan Süleyman Mosque*				
			1554 1557		Kırkçeşme Water Supply			
			1564					
			1565 1566		B. Çekmece Bridge			
			1568	Sultan Selim [II] Mosque*		Edirne		Selim II
İstanbul	Sinan Ağa (Mi'mârbaşı) mescidi	1573	1574					
| İstanbul	İvaz (Hacı, Qaşâb) mescidi	1575				İstanbul		Murat III
[İstanbul]	Hamza (Hâcî) mescidi	1577						
Istanbul	Çivizade Efendi (Müftı) mescidi	1582						
[İstanbul)	Hacegizade mescidi	1585	1584	Mecca (hac)				
			1588					

Table 11: Timetable of Mimar Sinan's Life and His *Medrese*s (Dates taken from Necipoğlu 2013)

			1488-9 1512-3	Ağırnas Kayseri			Childhood	Bayezid II
			1512	Istanbul Acemi Ocağı (Dülgerlik)			Acemioğlan	Selim I
			1514	Çaldıran Camp.				
			1517	Cairo Camp.				
			1521	Belgrade Camp.			Jannisary	Süleyman I
			1522	Rhodes Camp.				
[İstanbul]	Mustafa Paşa [Çoban] (Mlrîmirân-ı Mışr) medresesi*	1523	1526	Mohachs Camp.			Atlı sekban	
[İstanbul]	Üçbaş (Avcı-başı) medresesi	1530	1532	German Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	
			1533	Baghdad Camp.				
Istanbul	Ali Paşa (Hâdım) medresesi*	1534	1534 -5	Persian Camp.				
İstanbul	Kasım Paşa [Güzelce] medresesi*	1537	1536	Corfu & Pulia			Haseki	
[Istanbul]	Yahya Çelebi medresesi	1538	1538	Moldavia Camp.				
[İstanbul]	Haseki [Hurrem] Sultan medresesi*	1539	1538			İstanbul	Mimar Başı	
[İstanbul]	Yunus (Dırağömân) medresesi	1541						
İstanbul	Osman Şah Validesi medresesi	1543	1543	Şehzade Sultan Mehmed Mosque*				
[İstanbul]	Şehzade Sultan Mehmed medresesi *	1546						
İstanbul	Mihrmümah Sultan (Rüstem Paşa sultânı) medresesi*	1547						
İstanbul	Sultan Selim (I) medresesi*	1548	1548					
İstanbul	Rüstem Paşa medresesi*	1550	1550	Sultan Süleyman Mosque*				
İstanbul	Sultan Süleyman medreseleri*	1552						
[Istanbul]	Mahmud Ağa (Qapu ağası) medresesi	1553	1554		Kırkçeşme Water Supply System			
İstanbul	Sinan Paşa [Kapudan] medresesi	1555	1557					
İstanbul	Ali Paşa [Semiz] (Vezir) medresesi	1558						
İstanbul	Cafer Ağa (Qapu ağası) medresesi	1559						
[Istanbul]	İbrahim Paşa [Hadım] medresesi	1560						
[İstanbul]	Ahmed Paşa [Kara] medresesi	1561						
Mecca	Sultan Süleyman medresesi	1564	1564					
			15665		B. Çekmece Bridge			
Damascus	Sultan Süleyman medresesi*	1566	1566					
Van	Husrev Paşa [Köse] medresesi*	1567						Selim II
Istanbul	[İsmihan] Mehmed Paşa [Sokollu] sultanı medresesi	1568	1568	Sultan Selim [II] Mosque*		Edirne		
İstanbul	Mihrümah Sultan (Rüstem Paşa sultânı) medresesi*	1569						
Lüleburgaz	Mehmed Paşa [Sokollu] (Vezir-i a'zam) medresesi*	1570						
İstanbul	Mehmed Paşa [Sokollu] (Vezîr-i a'zam) medresesi*	1571						
Edime	Sultan Selim (II) medresesi*	1572	1574					
İstanbul	Hamid Efendi (Müftı) medresesi	1575				İstanbul		Murat III
[İstanbul]	Valide Sultan [Nurbanu] medresesi*	1579						
[İstanbul]	Zal [Mahmud] Paşa medresesi*	1579						
[İstanbul]	Şemsi Ahmed Paşa medresesi	1580						
İstanbul	Emir Efendi (Ma'lül, Ma'lülzâde) medresesi	1582						
[Istanbul]	Mehmed Ağa [Habeşi] medresesi	1582						
[İstanbul]	Hacegizade medresesi	1585	1584	Mecca				
			1588					

Table 12: Timetable of Mimar Sinan's Life and His *Türbe*s (Dates taken from Necipoğlu 2013)

			1488-9 1512-3	Ağırnas Kayseri		Childhood	Bayezid II
[İstanbul]	Bali Paşa türbesi	1495					
			1512	İstanbul Acemi Ocağı (Dülgerlik)		Acemioğlan	Selim I
			1514	Çaldıran Camp.			
			1517	Cairo Camp.			
			1521	Belgrade Camp.		Jannisary	Süleyman I
İstanbul	Sultan Selim [I] türbesi*	1522	1522	Rhodes Camp.			
Gebze	Mustafa Paşa [Çoban] (Mirlmîrân-ı Mısr) türbesi*	1523	1526	Mohachs Camp.		Atlı sekban	
İstanbul	Haseki [Hafsa] Sultan türbesi	1533	1532	German Camp.		Yayabaşı Kapıyayabaşı Zenberekçibaşı	
			1533	Baghdad Camp.			
			1534 -5	Persian Camp.			
			1536	Corfu & Pulia Camp.		Haseki	
			1538	Moldavia Camp.			
			1538		İstanbul	Mimar Başı	
İstanbul	Hayreddin [Barbaros] Paşa türbesi	1541					
İstanbul	Şehzade Sultan Mehmed türbesi*	1543	1543	Şehzade Sultan Mehmed Mosque*			
İstanbul	Husrev Paşa (Vezîr) türbesi*	1545					
			1548				
[İstanbul]	Sinan Paşa (Qâpüdaıı) türbesi*	1553	1550	Sultan Süleyman Mosque*			
			1554	Kırkçeşme Water Supply System			
İstanbul	Haseki [Hurrem] Sultan türbesi*	1557	1557				
İstanbul	Ahmed Paşa [Kara] (Vezîr-i a'zam) türbesi*	1558					
İstanbul	Rüstem Paşa türbesi*	1560					
İstanbul	İbrahim Paşa (Hâdım) türbesi*	1562	1564				
İstanbul	Ali Paşa [Semiz] (Vezîr-i a'zam) türbesi*	1565	1565	B.Çekmece Bridge			
İstanbul	Sultan Süleyman Türbesi*	1566	1566				
İstanbul	Mehmed Paşa [Sokollu] (Vezîr-i a'zam) türbesi*	1568	1568	Sultan Selim [II] Mosque*	Edirne		Selim II
Istanbul	Yahya (Şeyh) türbesi	1570					
[İstanbul]	İskender Paşa (Bostancıbaşı) [Gazi] türbesi*	1571					
[İstanbul]	Hüseyin Paşa [Lala] türbesi	1572					
[İstanbul]	Pertev Paşa türbesi*	1572					
[İstanbul]	Ebulfazl Efendi (Başdefterdâr) türbesi*	1574	1574				
[İstanbul]	Ahmed Paşa (Qibns Beglerbegisi, Arab) Türbesi	1575			İstanbul		Murat III
İstanbul	Sah-ı Huban türbesi	1575					
[İstanbul]	Hacı [Ahmed] Paşa [Kızıl Ahmedlu] türbesi	1576					
[İstanbul]	Sultan Selim [II] türbesi	1576					
Buda	Mustafa Paşa [Sokollu] türbesi*	1578					
[İstanbul]	Şehzadeler türbesi	1579					
İstanbul	Ahmed Paşa [Güzelce] (Vezîr-i a'zam) türbesi*	1580					
İstanbul	Ali Paşa (Qılıç) türbesi*	1580					
[İstanbul]	Şemsi Ahmed Paşa türbesi*	1580					
Istanbul	Zal [Mahmud] Paşa and [Şah] Sultan türbesi*	1580					
İstanbul	Siyavuş Pasha's children's tomb	1582					
[İstanbul]	Mehmed Ağa [Darüssaade Ağası | türbesi*	1585	1584	Mecca			
[İstanbul]	Mesih [Mehmed] Paşa (Vezîr-i a'zam) türbesi*	1585					
[Diyarbakır]	Osman Paşa [Özdemiroğlu] türbesi	1585					
Istanbul	Türbe-i duhterzâde-i Rüstem Paşa	1585					
[İstanbul]	Mehmed Paşa (Nişancı, Vezîr) türbesi*	1587	1588				

Table 13: Timetable of Mimar Sinan's Life and His *İmaret*s (Dates taken from Necipoğlu 2013)

Gebze	Mustafa Paşa [Çoban] (Mlrîmirân-ı Mışr) imar	1520s
İstanbul	Sultan Selim [I] İmareti*	1522
Jerusalem	[Haseki Hürrem Sultan] imaret*	1540
Svilengrad	[Haseki Hürrem Sultan] İmaret	1540
Istanbul	Şehzade Sultan Mehmed İmareti*	1543
[Istanbul]	[Mihrimah S.] (Rüstem P. Sultanı) imareti	1547
Tekirdağ	Rüstem Paşa İmareti	1552
Damascus	Sultan Süleyman İmareti	1554
Karapınar	Sultan Selim [II] İmareti*	1563
Lüleburgaz	Mehmed Paşa [Sokollu] İmareti*	1569
Payas	Mehmed P. [Sokollu] (Vezîr-i a'zam) İmareti	1574
Hafsa	Mehmed Paşa [Sokollu] İmareti	1576
Visegrad	Mehmed Paşa [Sokollu] İmareti	1577
[Istanbul]	Valide INurbanu] Sultan İmareti*	1579
Manisa	Sultan Murad İmareti	1586

1488-9 1512-3	Ağırnas Kayseri			Childhood	Bayezid II
1512	İstanbul Acemi Ocağı (Dülgerlik)			Acemioğlan	Selim I
1514	Çaldıran Camp.			Acemioğlan	Selim I
1517	Cairo Camp.			Acemioğlan	Selim I
1521	Belgrade Camp.			Jannisary	Süleyman I
1522	Rhodes Camp.			Jannisary	Süleyman I
1526	Mohachs Camp.			Atlı sekban	Süleyman I
1532	German Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	Süleyman I
1533	Baghdad Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	Süleyman I
1534 -5	Persian Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	Süleyman I
1536	Corfu & Pulia Camp.			Haseki	Süleyman I
1538	Moldavia Camp.			Haseki	Süleyman I
1538			İstanbul	Mimar Başı	Süleyman I
1543 1548	Şehzade Sultan Mehmed Mosque*		İstanbul	Mimar Başı	Süleyman I
1550	Sultan Süleyman Mosque*		İstanbul	Mimar Başı	Süleyman I
1554 1557	Sultan Süleyman Mosque*	Kırkçeşme Water Supply	İstanbul	Mimar Başı	Süleyman I
1564		Kırkçeşme Water Supply	İstanbul	Mimar Başı	Süleyman I
1565 1566		B.Çekmece Bridge	İstanbul	Mimar Başı	Süleyman I
1568	Sultan Selim [II] Mosque*	B.Çekmece Bridge	Edirne	Mimar Başı	Selim II
1574	Sultan Selim [II] Mosque*		Edirne	Mimar Başı	Selim II
			İstanbul	Mimar Başı	Murat III
1584	Mecca		İstanbul	Mimar Başı	Murat III
1588			İstanbul	Mimar Başı	Murat III

Table 14: Timetable of Mimar Sinan's Life and His *Mekteb*s, *Darüşşifa*s*, Darülkurra*s, *Darüttıb* (Dates taken from Necipoğlu 2013)

1488-9 1512-3	Ağırnas Kayseri	Childhood	Bayezid II
1512	İstanbul Acemi Ocağı	Acemioğlan	Selim I
1514	Çaldıran Camp.		
1517	Cairo Camp.		
1521	Belgrade Camp.	Jannisary	Süleyman I
1522	Rhodes Camp.		
1526	Mohachs Camp.	Atlı sekban	
1532	German Camp.	Yayabaşı Kapıyayabaşı Zenberekçibaş ı	
1533	Baghdad Camp.		
1534 -5	Persian Camp.		
1536	Corfu & Pulia Camp.	Haseki	
1538	Moldavia Camp.		

1538			İstanbul	Mimar Başı	Süleyman I
1543 1548	Şehzade Sultan Mehmed Mosque*				
1550	Sultan Süleyman Mosque*				
1554		Kırkçeşme Water Supply System			
1557					
1564					
1565 1566		B.Çekmece Bridge			
1568 1574	Sultan Selim [II] Mosque*		Edirne		Selim II
			İstanbul		Murat III
1584	Mecca (Hac)				
1588					

[Istanbul]	Sadi Çelebi (Müfti) darülkurrası	1538
[Istanbul]	Haseki [Hürrcm] Sultan Mektebi*	1539
Istanbul	Şehzade Sultan Mehmed Mektebi*	1543
Istanbul	Haseki [Hürrem] Sultan Darüşşifası*	1550
Istanbul	Sultan Süleyman Darüşşifası*	1550
Istanbul	Sultan Süleyman Mektebi*	1552
Istanbul	Sultan Süleyman Darülhadisi*	1556
Istanbul	[Sultan Süleyman] Darüttıb*	1556
Istanbul	Sultan Süleyman darülkurrası	1557
[Istanbul]	Mehmed Paşa [Sokollu] darülkurrası	1568
[Istanbul]	Valide [Nurbanu] Sultan Mektebi	1579
[Istanbul]	Valide [Nurbanu] Sultan Darüşşifası	1579
[Istanbul]	Valide [Nurbanu] Sultan darülkurrası*	1583
Edirne	Sultan Selim [II] darülkurrası*	1590

Table 15: Timetable of Mimar Sinan's Life and His *Tekke*s, Palace, *Köşk* (Dates taken from Necipoğlu 2013)

			1488-9 1512-3	Ağırnas Kayseri			Childhood	Bayezid II
			1512	Istanbul Acemi Ocağı (Dülgerlik)			Acemioğlan	Selim I
			1514	Çaldıran Camp.				
			1517	Cairo Camp.				
			1521	Belgrade Camp.			Jannisary	Süleyman I
			1522	Rhodes Camp.				
			1526	Mohachs Camp.			Atlı sekban	
			1532	German Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaş ı	
Baghdad	Abdülkadir Geylani (Şeyh) Tekkesi*	1534	1533	Baghdad Camp.				
Baghdad	Imam-ı A'zam [Abu Hanifa] Tekkesi*	1534	1534 -5	Persian Camp.				
lIstanbul]	İbrahim Paşa [Maktul] Palace	1536	1536	Corfu & Pulia Camp.			Haseki	
			1538	Moldavia Camp.				
			1538				Mimar Başı	
			1543 1548	Şehzade Sultan Mehmed Mosque*				
[Istanbul]	Üsküdar Palace	1551	1550	Sultan Süleyman Mosque*	Kırkçeşme Water Supply	İstanbul		
[Istanbul]	Şah Sultan Tekkesi*	1555	1554					
			1557					
			1564					
			1565 1566		B.Çekmece Bridge			
[Istanbul]	Mehmed Paşa [Sokollu] Tekkesi*	1571	1568	Sultan Selim [II] Mosque*		Edirne		Selim II
			1574					
[Istanbul]	Sultan Murad [III] köşkü	1578				İstanbul		Murat III
[Istanbul]	Valide [Nurbanu] Sultan Tekkesi*	1579						
			1584	Mecca				
			1588					

Table 16: Timetable of Mimar Sinan's Life and His Bridges, Aqueducts (Dates taken from Necipoğlu 2013)

			1488-9 1512-3	Ağırnas Kayseri			Childhood	Bayezid II
			1512	İstanbul Acemi Ocağı (Dülgerlik)			Acemioğlan	Selim I
			1514	Çaldıran Camp.				
			1517	Cairo Camp.				
			1521	Belgrade Camp.			Jannisary	Süleyman I
			1522	Rhodes Camp.				
[Svilengrad]	Mustafa Paşa [Çoban] Bridge	1528	1526	Mohachs Camp.			Atlı sekban	
			1532	German Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	
			1533	Baghdad Camp.				
Gebze	Sultan Suleyman's other bridges	1534	1534 -5	Persian Camp.				
			1536	Corfu & Pulia Camp.			Haseki	
			1538	Moldavia Camp.				
			1538			İstanbul	Mimar Başı	
			1543 1548	Şehzade Sultan Mehmed Mosque*				
			1550 1554 1557	Sultan Süleyman Mosque*	Kırkçeşme Water Supply			
[Istanbul]	Havz-ı kebir	1563						
[Istanbul]	Bend [Paşa Dere] Aquaduct	1564						
[Istanbul]	Gözlüce [Güzelce] (Qâvuq) Aquaduct	1564						
[Istanbul]	Mağlova Aquaduct	1564						
[Istanbul]	Uzun Aquaduct	1564						
[Istanbul]	Eğri Aquaduct	1564	1564					
			1565 1566		B.Çekmece Bridge			
[B.çekmece]	[Sultan Süleyman] Büyükçekmece Brd.	1568	1568	Sultan Selim [II] Mosque*		Edirne		Selim II
			1574					
Visegrad	Mehmed Paşa [Sokollu]Bridge	1577				İstanbul		Murat III
			1584	Mecca				
			1588					

Table 17: Timetable of Mimar Sinan's Life and His *Kervansarays* (Dates taken from Necipoğlu 2013)

Location	Kervansaray	Year	Date	Event / Work	Project	Place	Position	Sultan
			1488-9 1512-3	Ağırnas Kayseri			Childhood	Bayezid II
			1512	İstanbul Acemi Ocağı (Dülgerlik)			Acemioğlan	Selim I
			1514	Çaldıran Camp.				
			1517	Cairo Camp.				
			1521	Belgrade Camp.			Jannisary	Süleyman I
[İstanbul]	[Sultan Selim I] kervansaray	1522	1522	Rhodes Camp.				
Eskişehir	[Mustafa Paşa (Çoban)] kervansaray	1525	1526	Mohachs Camp.			Atlı sekban	
			1532	German Camp.			Yayabaşı Kapıyayabaşı Zenberekçibaşı	
			1533	Baghdad Camp.				
			1534-5	Persian Camp.				
			1536	Corfu & Pulia Camp.			Haseki	
			1538	Moldavia Camp.				
			1538				Mimar Başı	
[Istanbul]	[Şehzade Sultan Mehmed] kervansaray	1543	1543	Şehzade Sultan Mehmed Mosque*				
[İstanbul]	Rüstem Paşa kervansarayı	1544						
			1548					
Belen, Hatay	[Sultan Süleyman] kervansaray*	1550	1550	Sultan Süleyman Mosque*				
[Tekirdağ]	Rüstem Paşa kervansarayı	1552				İstanbul		
İstanbul	[Sultan Süleyman] kervansarayı	1554	1554		Kırkçeşme Water Supply			
Aleppo	Mehmed Paşa [Sokollu] hanı	1555						
			1557					
Edime	Rüstem Paşa kervansarayı	1560						
Karapınar	Sultan Selim [II] hanı*	1563	1564					
			1565		B.Çekmece Bridge			
B.kmece	Sultan Süleyman kervansarayı	1566	1566					
Edirne	Ali Paşa lSemiz] kervansarayı	1568	1568	Sultan Selim [II] Mosque*		Edirne		Selim II
Lüleburgaz	Mehmed Paşa [Sokollu] kervansarayı	1569						
Payas, Hatay	Mehmed Paşa [Sokollu]kervansarayı	1574	1574					
Hafsa	Mehmed Paşa [Sokollu] kervansarayı	1576				İstanbul		Murat III
[Visegrad,Bosnia]	Mehmed Paşa [Sokollu] kervansarayı	1577						
[İstanbul]	Valide [Nurbanu] Sultan hanı*	1579						
Ilgın, [Konya]	Mustafa Paşa [Lala] kervansarayı*	1584		Mecca				
			1588					

Table 18: Timetable of Mimar Sinan's Life and His *Hamam*s (Dates taken from Necipoğlu 2013)

[Istanbul]	Hayreddin Paşa [Barbaros] hamamı	1534
[Istanbul]	Yakub Ağa (Qapu ağası) hamamı	1547
[Istanbul]	İbrahim Paşa [Hadım] hamamı	1551
[İstanbul]	Merkez Efendi hamamı	1552
[Istanbul?]	I-Iascki Sultan hamamı	1553
[İstanbul]	Sinan Paşa (Qâpüdân) hamamı	1555
[Istanbul]	Haseki [Hurrem] Sultan hamamı	1556
İstanbul	Sultan Süleyman hamamı	1557
Karapınar	Sultan Selim-i Sani (Qarapînar Valide Sult.)	1563
[İstanbul]	Valide INurbanu] Sultan hamamı	1563
[Istanbul]	İskender Paşa [Bostancıbaşı, Gazi] hamamı	1564
Medina	Mehmed Paşa [Sokollu] hamamı	1565
[İstanbul]	Mihrümah Sul. (Rüslem P. sultânı) hamamı	1565
[Istanbull	Molla Çelebi (Oâdr'asker) hamamı	1565
Edirne	Mehmed Pasa [Sokollul] hamamı	1568
[Istanbul]	Haydar Paşa (Vezir) hamamı	1569
Hafsa	Mehmed Paşa [Sokollu] hamamı	1576
[Istanbul]	Valide Sultan hamamı	1581
[Istanbul]	Ali Paşa [Kılıç] (Qâpûdân) hamamı	1583
[Istanbul]	Kethüda Kadın hamamı	1585
[İstanbul]	[Mustafa] P.[Celalzade](Nişancı) hamamı	1585

1488-9 1512-3	Ağırnas Kayseri	Childhood	Bayezid II
1512	İstanbul Acemi Ocağı (Dülgerlik)	Acemioğlan	Selim I
1514	Çaldıran Camp.		
1517	Cairo Camp.		
1521	Belgrade Camp.	Jannisary	Süleyman I
1522	Rhodes Camp.		
1526	Mohachs Camp.	Atlı sekban	
1532	German Camp.	Yayabaşı Kapıyayabaşı Zenberekçibaşı	
1533	Baghdad Camp.		
1534-5	Persian Camp.		
1536	Corfu & Pulia Camp.	Haseki	
1538	Moldavia Camp.		

1538				Mimar Başı	Süleyman I
1543–1548	Şehzade Sultan Mehmed Mosque*				
1550–1557	Sultan Süleyman Mosque*				
1554–1564		Kırkçeşme Water Supply	İstanbul		
1565–1568		B.Çekmece Bridge			
1566					Selim II
1568–1574	Sultan Selim [II] Mosque*		Edirne		
1584	Mecca		İstanbul		Murat III
1588					

B. INVENTORY REGARDING THE CONSTRUCTION TECHNIQUE OF HISTORIC MONUMENTAL BUILDINGS

Table 19: An Inventory Study Regarding the Construction Technique of Historic Monumental Buildings

SOURCE	SCOPE OF SOURCE				AIM and/or APPROACH OF SOURCE						
Bibliography	Historical Period	Location	Number of Buildings (single/ multiple/ general)	Building Type	Study on Building/ s with a Holistic Approach	Study on Various Buildings' Sections for a Holistic Approach	Study on Particular Section/s of the Building/s	Study on Particular Element/ s of the Building/ s	Study on Materials of the Building/ s	Study on Tools and Process of the Construct ions	Study on Architect ure & Plan Organ. & Facade Organ.
Ahmet Efendi. (1335-37). *Tarih-i Cami-i Nur-u Osmani* . İstanbul: Tarihi Osmani Encümeni Mecmuası.	Ottoman Period (18.c)	İstanbul	Nur-u Osmaniye Mosque	Mosque	x						
Ahunbay, M. (2006). Bizans Yapım Teknikleri. In *Geçmişten Geleceğe Anadolu'da Malzeme ve Mimarlık Sempozyumu / UIA 2005 XXII. Dünya Mimarlık Kongresi 4-5 July 2005* (pp. 68-78). İstanbul: TMMOB Mimarlar Odası İstanbul Büyükkent Şubesi Yayınları.	Byzantine Period	-	-	-		x					
Ahunbay, M., & Ahunbay, Z. (2010). Zeyrek Camii'nde Restorasyon Çalışmaları (1997-1998, 2001-2006). *Kagir Yapılarda Koruma ve Onarım Semineri. 2* , pp. 33-53. İstanbul: KUDEB.	Byzantine Period (12.c)	İstanbul	Zeyrek Mosque	Church / Mosque	x						
Ahunbay, Z. (1988). Mimar Sinan Yapılarında Kullanılan Yapım Teknikleri ve Malzeme. In S. Bayram (Ed.), *Mimarbaşı Koca Sinan Yaşadığı Çağ ve Eserleri* (pp. 531-538). İstanbul: Vakıflar Genel Müdürlüğü.	Ottoman Period (16.c)	İstanbul Edirne Lüleburgaz	Mimar Sinan Buildings	Various		x					
Ahunbay, Z. (1995). Osmanlı Mimarlığında Od Taşı. *9. Milletlerarası Türk Sanatları Kongresi-Bildiriler (23-27 Sep 1991). 1* , pp. 27-33. Ankara: T.C. Kültür Bakanlığı Yayınları.	Ottoman Period	-	General	Various				x			
Akıncı, Ş. (1998). *İstanbul'un Fethinden Lale Devrine Kadar Osmanlı Kargir Mimarisinde Yapım Teknikleri 1453-1730.* İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Ottoman Period (15-18.c)	İstanbul	Multiple	Various		x					
Akman, M. S., Güner, A., & Aksoy, İ. H. (1986). The History and Properties of Khorasan Mortar and Concrete. *II. Uluslararası Türk-İslam Bilim ve Teknoloji Tarigi Kongresi-Bildiriler. 1* , pp. 101-113. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Byzantine & Ottoman Period	İstanbul	General	Various					x		
Aksoy, İ. H. (1976). *Süleymaniye Unkapanı Yemiş Bölgesinin Geoteknik Etüdü ve Süleymaniye Camii Temel İncelemesi* . İstanbul: (Unpublished Master Thesis İTÜ İnşaat Fakültesi) .	Ottoman Period (16.c)	İstanbul	Single	Mosque			x (Foundation)				
Aksoy, İ. H. (1981). Osmanlı Döneminde Kullanılan Eski Su Boşaltma ve İnşaat Araçları. *I. Uluslararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi. 3* , pp. 47-56. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period	Anatolia	General	Various						x	
Aksoy, İ. H. (1982). *İstanbul'da Tarihi Yapılarda Uygulanan Temel Sistemleri.* İstanbul: İTÜ İnşaat Fakültesi.	-	İstanbul	General	Various			x (Foundation)				
Aksoy, İ. H. (1986). Büyükçekmece Köprüsü Temel İnşaatı. *II. Uluslararası Türk İslam Bilim Ve Teknoloji Tarihi Kongresi-Bildiriler. 2* , pp. 145-155. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	İstanbul	Single	Bridge			x (Foundation)				
Aktuğ-Kolay, İ. (1999). *Batı Anadolu 14. Yüzyıl Beylikler Mimarisinde Yapım Teknikleri* . Ankara: Atatürk Kültür Merkezi Başkanlığı.	Seljuk Period (14.c)	Western Anatolia	General	Various		x					
Aktuğ-Kolay, İ., & Çelik, S. (2007). Malzeme ve Teknoloji. In S. Mülayim (Ed.), *Bir Şaheser: Süleymaniye Külliyesi* (pp. 125-147). Ankara: Kültür ve Turizm Bakanlığı Yayınları.	Ottoman Period (16.c)	İstanbul	Single	Mosqeu					x		
Aktuğ, İ. (1986). 16. Yüzyılda Kullanılan Bazı İnşaat Malzemeleri ve Kullanım Yerleri. *II. Uluslararası Türk-İslam Bilim Ve Teknoloji Tarihi Kongresi-Bildiriler. 1* , pp. 71-76. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	İstanbul	General	Various					x		
Aktuğ, İ. (1989). *Batı Anadolu 14. Yüzyıl Beylikler Mimarisinde Yapım Teknikleri* . İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Principalities Period	Western Anatolia	General	Various		x					
Aktuğ, İ. (1995). Ayazma Camisi İnşaat Defteri. *9. Milletlerarası Türk Sanatları Kongresi-Bildiriler (23-27 Sep 1991)* (pp. 79-90). Ankara: T.C. Kültür Bakanlığı Yayınları.	Ottoman Period (16.c)	İstanbul	Single	Mosque						x	
Aktuğ, İ. (2000). A Survey on Timber as Building Material in the Ottoman Registers. *The Fourth International Congress on: Ottoman Archaeology in the World 22-24 March* (pp. 23-33). Tunus: Foundation Temimi-Zaghonan.	Ottoman Period	-	General	Various						x	
Aktuğ, İ. (2001). A Survey in Mortars and Plasters as Building Materials in the Ottoman Registers. *Historic Masonry Structures* (pp. 69-76). Cluj Napoca: Transsylvania Nostra.	Ottoman Period	-	General	Various					x		
Aktuğ, İ. (2006). Osmanlı Belgelerinde Yer Alan Bazı Ahşap Yapı Malzemesi Üzerine Düşünceler. *Sanat Tarihi Defterleri, 10,* 23-46.	Ottoman Period	-	General	Various					x		
Aktuğ, İ., & Çelik, S. (2006). Ottoman Stone Acquisition in the Mid-Sixteenth Century: The Süleymaniye Complex in İstanbul. *Muqarnas , 23* , 251-272.	Ottoman Period (16.C)	İstanbul	Multiple	Comlplex					x	x	
Aktuğ, İ., & Ersen, A. (1991). Bir 15. Yüzyıl Yapısı Olan Tahtakale Hamamı'nda Uygulanan Bazı Yapım Teknikleri. *TAÇ Vakfı Yıllığı, 1* , pp. 25-55.	Ottoman Period (15.c)	Edirne	Single	Hamam	x						
Anhegger, R. (1958). Beitrage zur Osmanischen baugeschichte II. *Istanbuler Mitteilungen* , 8, 40-56.	Ottoman Period	-	General	Various							
Anhegger, R. (1981). Topkapı Sarayı Veliahd Dairesi Onarımı. *Sanat Tarihi Yıllığı, IX-X* , 53-81.	Ottoman Period	İstanbul	Single	Palace	x						
Aran, B. (1982a). The Idea of "Wall" in the Architecture of Byzantine Constantinople. *XVI. International Byzantinischen Kongress, AKTEN II/6.* Wien.	Byzantine Period	Anatolia	General	Various					x		
Aran, B. (1982b). A New Evaluation of Byzantine Brickwork Based on the Method of Discriminant Analysis. *XVI. International Byzantinischen Kongress, AKTEN II/6.* Wien.	Byzantine Period	Anatolia	General	Various			x (Wall)				
Arseven, C. E. (1928 & 1970). *Türk Sanatı* . İstanbul.	-	Anatolia	General	Various	x						
Arseven, C. E. (1943-52). *Sanat Ansiklopedisi* . İstanbul: Maarif Matbaası.		Anatolia	General	Various	x						
Arseven, C. E. (1952). *Les Arts Décoratif Turcs* . İstanbul.		Anatolia	General	Various	x						
Arseven, C. E. (1955-59). *Türk Sanatı Tarihi, Menşeinden Bugüne Kadar Mimari, Heykel, Resim, Süsleme ve Tezyini Sanatları* . İstanbul: Milli Eğitim Basımevi.		Anatolia	General	Various							x

SOURCE	SCOPE OF SOURCE				AIM and/or APPROACH OF SOURCE						
Bibliography	**Historical Period**	**Location**	**Number of Buildings (single/ multiple/ general)**	**Building Type**	**Study on Building/s with a Holistic Approach**	**Study on Various Buildings' Sections for a Holistic Approach**	**Study on Particular Section/s of the Building/s**	**Study on Particular Element/s of the Building/s**	**Study on Materials of the Building/s**	**Study on Tools and Process of the Constructions**	**Study on Architecture & Plan Organ. & Facade Organ.**
Aru, K. A. (1949). *Türk Hamamları Etüdü* . İstanbul: T.A.O Matbaacılık.	Seljuk & Ottoman Period	Anatolia	General	Hamam		x					
Bakırer, Ö. (1981). *Selçuklu Öncesi ve Selçuklu Dönemi Anadolu Mimarisinde Tuğla Kullanımı* . Ankara: ODTÜ.	Seljuk Period	Anatolia	General	Various					x		
Bakırer, Ö. (1986). 16. Yüzyıl Osmanlı Mimarisinde Pencerelere İlişkin Biçim ve Malzeme Özellikleri. *II. Uluslararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler. 1,* pp. 113-127. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	Anatolia	General	Various					x		
Barkan, Ö. L. (1972-79). *Süleymaniye Cami ve İmareti İnşaatı (1556-57)* . Ankara: Türk Tarih Kurumu.	Ottoman Period (16.c)	İstanbul	Single	Mosque					x	x	
Batur, A. (1970). Osmanlı Camilerinde Almaşık Duvar Üzerine. *Anadolu Sanatı Araştırmaları* , 2, 135-208.	Ottoman Period	Anatolia	General	Various			x (Wall)				
Batur, A. (1974). *Osmanlı Camilerinde Kemer: Strüktür - Biçim İlişkisi Üzerine Bir Deneme*, (1300-1730). İstanbul: İTÜ Mimarlık Fakültesi.	Ottoman Period	Anatolia	General	Mosque				x (Arch)			
Batur, A. (1980). *Osmanlı Camilerinde Eğrisel Örtüler ve Geçiş Öğeleri, Sorunlar ve Biçimler, 1300-1600* . İstanbul: (Unpublished Doçentlik Tezi İTÜ Mimarlık Fakültesi).	Ottoman Period	Anatolia	General	Mosque			x (Superrstructure & Transition Elements)				
Batur, A. (1986). Osmanlı Camilerinde Geçiş Öğelerinin Evrimi, Mimar Sinan'ın Katkısı. *II. Uluslararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler. 2* , pp. 207-217. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	Anatolia	General	Mosque			x (Transition Elements)				
Baytin, T. (1951). *Bacalar , Tekniği-Yapısı-Mimarisi ve Türk Yapıcılığında Baca.* İstanbul: İTÜ.	-	Anatolia	General	-				x (Chimneys)			
Binan, D. U. (2008). Ortaçağ Anadolu Türk Mimarisinde Taşçı İşaretlerinin Tanımlama, Belgeleme ve Değerlendirilmesi. Geçmişten Geleceğe Su Yapılarında Taş Sempozyumu, 19-20 Dec, (pp. 143-152). Antalya.	Medieval Age	Anatolia	General	Various					x		
Binan, M. (1952). *Türk Saçak ve Kornişleri: İlk Çağlar, Selçuk ve Osmanlı Devirleri, Yabancı Mimari Devirlerle Mukayese* . İstanbul: İTÜ Mimarlık Fakültesi Yayını.	Seljuk & Ottoman Period	Anatolia	General	Various				x (Cornice & Eave)			
Binan, M. (1961). *Tabii Taş Duvar: Blok Taş Duvarlar, Blok ve Plak Kaplama Duvarlar* . İstanbul: İTÜ Mimarlık Fakültesi Yayını.	-	Anatolia	General	Various			x (Wall)				
Bozkurt, O. (1952). *Koca Sinan'ın Köprüleri, XVI. Asır Osmanlı Medeniyeti İçinde Sinan, Köprülerinin Mimari Bakımdan Tetkiki, Silüet ve Abide Kıymetleri* . İstanbul.	Ottoman Period (16.c)	Anatolia	Multiple	Bridge		x					
Büyükdıgan, İ. (1988). *İkinci Murat Çağı Edirne Hamamlarında Alçı Mukarnas Bezeme.* İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Ottoman Period (15.c)	Edirne	Multiple	Hamam				x (Muqarnas)			
Büyükdıgan, İ. (2001). Muqarnas Domes in Edirne. *Architectural Science Review* , 44, 161-171.	Ottoman Period (15.c)	Edirne	Multiple	Hamam				x (Muqarnas)			
Cafer Efendi. (2005). *Risâle-i mi'mâriyye: Ca'fer Efendi 1023/1614 Topkapı Sarayı Müzesi Kütüphanesi Ms, Yeni Yazma 339* . (İ. A. Yüksel, Ed.) İstanbul: İstanbul Fetih Cemiyeti.	Ottoman Period (17.c)	İstanbul	Multiple	Various						x	x
Crane, H. (1987). *Risale-i Mi'mariyye, An Early-Seventeenth-Century Ottoman Treatise on Architecture, Facsimile with Translation and Notes* . Leiden, New York: E. J. Brill.	Ottoman Period (17.c)	İstanbul	Multiple	Various						x	
Çamlıbel, A. N. (1984). *Geleneksel Yapılarda Stabilitenin İyileştirilmesi, Temellerin Takviyesi* . İstanbul: Birsen Kitabevi Yayınları.							x (Foundation)				
Çamlıbel, N. (1993). *Mekan Örtüsü Olarak Tonozlar ve Kubbeler* . İstanbul: Yıldız Teknik Üniversitesi-Mimarlık Fakültesi.			General	Various				x (Vault & Dome)			
Çeçen, K. (1984). *İstanbul'da Osmanlı Devrindeki Su Tesisleri* . İstanbul: İTÜ İnşaat Fakültesi.	Ottoman Period	İstanbul	Multiple	Water Supply	x						
Çeçen, K. (1986). 16. Yüzyılda İstanbul'da Yapılan Su Tesisleri. *II. Uluslararası Türk-İslam Bilim Ve Teknoloji Tarihi Kongresi - Bildiriler. 3* , pp. 105-122. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	İstanbul	Multiple	Water Supply		x					
Çeçen, K. (2000). *İstanbul'un Osmanlı Dönemi Su Yolları* . İstanbul: Renk Ajans.	Ottoman Period	İstanbul	Multiple	Water Supply	x						
Çelik, S. (2000). Ahi Çelebi Camisi'nin Özgün Tasarım ve Onarım Evreleri. *Celal Esad Arseven Anısına Sanat Tarihi Semineri Bildirileri 7-10 March 1994* (pp. 327-337). İstanbul: İTÜ.	Ottoman Period (15.c)	İstanbul	Single	Mosque	x						
Çelik, S. (2001). *Mevcut Belgeler Işığında Süleymaniye Külliyesi'nin Yapım Süresi.* İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Ottoman Period (16.c)	İstanbul	Multiple	Complex					x	x	
Çelik, S. (2009). *Süleymaniye Külliyesi Malzeme, Teknik ve Süreç* . Ankara: Atatürk Kültür Merkezi Yayınları.	Ottoman Period (16.c)	İstanbul	Multiple	Complex	x				x	x	
Çetintaş, S. (1946). *Türk Mimari Anıtları, Osmanlı Devri: Bursa'da İlk Eserler.* İstanbul: Milli Eğitim Basımevi.	Ottoman Period (14.c)	Bursa	Multiple	Various		x					
Çetintaş, S. (1952). *Turk Mimari Anıtları: Osmanlı Devri: Bursa'da Murat I ve Bayezıt I Binaları* . İstanbul: Milli Eğitim Bakanlığı.		Bursa	Multiple	Various	x						
Doğanay, A. (2007). Taş İşçiliği ve Profiller. In S. Mülayim (Ed.), *Bir Şaheser: Süleymaniye Külliyesi* (pp. 151-188). Ankara: Kültür ve Turizm Bakanlığı Yayınları.	Ottoman Period (16.c)	İstanbul									
Downey, G. (1948). Byzantine Architects, Their Training and Methods. *Byzantion, 18* , 99-118.	Byzantine Period	-	General	Various						x	
Dölen, E. (1986). XVI. Yüzyılda Osmanlı Cam Fırınları. *II. Uluslararası Türk-İslam Bilim Ve Teknoloji Tarihi Kongresi-Bildiriler* . 1, pp. 239-250. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	-	General	Various					x		
Dündar, A. (2000). *Arşivlerdeki Plan ve Çizimler Işığı Altında Osmanlı İmar Sistemi (XVIII. ve XIX. Yüzyıl)* . Ankara: Kültür ve Turizm Bakanlığı.	Ottoman Period (18. & 19. c)	-	General	Various						x	
Emler, S. (1963). Topkapı Sarayı Restorasyon Çalışmaları. In *Türk Sanat Tarih Araştırma ve İncelemeleri* (Vol. 1, pp. 211-312). İstanbul: İstanbul Devlet Güzel Sanatlar Akademisi.	Ottoman Period (15.c)	İstanbul	Single	Palace	x						
Erguvanlı, K. (1949). *Hereke Pudingleri ile Gebze Taşlarının İnşaat Bakımından Etüdü ve Civarlarının Jeolojisi* . İstanbul: İTÜ.	Ottoman Period	-	General	Various					x		
Erguvanlı, K. (1986). Keserek Taş Çıkarma Yöntemleri. *Mühendislik Jeolojisi Bülteni, 8* , 8-15.	-	-	General	Various						x	
Erguvanlı, K., & Ahunbay, Z. (1989). Mimar Sinan'ın İstanbul'daki Eserlerinde Kullandığı Taşların Mühendislik Jeolojisi ve Mimari Özellikleri / The Building Stones of Sinan's Monuments in Istanbul. *Mühendislik Jeolojisi Bülteni, 11* , 109-114.	Ottoman Period (16.c)	İstanbul	General	Various					x		

SOURCE	SCOPE OF SOURCE				AIM and/or APPROACH OF SOURCE						
Bibliography	**Historical Period**	**Location**	**Number of Buildings (single/ multiple/ general)**	**Building Type**	**Study on Building/s with a Holistic Approach**	**Study on Various Buildings' Sections for a Holistic Approach**	**Study on Particular Section/s of the Building/s**	**Study on Particular Element/s of the Building/s**	**Study on Materials of the Building/s**	**Study on Tools and Process of the Constructions**	**Study on Architecture & Plan Organ. & Facade Organ.**
Erguvanlı, K., & Sayar, M. (1962). *Türkiye Mermerleri ve İnşaat Taşları.* İstanbul: İstanbul Üniversitesi Maden Fakültesi.									x		
Erguvanlı, K., Eriş, I., Ahunbay, M., & Ahunbay, Z. (1988). The Significance of Research on Old Quarries for the Restoration of Historic Buildings with Special Reference to Marmara Region, Turkey. *The Engineering Geology of Ancient Works, Monuments and Historical Sites: Preservation and Protection, Conference Papers of an International Symposium Organized by the Greek National Group of IAEG, Athens, 19-23 September 1988* (pp. 631-638). Rotterdam: Balkema.		Marmara Region							x		
Eriç, M. (1986). Sinan'ın Malzeme Kullanım Anlayışı. *II. Uluslararası Türk-İslam Bilim Ve Teknoloji Tarihi Kongresi-Bildiriler. 2* , pp. 125-135. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	İstanbul	General	Various					x		
Ersen, A. (1986). *Erken Osmanlı Mimarisinde Cephe Biçim Düzenleri ve Bizans Etkisinin Niteliği* . İstanbul: İTÜ Mimarlık Fakültesi Yayınları.	Ottoman Period (Early)	-	General	Various			x (Facade)				
Ersen, A. (1990). *Orta ve Geç Devirde Bizans Mimarisinin Merkez (İstanbul) ve Yunanistan Örneklerindeki Üslup Farkı* . Sanat Tarihi Araştırmaları Dergisi, 7, 2-16.	Byzantine Period	İstanbul & Greece	General	Various				x (Opennings, apsis, drums & domes)			
Ersen, A., & Güleç, A. (1991). Geleneksel Harçlar Konusunda Bir Araştırma, Tahtakale Hamamı. *TAÇ Vakfı Yıllığı, 1* , pp. 56-75.	Ottoman Period (15.c)	Edirne	Single	Hamam					x		
Eser, L. (1977). *Geleneksel ve Gelişmiş Geleneksel Yapı.* İstanbul: İTÜ Mimarlık Fakültesi.			General	Various	x						
Eyice, S. (1953). İstanbul'da Bazı Cami ve Mescid Minareleri. *Türkiyat Mecmuası, 10,* 247-268.	Ottoman Period	İstanbul	Multiple	Minaret		x					
Eyice, S. (1960). İznik'te Büyük Hamam ve Osmanlı Devri Hamamları Hakkında Bir Deneme. *Tarih Dergisi* , XI(15), 108-120.	Ottoman Period	İznik	Multiple	Hamam							x
Eyice, S. (1963a). *Son Devir Bizans Mimarisi* . İstanbul: İ.Ü. Edebiyat Fakültesi Yayını.	Byzanitine Period	-	Multiple	Various							x
Eyice, S. (1963b). İstanbul Minareleri. In *Türk Sanatı Tarihi Araştırma ve İncelemeleri* (Vol. 1, pp. 31-132). İstanbul: İstanbul Devlet Güzel Sanatlar Akademisi.		İstanbul	Multiple	Minaret			x				
Eyice, S. (1976). Türk Sanatında Şebekeler, Parmaklıklar. *Sanat Dünyamız, 6* , 32-41.	-	-	General	Various				x (Grill)			
Eyice, S. (1981). Osmanlı Devri Türk Yapı Sanatında Damgalı Tuğlalar. *Sanat Tarihi Yıllığı, IX-X* , 155-162.	Ottoman Period	-	General	Various					x		
Eyüpgiller, K. K. (2010). II. Bayezid Hamamı Restorasyonu. *Kagir Yapılarda Koruma ve Onarım Semineri. 2* , pp. 54-61. İstanbul: KUDEB.	Ottoman Period (16.c)	İstanbul	Single	Hamam	x						
Goodwin, G. (1977). The Reuse of Marble in the Eastern Mediterranean in Medieval Times. *Journal of the Royal Asiatic Society of Great Britain and Ireland, 1* , 17-30.	Medieval Age	Eastern Mediterranean	General	Various					x		
Gurlitt, C. (1999). *İstanbul'un Mimari Sanatı = Architecture of Constantinople = Die Baukunst Konstantinopels.* (R. Kızıltan, Trans.) Ankara: Enformasyon ve Dokümantasyon Hizmetleri Vakfı.	-	İstanbul	General	Various							x
Hochhut, P. (1986). *Die Moschee Nuruosmaniye, Beiträge zur Baugeschichte nach osmanischen Quellen* . Berlin: Klaus Schwarz Verlag.	Ottoman Period (18.c)	İstanbul	Single	Mosque	x						
İpekoğlu, B. (2009). Tarihi Hamam Yapılarında Yapısal Sorunlar ve Güçlendirme Uygulamaları. In İ. Nardereli (Ed.), *Kagir Yapılarda Koruma ve Onarım Semineri. 1* , pp. 102-111. İstanbul: KUDEB.	Seljuk & Ottoman Period	Western Anatolia	Multiple	Hamam		x					
İzmirligil, Ü. (2008). Side Su Yolu: Geleneksel Malzeme ve Yapım Teknikleri. *Geçmişten Geleceğe Su yapılarında Taş Sempozyumu 19-20 Dec,* (pp. 46-51). İstanbul.	-	Side	Single	Water Supply	x				x		
Kahya, Y. (1984). *Cafer Ağa Medresesi Restorasyon Projesi* . İstanbul: (Unpublished Master Thesis İTÜ Sosyal Bilimler Enstitüsü).	Ottoman Perido (16.c)	İstanbul	Cafer Ağa Medresesi	Medrese	x						
Kahya, Y. (1991). *İstanbul Bizans Mimarisinde Kullanılan Tuğlanın Fiziksel Ve Mekanik Özellikleri* . İstanbul: (Unpbulished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Byzantine Period	İstanbul	General	Various					x		
Karaesmen, E. (1999). XVI. Yüzyılın Osmanlı İmparatorluğunda Yapı Teknolojisi. In K. Çeçen (Ed.), *Osmanlı İmparatorluğunun Doruğu 16. Yüzyıl Teknolojisi* (pp. 111-134). İstanbul: İstanbul Büyükşehir Belediyesi İstanbul Su ve Kanalizasyon İdaresi.	Ottoman Period (16.c)	İstanbul Edirne	General	Mosque & Bridge	x						
Klinghardt, K. (1927). *Türkische Baeder.* Stuttgart: Julius Hoffmann.	-	-	Multiple	Hamam		x					
Kuban, D. (1981). Notes on Building Technology of the 18th Century The Building of The Mosque of Nuruosmaniye at Istanbul, According to 'Tarih-i Camii Şerif-i Nur-u Osmani. *I. Uluslararasu Türk-İslam Bilim ve Teknoloji Tarihi Kongresi. 5* , pp. 271-293. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (17.c)	İstanbul	Single	Mosque	x						
Kuban, D. (1982). Tarih-i Cami-i Şerif-i Nur-u Osmani ve XVIII. Yüzyıl Osmanlı Yapı Tekniği Üzerine Gözlemler. In *Türk ve İslam Sanatı Üzerine Denemeler* (pp. 123-140). İstanbul: Arkeoloji ve Sanat Yayınları.	Ottoman Period (17.c)	İstanbul	Single	Mosque	x						
Kula Say, S. (2007). *Erken Dönem Osmanlı Hamamlarında Eğrisel Örtüye Geçiş Sistemleri* . İstanbul: (Unpublished Master Thesis İTÜ Fen Bilimleri Enstitüsü).	Ottoman Period (Early)	-	Multiple	Hamam			x (Transition Elements)				
Kula Say, S. (2011). *Kubbeye Doğru Erken Dönem Osmanlı Hamamlarında Eğrisel Örtüye Geçiş Sistemleri* . İstanbul:Tarihçi Kitabevi	Ottoman Period (Early)	Anatolia					x (Superstructure)				
Kulaç, Ü. (1981). Türk Taş Minarelerinde Döner Merdiven ve Metal Bağlantı Elemanların Yatay Yükleri Karşılamadaki İşlevleri. *I. Uluslararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi. 3* , pp. 235-240. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	-	-	Multiple	Minaret		x			x		
Kumbaracılar, İ. (1944). *İstanbul Sebilleri* . İstanbul: Milli Eğitim Matbaası.	-	İstanbul	Multiple	Sebil	x						
Kural, M. R. (1944). Çelebi Mehmed'in Yeşil Türbesi ve 1941-1943 Restorasyonu. *Güzel Sanatlar* , 5.	Ottoman Period (15.c)	Bursa	Single	Tomb	x						
Kuşüzümü, K. H. (2010). Yapım Teknikleri Açısından İstanbul Minareleri. *Vakıf Restorasyon Yıllığı, 1* , 54-64.	Ottoman Period	İstanbul	Multiple	Minaret		x					
Madran, E. (2004). *Osmanlı İmparatorluğu'nun Klasik Çağlarında Onarım Alanının Örgütlenmesi* . Ankara: ODTÜ Mimarlık Fakültesi.	Ottoman Period	-	General	Various		x					
Mainstone, R. J. (1988). *Hagia Sophia, Architecture, Structure and Liturgy of Justinian's Great Church* . London: Thames and Hudson.	(6.c)	İstanbul	Single	Cathedral	x						
Mango, C. (1985). *Byzantine Architecture* . Milan: Electa Editrice.	Byzantine Period	Anatolia	General	Various			x (Wall & Superstructure)		x		
Mazlum, D. (2001). *Osmanlı Arşiv Belgeleri Işığında 22 Mayıs 1766 İstanbul Depremi ve Ardından Gerçekleştirilen Yapı Onarımları.* İstanbul: (Unpbulished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Ottoman Period (18.c)	İstanbul	General	Various			x				

SOURCE	SCOPE OF SOURCE				AIM and/or APPROACH OF SOURCE						
Bibliography	Historical Period	Location	Number of Buildings (single/ multiple/ general)	Building Type	Study on Building/s with a Holistic Approach	Study on Various Buildings' Sections for a Holistic Approach	Study on Particular Section/s of the Building/s	Study on Particular Element/s of the Building/s	Study on Materials of the Building/s	Study on Tools and Process of the Constructions	Study on Architecture & Plan Organ. & Facade Organ.
Mercangöz, Z. (1995). Batı Anadolu'da Türk Yapılarının Duvar Tekniği ve Tuğla Süslemelerinin Kaynağı Üzerine Düşünceler. *9. Milletlerarası Türk Sanatları Kongresi İstanbul 1991- Bildirileri* , 2, pp. 485-495. İstanbul.	Byzantine & Ottoman Period (Early)	Western Anatolia	General	Various			x (Wall)				
Nayır, Z. (1975). *Osmanlı Mimarlığı'nda Sultan Ahmet Külliyesi ve Sonrası (1609-90)* . İstanbul: İTÜ Mimarlık Fakültesi.	Ottoman Period (17.c)	İstanbul	Multiple	Complex							
Neftçi, A. (2002). *Lâleli Külliyesi'nin İnşaat Süreci* . İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bilimleri Enstitüsü).	Ottoman Period (18.c)	İstanbul	Multiple	Complex						x	
Oğuz, B. (1986). On the Origins of the Ottoman Building Material's Standardisation in the XVIth Century. *II Ulsulararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler. 1,* pp. 65-71. İstanbul: İTÜ Bİlim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	Anatolia	General	Various						x	
Ousterhout, R. (1999). *Master Builders of Byzantium* . Princeton, N.J.: Princeton University Press.	Byzantine Period	-	General	Various							
Ousterhout, R. (2004). The East, the West, and the Appropriation of the Past in Early Ottoman Architecture. *Gesta* , 43(2), 165-176.	Ottoman Period (14.&15.c)	Anatolia									x
Ödekan, A. (1986). Some Observations on Muqarnas Decorations of the Portal Coverings of the Sinan Period. *II. Uluslararası Türk-İslam ve Teknoloji Tarihi Kongresi-Bildiriler. 2,* pp. 115-119. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period 13.-17.c)	Anatolia	General	Various				x (Portal Muqarnas)			
Önge, Y. (1986). Koca Sinan'ın Hamamlarında Görülen Bir Yenilik Merkezi Kubbeli Örtü Sistemleri. *II. Uluslararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler. 2* , pp. 81-87. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period (16.c)	Anatolia	Multiple	Hamam			x (Superstructure)				
Özgönül, N., & Madran, E. (1986). Osmanlı Devletinde Yapı ve Onarım Alanında Kullanılan Malzemeler ve Sanatkar Ünvanları: Bir Birim Fiyat Listesi Denemesi. *II. Uluslararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler. 1* , pp. 77-88. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period	Anatolia	General	Various						x	
Peynircioğlu, H., Aksoy, İ. H., & Özudoğru. (1978). *Eminönü- Süleymaniye-Unkapanı Bölgesinin Geoteknik Etüdü ve Yeni Cami Temellerinin İncelenmesi* . İstanbul: İTÜ Technical Report.	Ottoman Period (17.c)	İstanbul	Single	Mosque			x (Foundation)				
Peynircioğlu, H., Toğrol, E., & Aksoy, İ. H. (1981). İstanbul'da Osmanlı Döneminde İnşa Edilen Camilerin Temelleri. *I. Uluslararası Türk-İslam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler. 3* , pp. 37-46. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Derneği.	Ottoman Period	İstanbul	Multiple	Mosque			x (Foundation)				
Reyhan, K. (2004). *Construction Techniques and Materials of the Ottoman Period Baths in Seferihisar-Urla region* . İzmir: (Unpublished Master Thesis İYTE Mühendislik ve Fen Bilimleri Enstitüsü).	Ottoman Period	Seferihisar - Urla	Multiple	Hamam	x						
Reyhan, K. (2011). *Architectural Characteristics and Construction Techniques of Domes in a Group of Ottoman Baths* . İzmir: (Unpublished Ph.D. Thesis İYTE Mühendislik ve Fen Bilimleri Enstitüsü).	Ottoman Period		Multiple	Hamam			x (Superstructure)				
Reyhan, K., & İpekoğlu, B. (2004). Osmanlı Dönemi Bir Grup Hamam Yapısında Malzeme. *2. Ulusal Yapı Malzemesi Kongresi ve Sergisi 6-8 Ekim 2004, Bildiriler (pp. 482-493)* . İstanbul: İTÜ.	Ottoman Period	Western Anatolia	Multiple	Hamam					x		
Rogers, J. M. (1982a). The State and the Arts in Ottoman Turkey, Part 1: The Stones of Süleymaniye. *International Journal of Middle East Studies, 14(1)* , 71-86.	Ottoman Period	İstanbul	Single	Mosque					x		
Rogers, J. M. (1982b). The State and The Arts in Ottoman Turkey, Part 2: The Furniture and Decoration of Süleymaniye. *International Journal of Middle East Studies, 14(3)* , 283-313.	Ottoman Period	İstanbul	Single	Mosque					x	x	
Rogers, J. M. (1983). Glass in Ottoman Architecture. *Istanbuler Mitteilungen* , 33.	Ottoman Period								x		
Sert, H. (2007). Geçmişten Günümüze Tarihi Köprüler. *Tarihi Eserlerin Güçlendirilmesi ve Geleceğe Güvenle Devredilmesi Sempozyumu, 1* , pp. 321-339. Ankara.			Multiple	Bridge	x						
Sert, H. (2008). Tarihi Köprülerde Taş Malzeme Kullanımı. *Geçmişten Geleceğe Su Yapılarında Taş Sempozyumu, 19-20 Dec* , (pp. 55-80). Antalya.			Multiple	Bridge					x		
Sönmez, N. (1991). *18. Yüzyıl Osmanlı Mimarisi İçin Bir Kaynak Olarak Ayazma Camii İnşaat Defteri* . İstanbul: (Unpublished Doçentlik Tezi YTÜ Fen Bilimleri Ensititüsü).	Ottoman Period (18.c)	İstanbul	Single	Mosque						x	
Sönmez, N. (1997). *Osmanlı Dönemi Yapı ve Malzeme Terimleri Sözlüğü* . İstanbul: YEM Yayınları.	-	-	General	Various				x	x		
Tanyeli, G. (1990). *Osmanlı Mimarlığında Demirin Strüktürel Kullanımı (15.-18. Yüzyıl)* . İstanbul: (Unpublished Ph.D. Thesis İTÜ Fen Bİlimleri Enstitüsü).	Ottoman Period	Anatolia	General	Various					x		
Tanyeli, G. (1991). Kanuni ve II. Selim Türbeleri - Teknik Çözümleme. *TAÇ Vakfı Yıllığ, 1* , pp. 97-113.	Ottoman Period (16.c)	İstanbul	Multiple	Tomb	x						
Tanyeli, G. (2000). 18. Yüzyıl Osmanlı Mimarlığında Yapım Süreci: Laleli Külliyesi Örneği. *Celal Esad Arseven Anısına Sanat Tarihi Semineri Bildirileri 7-10 March 1994* , (pp. 317-326). İstanbul.	Ottoman Period (18.c)	İstanbul	Multiple	Complex						x	
Tanyeli, G. (2009). Osmanlı Yapım Teknolojilerini Araştırmak. *Taşınmaz Kültür Varlıklarını Tespit ve Belgeleme Yöntemleri Koruma Sempozyumu,* (pp. 99-104). Mersin.	Ottoman Period	-	General	Various							
Tanyeli, G. (2009). Türkiye'de Mimarlık ve İnşaat Teknolojisi Tarihi Araştırmaları: Kısa bir Tarihçe ve Bibliyografya. *Türkiye Araştırmaları Lüteratür Dergisi, 7(13)* , 190-204.	-	Türkiye	General	Various							
Tanyeli, G., & Kuzucular, K. (1990). Osmanlı Mimarlığında Çift Örtü Sistemi. In N. Akın, A. Batur, & S. Batur (Eds.), *Osmanlı Mimarlığının 7 Yüzyılı: Uluslarüstü Bir Miras* (pp. 106-111). İstanbul: YEM Yayınları.	Ottoman Period	-	General	Various			x (Superstructure)				
Tanyeli, G., & Tanyeli, U. (1989a). Osmanlı Mimarlığında Devşirme Malzeme Kullanımı. *Sanat Tarihi Araştırmaları Dergisi* , 2(4), 23-31.	Ottoman Period	-	General	Various					x		
Tanyeli, G., & Tanyeli, U. (1989b). Structural Use of Iron in Ottoman Architecture. In C. A. Brebbia (Ed.), *Structural Repair and Maintenance of Historical Buildings* (pp. 13-22). Berlin: Computational Mechanics Publications.	Ottoman Period	-	General	Various					x		
Tanyeli, G., & Tanyeli, U. (1990). Osmanlı Yüzer Köprüleri. *ODTÜ Mimarlık Fakültesi Dergisi, 10(1-2)* , 5-17.	Ottoman Period	-	Multiple	Bridge							
Tanyeli, G., & Tanyeli, U. (1993). 16. Yüzyıl Osmanlı Mimarlık Teknolojisi. In M. Saçlıoğlu, & G. Tanyeli (Eds.), *Türk Kültüründe Sanat ve Mimari, Klasik Dönem Sanatı ve Mimarlığı Üzerine Denemeler* (pp. 125-156). İstanbul: YEKUV Yayınları.	Ottoman Period (16.c)	-	General	Various		x					
Tanyeli, G., & Tanyeli, U. (2004). Ayasofya'da Strüktürel Demir Kullanımı. Metin Ahunbay'a Armağan, *Sanat Tarihi Defterleri, 8* , 23-58.	(6.c)	İstanbul	Single	Cathedral					x		
Tanyeli, G., Geçkinli, E., & Ata, A. (1990). Osmanlı Mimarisinde Kullanılan Demir Öğelerinin Üretim Teknolojisi. *VI. Arkeometri Sonuçları Toplantısı 28 May - 1 June* , pp. 109-125.	Ottoman Period (15-18.c)	İstanbul - Edirne	Multiple	Various						x	
Tanyeli, U. (1993). 16. Yüzyılda Osmanlı Su Teknolojisinin Kökenleri. *İstanbul, 7* , 99-105.	Ottoman Period (16.c)	-	General	Water Supply						x	

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Bibliography	Historical Period	Location	Number of Buildings (single/ multiple/ general)	Building Type	Study on Building/s with a Holistic Approach	Study on Various Buildings' Sections for a Holistic Approach	Study on Particular Section/s of the Building/s	Study on Particular Element/s of the Building/s	Study on Materials of the Building/s	Study on Tools and Process of the Constructions	Study on Architecture & Plan Organ. & Facade Organ.
Tanyeli, U. (2010). Ölçerek Görmek: Osmanlı Topoğrafya Teknolojisi (16.-18. Yüzyıl). In *Türkiye'nin Görsellik Tarihine Giriş* (pp. 17-45). İstanbul: Metis.	Ottoman Period (16-18.c)	-	General	Various						x	
Tayla, H. (2007). *Geleneksel Türk Mimarisinde Yapı Sistem ve Elamanları I-II* . İstanbul: TAÇ Vakfı Yayınları.	Princ. Seljuk & Ottoman Period	Anatolia	General	Various			x (Foundation, Wall)		x		
Uluengin, F., Uluengin, B., & Uluengin, M. B. (2010). *Osmanlı Anıt Mimarisinde Klasik Yapı Detayları* (3 ed.). İstanbul: YEM Yayın.	-	-	General	Various			x				
Ward-Perkins, J. B. (1958). Notes on the Structure and Building Methods of Early Byzantine Architecture. In D. T. Rice (Ed.), *The Great Palace of the Byzantine Emperors 2* (pp. 52-104). Edinburgh.	Byzantine Period	İstanbul	Single	Palace		x					
Wright, G. R. (1999). *Ancient Building Technology: Historical Background.* Boston: Brill.	Ancient	-	General	Various						x	
Wright, G. R. (2000). *Ancient Building Technologies Vol.2: Material.* Leiden: Brill.	Ancient	-	General	Various					x		
Wright, G. R. (2009). Ancient Building Technologies Vol.3: Construction. Leiden: Brill.	Ancient	-	General	Various					x	x	
Yavuz, A. T. (1981). Relieving Systems Used ın the Superstructure of Anatolian Islamic Monuments. In *I. Uluslararası Türk-Islam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler,3.* (pp. 241-255). İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Merkezi.	(12-17.c)	Anatolia	General	Various			x (Superstructure)				
Yavuz, A. T. (1983). *Anadolu Selçuklu Mimarisinde Tonoz ve Kemer* . Ankara: Kelaynak Yayınevi.	Seljuk Period	Anatolia	General	Various				x (Vault & Arch)			
Yavuz, A. T. (2005). Selçuklu Döneminde Malzeme ve Mimarlık İlişkisi. *Geçmişten Geleceğe Anadolu'da Malzeme ve Mimarlık Sempozyumu / UIA 2005 XXII. Dünya Mimarlık Kongresi 4-5 July 2005* (pp. 79-142). İstanbul: TMMOB Mimarlar Odası İstanbul Büyükkent Şubesi Yayınları.	Seljuk Period	Anatolia	General	Various					x		
Yavuz, A. T. (2008). Anadolu Selçuklu Mimarisinin Yapı Özellikleri. In D. Kuban (Ed.), *Selçuklu Çağında Anadolu Sanatı* (pp. 281-299). İstanbul: YKY.	Seljuk Period	Anatolia	General	Various		x			x		
Yergün, U. (2002). *Batılaşma Dönemi Mimarisinde, Yapım Teknolojisindeki Değişim ve Gelişim* . İstanbul: (Unpublished Ph.D. Thesis YTÜ Fen Bilimleri Enstitüsü).											
Yorulmaz, M. (1988). Yapısal Özellikler. In S. Bayram (Ed.), *Mimarbaşı Koca Sinan Yaşadığı Çağ ve Eserleri* (pp. 501-504). İstanbul: Vakıflar Genel Müdürlüğü.	Ottoman Period (16.c)	İstanbul	General	Various		x					
Yorulmaz, M., & Ahunbay, Z. (1987). Sinan Camilerinde Taşıyıcı Sistem ve Yapım Teknikleri. *II. Uluslararası Türk-Islam Bilim ve Teknoloji Tarihi Kongresi-Bildiriler.* 3, pp. 123-143. İstanbul: İTÜ Bilim ve Teknoloji Tarihi Araştırma Merkezi.	Ottoman Period (16.c)	Anatolia	Multiple	Mosque			x (Superstructure)				
Zeren, L. (1955). *Ocaklar (Şömineler)* . İstanbul: Pulhan Matbaası.	-							x (Ocak & Şömine)			

C. CATALOGUES

- There are 3 catalogues explaining 3 buildings. These buildings are the:
  - Lüleburgaz Sokullu Mehmed Paşa Mosque
  - Havsa Sokullu Mehmed Paşa Mosque
  - Payas Sokullu Mehmed Paşa Mosque

- These buildings are documented and discussed in
  - Catalogue Restitution
  - Catalogue Site Plan
  - Catalogue Mass
  - Catalogue Measured Drawings (Plan, Elevation and Section)
  - Catalogue System Details

- Lüleburgaz Sokullu Mehmed Paşa Mosque is also evaluated and discussed in
  - Catalogue Element Details

CATALOGUE 1 Lüleburgaz 2 Havsa 3 Payas

Lüleburgaz Sokullu Mehmet Paşa Complex

Current Complex
Restitution

Town: Bergula, Bergos, Lülebergos, Burgaz, Lüleburgaz, برغوس

Location: The 5th *menzil* on the *kervan* route to Belgrad from İstanbul. It is after the town of Karıştıran (Rüstem Paşa *Menzil* Complex) and before the town of Babaeski (Cedid Ali Paşa *Menzil* Complex).

Construction Date: Between 1565 and 1569-70 (Inscription Panel)

Donor: Grand Vizier of Sokullu Mehmed Paşa

Architect: Mimar Sinan

Buildings recorded in *Vakfiye*[1]:	Buildings cited in the manuscripts about Mimar Sinan:			Still Existing Buildings of the Complex:
	TE[2]	TB[3]	TM[4]	
mosque	●	●	●	●
medrese			●	●
sıbyan mektebi				●
imaret	●	●	●	
tabhane				
kervansaray	●	●		○
hamam				●
2 water storages				
aqueduct				
water tower and *şadırvan*				
kaldırım (pavement)				
shops				●
toilets				
mumhane				
bozahane				
sabunhane				
debbağhane				
semihane				
bridge	●		●	●
royal palace for Sultan				
residences for the teachers and *imam*				

[1] Sokullu Mehmed Paşa's Vakfiye. 29 Zilhicce 981 (H) / 21 April 1574 (M). In the Archive of Directorate of General Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20. In the Turkish records, it is in the #2104 book on the 442-78 pages and in the queue of 323. Trasnlated by Mevlüt Çam.
[2] Tezkiretü'l-Ebniye (Record of Buildings) is written by Sai Mustafa Çelebi based on the narratives of Mimar Sinan and it is mainly composed of the lists of his buildings (Crane, Akın (trans.), Necipoğlu (ed.) 2006).
[3] Tezkiretü'l-Bünyan (Record of Construction) explains the life of Mimar Sinan and his constructions. It is also written again by Sai Mustafa Çelebi based on the narratives of Mimar Sinan (Crane, Akın (trans.), Necipoğlu (ed.) 2006).
[4] Tuhfetü'l-Mi'mârin (Choice Gift of the Architects) gives brief information about the life of Mimar Sinan and building lists of him at the end (Crane, Akın (trans.), Necipoğlu (ed.) 2006).


Mustafa Gültekin Archive

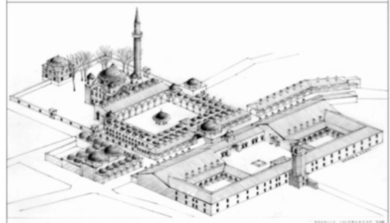

Mustafa Gültekin Archive


Mustafa Gültekin Archive


Mustafa Gültekin Archive


SALT Online Archive


Mustafa Gültekin Archive


Restitutive axonometric drawing of Lüleburgaz Sokullu Mehmed Paşa Complex (Necipoğlu, 2005, p. 350)


Dua Kubbesi in Lüleburgaz engraved by Traversier after Vormser (Jouanin & Gaver, 1840, pp. 260-261)


Kervanasaray in Lüleburgaz engraved by S. Cholet after Vormser (Jouanin & Gaver, 1840, pp. 300-301)

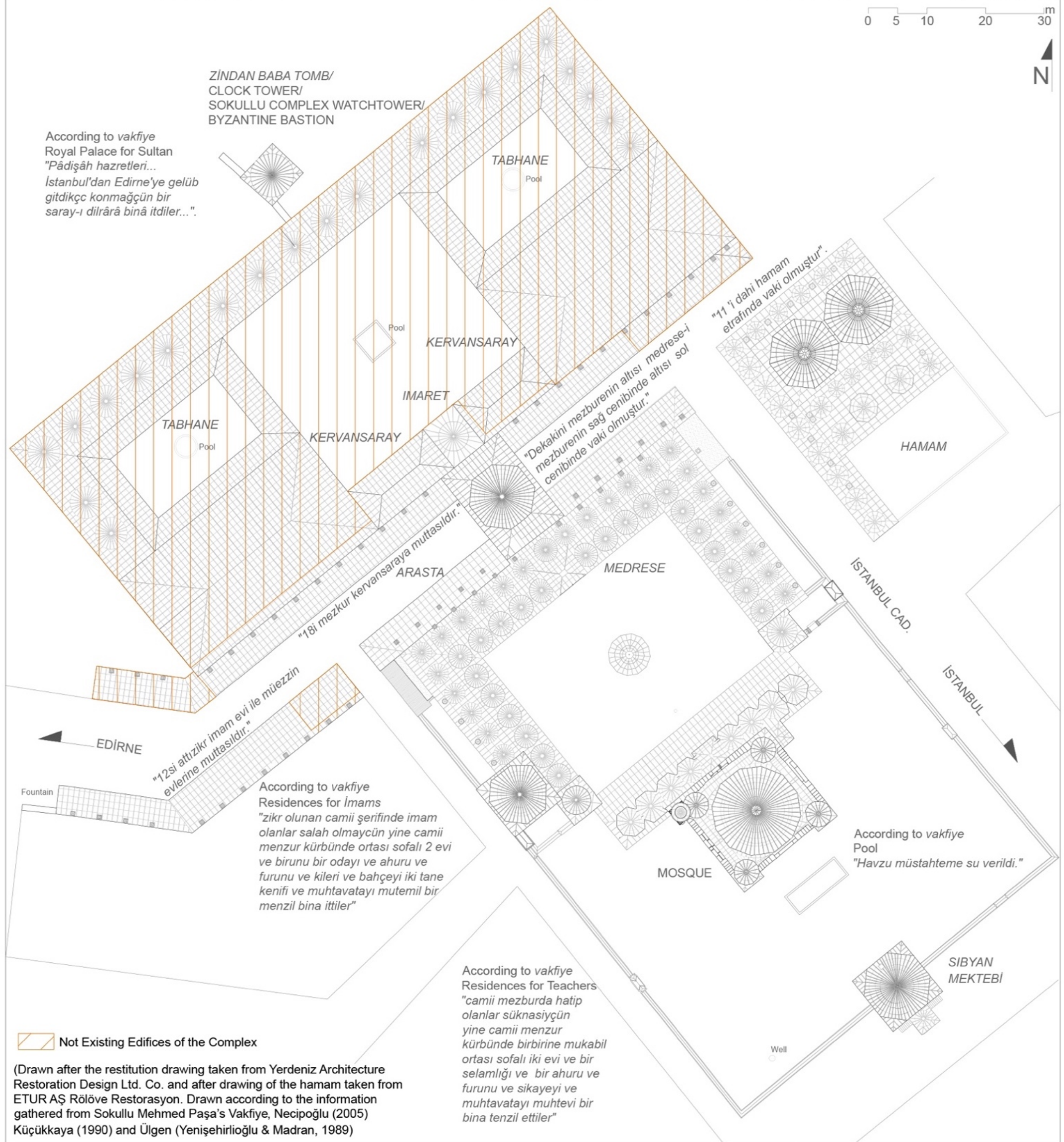


Figure 177: Catalogue 1 (Lüleburgaz) Restitution

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas

Lüleburgaz Sokullu Mehmet Paşa Complex — Current Complex / Restitution

Place: Kırklareli / Lüleburgaz, Kocasinan Quarter

Location: On the south, there are Fetvane Street and residential area, on the west, Sokullu Street and primary school, on the north, İnönü Street and Hükümet Square and on the east, İstanbul Street and commercial area.

Site Plan: The complex sits on a flat land. The buildings of the complex are positioned according to the axis which is the historic road from İstanbul to Edirne. This axis, Kubbeleraltı Street, which is on the east-west direction formed the aligned shops called as *arasta*. This axis also divides the complex into two parts according to their service purposes. The mosque, *medrese* and *sıbyan mektebi* which serve the inhabitants of the town are located on the south side. The other buildings such as *kervansaray*, *imaret, tabhane* which serve the travelers and visitors are located on the north side of this axis. This axis, the historic road to Edirne, comes from south, turns to west, passes through *arasta* and *dua kubbesi* and is directed to the bridge on Lüleburgaz Stream. The *hamam* which serve both the inhabitants and travelers is located on the north-east side of the complex. The *hamam* is on the east side of the historic road to İstanbul, which is now İstanbul Street. On the north-south direction, there can be observed a second axis which is the *Kıbla* direction. This axis constitutes the symmetry axis of the complex and the buildings are ordered according to this *Kıbla* direction. These two perpendicular axes intersect under the *dua kubbesi.* This structure, which has a baldachin form, provides entrances to the south and north side of the complex.
The rectangular south part of the complex is bordered by the courtyard walls on the east, south and west edges and shops on the north edge. The mosque is located at the center of this part. The last prayer hall of the mosque borders the south side of the courtyard shared with the *medrese*. The U shaped *medrese* borders the common cortyard from the west, north and east sides. The *sıbyan mektebi* is on the south edge of this part of the complex. Between the mosque and *sıbyan mektebi,* the *hazire*, now filled with trees, was located.
On the north side of the complex most of the buildings were demolished. Existing shops still border the south edge of the northern group buildings of the complex. The domed entrance space, the space adjacent to the west side of the entrance space and the ruined back wall of the *kervansaray* are still standing edifices of the north side of the complex.

Buildings: Mo_L : Mosque
Me_L : *Medrese*
S_L : *Sıbyan Mektebi*
A_L : *Arasta*
K_L : *Kervansaray*
H_L : *Hamam*

Complex in Lüleburgaz

1. Lüleburgaz Sokullu Mehmed Paşa Complex
2. Mimar Sinan Bridge
3. Lüleburgaz Stream
4. Kadı Ali Mosque
5. Cemetery
6. Lüleburgaz Municipality
7. Kongre Square
8. Gençlik Park

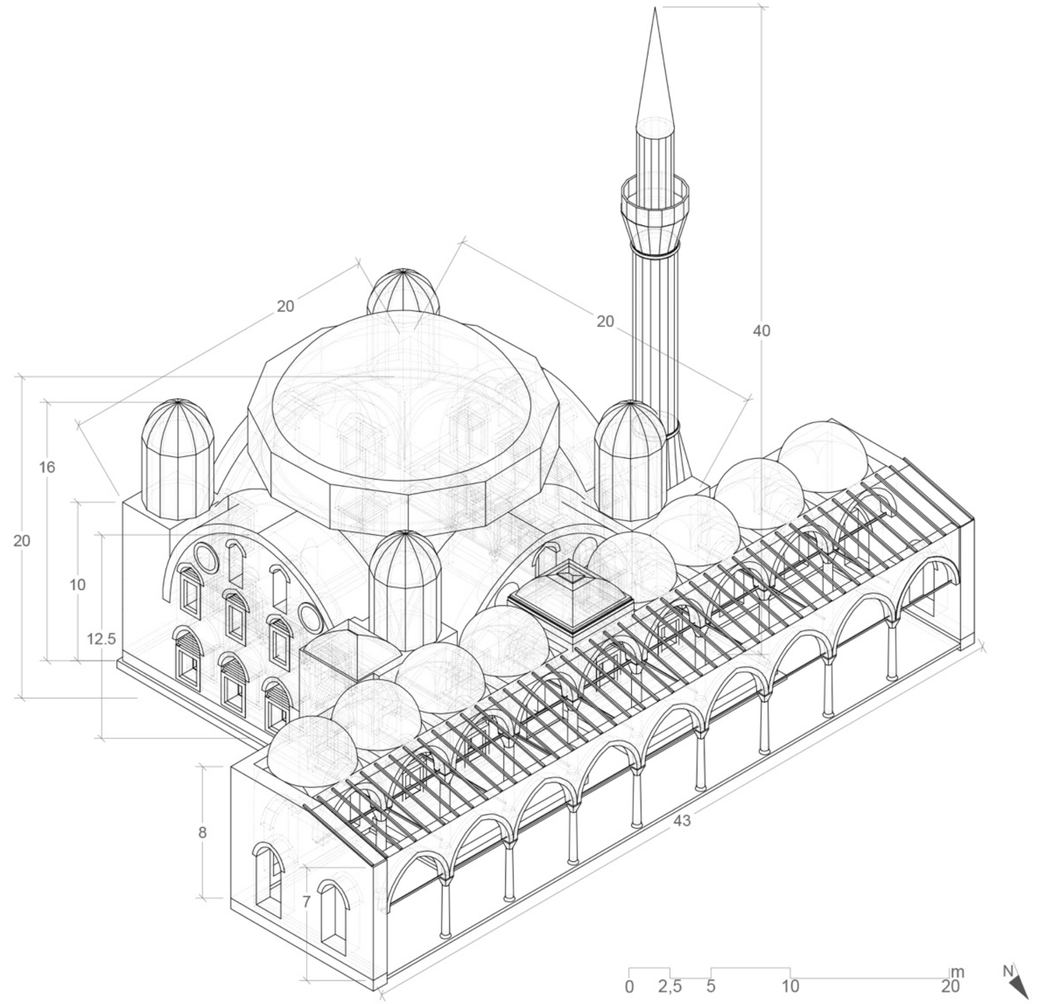
(After Yandex Maps, last accessed on 25.12.2016)

(Photographs taken by Ahmet Kazu by Drone Camera in 2015)

(Drawn after the measured drawing taken from Yerdeniz Architecture Restoration Design Ltd. Co. and after the measured drawing of the hamam taken from ETUR AŞ Rölöve Restorasyon)

Figure 178: Catalogue 2 (Lüleburgaz) Site Plan

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details



Location: The mosque is at the center of the rectangular south part of the complex. On the north, a common courtyard shared with the *medrese*, on the east, south and west, the *hazire*, now filled with trees, are located.

Mass: The square planned mosque is topped with a single dome. The dome sits on four main arches and it is circumscribed by the dodecagonal drum. On the corners, the main arches and the dome are supported with four dodecagonal weight towers topped by segmented domes. On the north-west corner, stands the high minaret with a slender polygonal shaft and a single *şerefe*. On the north-east corner, a rectangular prism, containing the staircases, creates the symmetry together with the prismatic minaret base in the mass. The last prayer hall which is attached to the north façade of the mosque protrudes on the east-west directions and enlarges the façade. It encloses a longitudinal last prayer hall with double arcade. The arcade which is adjacent to the mosque has the central unit covered with a vault with a shouldered profile. The other units on the sides are topped with 8 domes in the first arcade. The other arcade has a pent roof that slants towards the courtyard.

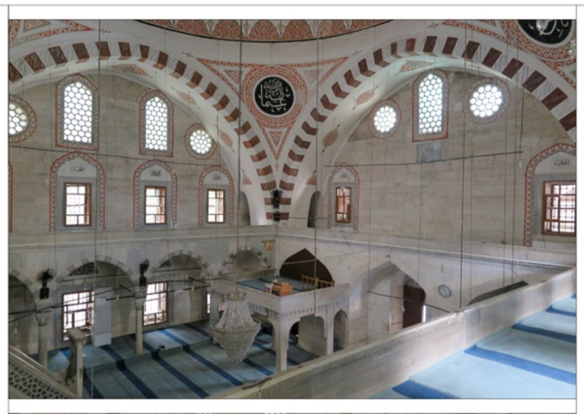
Figure 179: Catalogue 1.1 (Lüleburgaz) Mass

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Mosque | 1 Mass | 2 Measured Drawings | 3 System Details | 4 Element Details

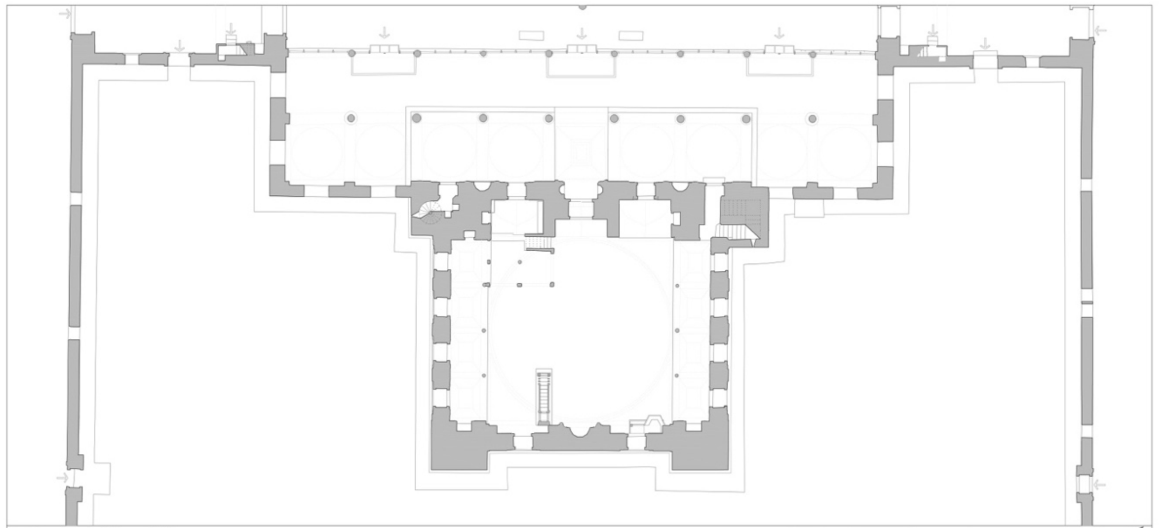
Plan: The square planned mosque is covered with a single dome that sits on four main arches and spherical pendentives. On the corners, there are four large piers embedded in the walls. Below the main arch on the south wall, the *kıbla* wall, the *mihrab* is placed. On both sides of this *mihrab*, there are half rectangular niche recessions which are topped by two centered tangent arches. Additionally, adjacent to the south wall, the *minber* and *vaaz kürsüsü* is placed. The *minber* is on the west side of the *mihrab* and the *vaaz kürsüsü* is on the east side. On the east, west and north walls of the mosque, the main arches are widened. This widening gives these arches form of a vault. Under these extended arches, there is an upper floor, the *mahfil* floor. On the upper floor, the *mahfil* encircles the interior space from these three sides. This floor can be reached by the staircase on the north-east corner of the mosque. The direct passage to *mahfil* is also avaliable by the door from the last prayer hall. Under the *mahfil* floor on east and west directions, there are spaces. These spaces are divided into 4 units by pointed arches sopperted by 3 columns. Each of these 4 units are covered with vaults with shouldered profiles. On the north side, under the *mahfil*, there is an entrance iwan at the center and two other iwans flanking its sides. All three have vaults with two centered tangent profiles. In front of the iwan which is on west side of the entrance iwan, there is the *müezzin mahfili*. It is a raised platform which can be reached by the staircase on its north-east corner.

The rectangular planned last prayer hall is a semi open space attached to the north wall of the mosque. The east, south and west sides of this hall are defined by the walls. An open colonnade, now closed with a later addition aluminum fenestration, borders the north side of this hall. The last prayer hall which acts as a passage way to the mosque is composed of double arcading. The arcade which is closer to the mosque consists of 9 square units divided by pointed arches supported by columns with stalactited capitals. The square unit space in the middle is covered with a vault and it introduces the entrance of the mosque. The other units on each side of this entrance unit are covered with domes resting on spherical pendentives. Additionally, in this first arcade, the floor of the units that are in front of the mosque façade are raised, but the floor of the entrance unit is not. The second arcade following this first one is a longitudinal single space expanding towards east and west. This arcade is covered with a pent roof that leans towards north.



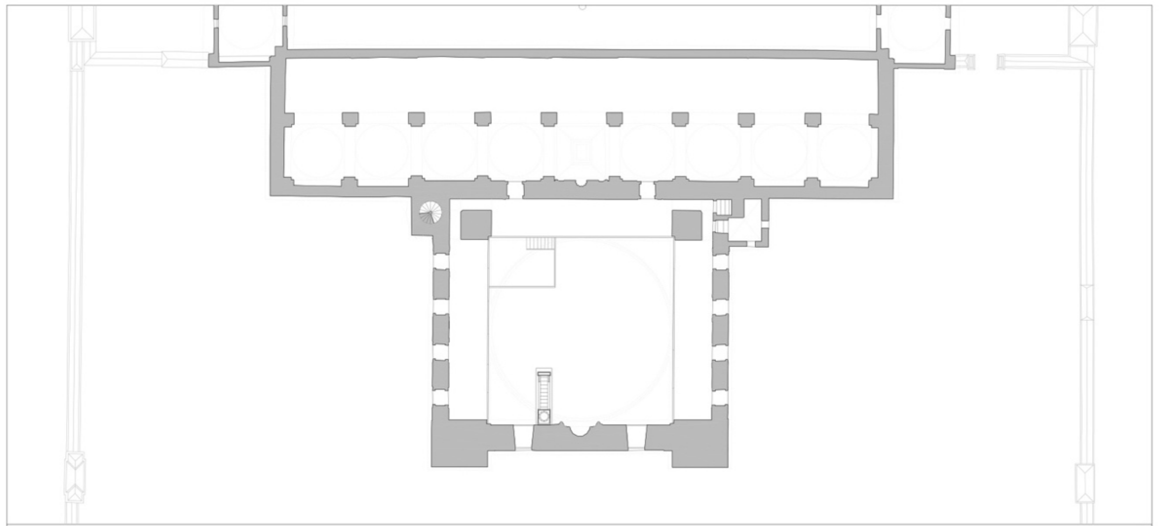
(Photographs taken by Author in 2014-16)

(Drawn after the measured drawing taken from Yerdeniz Architecture Restoration Design Ltd. Co.)



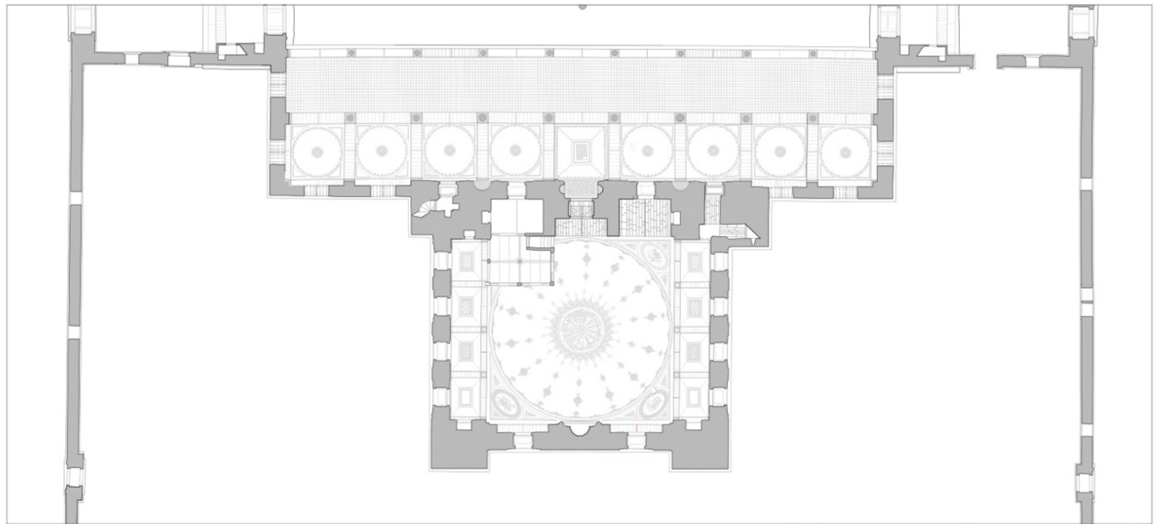
Ground Floor Plan

0 2 4 8 12 20 m N



Upper Floor Plan

0 2 4 8 12 20 m N



Ceiling Plan

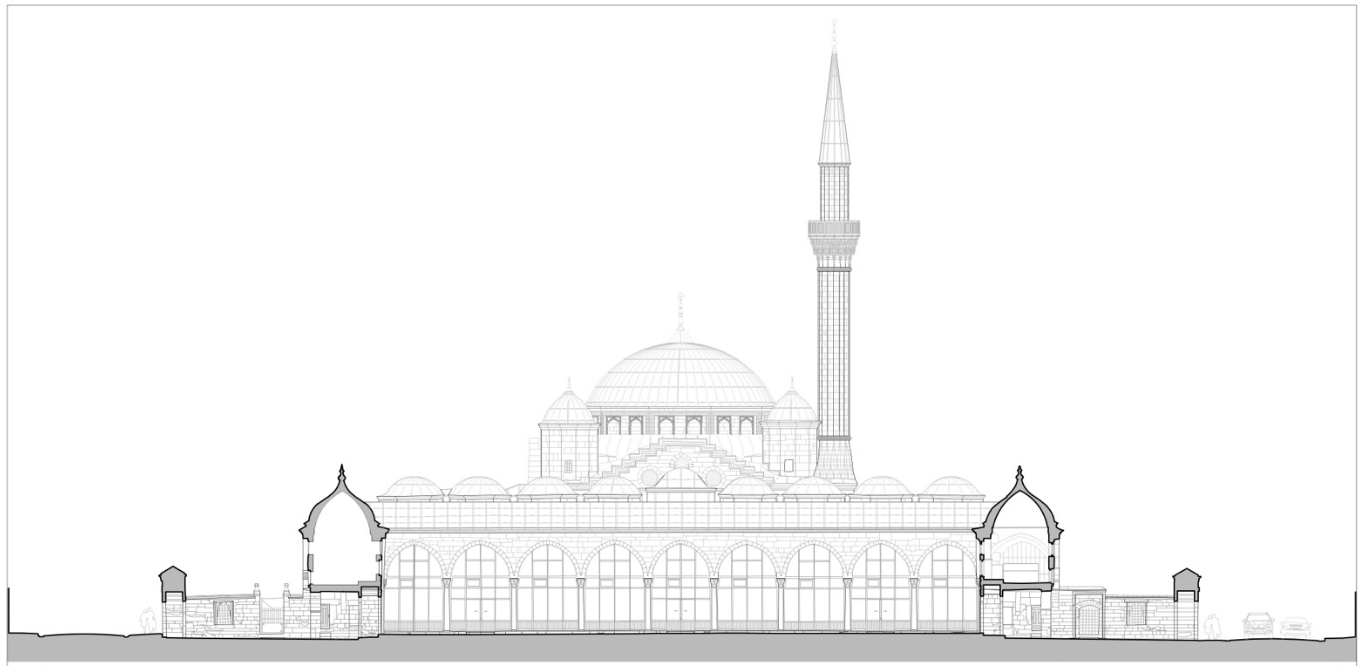
0 2 4 8 12 20 m N

Figure 180: Catalogue 1.2 (Lüleburgaz) Plans

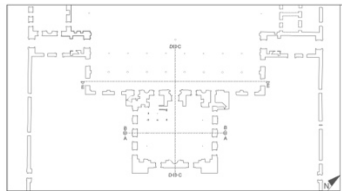
Elevations: The façades of the mosque are composed of modest architectural elements. On all the elevations, the windows are arranged in three rows under the main arches resting on the large piers. Above the window arrangements, the framing main arches are topped with a cascaded eave. From the ends of the cascades, the domed weight towers of the mosque rise on each side. On the walls of these weight towers, there are small rectangular window openings. In between the weight towers, the dome and the dodecagonal drum are seen. The faces of the drum are ornamented in the shape of relieving arches in rectangular frames. Additionally, the minaret, attached to the north-west corner of the mosque, can be observed on all of the facades.

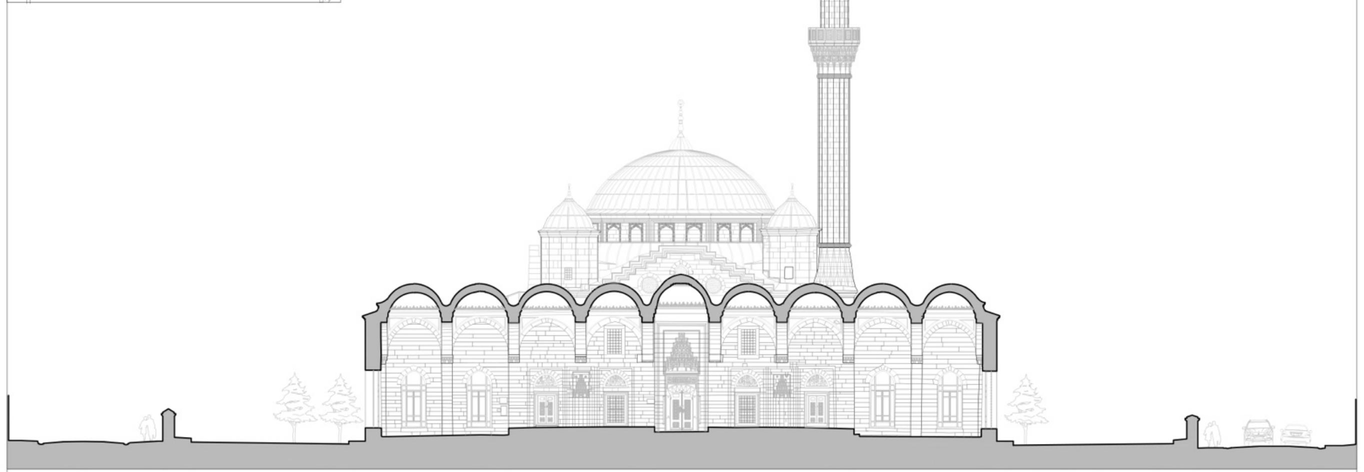
The north façade of the mosque, below the ends of the cascade, is hindered by the last prayer hall which is facing the courtyard. The north façade of the last prayer hall is composed of 9 large openings topped with pointed arches carried by 8 columns with baklavalı capitals. The arched openings were closed with aluminum fenestration as a later addition. Above these arches, the pent roof is raised towards the domes of the first arcade of the last prayer hall. The 8 domes and the vault of the first arcade can be observed from the north façade above the pent roof. The vaulted center unit which is raised defines the entrance unit. Behind the stilted roof, the topmost window row of the north facade is placed. A window with two centered tangent arch and a circular window on each side can be observed. These windows have *dışlık* panels.

The lower section of the north façade, the entrance façade, of the mosque is withinside the last prayer hall. So that, the rear wall of the last prayer hall is the entrance façade of the mosque. It carries the entrance portal of the mosque in the middle. On both sides of the portal, there are two windows, arranged one above the other, and then comes the mihrabiye niche and a door. The lower windows are rectangular ones with relieving pointed arches. The upper ones are smaller rectangular windows. These windows have grills with knots. The rectangular door openings have relieving pointed arches. The door on the west side opens to the staircase leading to the *minaret* and the door on the east opens to mosque and the staircase leading to the upper floor (*mahfil*) of the mosque. The surface of the tympanums of the windows and doors are filled with inscriptions. The inscriptions are gilded letters on a dark green background encircled with white washed frames.



North Elevation





North Elevation of the *Harim* Section / Section EE

(Photographs taken by Author in 2014-16)
(Drawn after the measured drawing taken from Yerdeniz Architecture Restoration Design Ltd. Co.)

Figure 181: Catalogue 1.2 (Lüleburgaz) Elevations

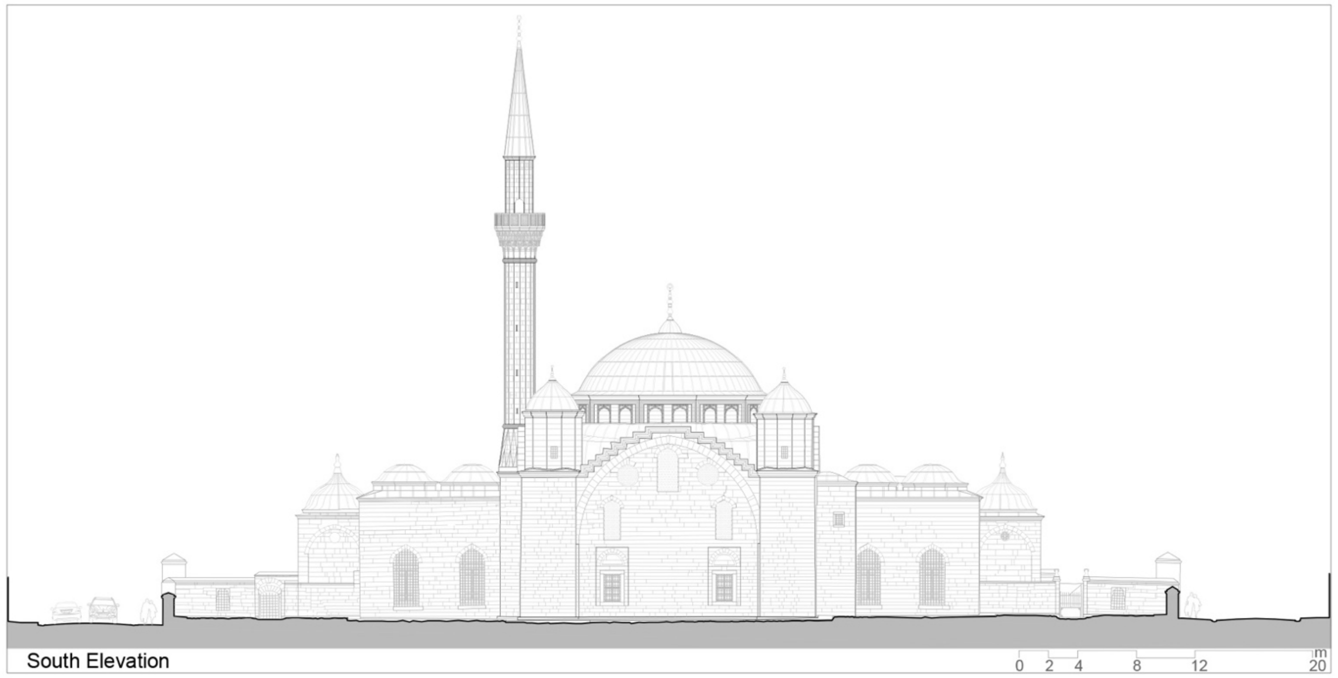
CATALOGUE | **1** Lüleburgaz | 2 Havsa | 3 Payas

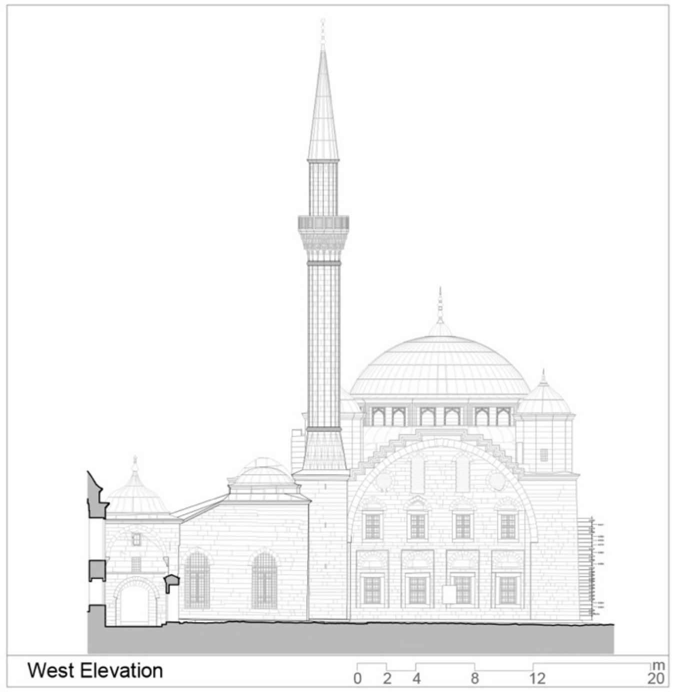
Mosque | 1 Mass | **2** Measured Drawings | 3 System Details | 4 Element Details

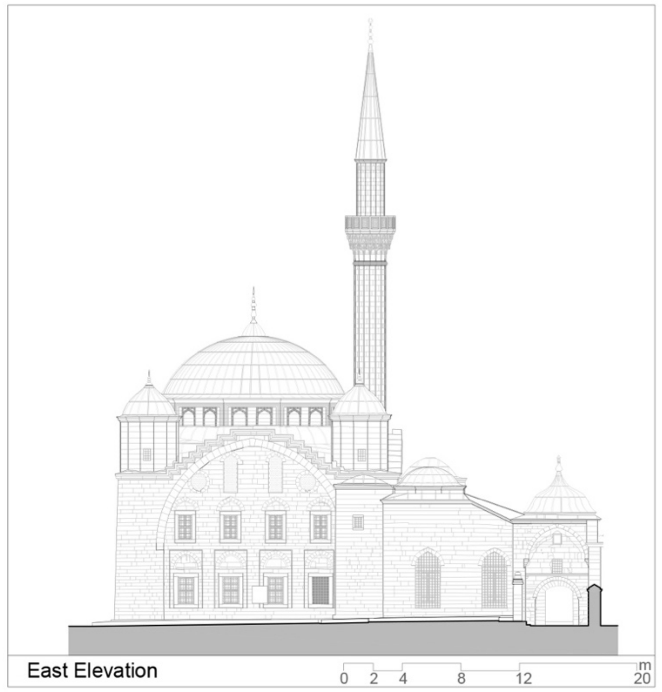
Elevations: The east and west facades are almost mirror image symmetry of each other. On these facades, the lowest row of the 3-rowed window arrangement is composed of four rectangular windows with relieving pointed arches. The four windowss on the second row are smaller rectangular ones with relieving two centered tangent arches. The windows at these two rows have grilles with knots. On the uppermost row, at the center, there are two windows with two centered tangent arch. Those are flanked by two circular windows. The windows on the highest row have *dışlık* panels. The difference of the west façade from the east is because of the *minaret* attached to the north corner and its slit windows. On the other side, the difference of the east façade from the west is caused by the rectangular prismatic mass which contains the staircase attached to the north corner. On the east wall of this attached mass, there are two slit windows and over them a small rectangular window. Additionally, the side walls of the last prayer hall are also observed on these facades. On these walls, there are two large window openings topped with pointed arches and grills with knots.

The south façade, the *mihrab* wall, has a symmetrical organization. On the lowest row of the window arrangement, there are two rectangular windows with relieving pointed arches. The windows at this lowest row have grills with knots. On the second row, there are two narrow windows with two centered tangent arches. On the upmost row, there are circular windows on both sides of a window with two centered tangent arch which is at the center. The windows on the higher two rows have *dışlık* panels. Outside of the framing main arch, the large main piers can be observed because they jut out from the wall surface. Likewise, the walls of the projected two units of the last prayer hall can be observed on each side of the south façade. On these walls, there are two large window openings with pointed arches and grills with knots.

(Photographs taken by Author in 2014-16)







(Drawn after the measured drawing taken from Yerdeniz Architecture Restoration Design Ltd. Co.)

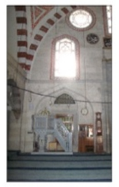
Figure 182: Catalogue 1.2 (Lüleburgaz) Elevations

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas	
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details

Arch. Elem. of Mosque: The entrance portal constructed in marble is set in a high rectangular frame encircled by a cornice. It has a rectangular niche which is covered with 7 rows of stalactited hood (*kavsara*). In this niche recession, above the door opening, there is the three-partite rectangular inscription panel with gilded Arabic letters on a dark green background. The door opening is topped with a two colored marble joggled arch with depressed profile. The cümle door which is made of timber in *kündekari* technique is inserted in the door opening. Additionally, on the east and west walls of the portal recession, there are two niches with half decagonal plan and they are covered with 4 rows of stalactited hood. The portal niche is flanked by two attached columns.

The *Mihrabiye* niches that are constructed in limestone have half decagonal niches which are covered with 5 rows of stalactited hood. On the spandrels of the stalactited hood there are rosettes.

The *mihrab* that was covered with grey marble has a rectangular frame topped with a pediment. The *mihrab* has a plan of a half decagonal prayer niche which is covered with a hood made of 7 rows of stalactites. On the spandrels of the stalactited hood there are rosettes. Above the hood, there is a rectangular inscription panel with gilded Arabic letters on a dark green background. The niche is flanked by two attached columns made of green marble.

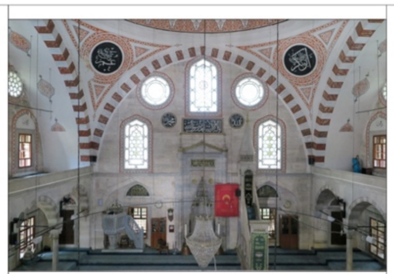


The *minber* which is made of marble is placed on the west side of the mihrab adjacent to the south wall.

The *vaaz kürsüsü* which is made of marble is placed at the south-east corner of the interior adjacent to the south wall.

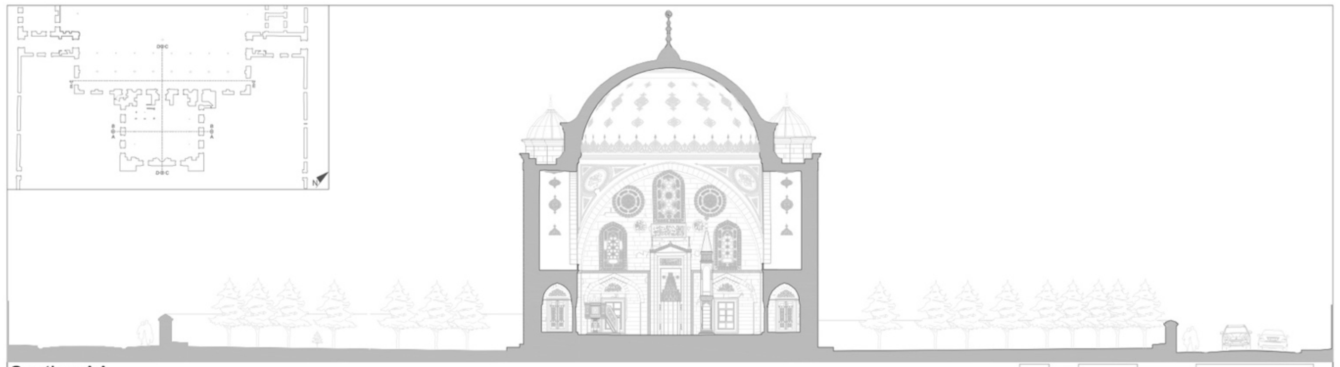
The *müezzin mahfili*, in marble, is placed at the north-west corner of the interior, adjacent to the iwan on the west. The platform of this mahfil is carried by 6 columns with square cross section. On both sides of each column there are brackets that articulate and give the appearance of arches with shouldered profiles. The east and south sides of the mahfil have balustrades and the stairs are on the north-east corner.

(Photographs taken by Author in 2014-16)

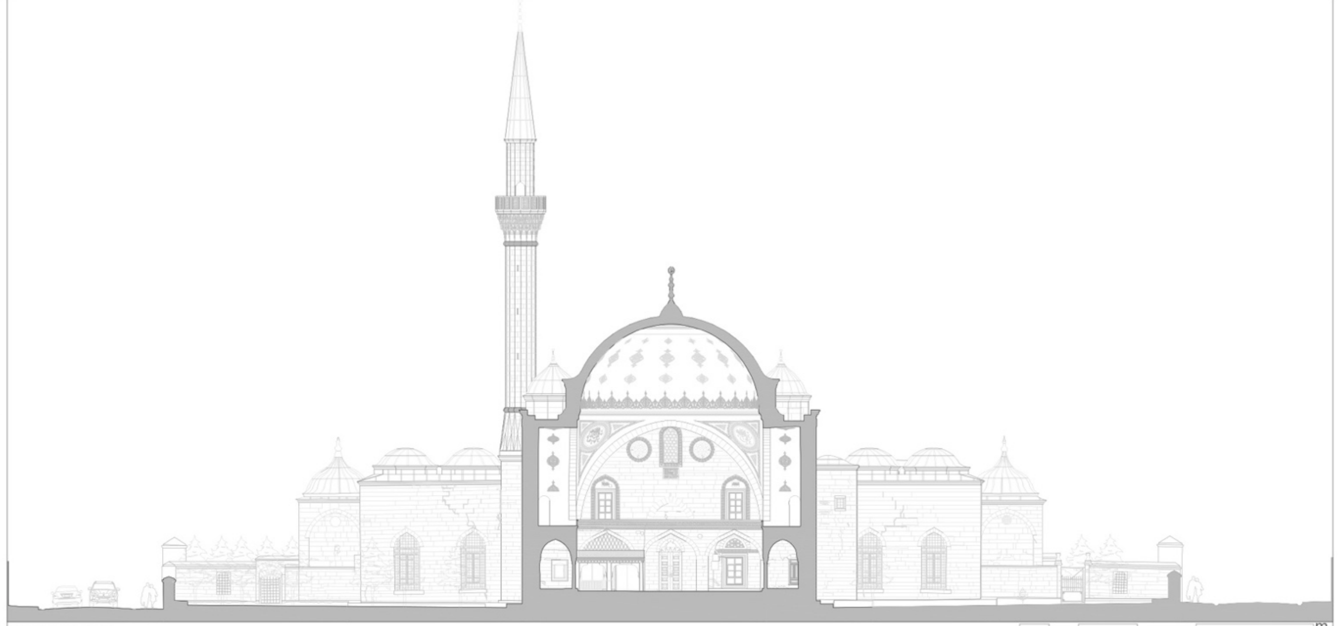


(Photographs taken by Author in 2014-16)

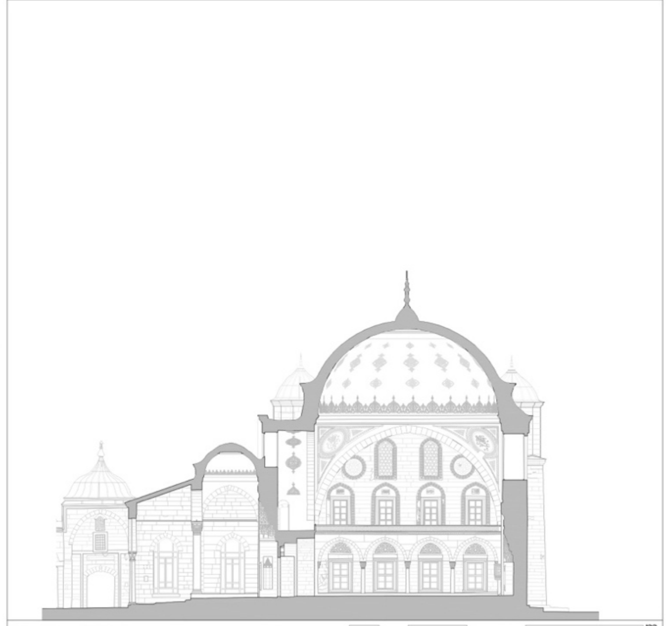
(Drawn after the measured drawing taken from Yerdeniz Architecture Restoration Design Ltd. Co.)



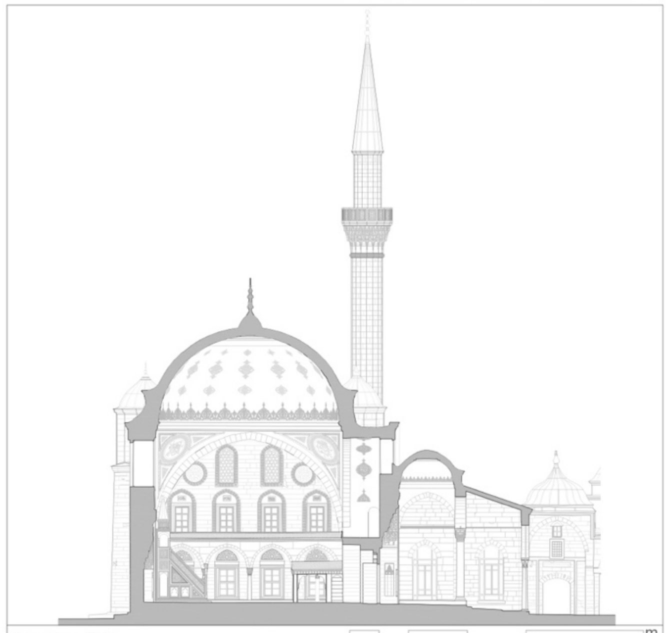
Section AA



Section BB



Section CC



Section DD

Figure 183: Catalogue 1.2 (Lüleburgaz) Sections

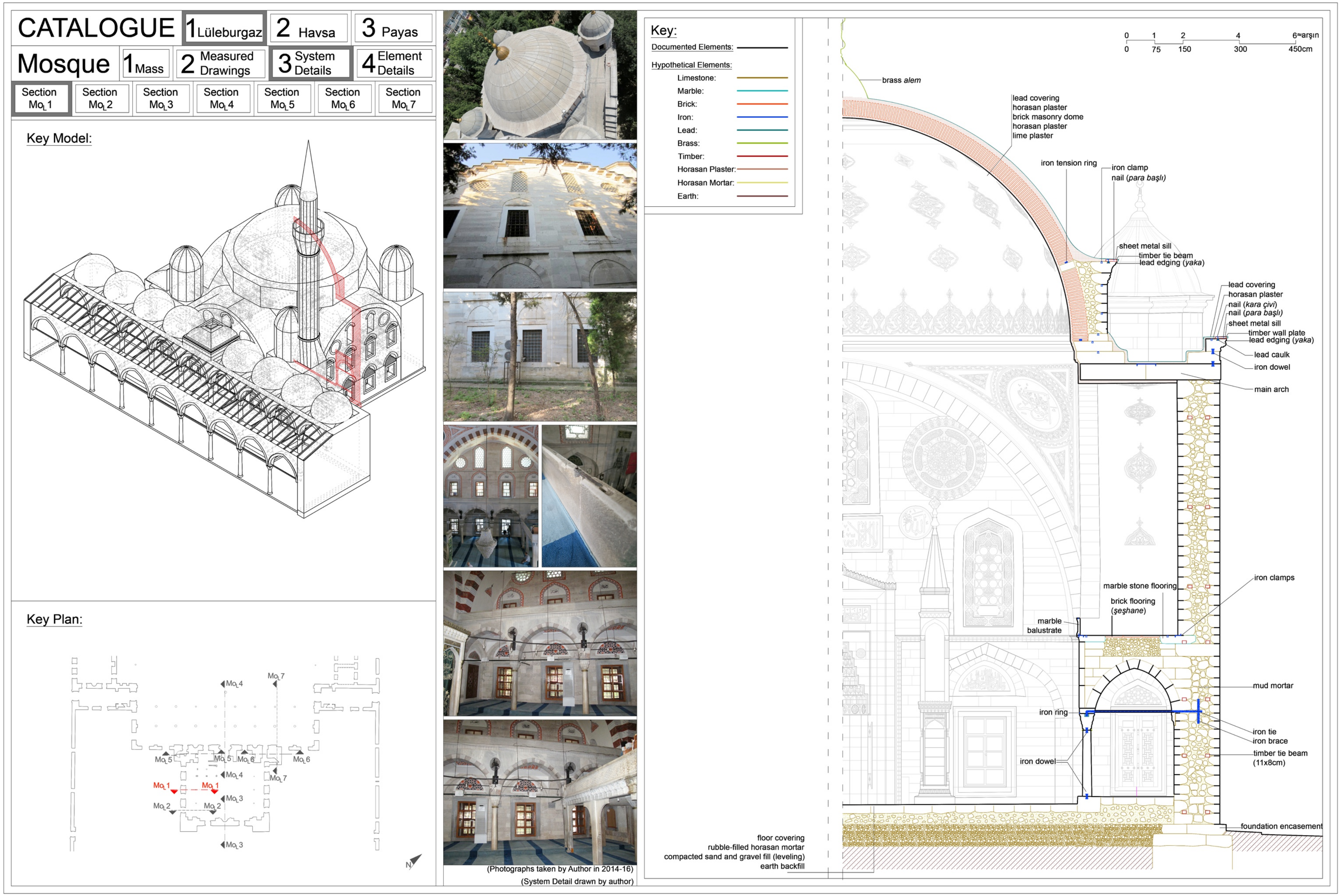


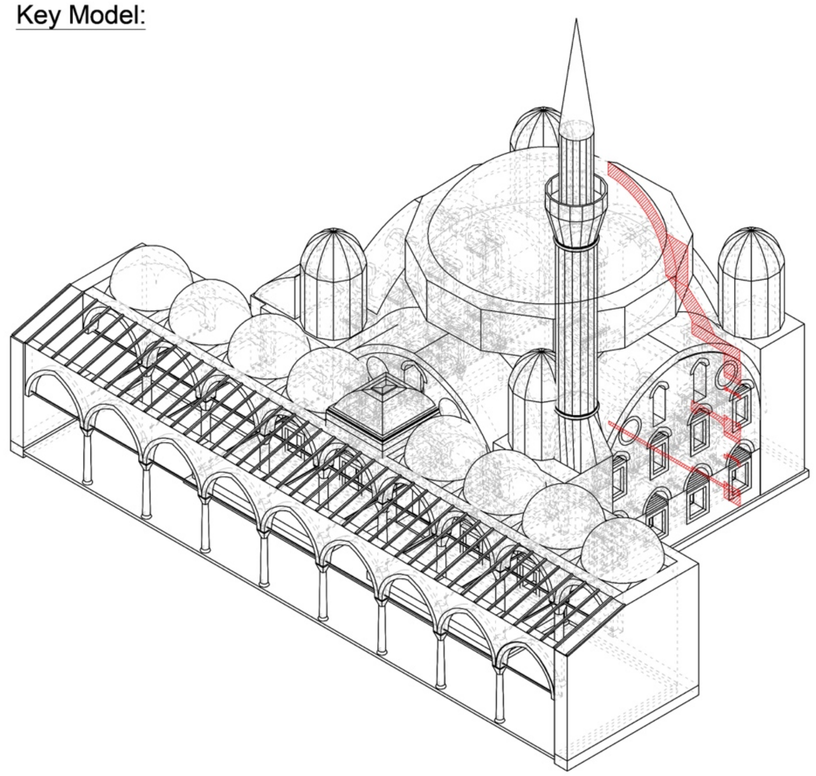
Figure 184: Catalogue 1.3.1 (Lüleburgaz) System Detail 1

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas

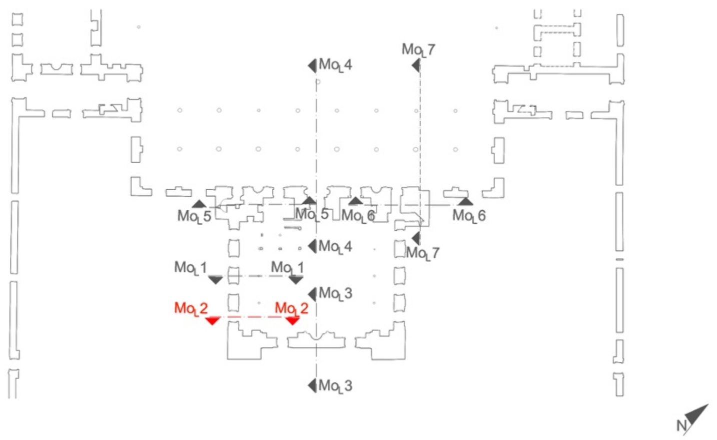
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details

Section Mo_L 1	Section Mo_L 2	Section Mo_L 3	Section Mo_L 4	Section Mo_L 5	Section Mo_L 6	Section Mo_L 7

Key Model:



Key Plan:



(Photographs taken by Author in 2014-16)

(System Detail drawn by author)

Key:

Documented Elements:

Hypothetical Elements:
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:

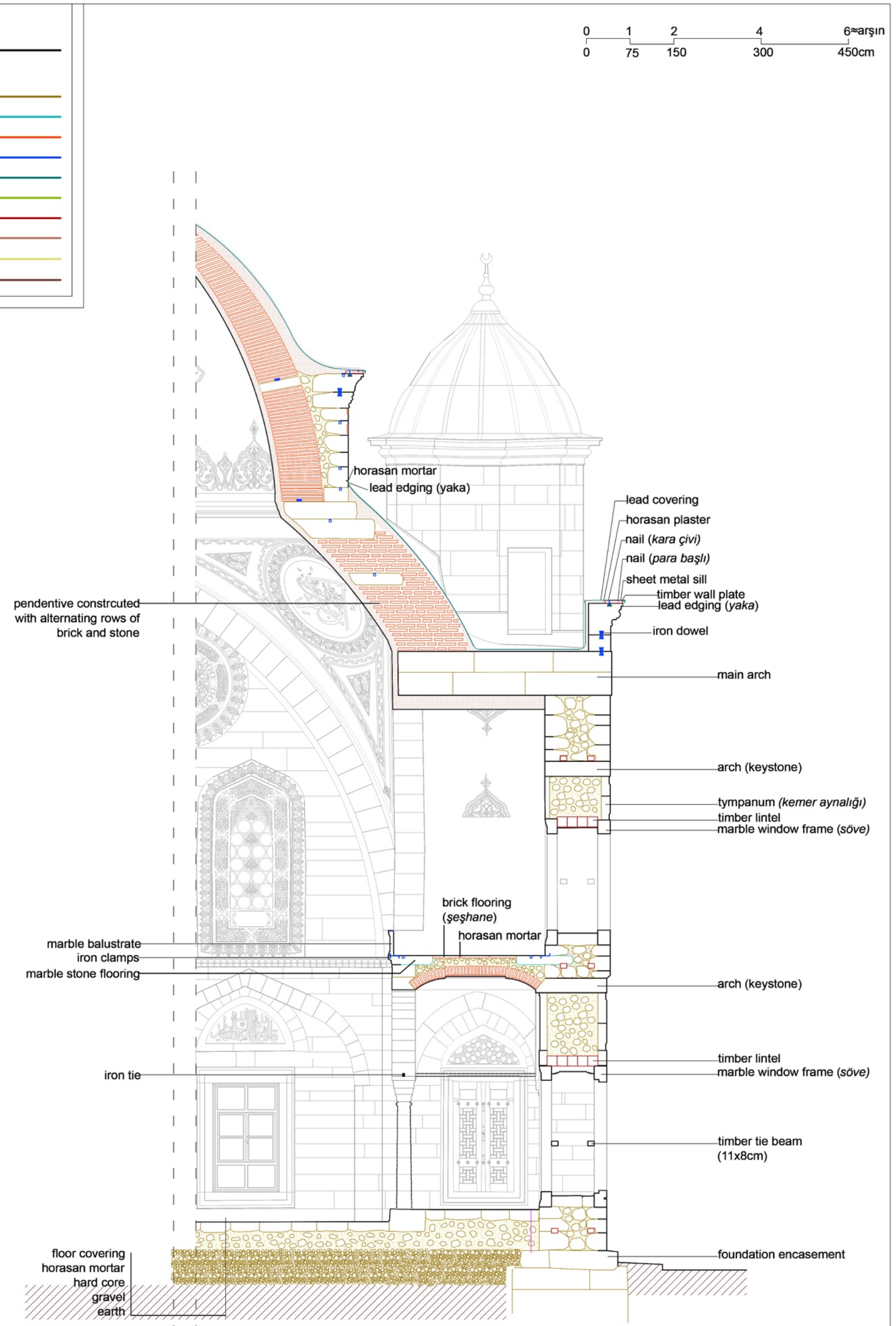


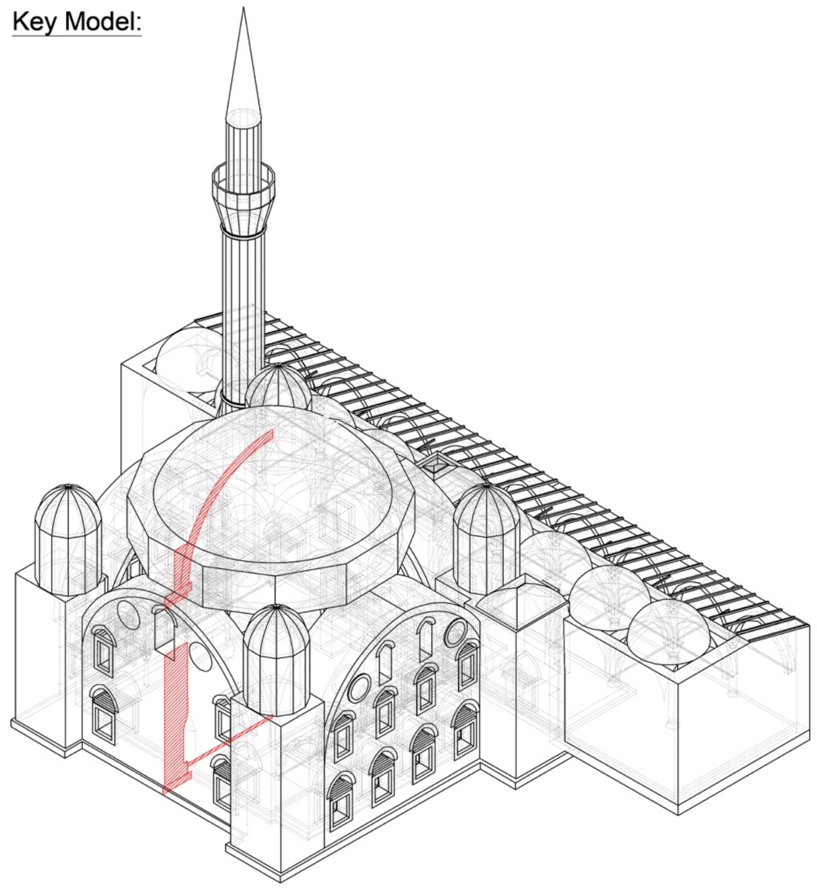
Figure 185: Catalogue 1.3.2 (Lüleburgaz) System Detail 2

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

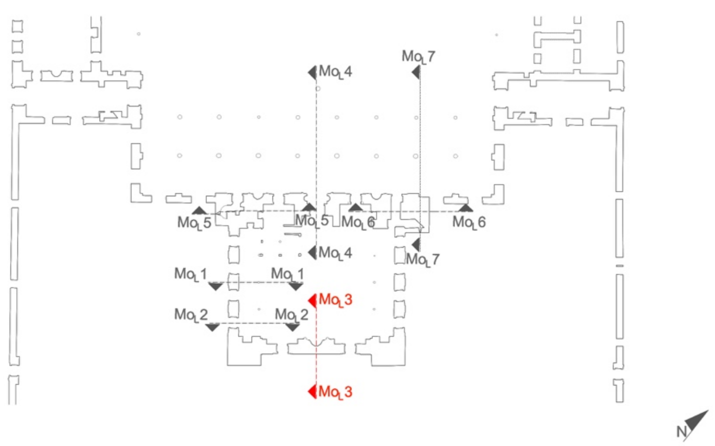
Mosque | 1 Mass | 2 Measured Drawings | 3 System Details | 4 Element Details

Section Mo. 1 | Section Mo. 2 | Section Mo. 3 | Section Mo. 4 | Section Mo. 5 | Section Mo. 6 | Section Mo. 7

Key Model:



Key Plan:



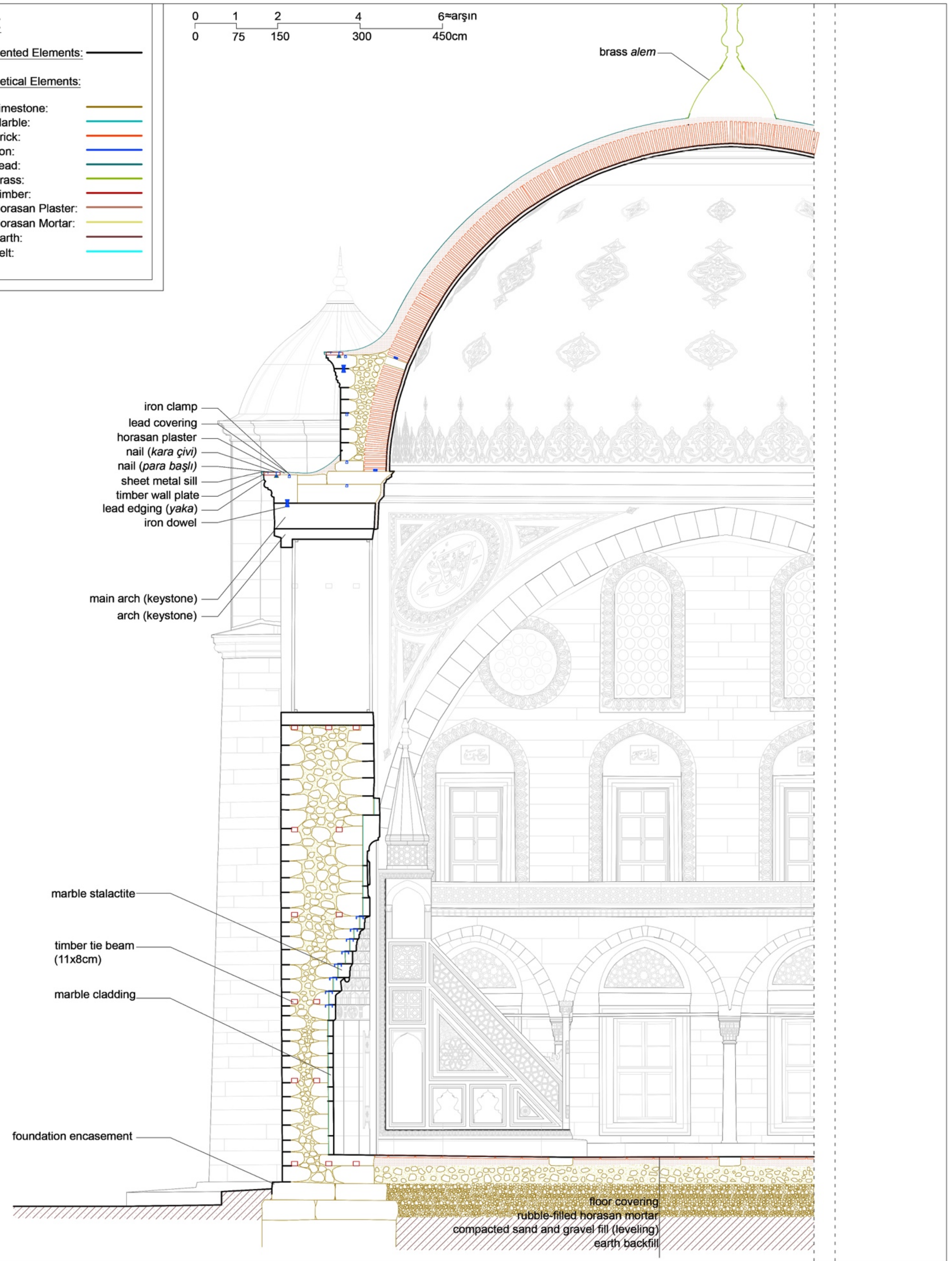
(Photographs taken by Author in 2014-16)

Key:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:



(System Detail drawn by author)

Figure 186: Catalogue 1.3.3 (Lüleburgaz) System Detail 3

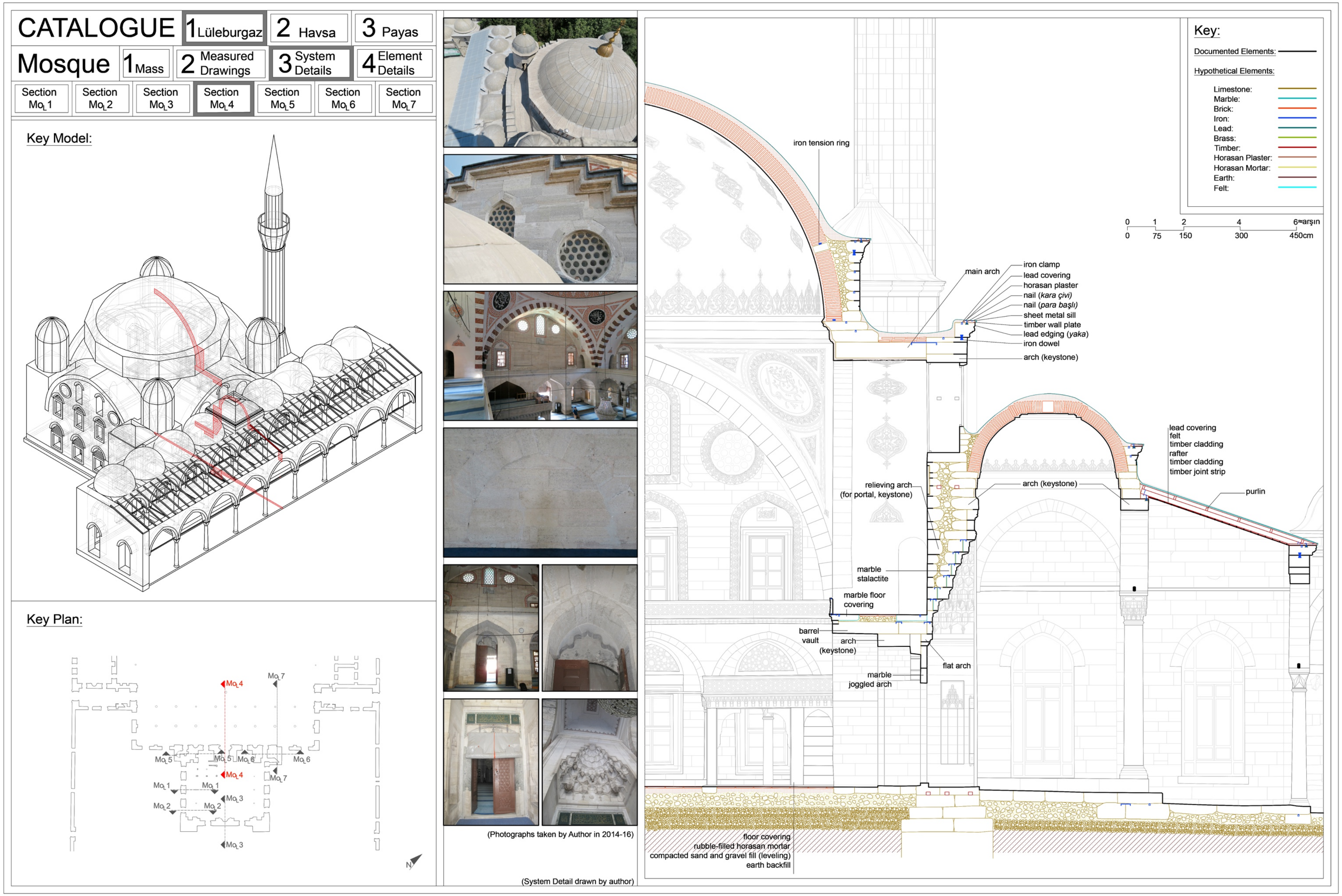


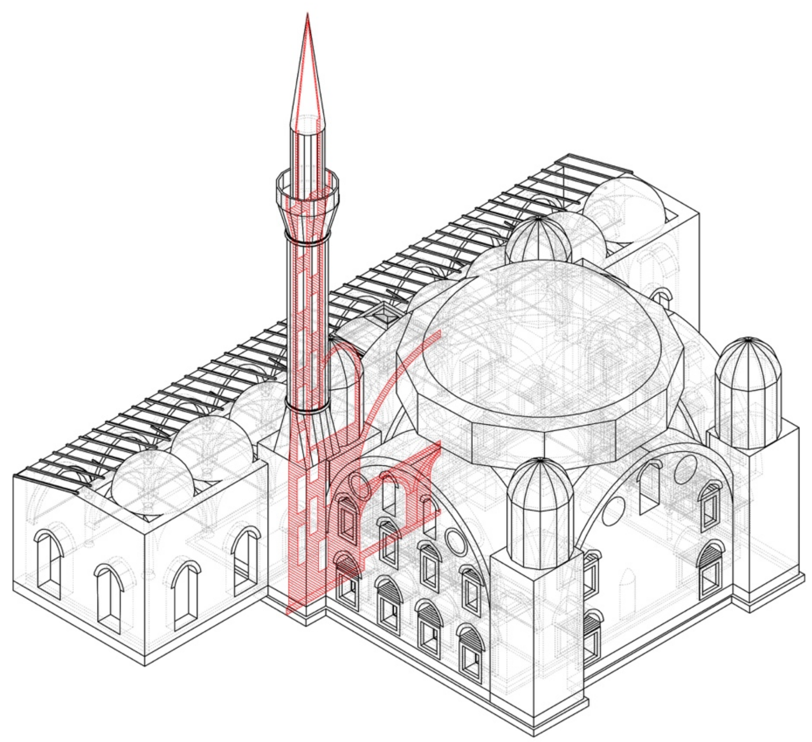
Figure 187: Catalogue 1.3.4 (Lüleburgaz) System Detail 4

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

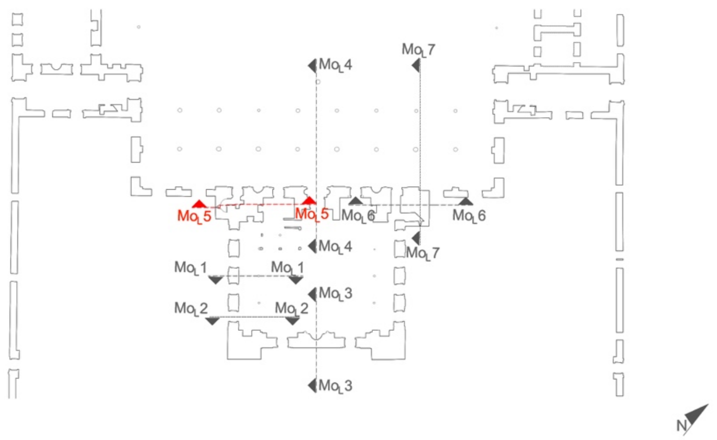
Mosque | 1 Mass | 2 Measured Drawings | 3 System Details | 4 Element Details

Section Mo$_L$ 1 | Section Mo$_L$ 2 | Section Mo$_L$ 3 | Section Mo$_L$ 4 | Section Mo$_L$ 5 | Section Mo$_L$ 6 | Section Mo$_L$ 7

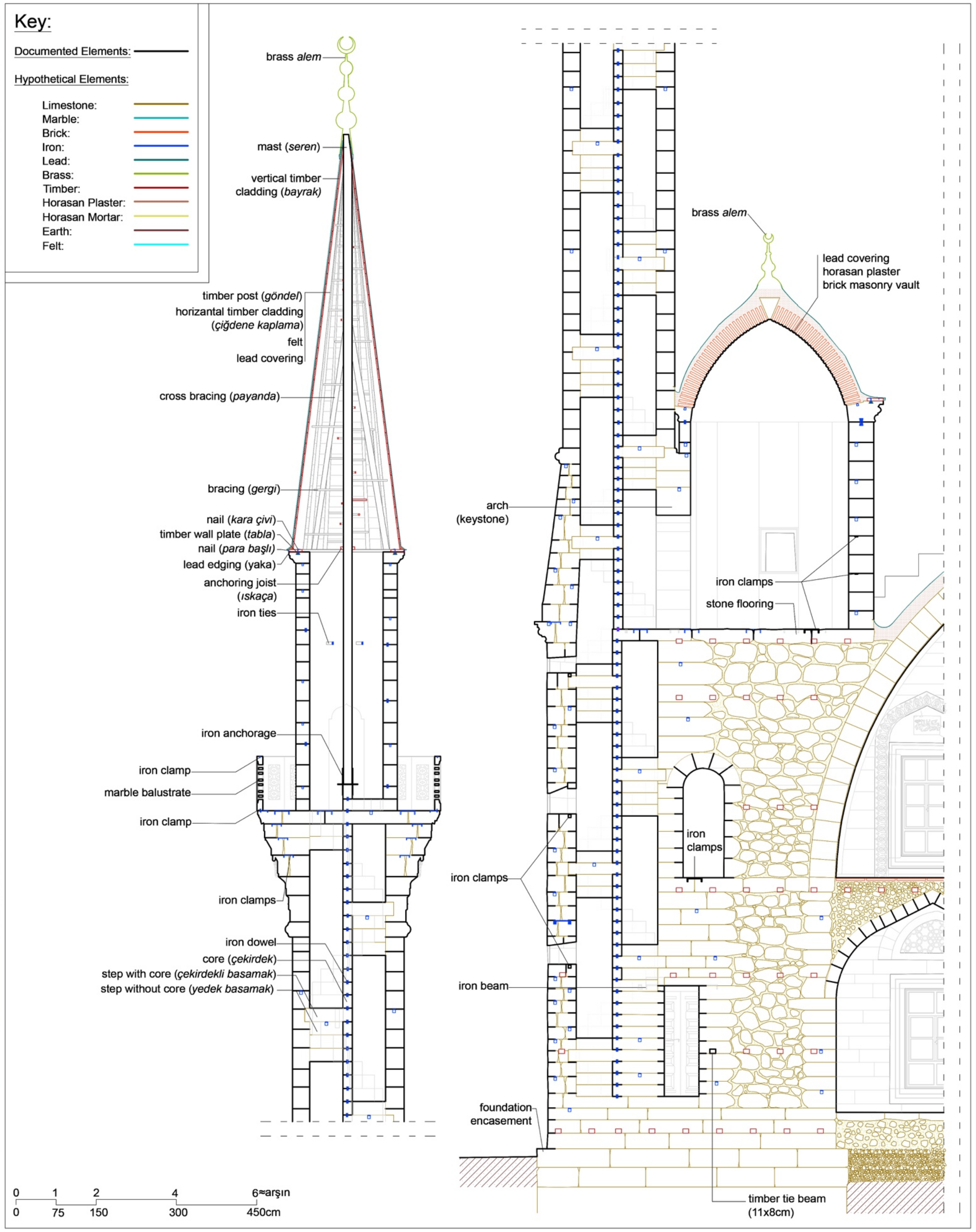
Key Model:



Key Plan:



(Photographs taken by Author in 2014-16)

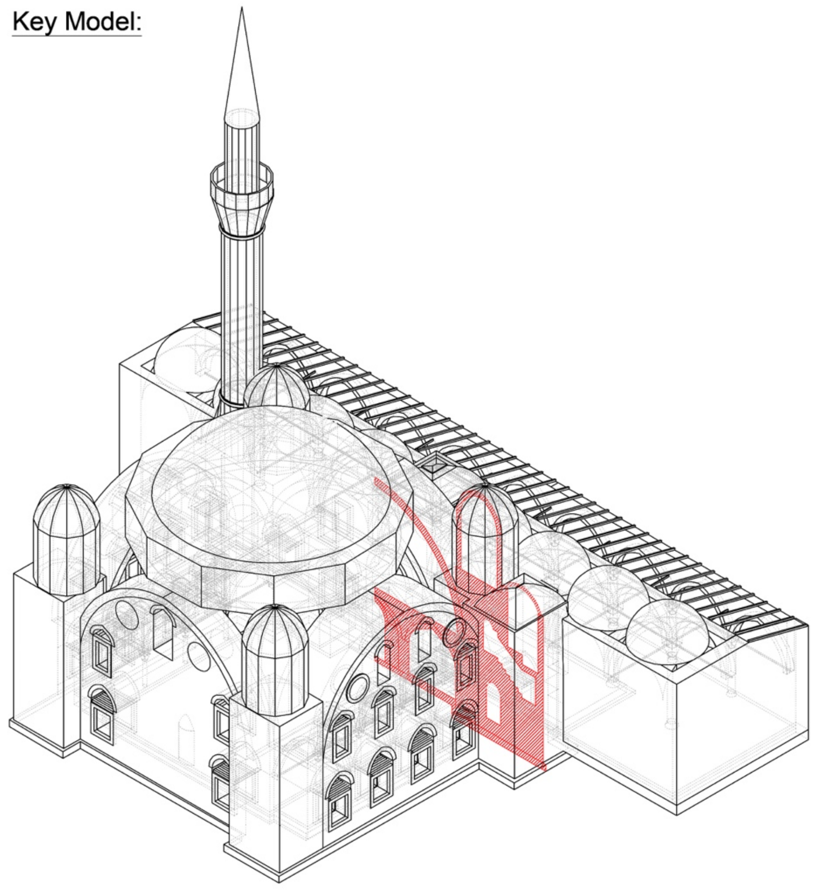


(System Detail drawn by author)

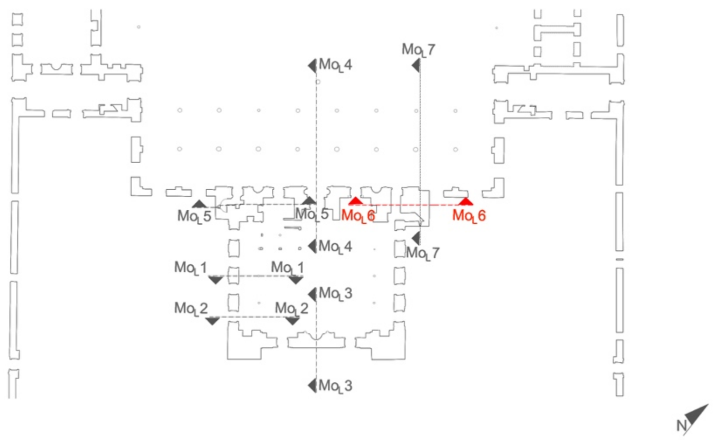
Figure 188: Catalogue 1.3.5 (Lüleburgaz) System Detail 5

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas			
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details		
Section Mo_L 1	Section Mo_L 2	Section Mo_L 3	Section Mo_L 4	Section Mo_L 5	Section Mo_L 6	Section Mo_L 7

Key Model:



Key Plan:



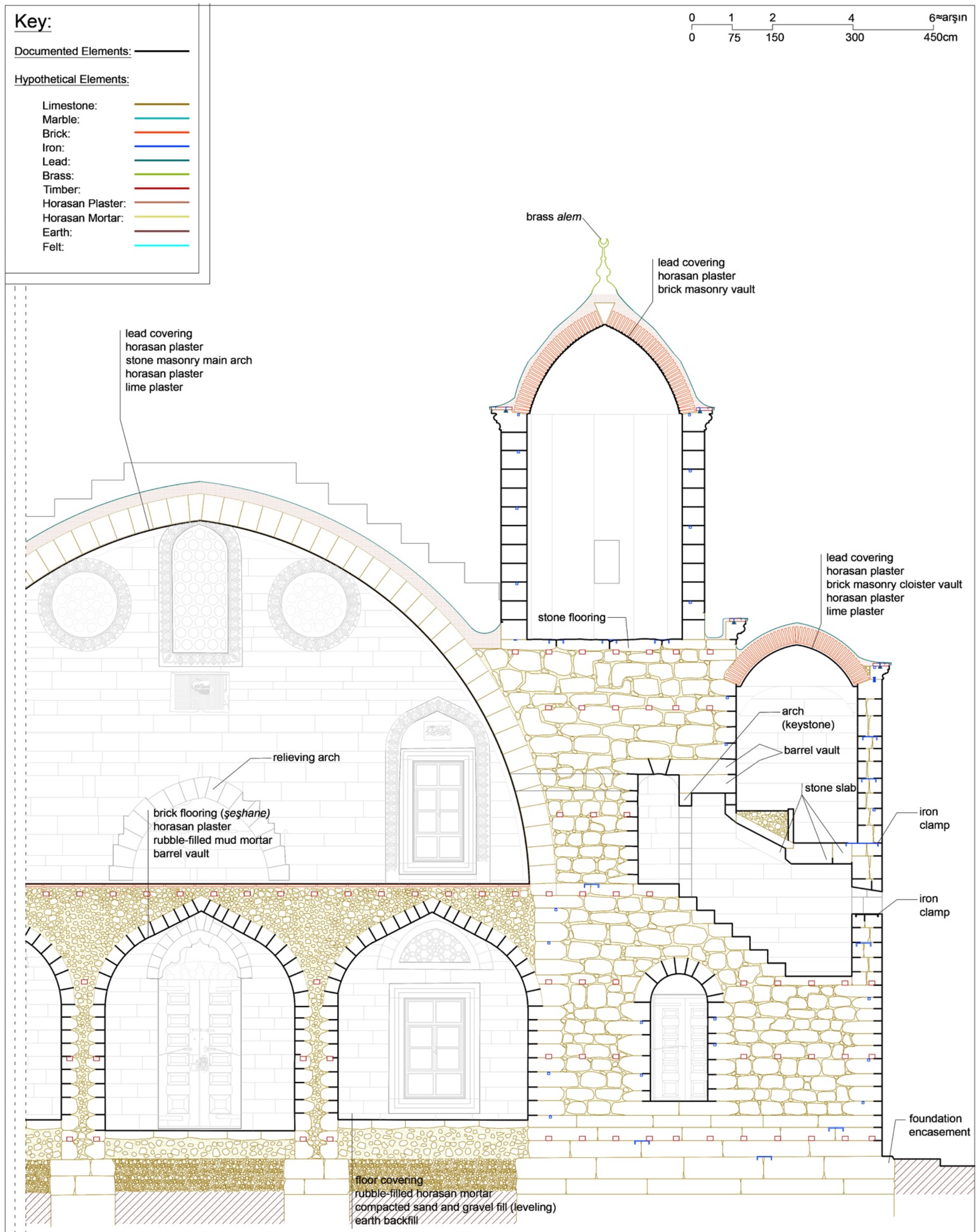
(Photographs taken by Author in 2014-16)

Key:

Documented Elements:

Hypothetical Elements:

Limestone:
Marble:
Brick:
Iron:
Lead:
Brass:
Timber:
Horasan Plaster:
Horasan Mortar:
Earth:
Felt:



(System Detail drawn by author)

Figure 189: Catalogue 1.3.6 (Lüleburgaz) System Detail 6

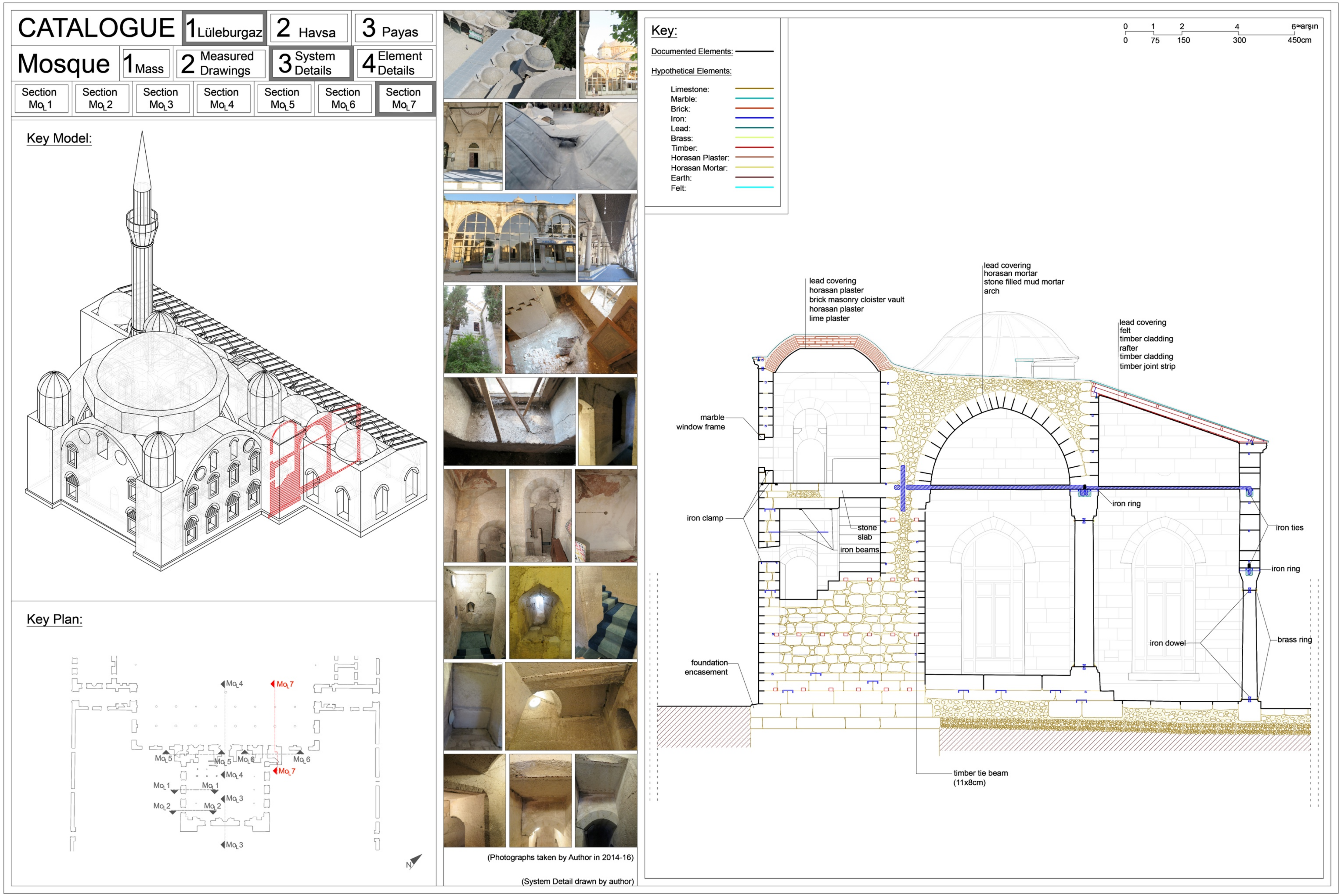


Figure 190: Catalogue 1.3.7 (Lüleburgaz) System Detail 7

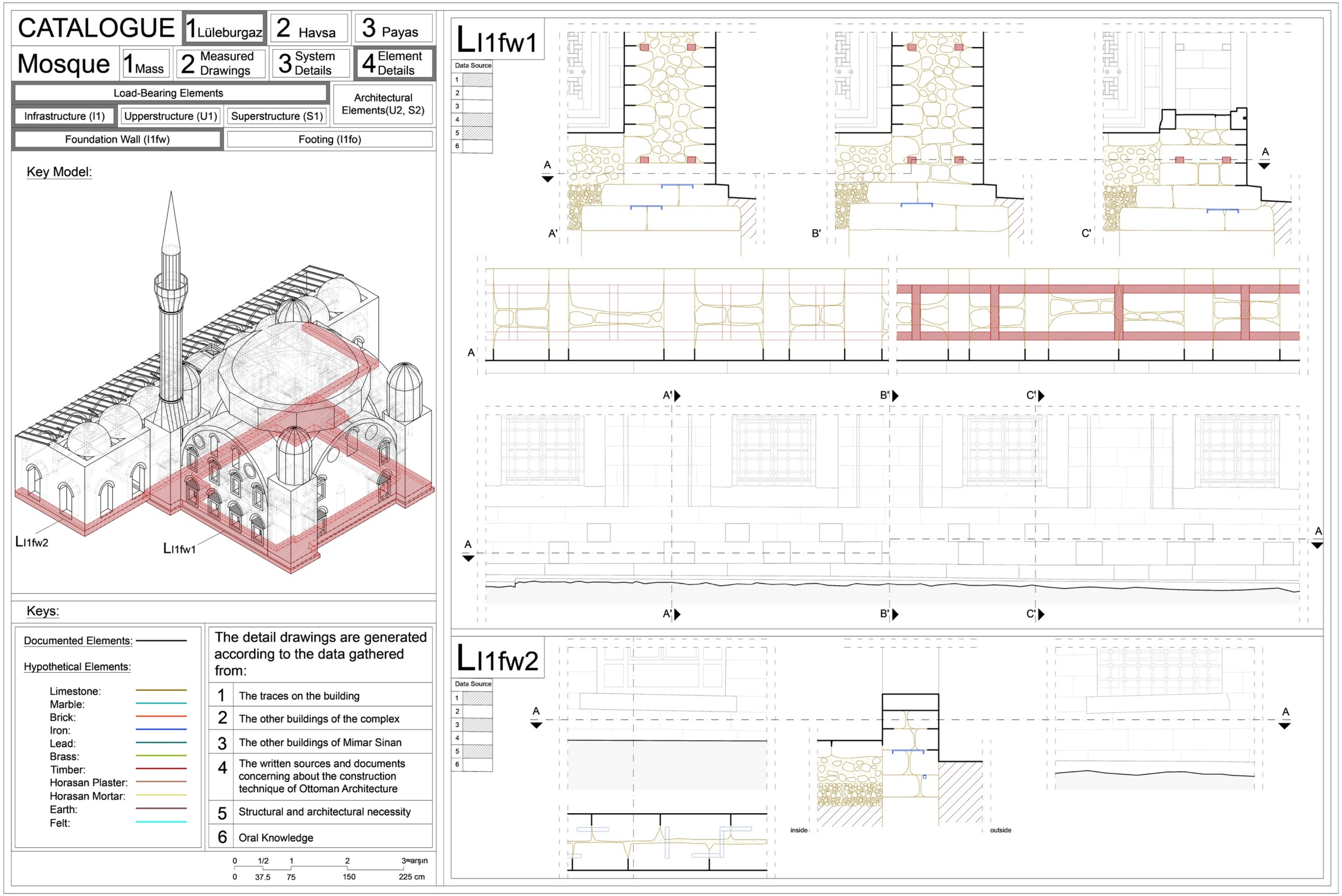


Figure 191: Catalogue 1.4.I1fw

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

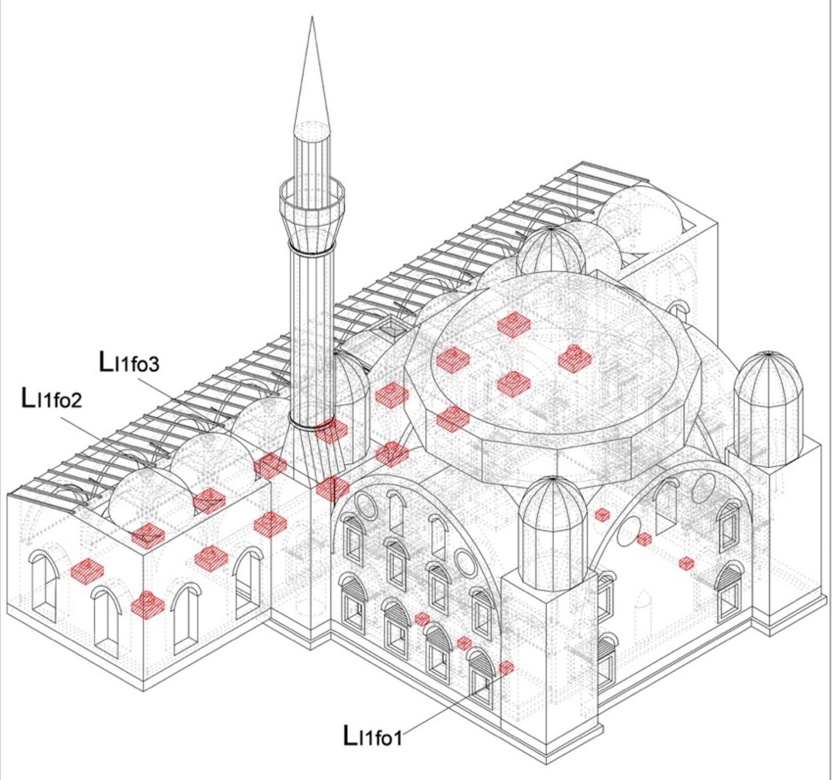
Mosque | 1 Mass | 2 Measured Drawings | 3 System Details | 4 Element Details

Load-Bearing Elements | Architectural Elements(U2, S2)

Infrastructure (I1) | Upperstructure (U1) | Superstructure (S1)

Foundation Wall (I1fw) | Footing (I1fo)

Key Model:



Keys:

Documented Elements:

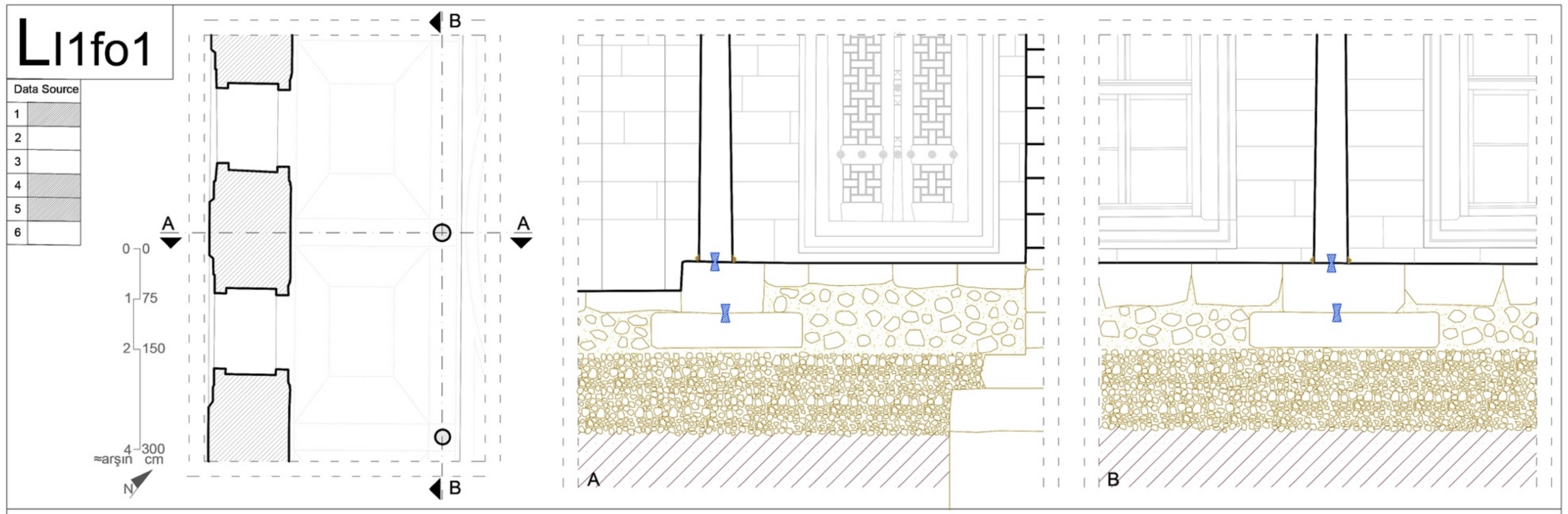
Hypothetical Elements:

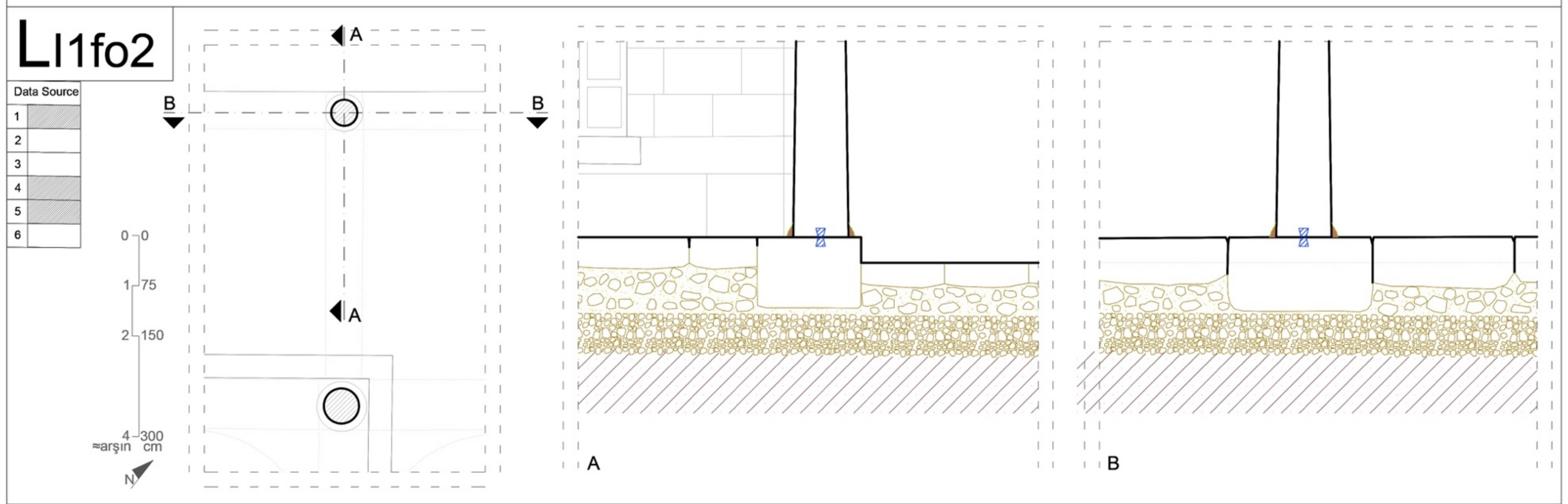
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3≈arşın
0 37.5 75 150 225 cm





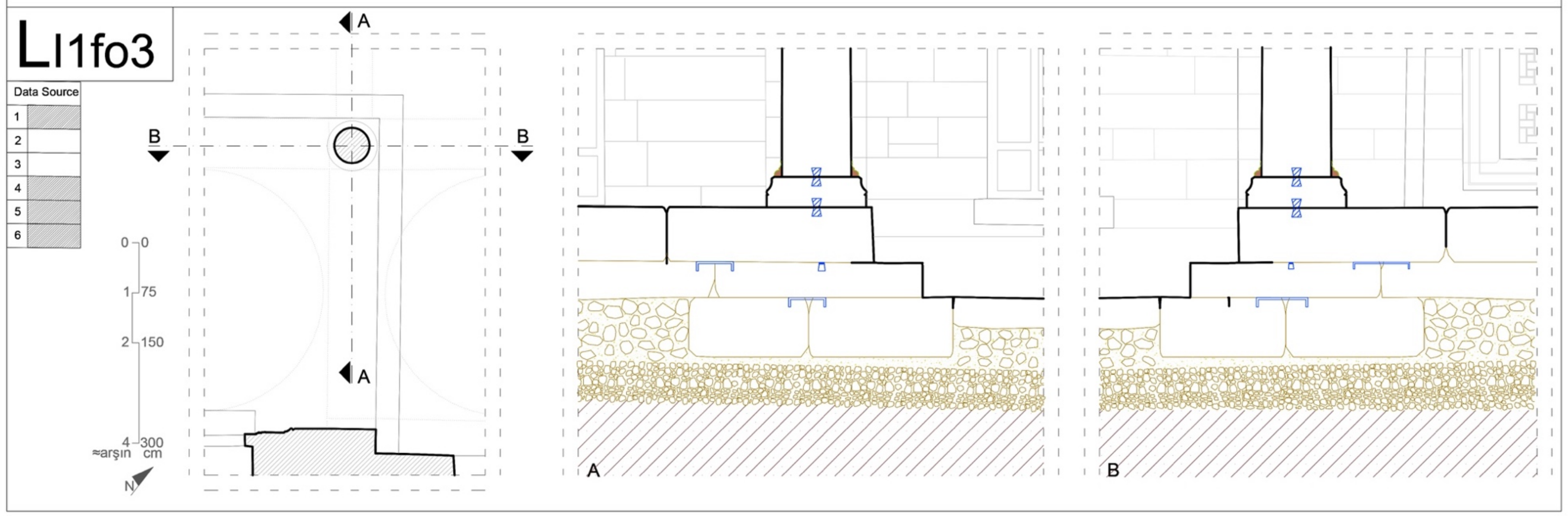


Figure 192: Catalogue 1.4.I1fo

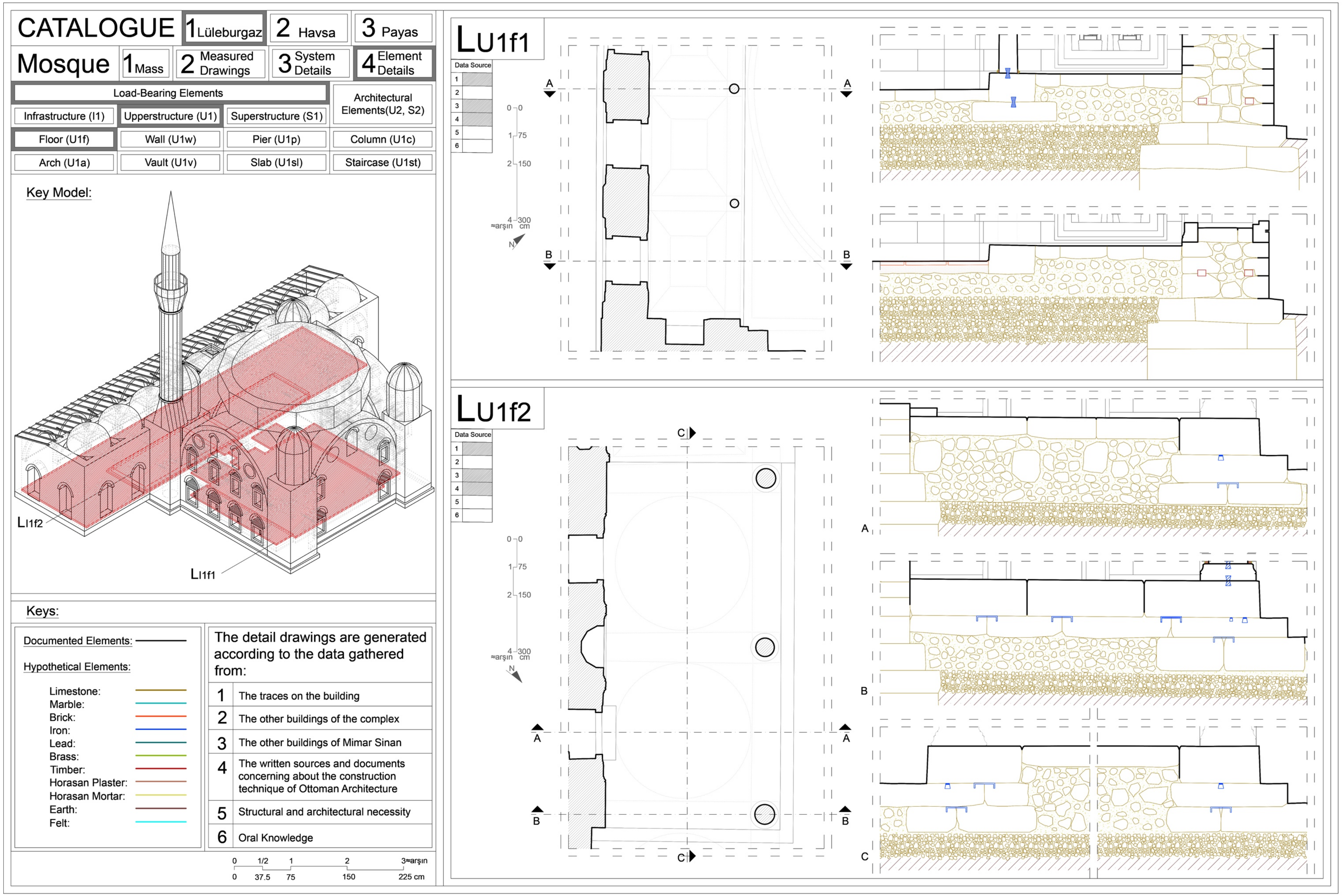


Figure 193: Catalogue 1.4.U1f

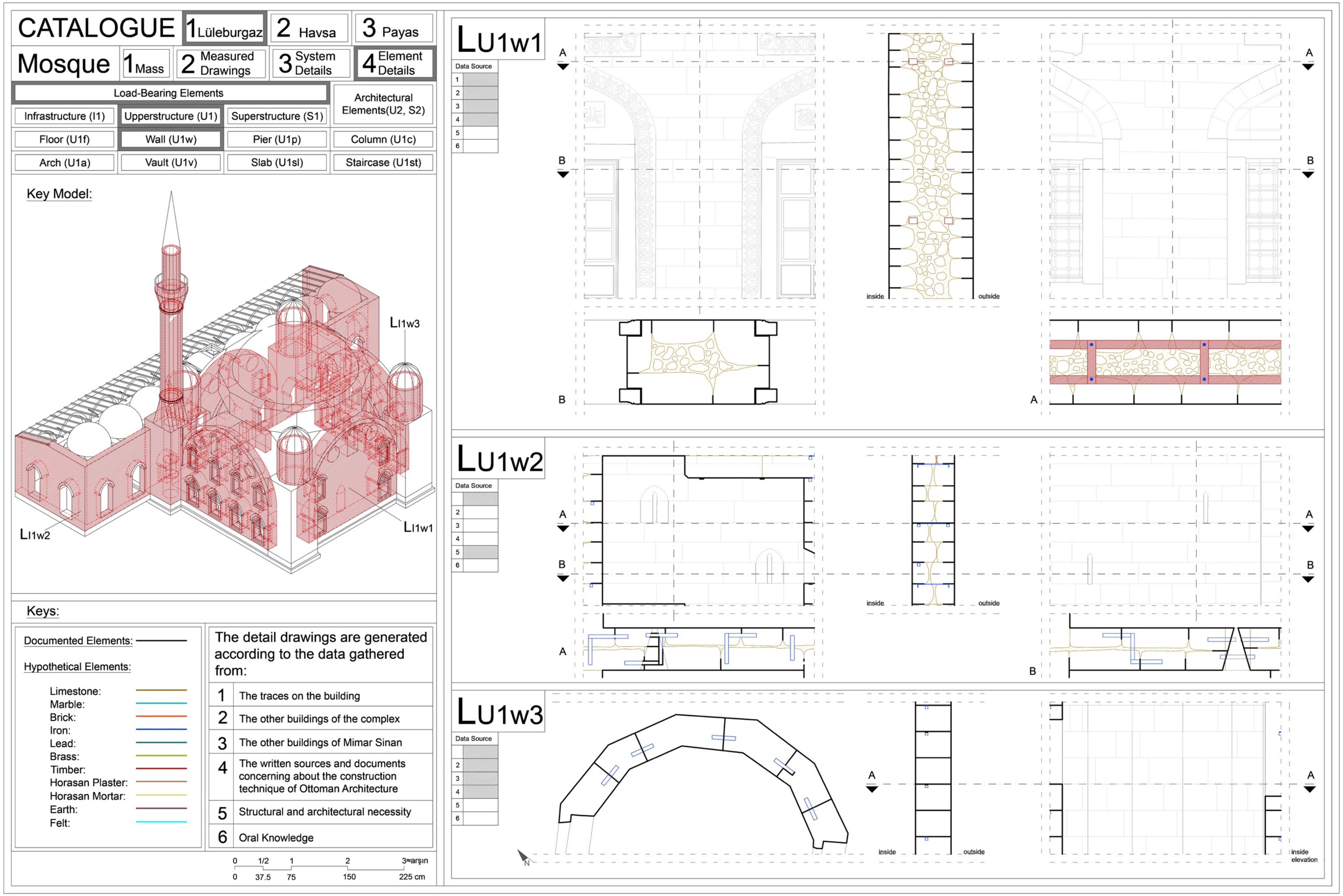


Figure 194: Catalogue 1.4.U1w

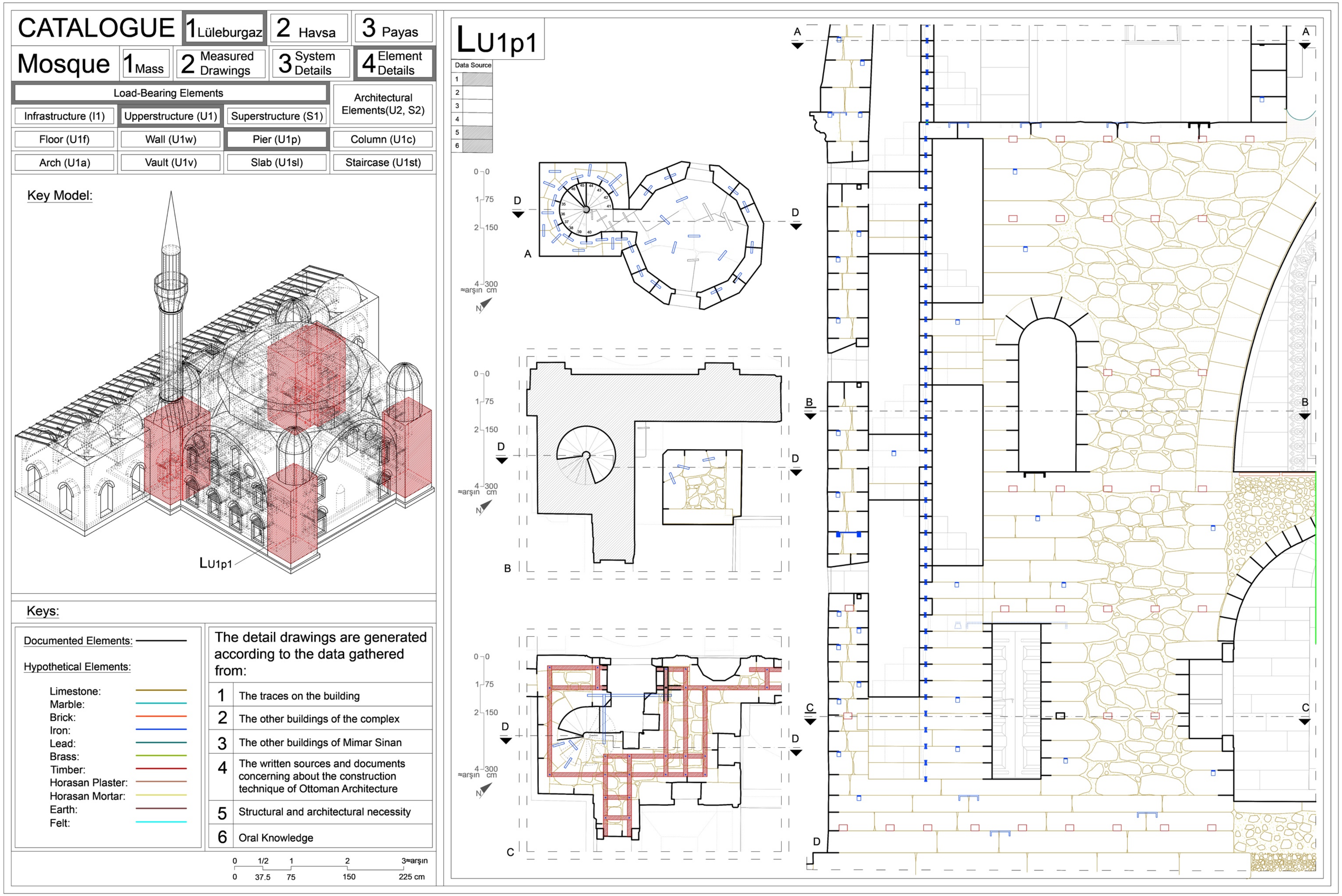
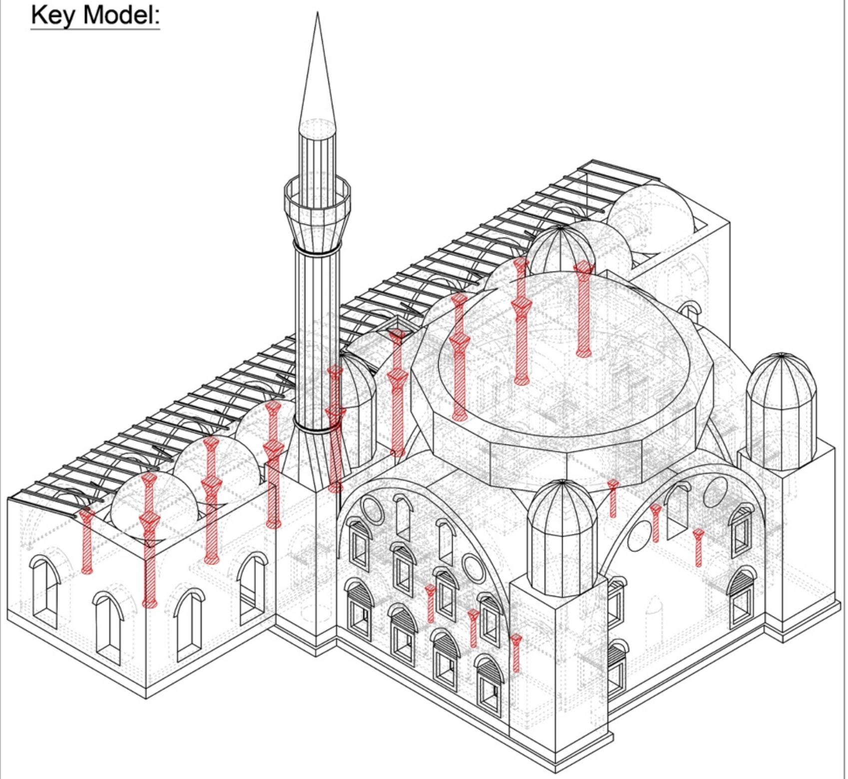


Figure 195: Catalogue 1.4.U1p

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details

Load-Bearing Elements			Architectural Elements(U2, S2)
Infrastructure (I1)	Upperstructure (U1)	Superstructure (S1)	
Floor (U1f)	Wall (U1w)	Pier (U1p)	Column (U1c)
Arch (U1a)	Vault (U1v)	Slab (U1sl)	Staircase (U1st)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3≈arşın
0 37.5 75 150 225 cm

LU1c1

Data Source
1
2
3
4
5
6

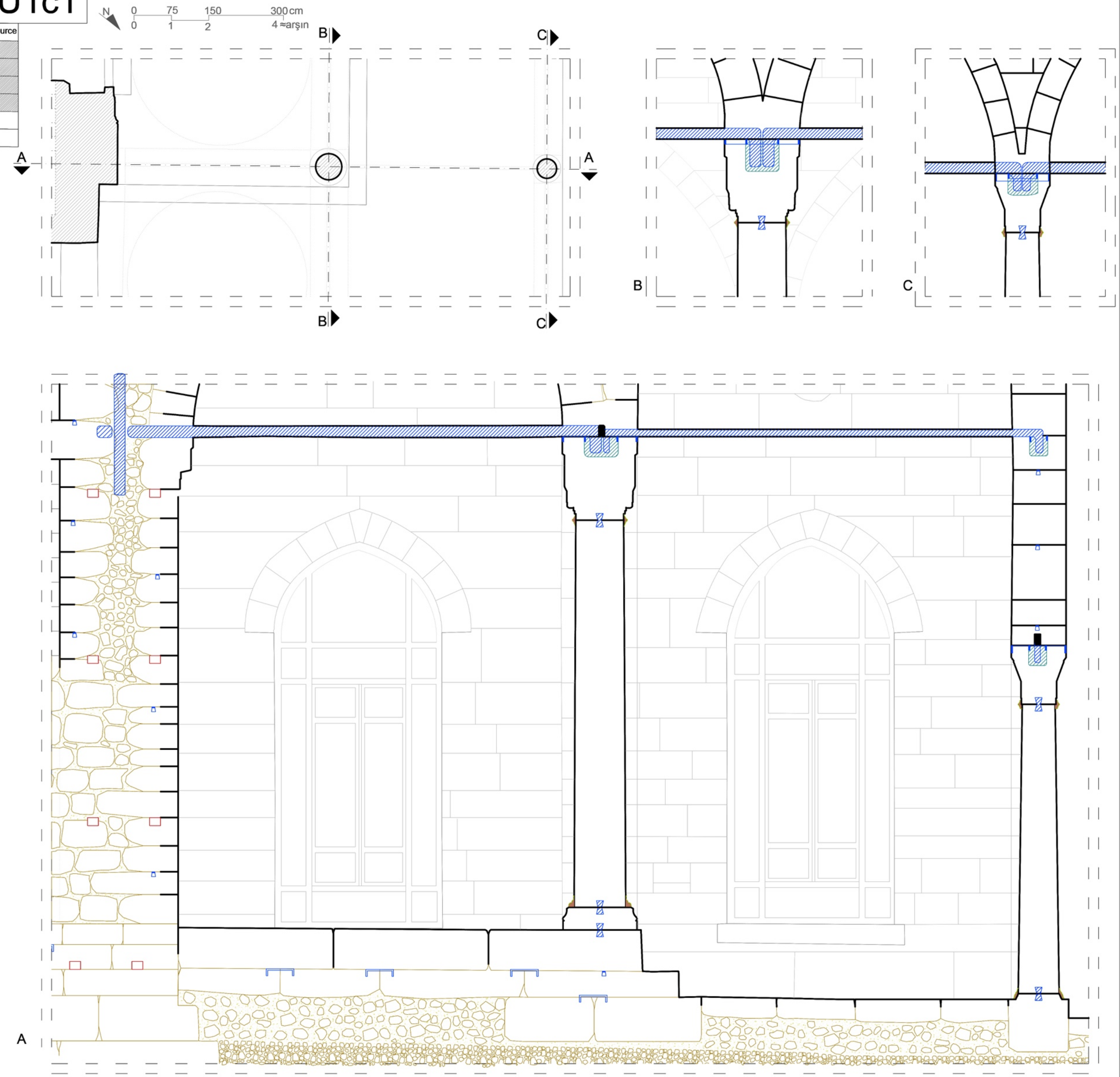


Figure 196: Catalogue 1.4.U1c

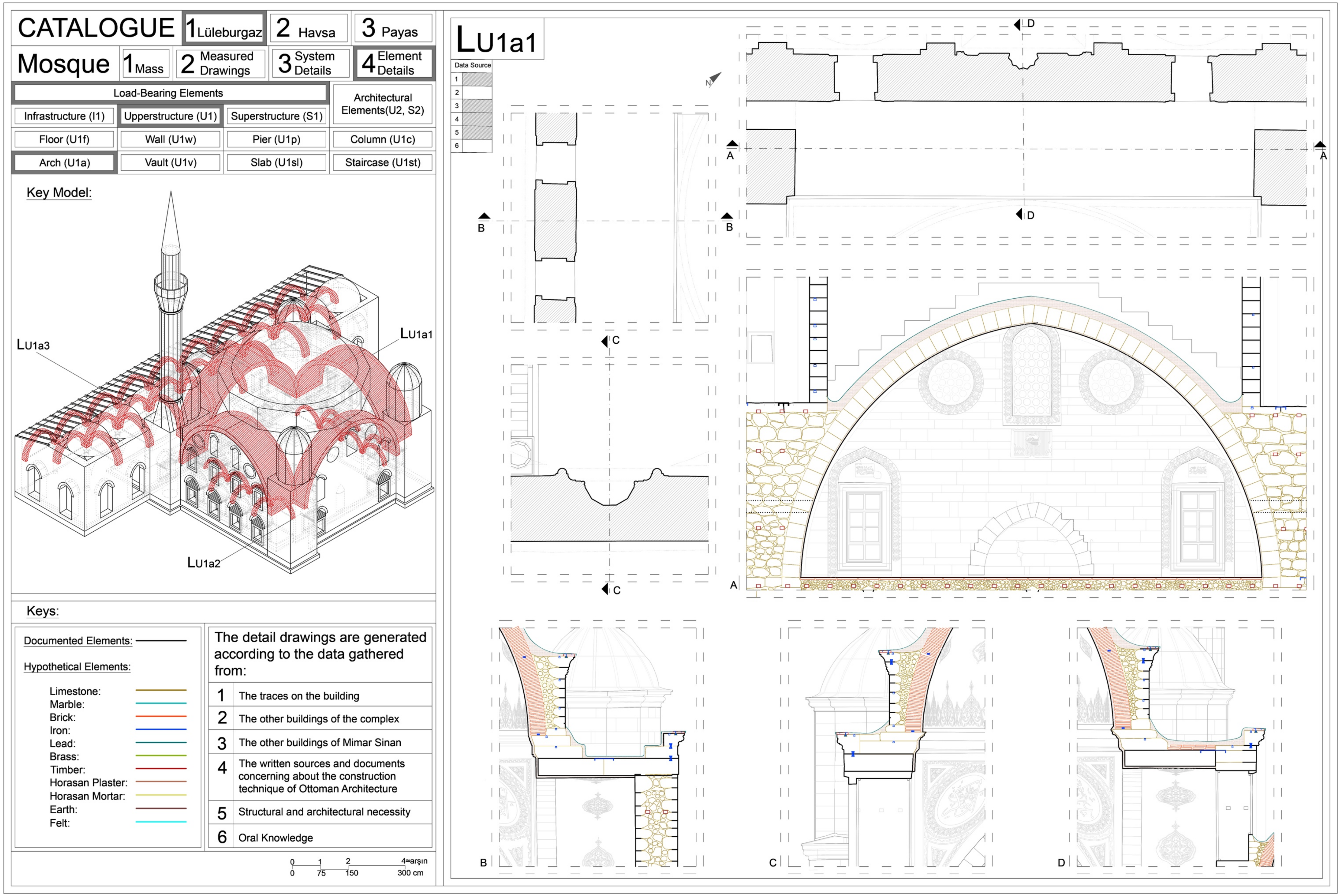
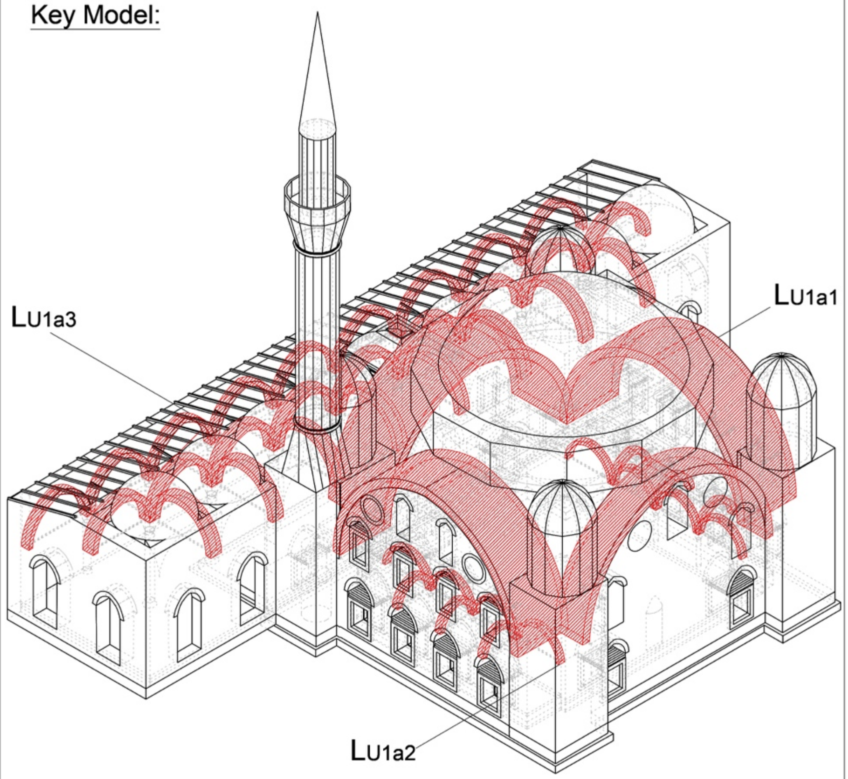


Figure 197: Catalogue 1.4.U1a

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass / 2 Measured Drawings	3 System Details	4 Element Details

Load-Bearing Elements			Architectural Elements(U2, S2)
Infrastructure (I1)	Upperstructure (U1)	Superstructure (S1)	
Floor (U1f)	Wall (U1w)	Pier (U1p)	Column (U1c)
Arch (U1a)	Vault (U1v)	Slab (U1sl)	Staircase (U1st)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

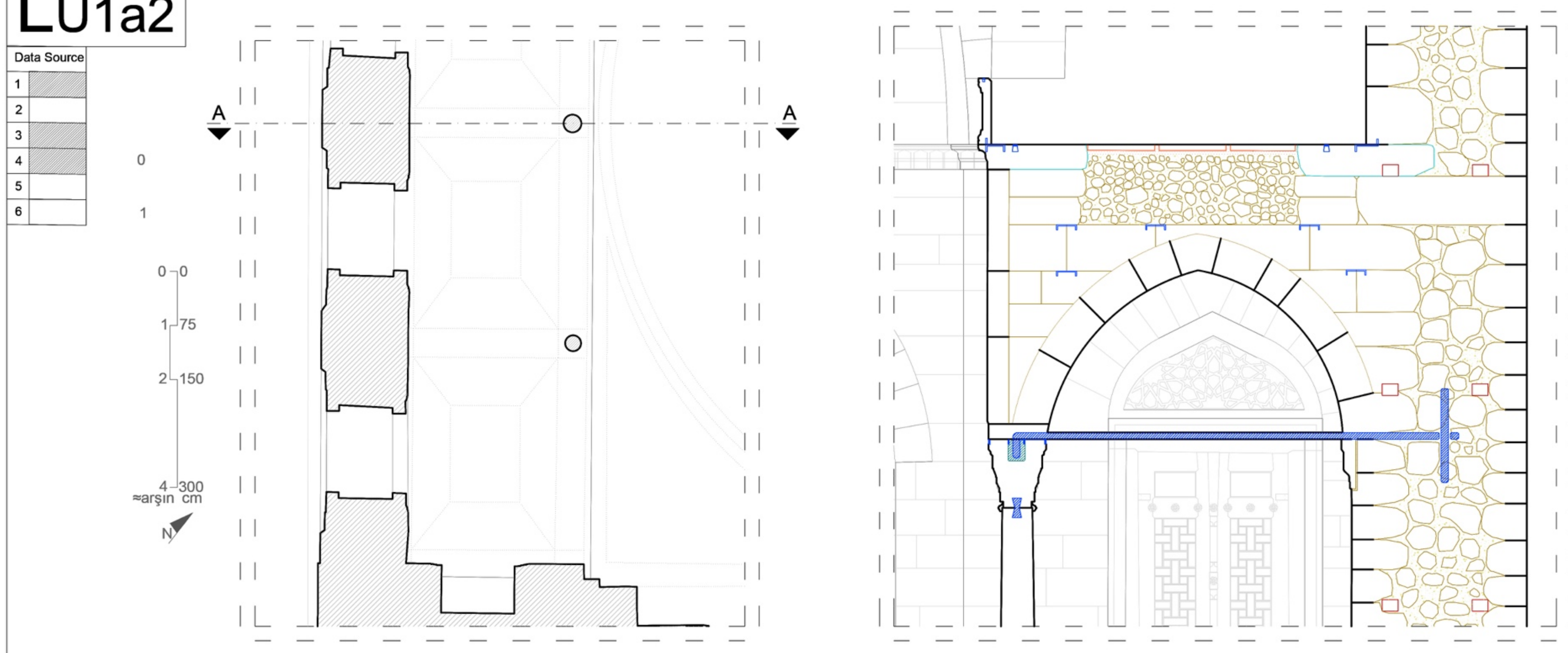
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3≈arşın
0 37.5 75 150 225 cm

LU1a2



LU1a3

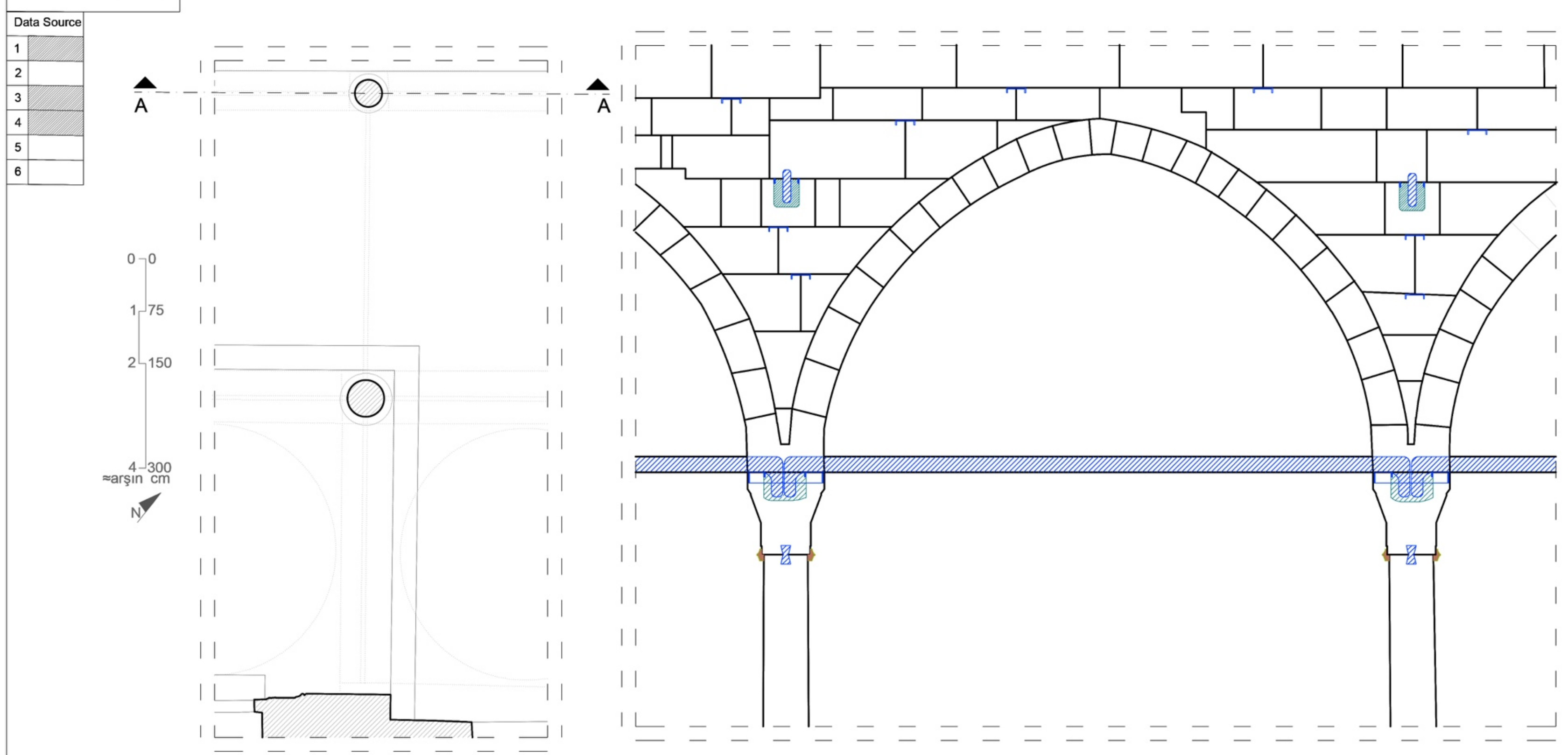


Figure 198: Catalogue 1.4.U1a

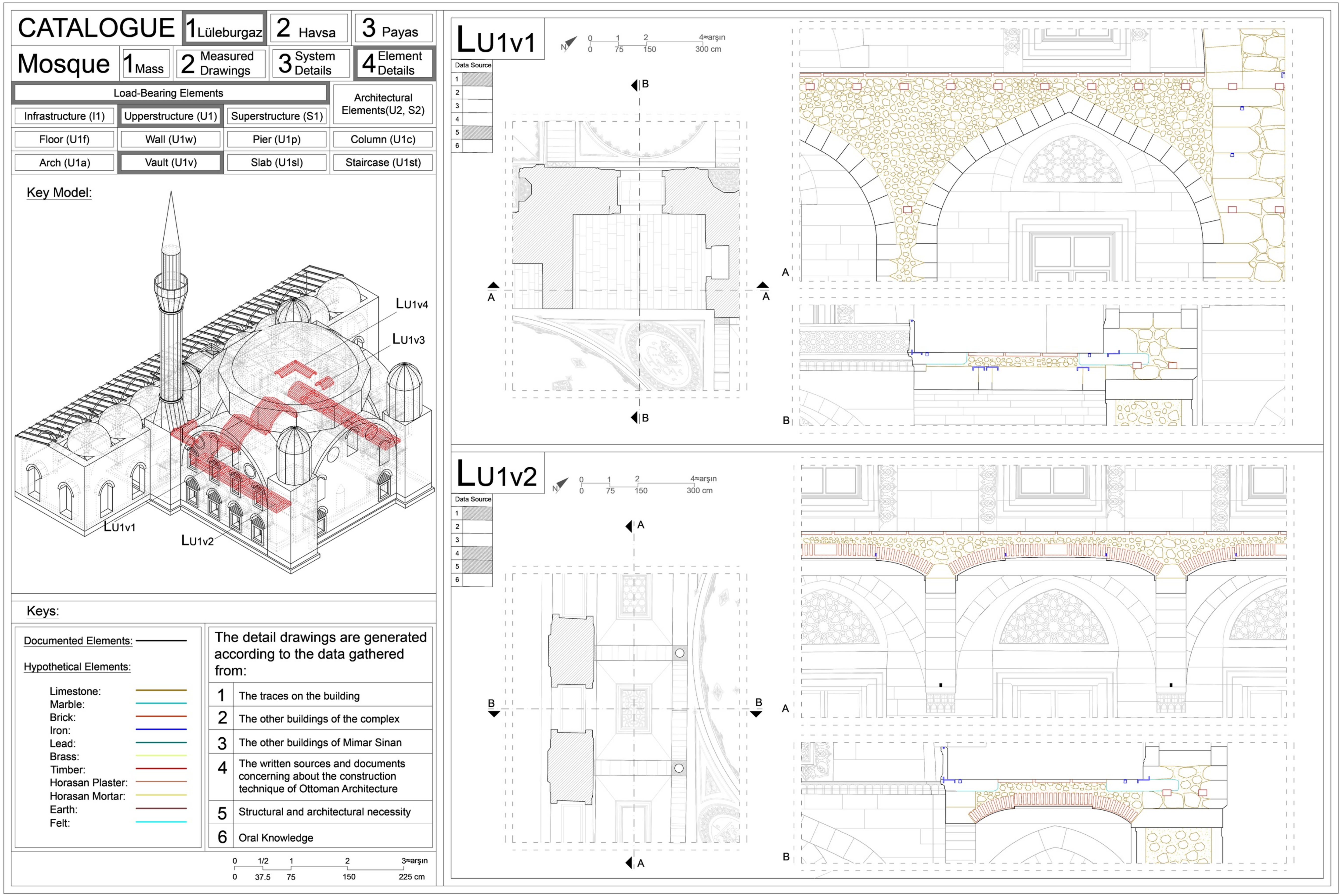


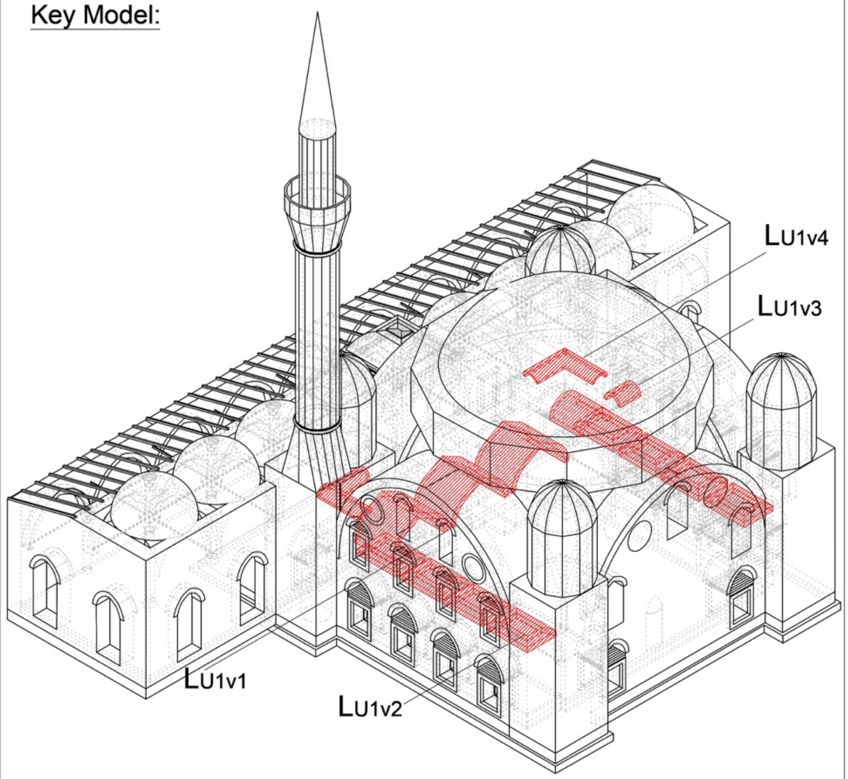
Figure 199: Catalogue 1.4.U1v

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Mosque | 1 Mass | 2 Measured Drawings | 3 System Details | 4 Element Details

Load-Bearing Elements			Architectural Elements(U2, S2)
Infrastructure (I1)	Upperstructure (U1)	Superstructure (S1)	
Floor (U1f)	Wall (U1w)	Pier (U1p)	Column (U1c)
Arch (U1a)	Vault (U1v)	Slab (U1sl)	Staircase (U1st)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

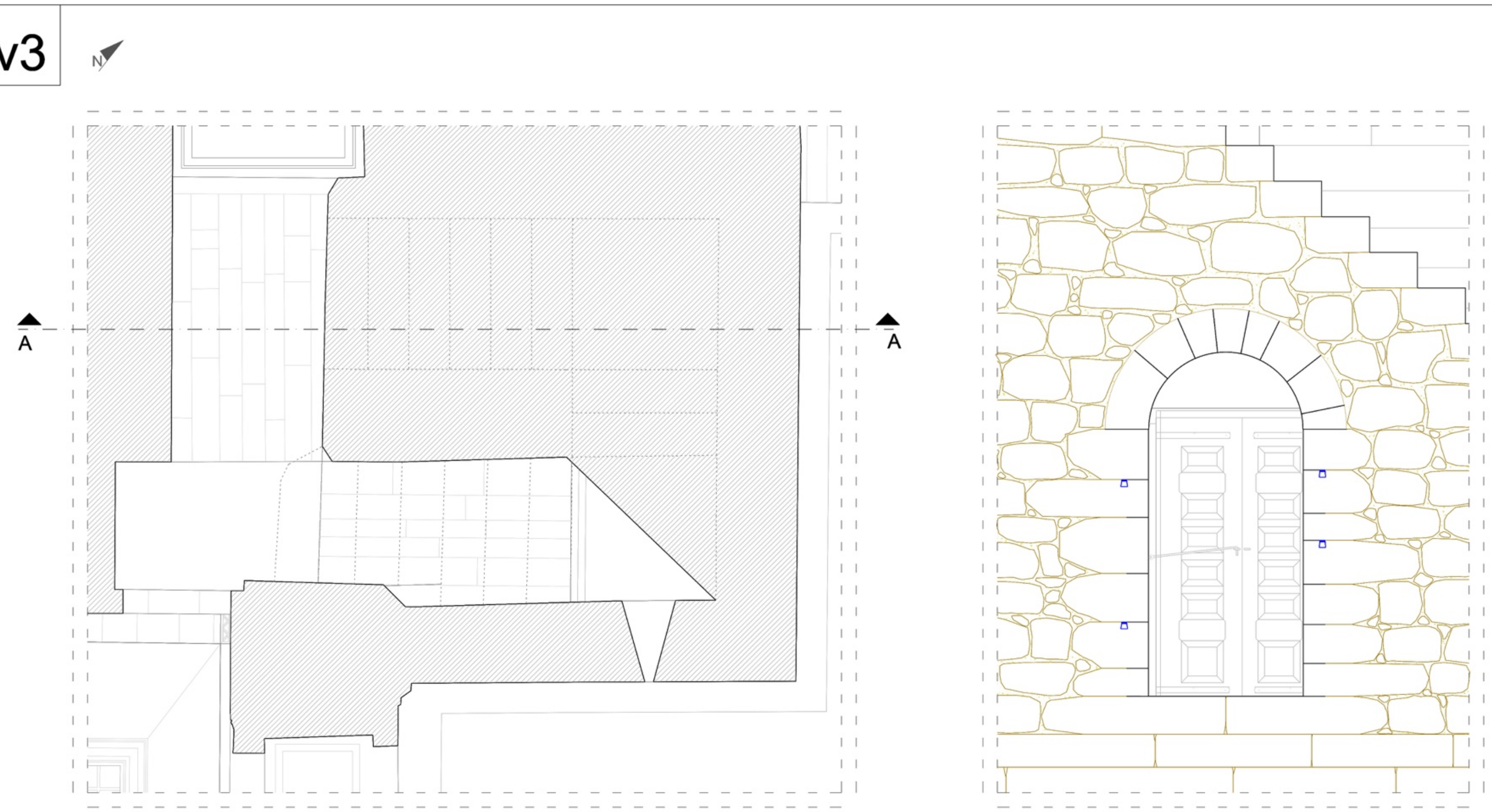
The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3=arşın
0 37.5 75 150 225 cm

LU1v3

Data Source: 1, 2, 3, 4, 5, 6



LU1v4

Data Source: 1, 2, 3, 4, 5, 6

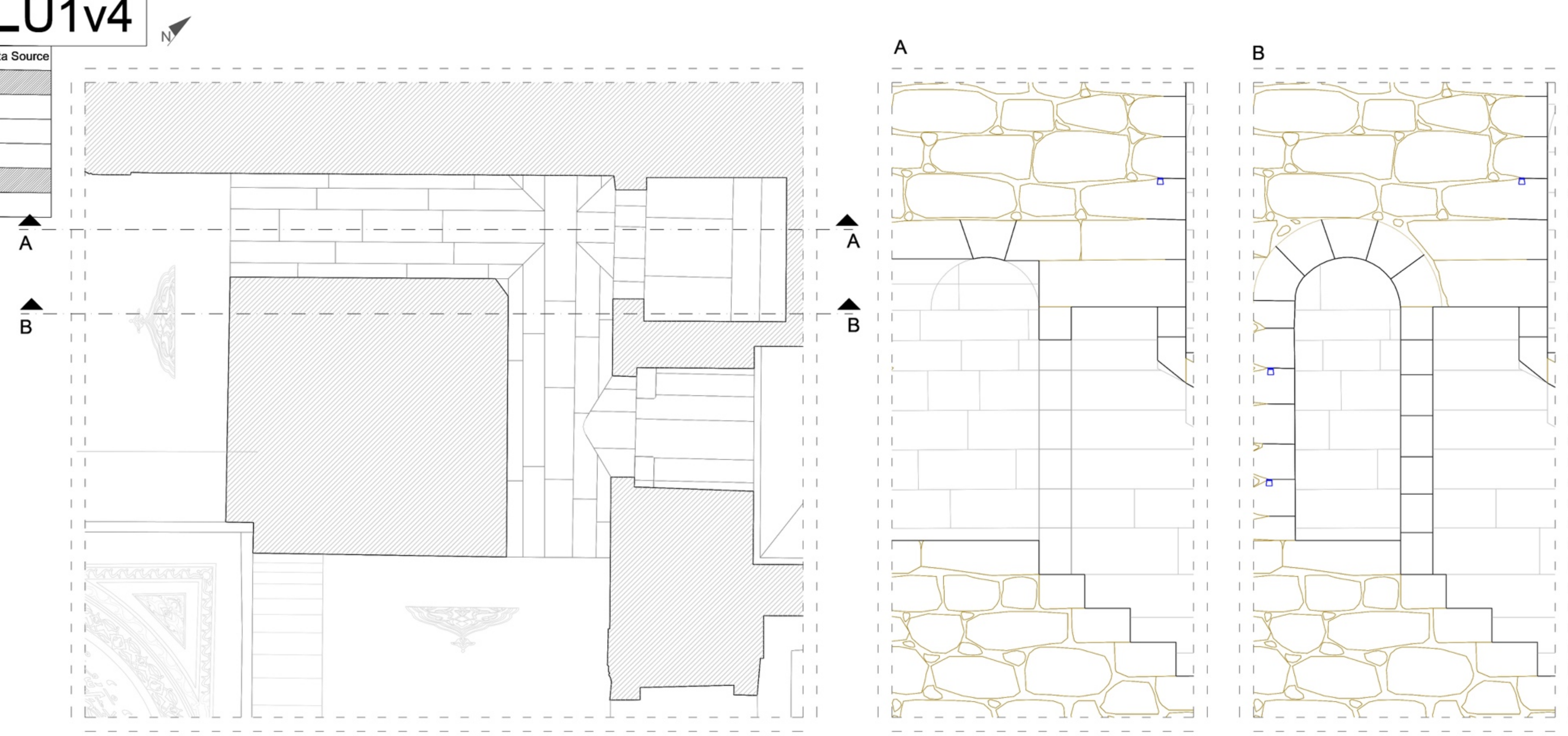


Figure 200: Catalogue 1.4.U1v

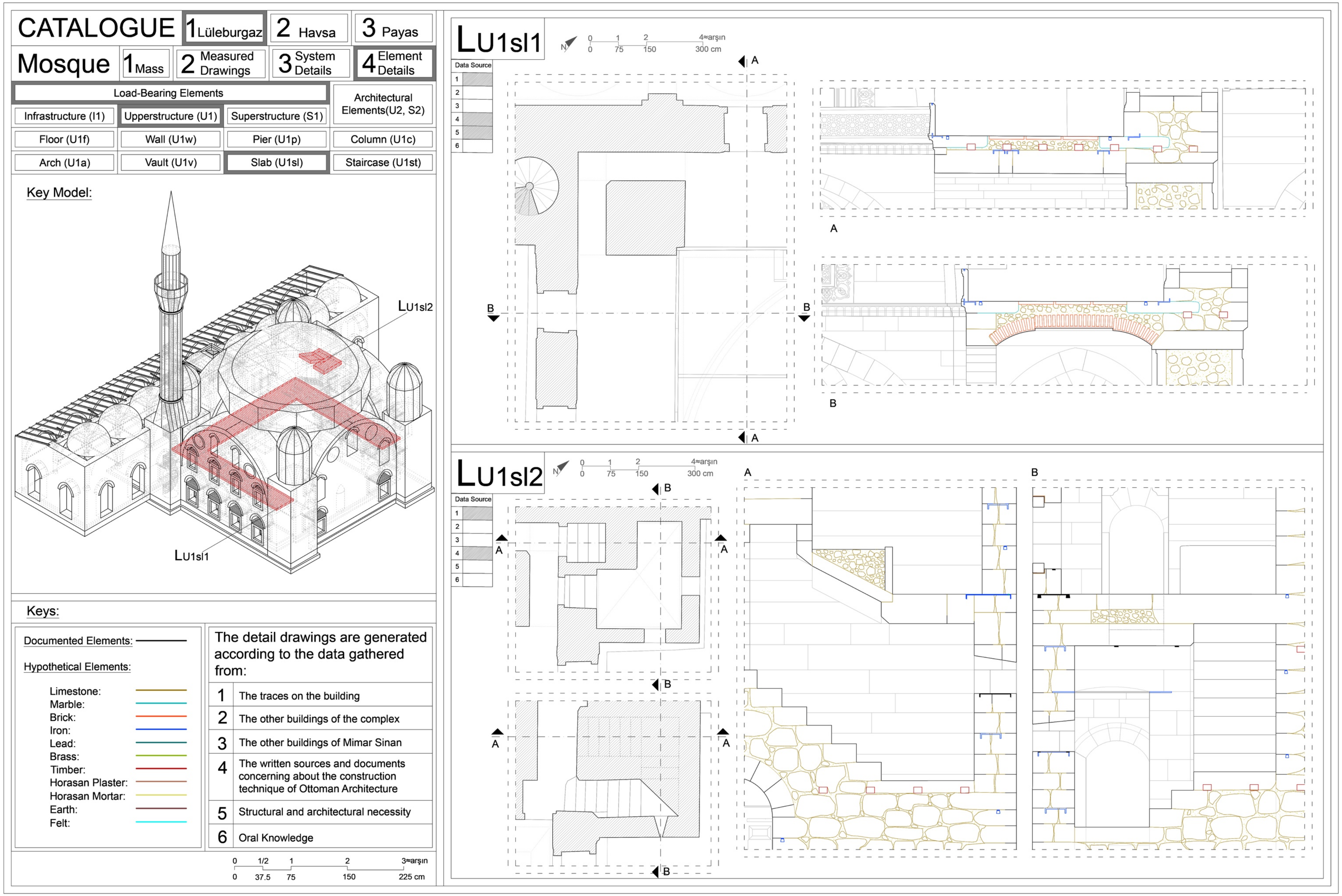


Figure 201: Catalogue 1.4.U1sl

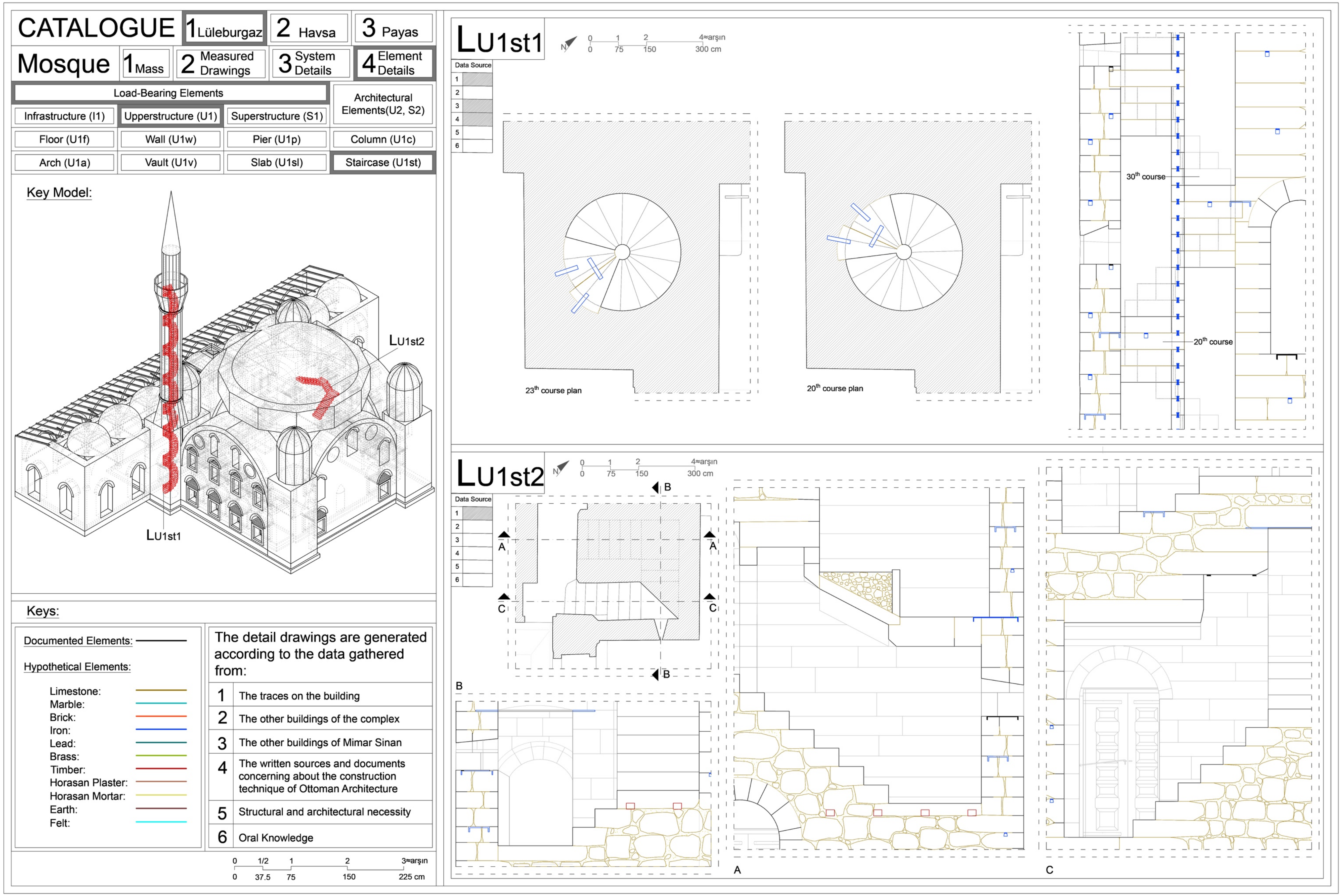
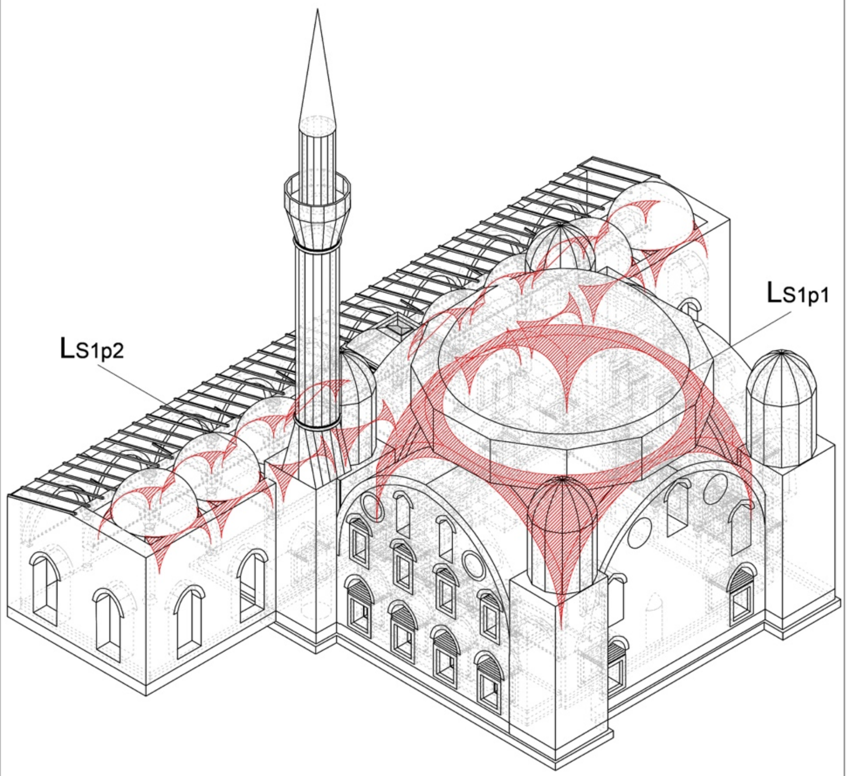


Figure 202: Catalogue 1.4.U1st

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass / 2 Measured Drawings	3 System Details	4 Element Details

Load-Bearing Elements			Architectural Elements(U2, S2)
Infrastructure (I1)	Upperstructure (U1)	Superstructure (S1)	
Pendentive (S1p)	Dome (S1do)	Vault (S1v)	Timber Roofing (S1r)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

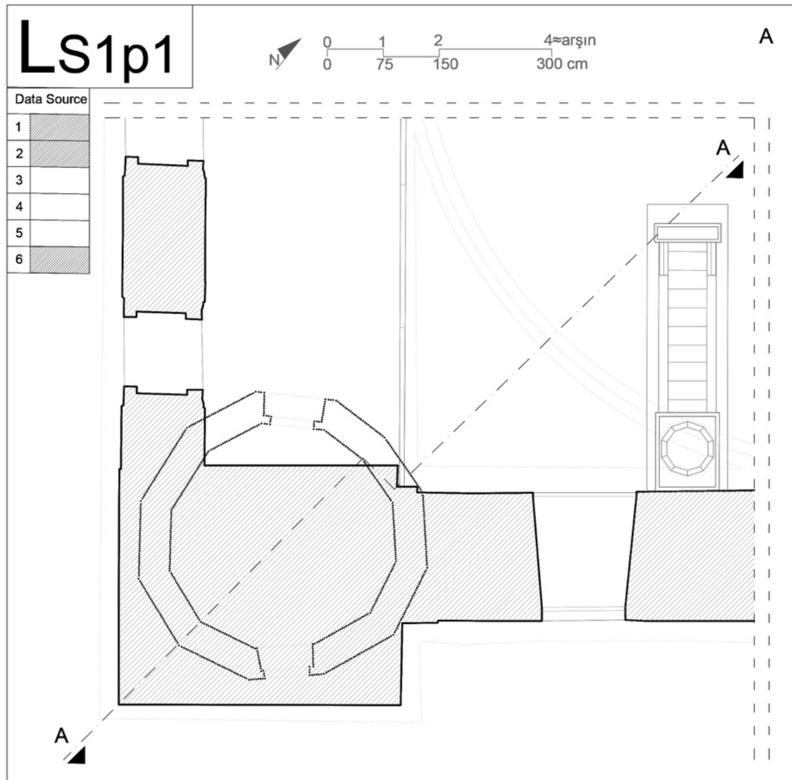
The detail drawings are generated according to the data gathered from:

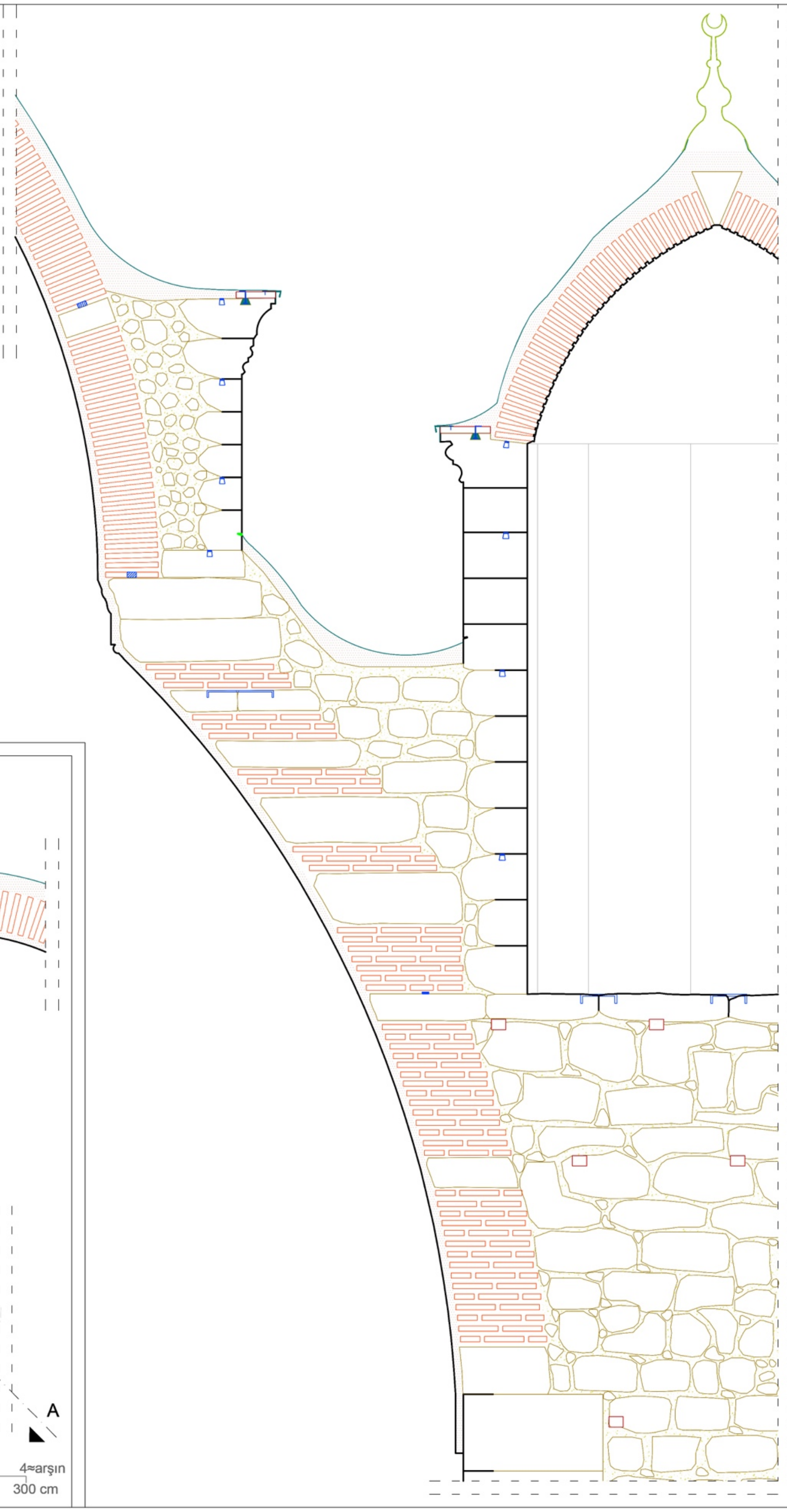
1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3≈arşın
0 37.5 75 150 225 cm

LS1p1

Data Source: 1 2 3 4 5 6





LS1p2

Data Source: 1 2 3 4 5 6

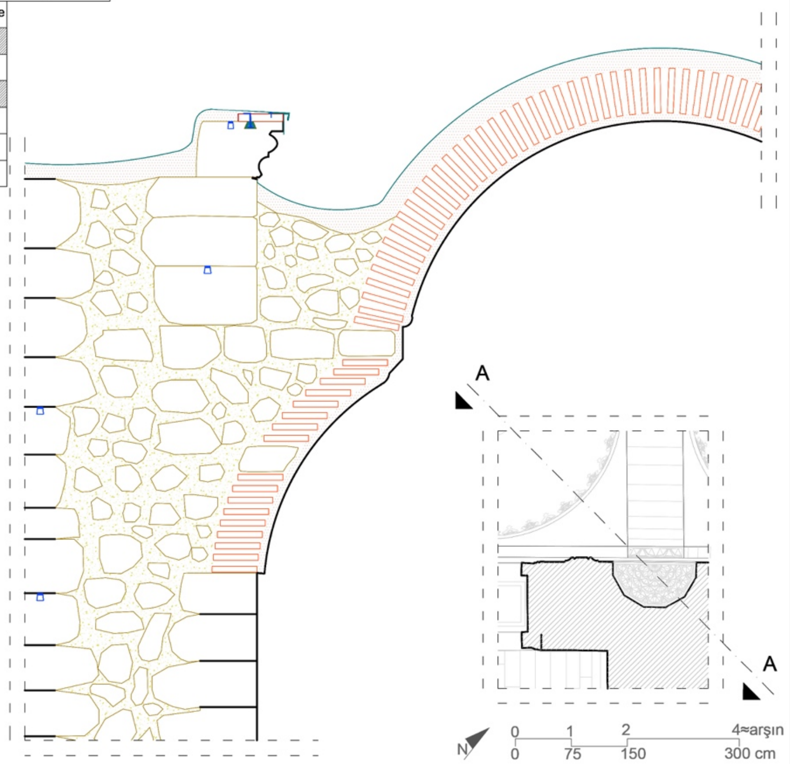


Figure 203: Catalogue 1.4.S1p

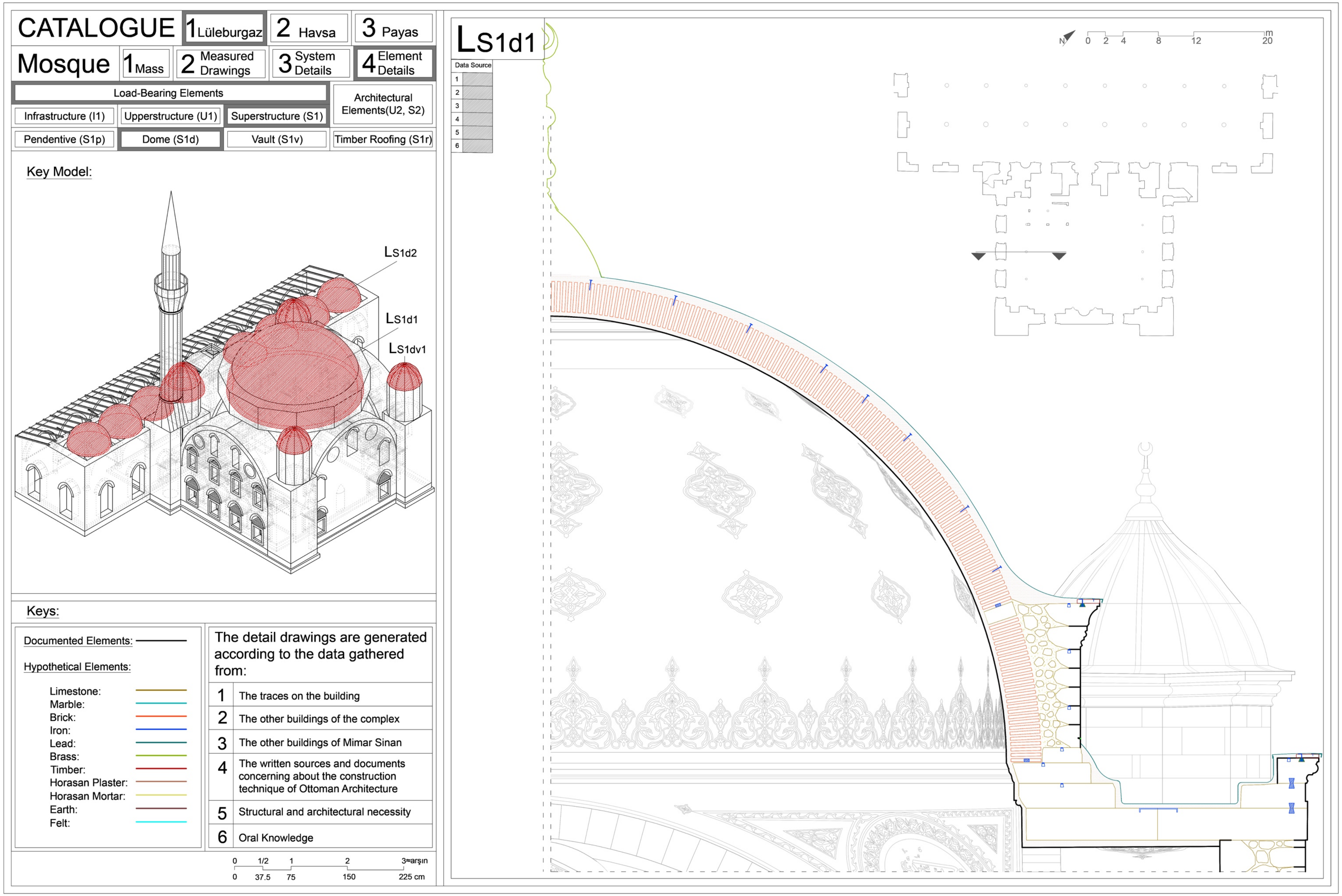


Figure 204: Catalogue 1.4.S1d

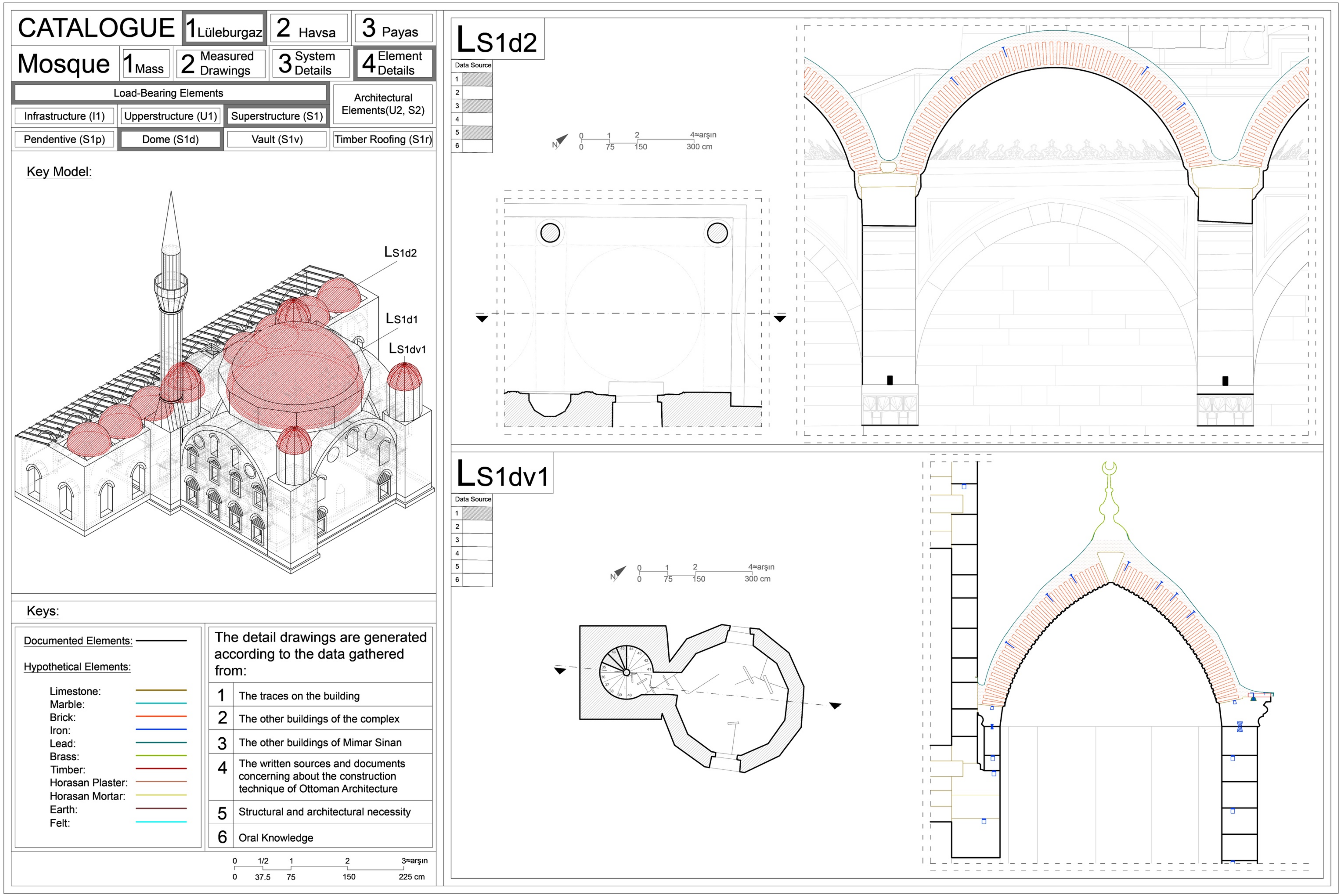


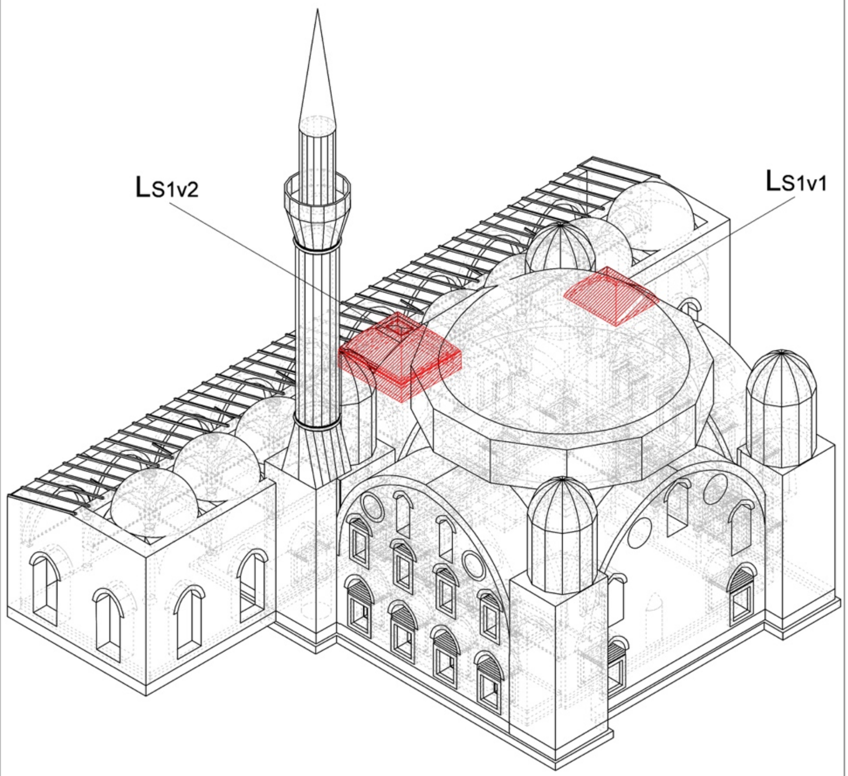
Figure 205: Catalogue 1.4.S1d

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Mosque | 1 Mass | 2 Measured Drawings | 3 System Details | 4 Element Details

Load-Bearing Elements			Architectural Elements(U2, S2)
Infrastructure (I1)	Upperstructure (U1)	Superstructure (S1)	
Pendentive (S1p)	Dome (S1d)	Vault (S1v)	Roof (S1r)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

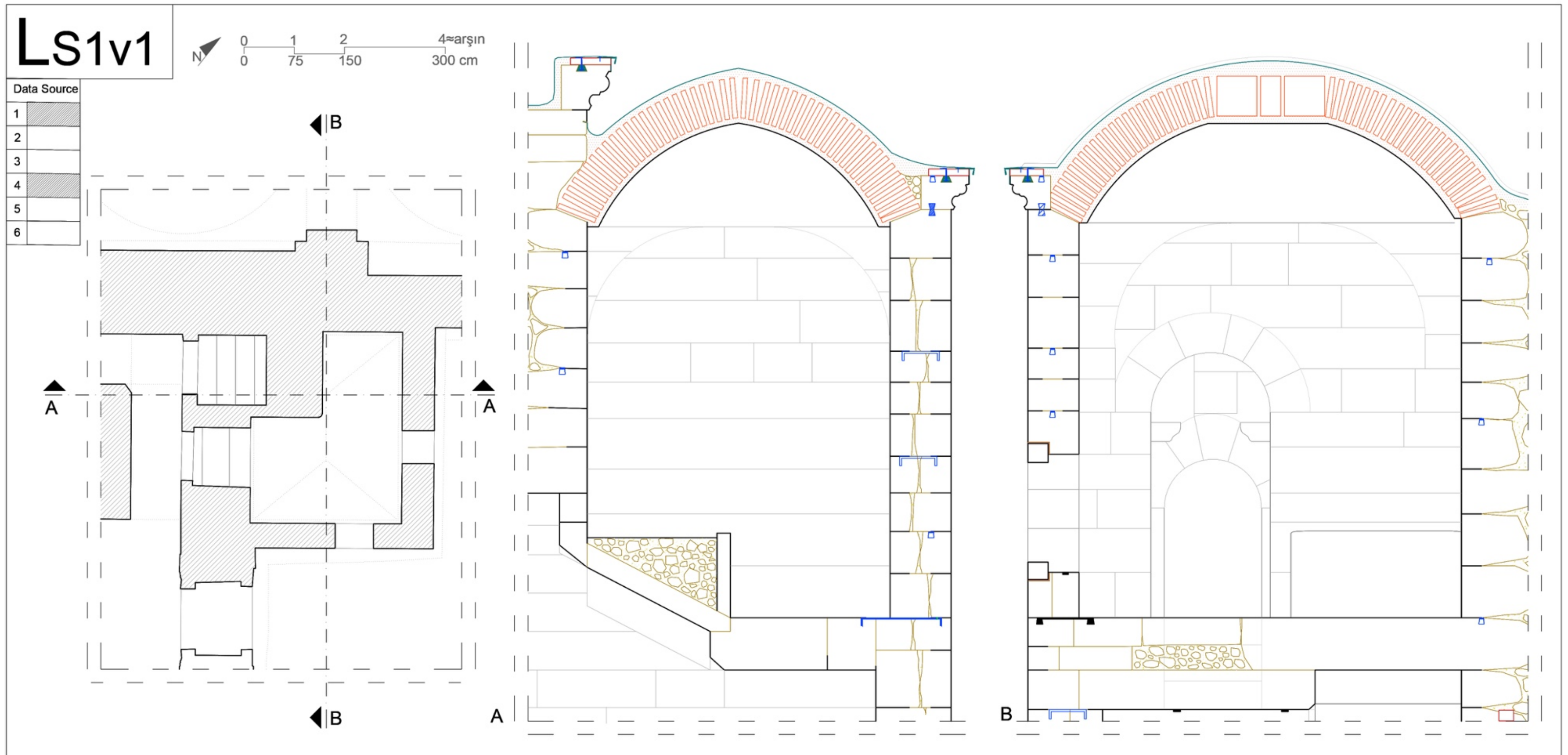
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3≈arşın
0 37.5 75 150 225 cm

LS1v1



LS1v2

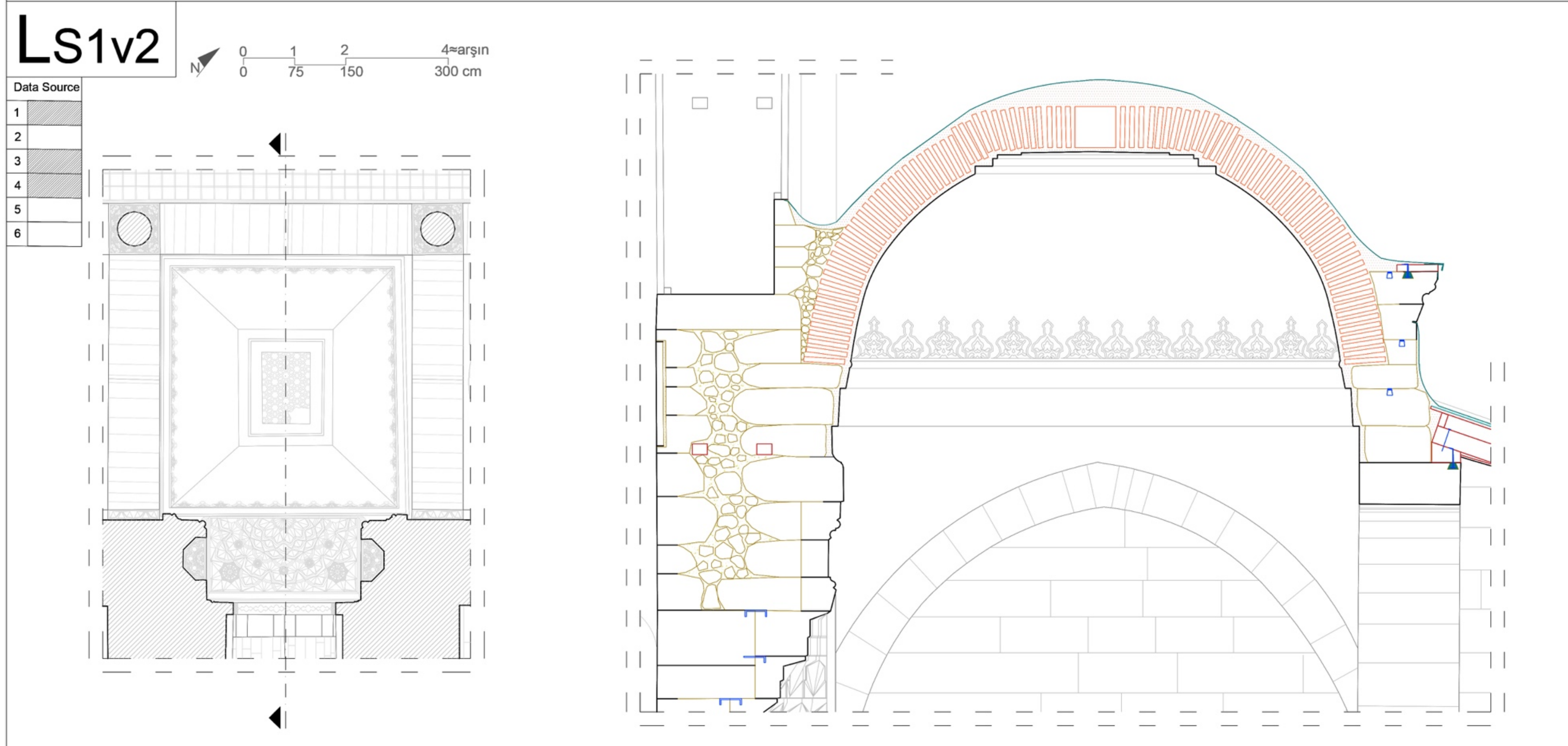
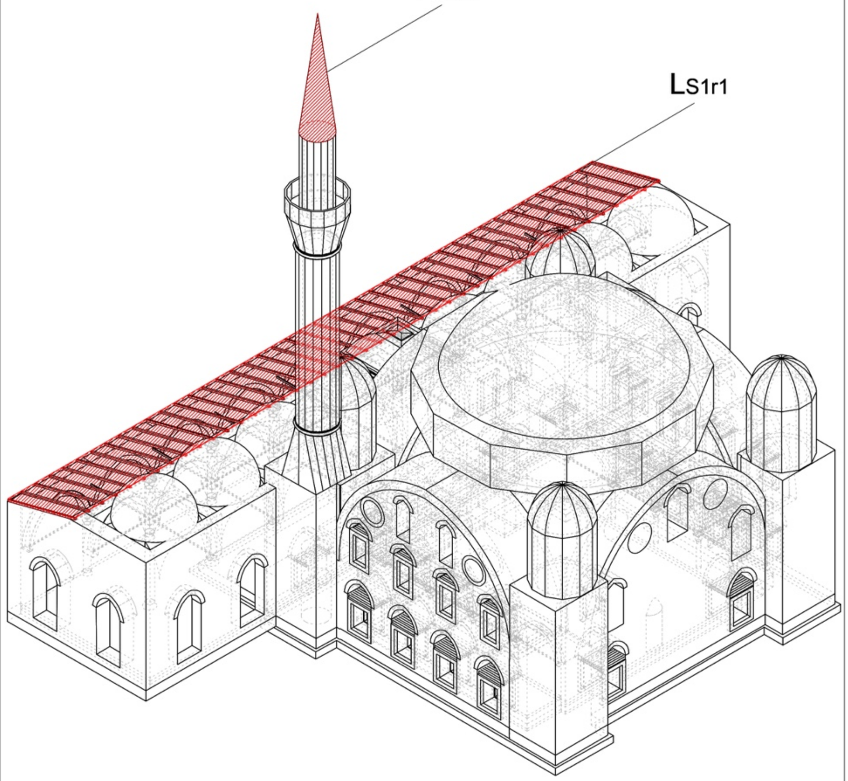


Figure 206: Catalogue 1.4.S1v

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details

Load-Bearing Elements			Architectural Elements(U2, S2)
Infrastructure (I1)	Upperstructure (U1)	Superstructure (S1)	
Pendentive (S1p)	Dome (S1d)	Vault (S1v)	Timber Roofing (S1r)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

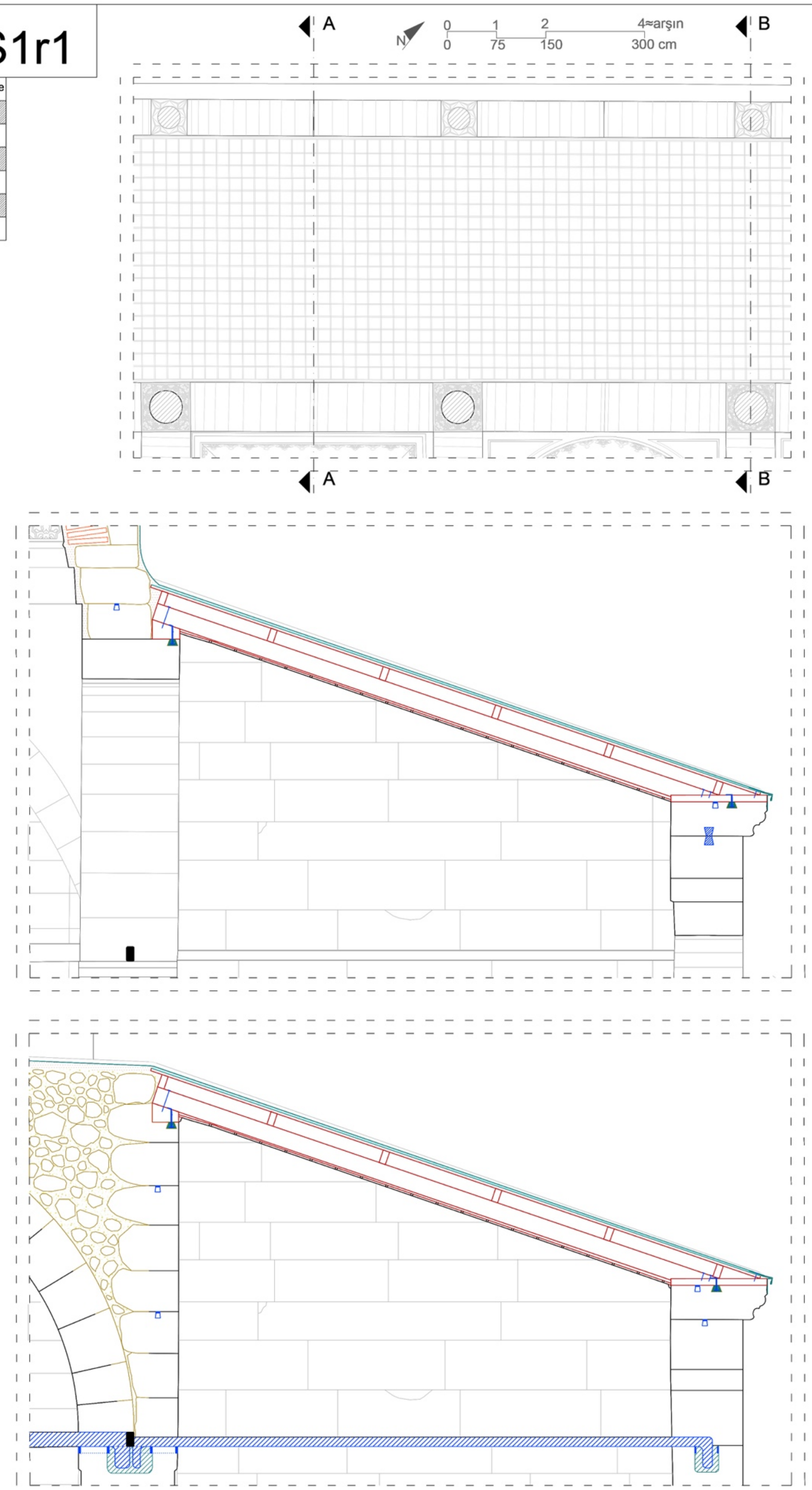
The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3=arşın
0 37.5 75 150 225 cm

LS1r1

Data Source: 1 2 3 4 5 6



LS1r2

Data Source: 1 2 3 4 5 6

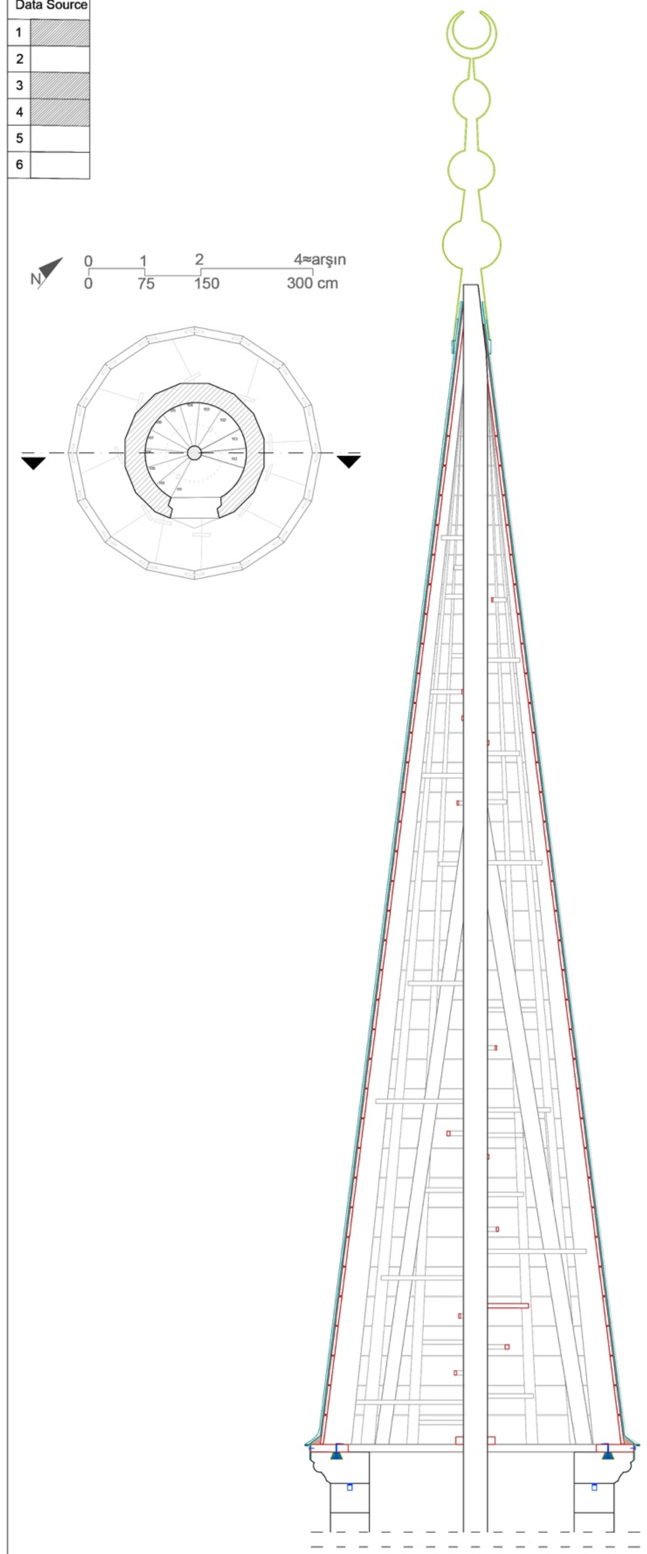


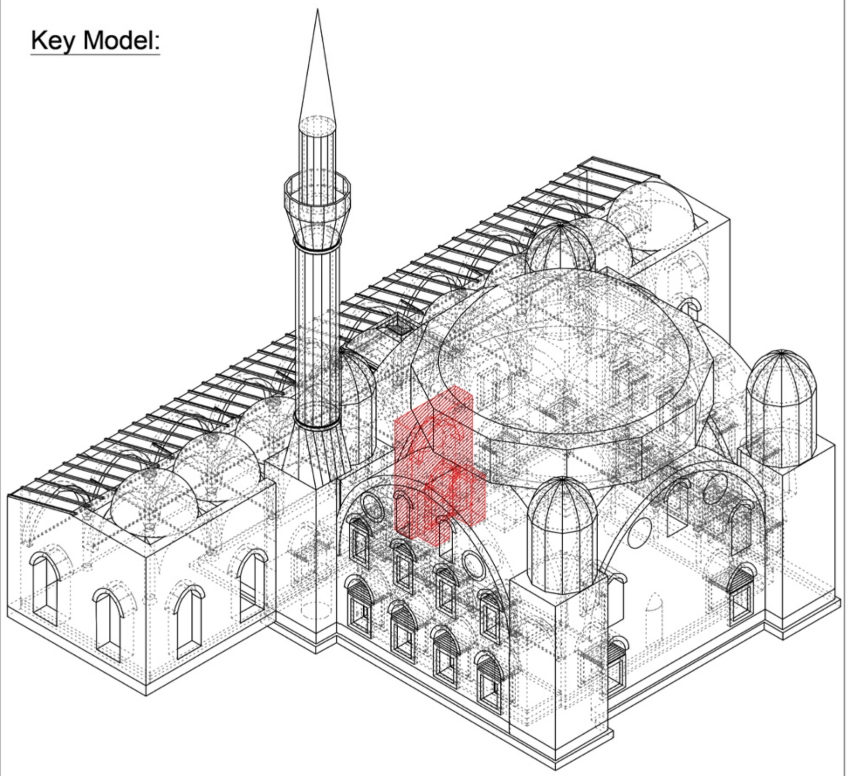
Figure 207: Catalogue 1.4.S1r

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details

Load-Bearing Elements: Infrastructure (I1) | Upperstructure (U1) | Superstructure (S1)

Architectural Elements(U2, S2): Portal (U2p) | *Mihrab* (U2mi) | Door (U2d) | Window (U2w) | Balustrade (U2b) | Niche (U2n)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

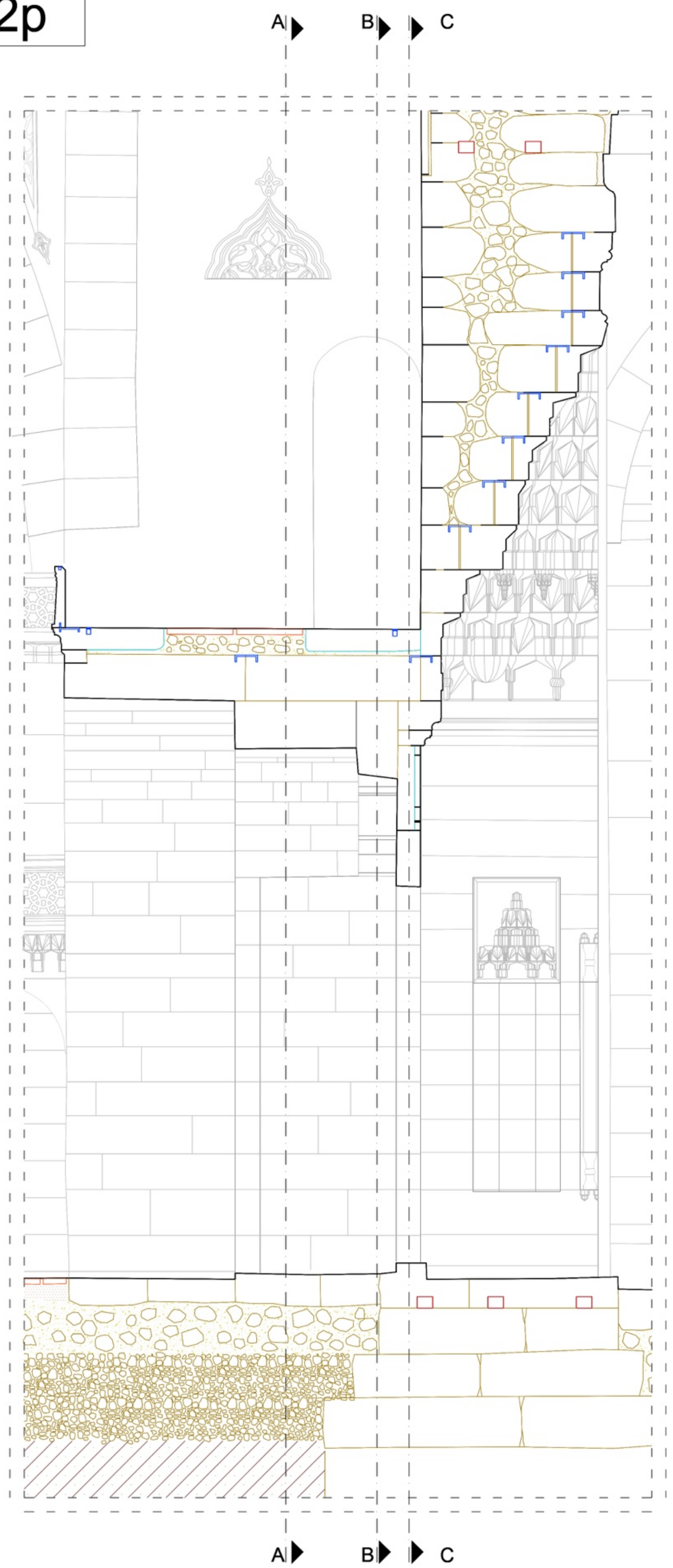
The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3=arşın
0 37.5 75 150 225 cm

LU2p

Data Source 1 2 3 4 5 6



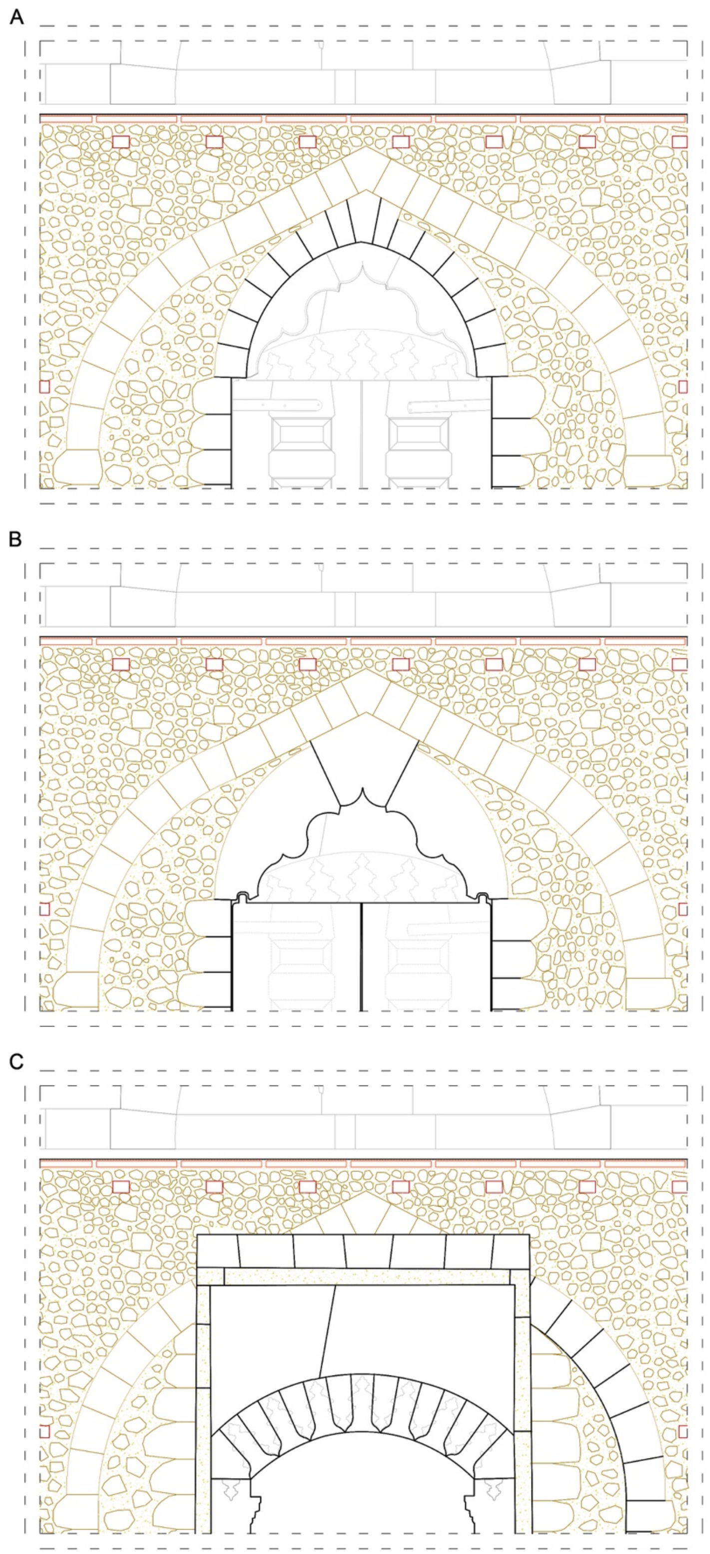


Figure 208: Catalogue 1.4.U2p

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Mosque | 1 Mass | 2 Measured Drawings | 3 System Details | 4 Element Details

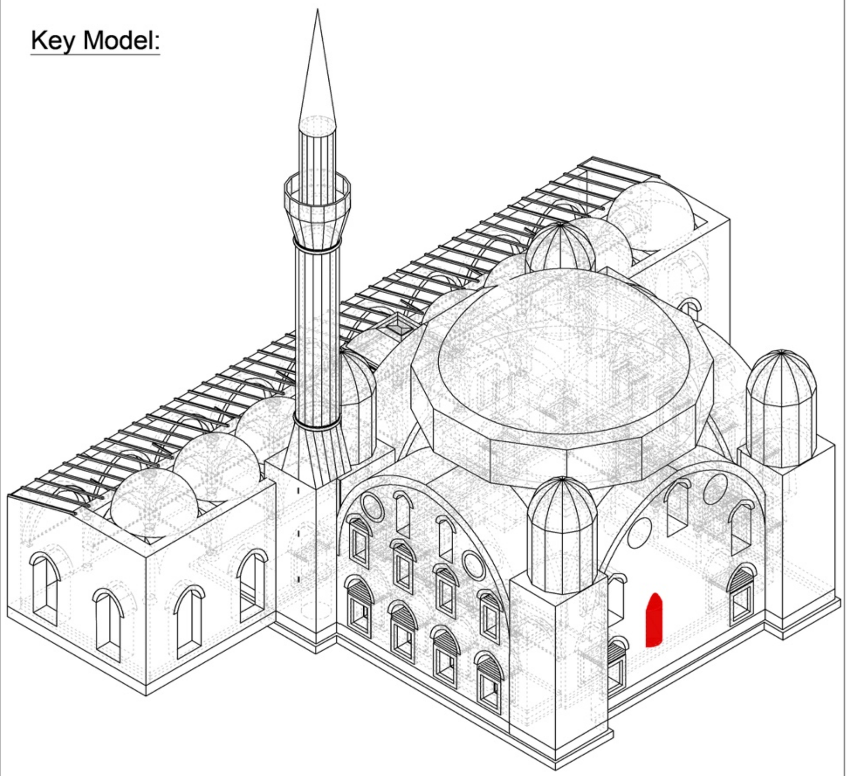
Load-Bearing Elements: Infrastructure (I1) | Upperstructure (U1) | Superstructure (S1)

Architectural Elements(U2, S2)

Portal (U2p) | *Mihrab* (U2mi) | Door (U2d)

Window (U2w) | Balustrade (U2b) | Niche (U2n)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3=arşın

0 37.5 75 150 225 cm

LU2mi

Data Source: 1, 2, 3, 4, 5, 6

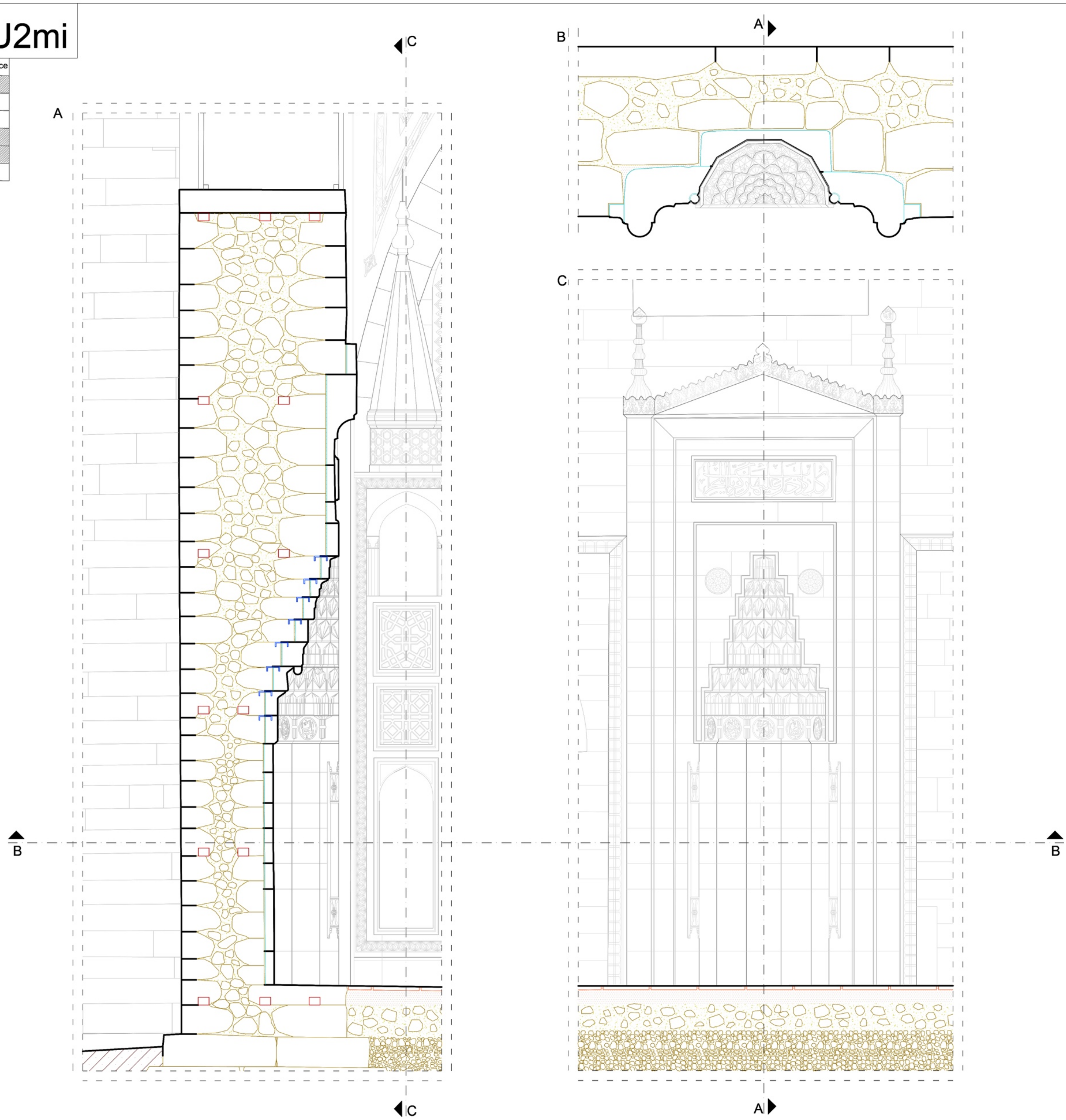


Figure 209: Catalogue 1.4.U2mi

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass	2 Measured Drawings	3 System Details / 4 Element Details

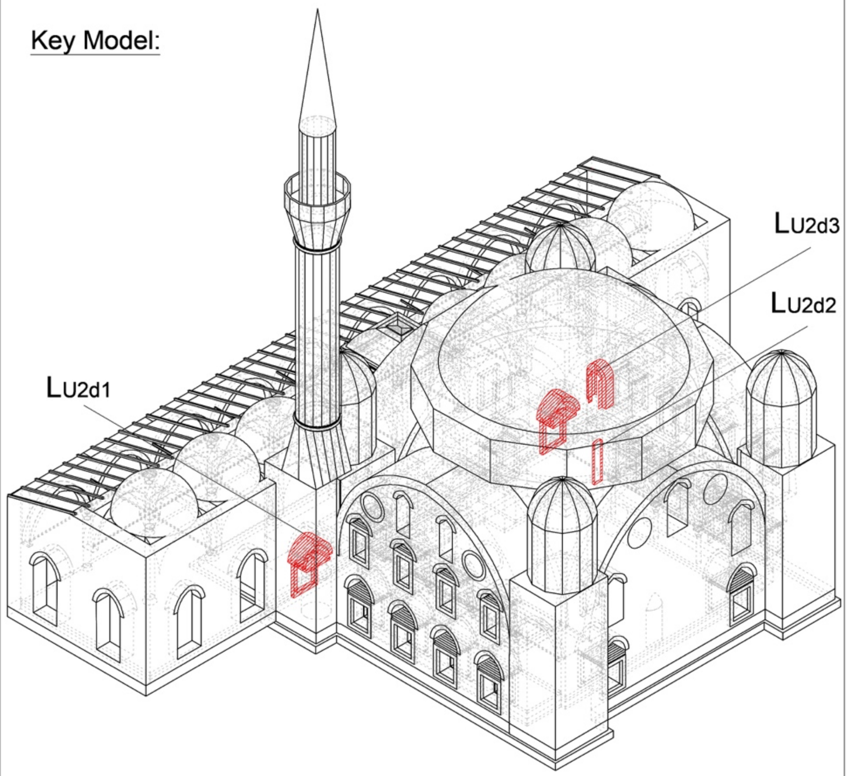
Load-Bearing Elements

Infrastructure (I1) | Upperstructure (U1) | Superstructure (S1)

Architectural Elements(U2, S2)

Portal (U2p)	*Mihrab* (U2mi)	Door (U2d)
Window (U2w)	Balustrade (U2b)	Niche (U2n)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3=arşın
0 37.5 75 150 225 cm

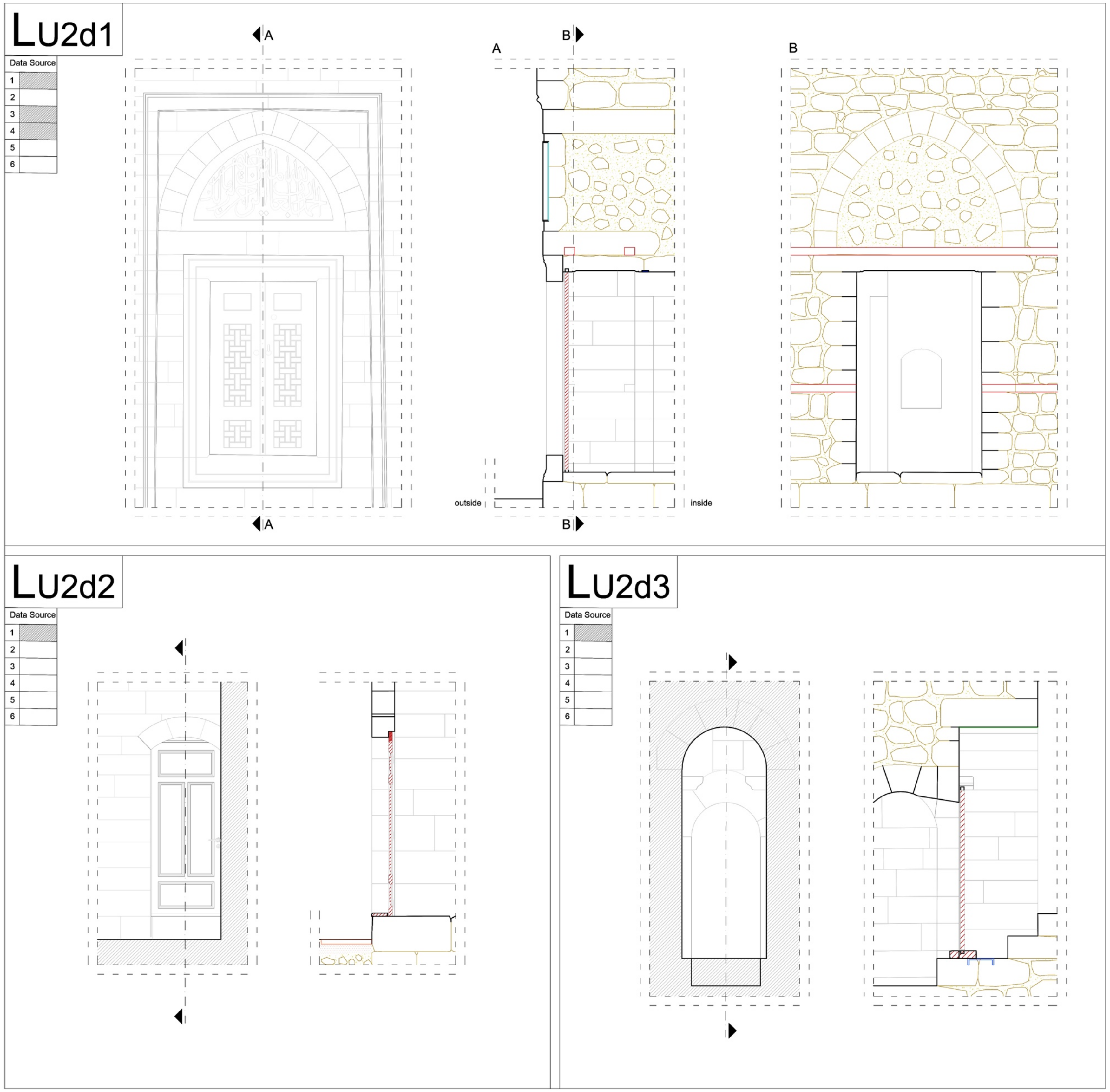


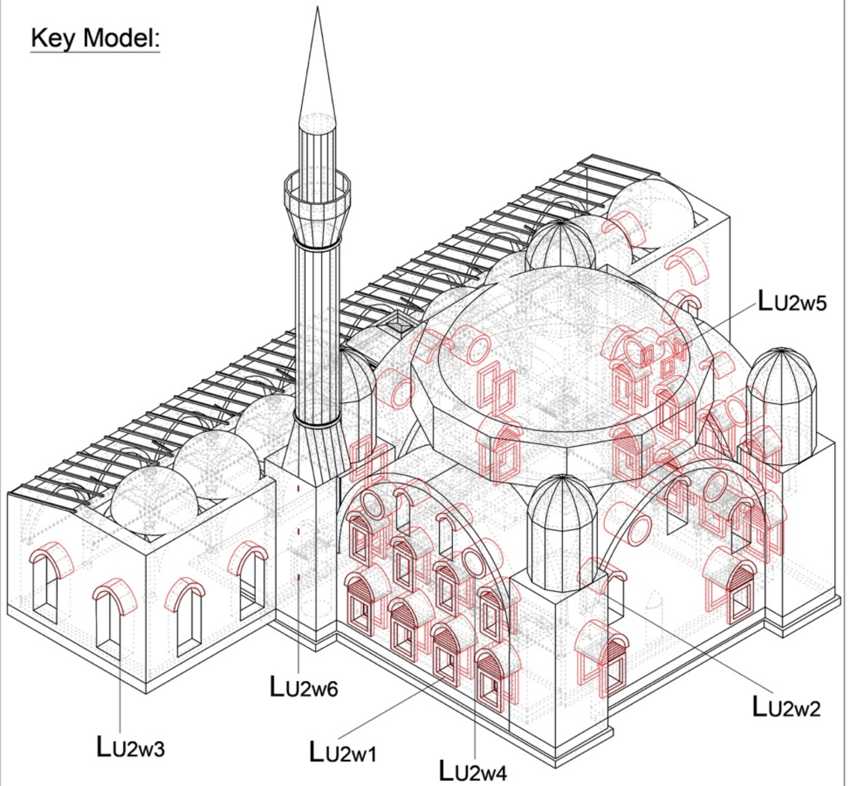
Figure 210: Catalogue 1.4.U2d

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass / 2 Measured Drawings	3 System Details	4 Element Details

Load-Bearing Elements			Architectural Elements(U2, S2)
Infrastructure (I1)	Upperstructure (U1)	Superstructure (S1)	

Portal (U2p)	*Mihrab* (U2mi)	Door (U2d)
Window (U2w)	Balustrade (U2b)	Niche (U2n)

Key Model:



Keys:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Felt:

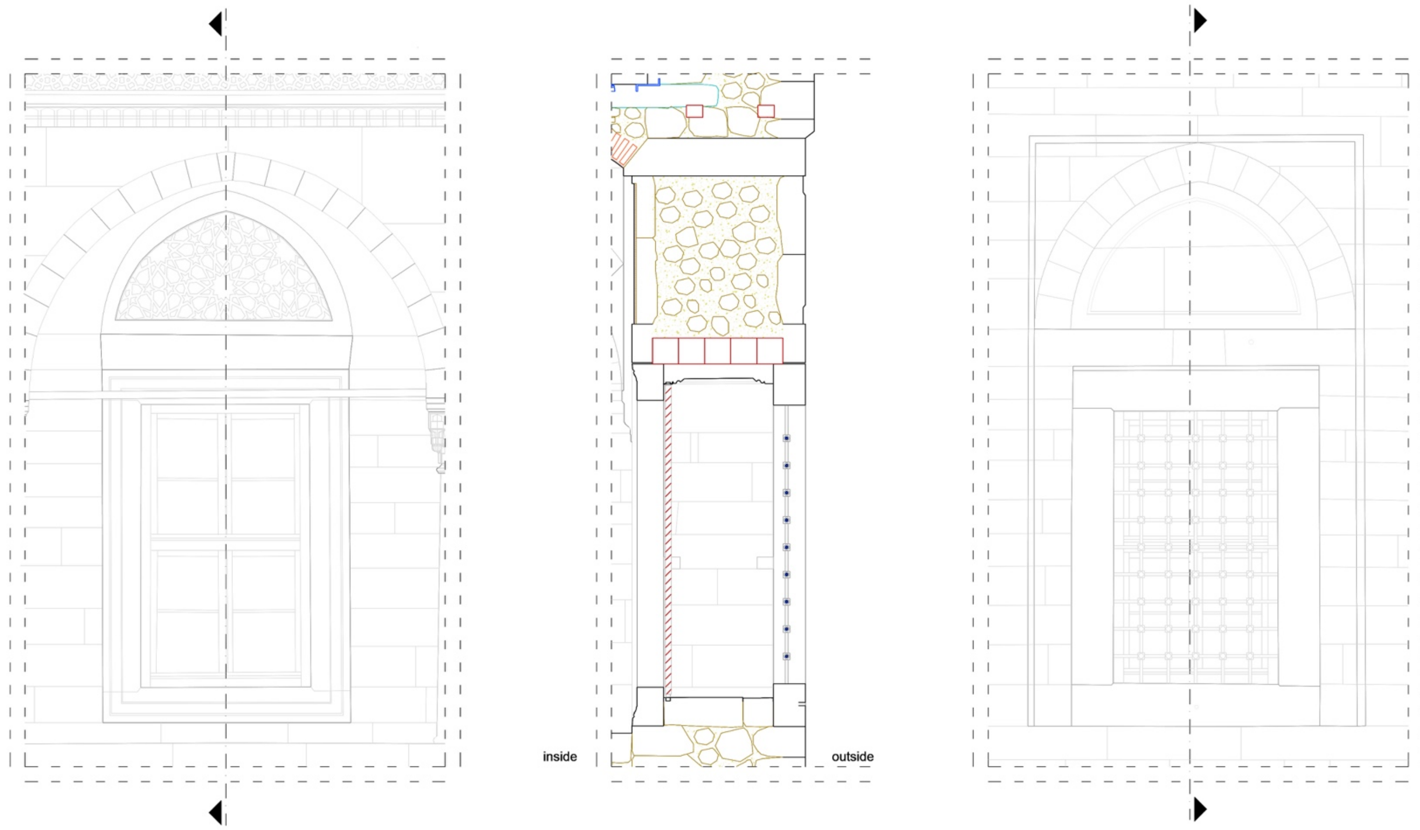
The detail drawings are generated according to the data gathered from:

1	The traces on the building
2	The other buildings of the complex
3	The other buildings of Mimar Sinan
4	The written sources and documents concerning about the construction technique of Ottoman Architecture
5	Structural and architectural necessity
6	Oral Knowledge

0 1/2 1 2 3=arşın
0 37.5 75 150 225 cm

LU2w1

Data Source	
1	
2	
3	
4	
5	
6	



LU2w2

Data Source	
1	
2	
3	
4	
5	
6	

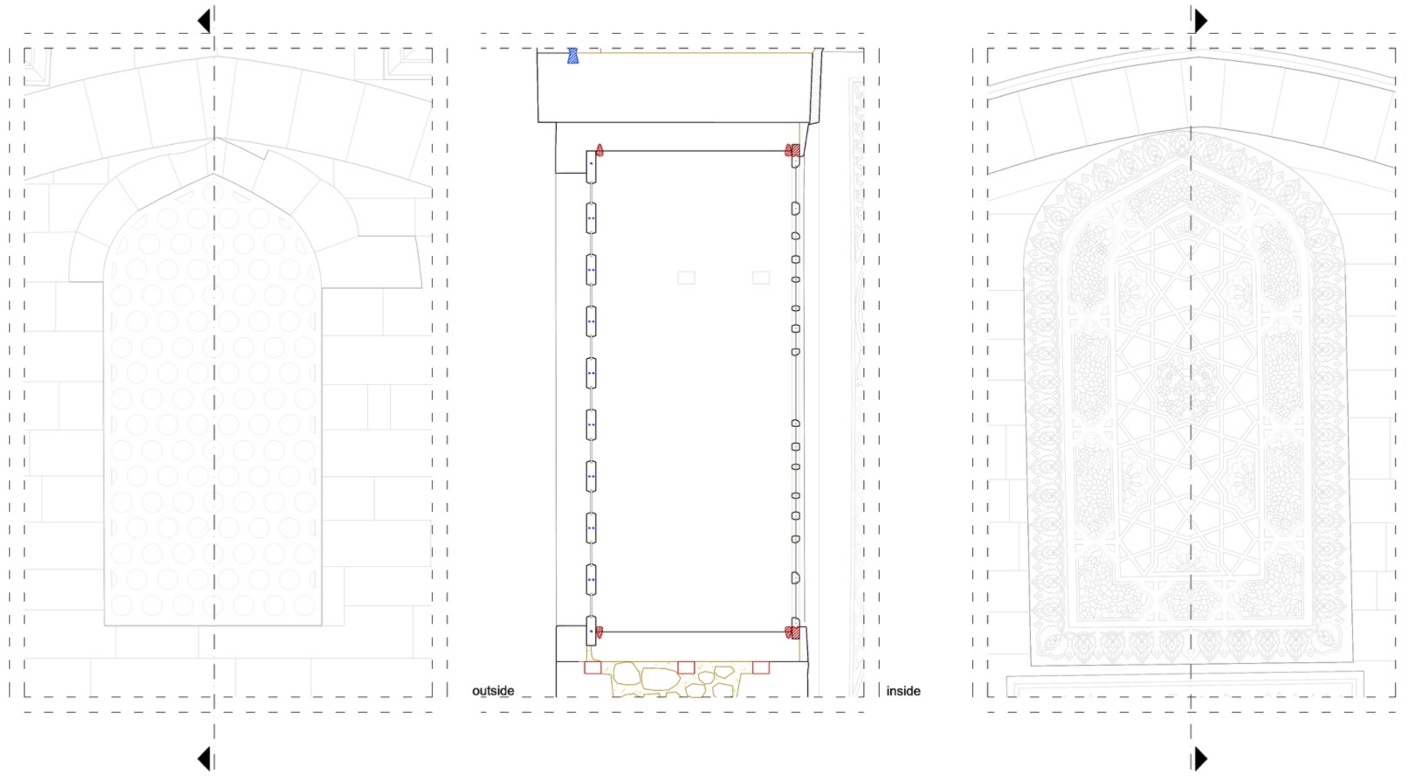


Figure 211: Catalogue 1.4.U2w

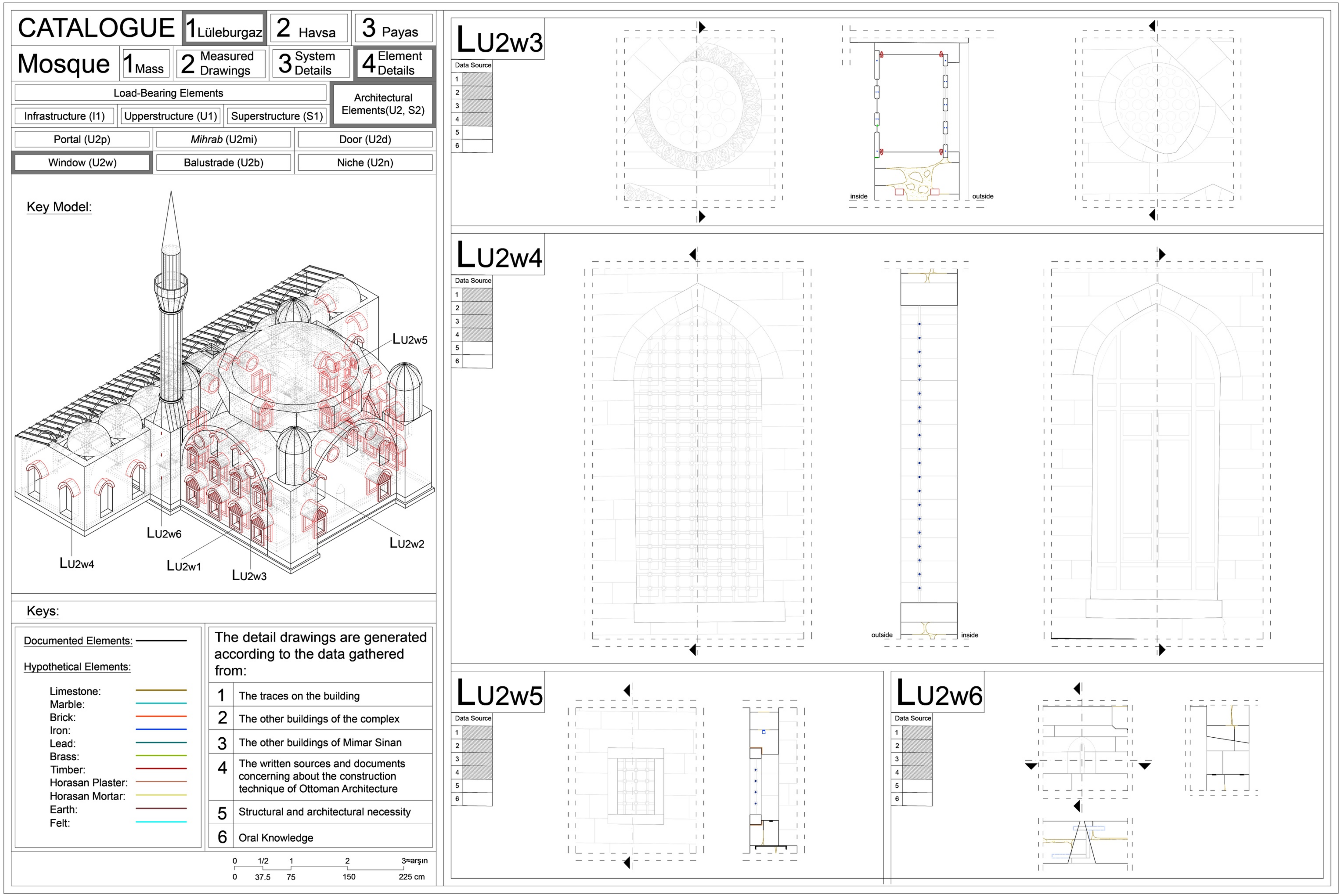


Figure 212: Catalogue 1.4.U2w

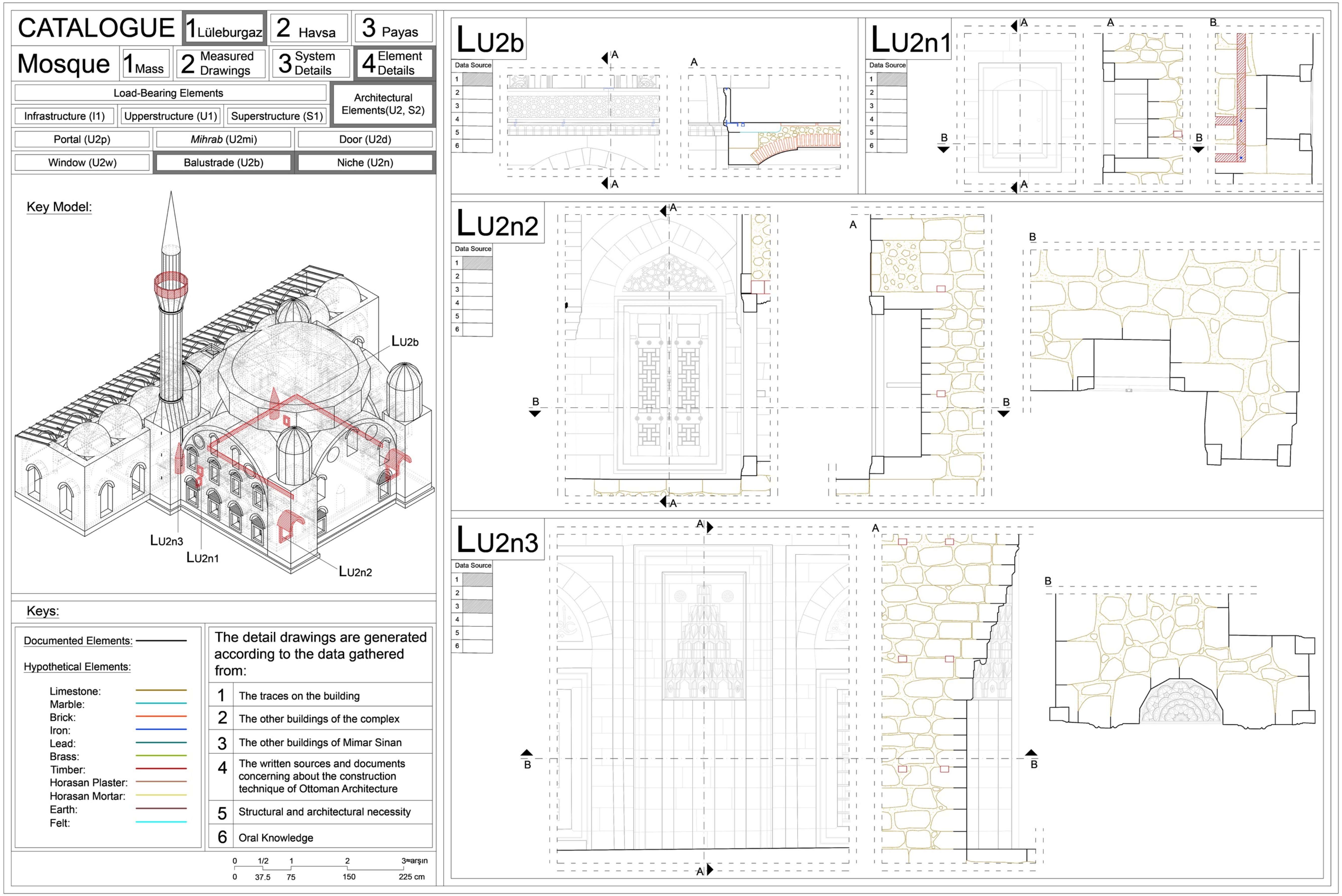


Figure 213: Catalogue 1.4.U2b/n

CATALOGUE

1 Lüleburgaz	2 Havsa	3 Payas

Havsa Sokullu Mehmet Paşa Complex

Current Complex
Restitution

Town: Hostizo, Ostudizus, Capsa, Havass-ı Mahmutpaşa, Havass-ı Refia, Havsa, خوصه

Location: The 7th *menzil* on the *kervan* route to Belgrad from İstanbul. It is after the town of Babaeski (Cedid Ali Paşa *Menzil* Complex) and before Edirne.

Construction Date: Between 1573 and 1577 (Inscription Panel)

Donor: Grand Vizier of Sokullu Mehmed Paşa on behalf of his son (Kurt) Kasım Paşa

Architect: Mimar Sinan

Buildings cited in Evliya Çelebi's *Seyahatname*[1]	Buildings recorded in *Vakfiye*[2]:	Buildings cited in the manuscripts about Mimar Sinan:			Still Existing Buildings of the Complex:
		TE[3]	TB[4]	TM[5]	
mosque	●	●	●	●	●
medrese					○
shops					○
imaret	●	●	●	●	
kervansaray		●			
tabhane					
hamam		●	●	●	●
tekke					
bridge					
public fountain					

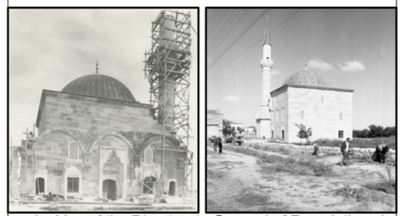
According to Evliya Çelebi (2006, pp. 622-625)

> *"Evvela büyük bir kubbeli, uzun bir minareli ve geniş avlulu gayet sanatlı camidir... 120 ocaklı, içli dışlı, ova gibi geniş avlulu, pek çok avlu odalı, at ahırlı büyük bir han vardır ki 5 bin at, katır ve deve alır gelen giden yolcular kervansaray ve minnetsiz kalacakları konuk evi... Bu anayolun sağ ve solunda tam 300 adet kargir kemer yapılı dükkanlar vardır... Sultan çarşısı içinde ibret verici bir hamamı vardır. Kapısında camekanına altı basamak taş merdiven ile çıkılır... Bir ziyafet evi, aşevi imareti vardır... Hanın muslukları ve camii abdest muslukları da kış günlerinde sıcak suludur... Öyle sağlam bir hayrattır ki yüksek binaları baştan başa çivit renkli has kurşun ile örtülü bakımlı bir hayrattır. Şehrin Lüleburgaz tarafı yolunda şehrin dışında (...) deresi üzerinde olan sanatlı köprü bu hayrattandır..."*

[1] Evliya Çelebi. (2006). *Günümüz Türkçesiyle Evliya Çelebi Seyahatnamesi: Konya - Kayseri - Antakya - Şam - Urfa - Maraş - Sivas - Gazze - Sofya - Edirne.* (S. A. Kahraman, & Y. Dağlı, Eds.) İstanbul: Yapı Kredi Yayınları. 623-625.
[2] Sokullu Mehmed Paşa's Vakfiye. 29 Zilhicce 981 (H) / 21 April 1574 (M). In the Archive of Directorate of General Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20. In the Turkish records, it is in the #2104 book on the 442-78 pages and in the queue of 323. Trasnlated by Mevlüt Çam.
[3] Tezkiretü'l-Ebniye (Record of Buildings) is written by Sai Mustafa Çelebi based on the narratives of Mimar Sinan and it is mainly composed of the lists of his buildings (Crane, Akın (trans.), Necipoğlu (ed.) 2006).
[4] Tezkiretü'l-Bünyan (Record of Construction) explains the life of Mimar Sinan and his constructions. It is also written again by Sai Mustafa Çelebi based on the narratives of Mimar Sinan (Crane, Akın (trans.), Necipoğlu (ed.) 2006).
[5] Tuhfetü'l-Mi'mârin (Choice Gift of the Architects) gives brief information about the life of Mimar Sinan and building lists of him at the end (Crane, Akın (trans.), Necipoğlu (ed.) 2006).

Tufan Baş Archive

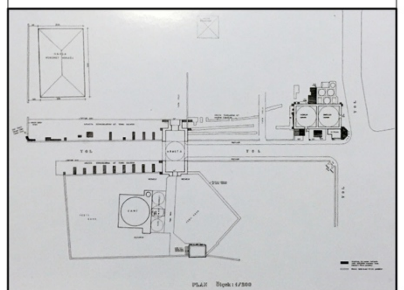
Archive of the Directorate General of Foundations in Ankara



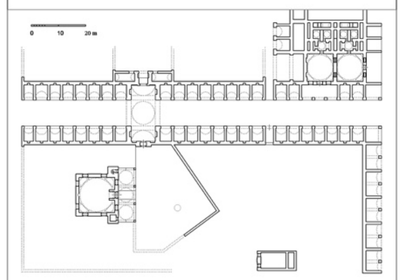
Archive of the Directorate General of Foundations in Ankara

Archive of the Directorate General of Foundations in Ankara

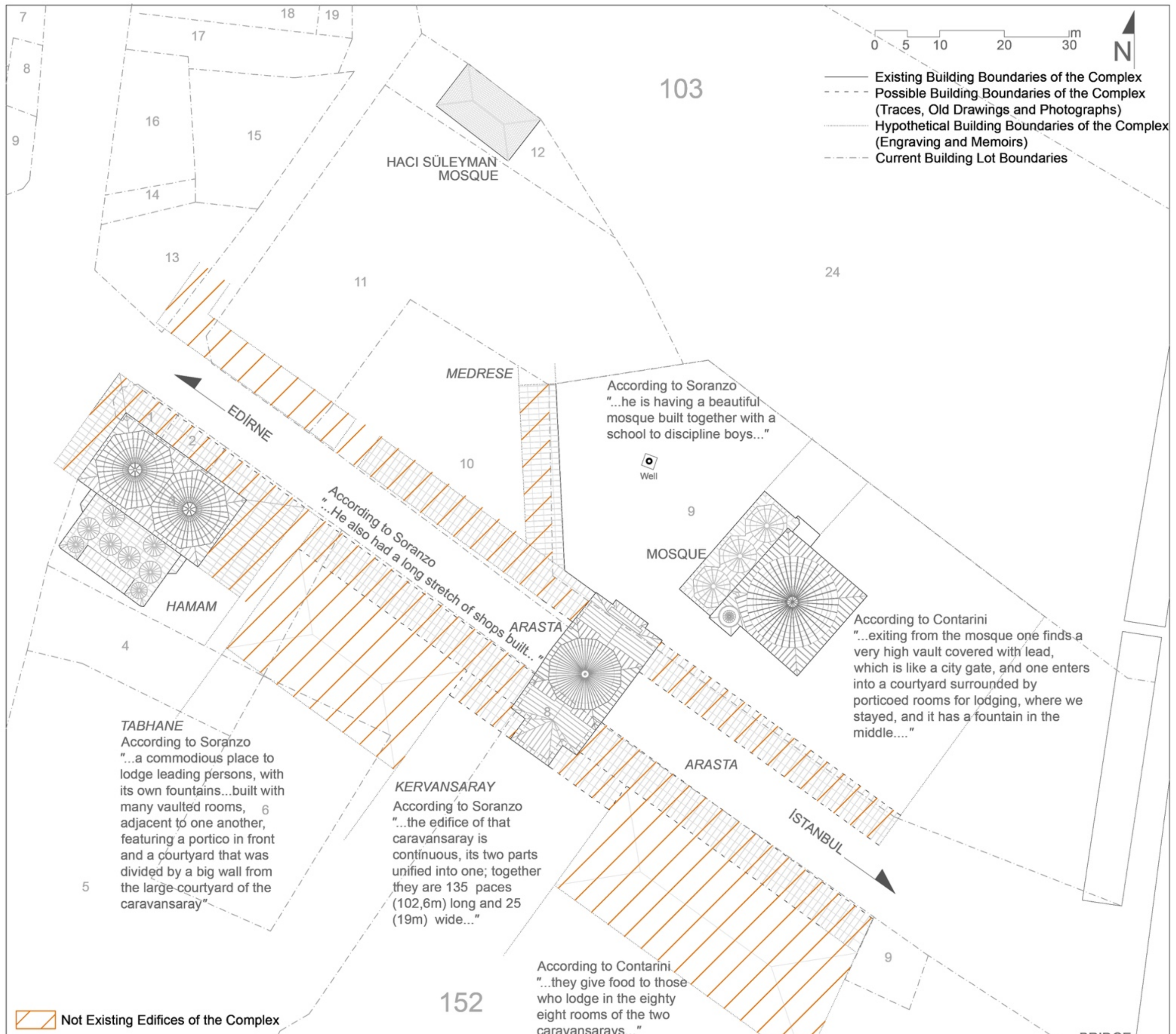
Archive of the Directorate General of Foundations in Ankara



(Edirne Kültür Envanteri, 2013, p. 283)



Restitutive plan drawing of Havsa Sokullu Mehmed Paşa Complex (Necipoğlu, 2005, p. 445)



Not Existing Edifices of the Complex

(Drawn by the author according to the information gathered from Sokullu Mehmed Paşa's *Vakfiye*, Necipoğlu (2005) Küçükkaya (1990), Reyhanlı (1974-1975) & (1977), Edirne Kültür Envanteri (2013), Evliya Çelebi (2006), Soranzo* (1856) and Contarini** (1856).
*Jacopo Soranzo is a Venetian ambassador who passed from Havsa on 21 June 1575, stayed in the *tabhane* while the mosque was under construction together with a *medrese.*
**Paolo Contarini is also a Venetian ambassador who was in İstanbul for 3 years in 1580s . He passed from Havsa in 1580 and stayed in *tabhane.*

(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)

Figure 214: Catalogue 2 (Havsa) Restitution

CATALOGUE 1 Lüleburgaz **2 Havsa** 3 Payas

Havsa Sokullu Mehmet Paşa Complex

Current Complex

Restitution

Place: Edirne / Havsa, Helvacı Quarter

Location: On the south, Aşağıova Stream,
on the east, Havsa Municipality, Havsa Government Office,
Milli Egemenlık Park and Kurtbey Mausoleum,
on the north, 23 Kasım Street, Hacı Süleyman Mosque
Sokullu Elementary School and Art School
on the west, the market place.

Site Plan: The complex sits on a flat land. The buildings of the complex were positioned according to the axis which is the historic road from İstanbul to Edirne. This axis, Mimar Sinan Street, which is on the north-south direction, had formed the demolished *arasta*. This axis, which passes through *dua kubbesi,* divides the complex into two parts according to their service purposes. The west block which was probably composed of *kervansaray, imaret tabhane* and double *hamam* served the travelers and visitors. Today, only the ruined *hamam* and the entrance iwan of the *kervansaray* exist, whereas the other buildings do not have any edifice. The east block which served the civics was probably composed of mosque, *medrese* and *tekke.* Today, there is the mosque and a wall remaining in this part. This wall remaining diagonally forms the north border of the mosque's courtyard. On the north side of this residual wall there are traces of serial fireplaces with niches. These traces show that this wall may have been part of the *medrese*.
The axis, the historic road to İstanbul, comes from north, passes through *dua kubbesi* and is directed to the bridge on Aşağıova Stream. Today, the physical evidences of the historic bridge can be seen below the contemporary bridge on the south.
The current complex cannot be perceived as a group of buildings due to the crowded contemporary buildings and recreational area organizations in the complex area. *Dua kubbesi*, which was the core of the complex in the past, individually stands on Mimar Sinan Street today. This structure with baldahcen form only defines the entrance to the courtyard of the mosque and unfortunately provides a shelter for car parking. The remaining wall which constitutes a diagonal border between the courtyards of the contemporary school and the mosque cannot be perceived even from Mimar Sinan Street. On the other hand, *Hamam* was fallen apart from the other buildings. Due to hamam's poor structural condition and security problems the Municipality tried to preserve and hide it by creating obstacles such as landscape elements. So that, the complex has lost its strong integrative character by fragmenting in time.

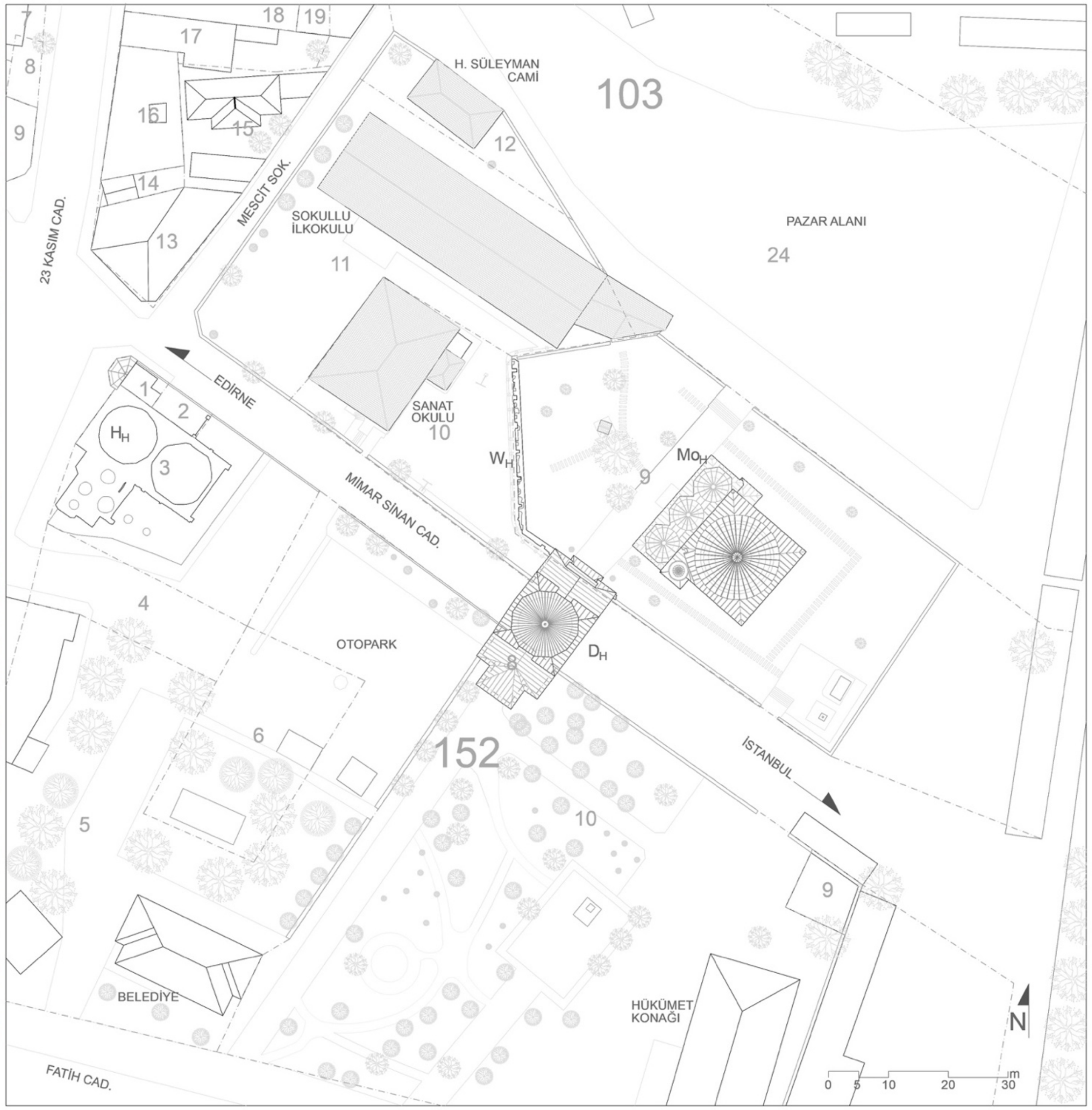
Buildings: Mo_H : Mosque
W_H : *Remaining Wall*
D_H : *Dua Kubbesi*
H_H : *Hamam*

Complex in Havsa
1. Havsa Sokullu Mehmed Paşa Complex
2. Hacı Süleyman Efendi Mosque
3. Havsa Government Office
4. Havsa Municipality
5. Şehit Okyay Deveci Park
6. Milli Egemenlik Park & Kurtbey Mausoleum
7. Aşağıova Stream & The Bridge
8. Market Place
9. Bus Station
10. Cemetery

(After Google Earth, last accessed on 19.04.2017)

(Aerial Photographs by Türk Hava Kurumu, 2013)

(Aerial Photograph by Türk Hava Kurumu, 2009)

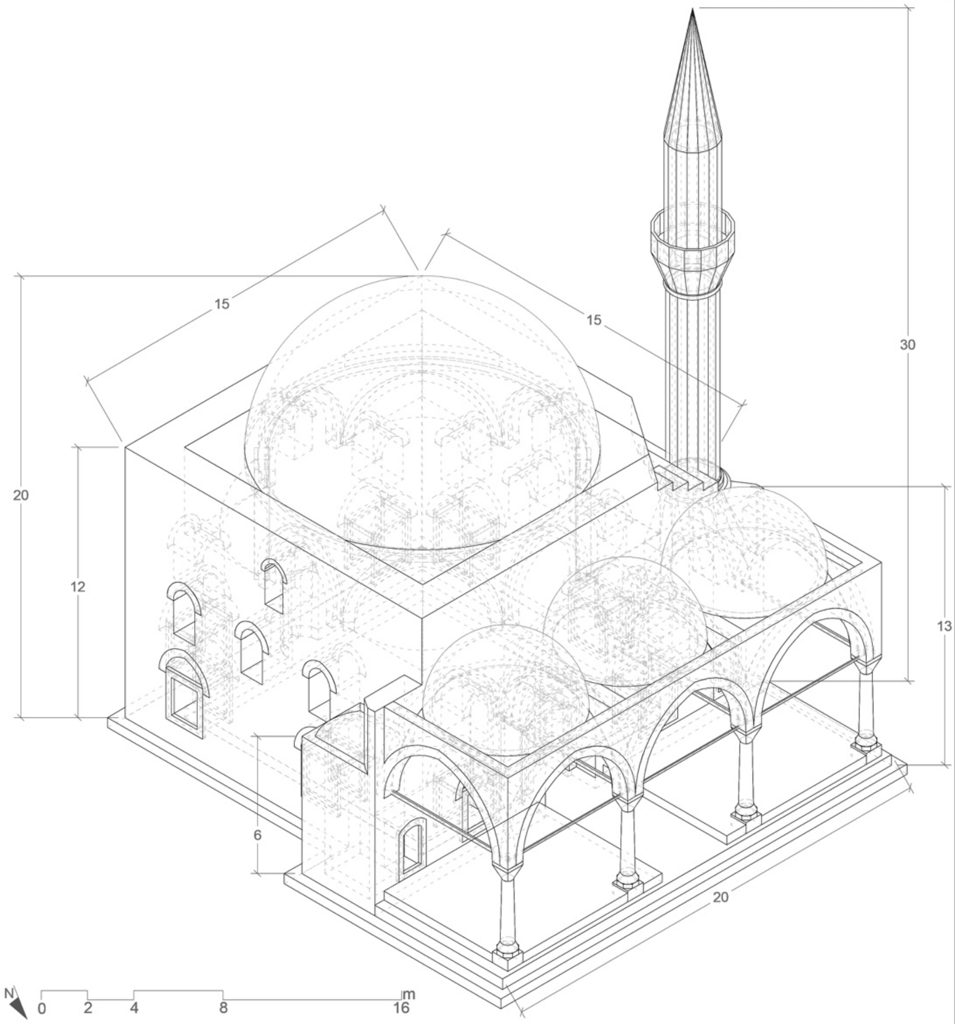


(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)

Figure 215: Catalogue 2 (Havsa) Site Plan

CATALOGUE | 1 Lüleburgaz | **2 Havsa** | 3 Payas

Mosque | **1 Mass** | 2 Measured Drawings | 3 System Details



<u>Location:</u> The mosque is in middle of the east part of the complex which is bordered by courtyard walls. The north edge of this courtyard is defined by the remaining wall which stands diagonally. In the courtyard, on the north side of the mosque there is the well. Additionally, on the north and west sides of the mosque, there are the gravestones in the courtyard.

<u>Mass:</u> The square planned mosque is topped with a single dome. The dome sits on the walls without a drum. On the north-west corner, stands the high minaret with a slender polygonal shaft and a single *şerefe*. On the north-east corner, a rectangular prism, topped with a cloister vault, creates the symmetry together with the prismatic minaret base in the mass. The last prayer hall is attached to the north façade of the mosque. From the south, it encloses the mosque, the prismatic minaret base and the rectangular prism which are attached on each side of the mosque. The semi-open last prayer hall is covered with 3 domes.

Figure 216: Catalogue 2.1 (Havsa) Mass

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Mosque | 1 Mass | 2 Measured Drawings | 3 System Details

Plan: The square planned mosque is covered with a single dome that mainly sits on four squinches and the four pointed arches between these squinches. These squinches and arches sit on the mosque walls and provides an octagonal base for the dome. Between these squinches and arches on the walls, there are spherical pendentive like transition elements. By means of these trasitions the circular base of the dome is achieved.

Today the mosque has a single floor. But there are traces which show that there had been a *mahfil* floor. Adjacent to the north wall, the entrance door is organized as an iwan. On both sides of this entrance iwan the floor is rised about one step. On the edges of these raised floors, there are column bases without columns. On the north wall, there are traces of horizontal load bearing elements. Moreover, on the north-west corner, there is a door opening on the same level with these traces on the wall. This door opens to the staircases of the minaret. Additionally, above the entrance iwan on the west side, there are four steps. These steps starts from the level of the load bearing elements' traces and then rise.

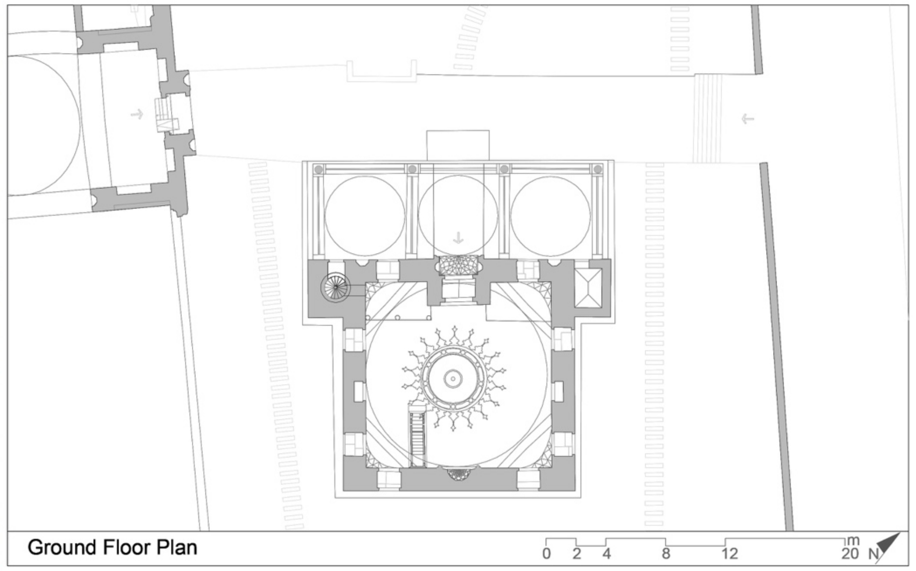
Below the arch on the south wall, the *kıbla* wall, the *mihrab* is placed. Adjacent to the south wall, on the west side of the *mihrab* the *minber* is placed.

The rectangular planned last prayer hall, which was reconstructed in 2013, is a semi open space attached to the north wall of the mosque. On the other sides, this space is defined by the pointed arches supported by columns with *baklavalı* capitals. These east, north and west sides are open. Accordingly, it acts as a passage way to the mosque and is composed of 3 square units divided by the pointed arches. These square units are covered with domes resting on spherical pendentives. The square unit space in the middle is the entrance of the mosque. The floor of the units that are in front of the mosque façade are raised, but the floor of the entrance unit is not.

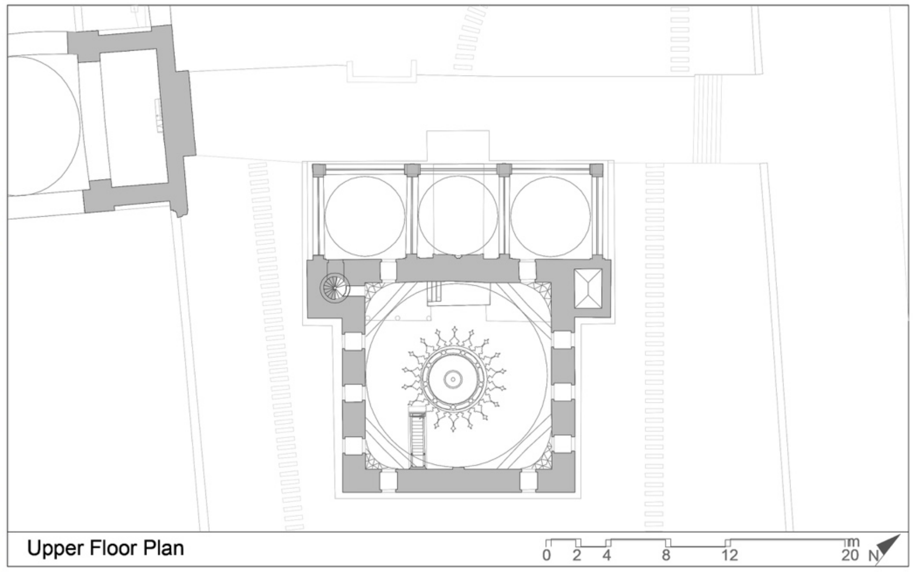
There is an additional rectangular planned small space on the north-east corner of the mosque. This space which can not be reached directly from the mosque, has an entrance from the last prayer hall. It has a later addition mezzanine floor out of timber and is covered with a cloister vault made up of reinforce concrete. The existance, the form and the function of this space is questionable. Today, this space is used as a storage place.

(Photographs taken by Author in 2014-16)

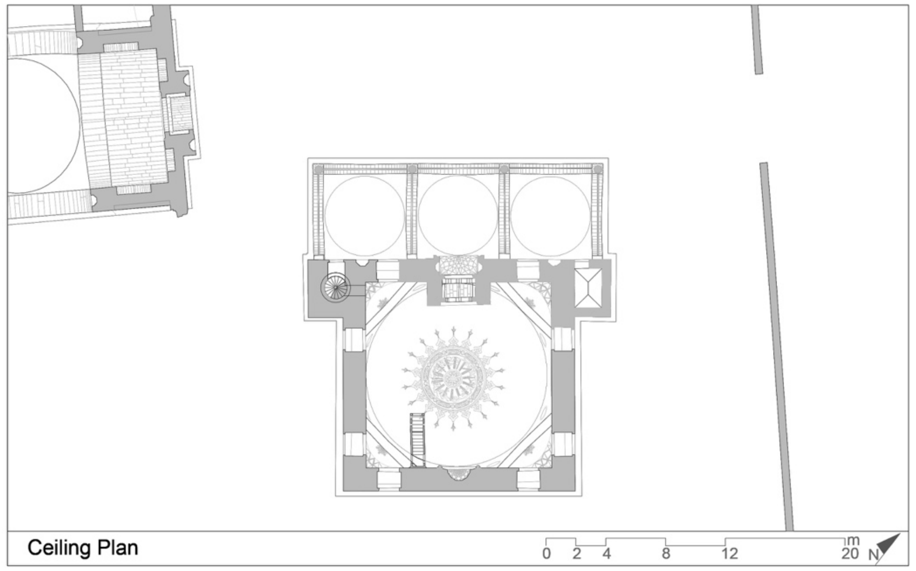
(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)



Ground Floor Plan



Upper Floor Plan



Ceiling Plan

Figure 217: Catalogue 2.2 (Havsa) Plans

CATALOGUE | 1 Lüleburgaz | **2 Havsa** | 3 Payas

Mosque | 1 Mass | **2 Measured Drawings** | 3 System Details

Elevations: The façades of the mosque are composed of modest architectural elements. The all openings are arranged on the rectangular walls under the dome without a drum. On the elevations, the windows are simply arranged in three rows except the entrance façade that have two rows. Additionally, the minaret, attached to the north-west corner of the mosque, can be observed on all of the facades.

The north façade of the mosque is hindered by the last prayer hall which is facing the courtyard. Then, the north façade of the last prayer hall is composed of 3 large openings topped with pointed arches carried by 4 columns with *baklavalı* capitals. The 3 domes of the arcade and the dome of the mosque can be observed from the north façade. The center unit floor of which is lowered, defines the entrance unit. Accordingly, due to the minaret attached to the north-west corner, top of this corner of the mosque is chamfered by cascading.

The entrance façade of the mosque is withinside the last prayer hall. So that, the rear wall of the last prayer hall is the entrance façade of the mosque. It carries the entrance portal of the mosque in the middle. On both sides of the portal, there are two windows, arranged one above the other, and then comes the *mihrabiye* niche and a door. The lower windows are rectangular ones with relieving pointed arches and grills with knots. The upper ones are smaller windows topped with pointed arches and containing *dışlık* panels. The rectangular door openings have depressed arches. The door on the west side opens to the staircase leading to the minaret and to the conceivable *mahfil* floor. The door on the east opens to questionable space which is used as storage now.

The east and west facades are almost mirror image symmetry of each other. On these facades, the lower two rows of the 3-rowed window arrangements are shifted towards the south side of the mosque. Whereas the ones at top are at the exact center of the mosque walls. This shift is caused by the minaret on the north-west corner and by the rectangular mass on the north-east corner. The lowest row of the 3-rowed window arrangement is composed of two rectangular windows with relieving pointed arches and grills with knots. The three windows on the second row are smaller ones with pointed arches. On the uppermost row, there is a window with pointed arch. The windows at two higher rows have *dışlık* panels.

The difference of the west façade from the east is because of the minaret attached to the north corner and its slit windows. On the other side, the difference of the east façade from the west is caused by the rectangular prismatic mass attached to the north corner. Additionally, the rear arched openings of the last prayer hall is also observed on these facades.

The south façade, the *mihrab* wall, has a symmetrical organization. On the lowest row of the window arrangement, there are two rectangular windows with relieving pointed arches. The windows at this lowest row have grills with knots. On the second row, there are two windows topped with pointed arches. On the upmost row, at the center, there is a single window topped with pointed arch. The windows on the higher two rows have *dışlık* panels.



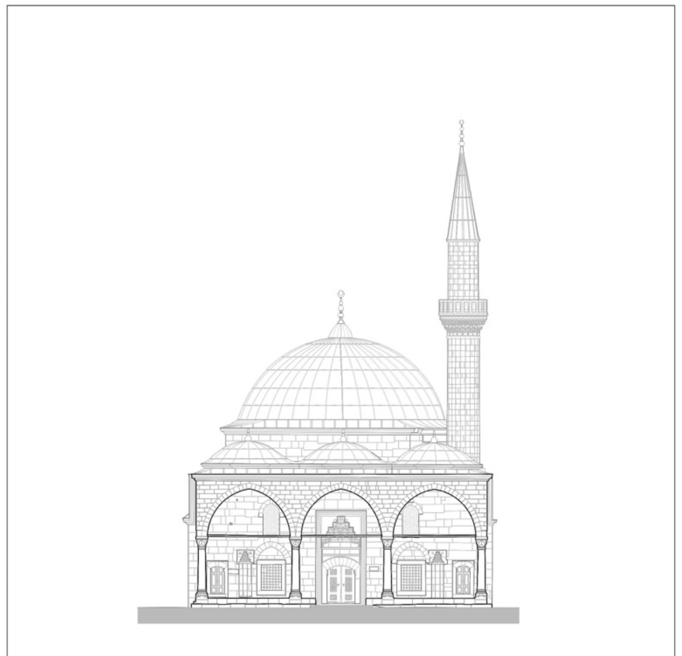




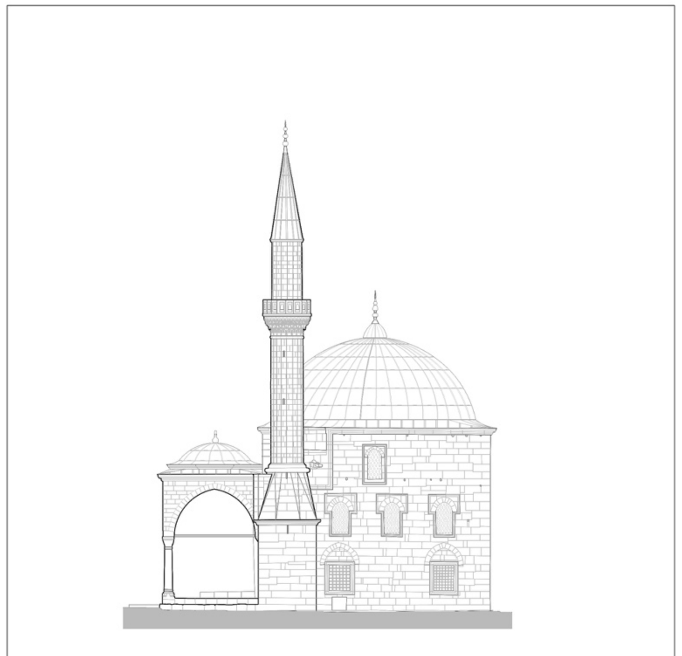




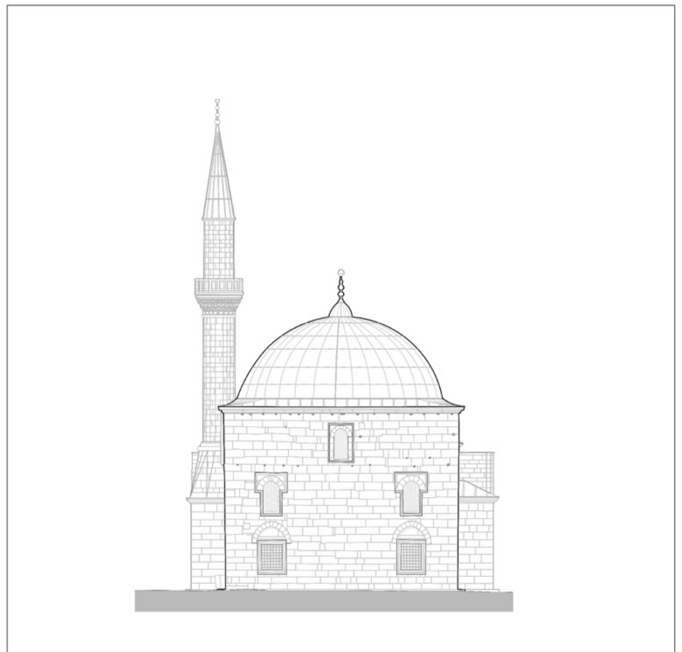
(Photographs taken by Author in 2014-16)
(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)



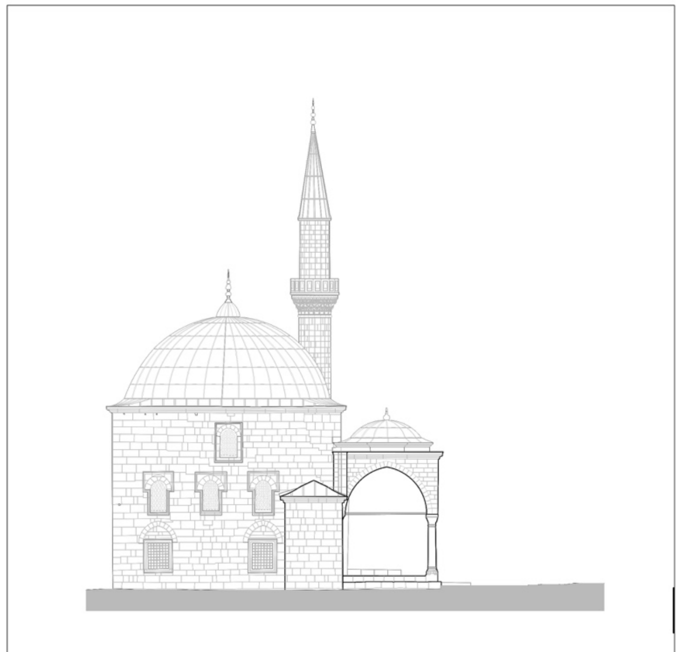
North Elevation 0 2 4 8 12 20 m



West Elevation 0 2 4 8 12 20 m



South Elevation 0 2 4 8 12 20 m

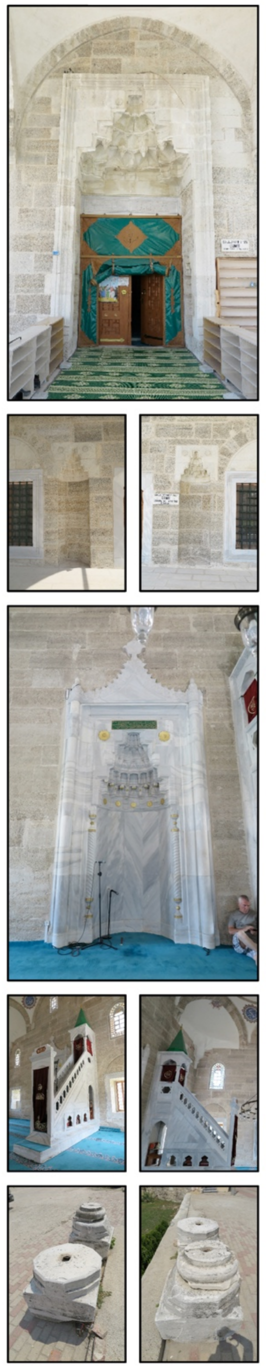


East Elevation 0 2 4 8 12 20 m

Figure 218: Catalogue 2.2 (Havsa) Elevations

CATALOGUE | 1 Lüleburgaz | **2 Havsa** | 3 Payas

Mosque | 1 Mass | **2 Measured Drawings** | 3 System Details



Arch. Elem. of Mosque: The entrance portal constructed in marble is set in a high rectangular frame encircled by a cornice. It has a rectangular niche which is covered with 5 rows of stalactited hood (*kavsara*). In this niche recession, above the door opening, there is the rectangular inscription panel with carved Arabic letters on a grey marble panel. The door opening is topped with a grey marble joggled arch with depressed profile. The *cümle* door which is made of timber is inserted in the door opening. Additionally, on the east and west walls of the portal recession, there are two niches with half decagonal plan and they are covered with 3 rows of stalactited hood.

The *Mihrabiye* niches that are constructed in limestone have half decagonal niches which are covered with 4 rows of stalactited hood. On the spandrels of the stalactited hood there are rosettes.

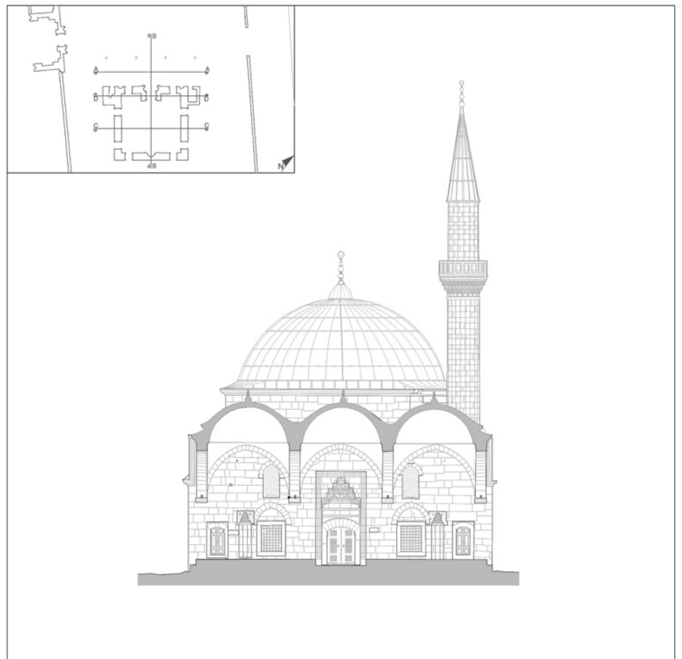
The *mihrab* that was covered with grey marble has a rectangular frame topped with a pediment and a palmet. The *mihrab* has a plan of a half dodecagonal prayer niche which is covered with a hood made of 5 rows of stalactites. On the spandrels of the stalactited hood there are rosettes. Above the hood, there is a rectangular inscription panel with gilded Arabic letters on a dark green background. The niche is flanked by two attached columns made of grey marble.

The *minber* which is made of marble is placed on the west side of the mihrab adjacent to the south wall.

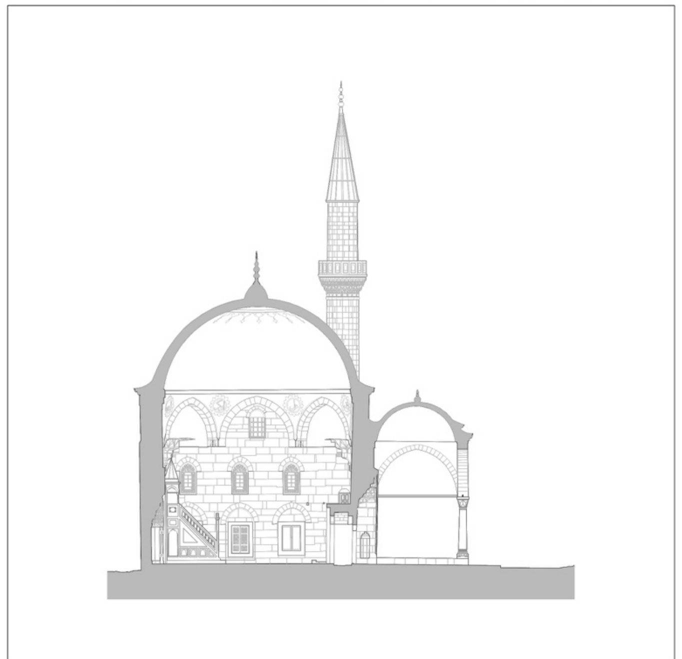
There are column bases made of limestone in the nearby environment of the mosque. They belong to last prayer hall of the mosque. They were removed and changed with the new ones during the reconstruction process in 2013. Two of them were placed outside of the the courtyard wall on the east. The others were scattered around the courtyard.

(Photographs taken by Author in 2014-16)

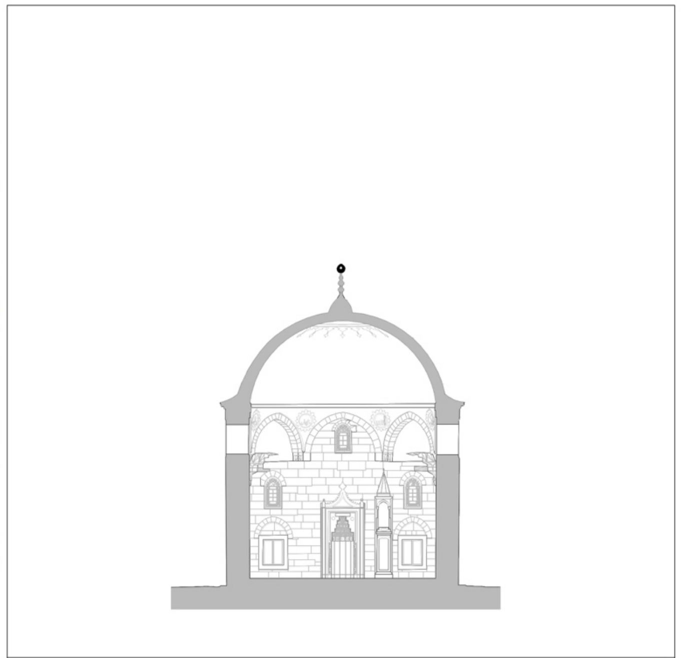
(Photographs taken by Author in 2014-16)
(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)



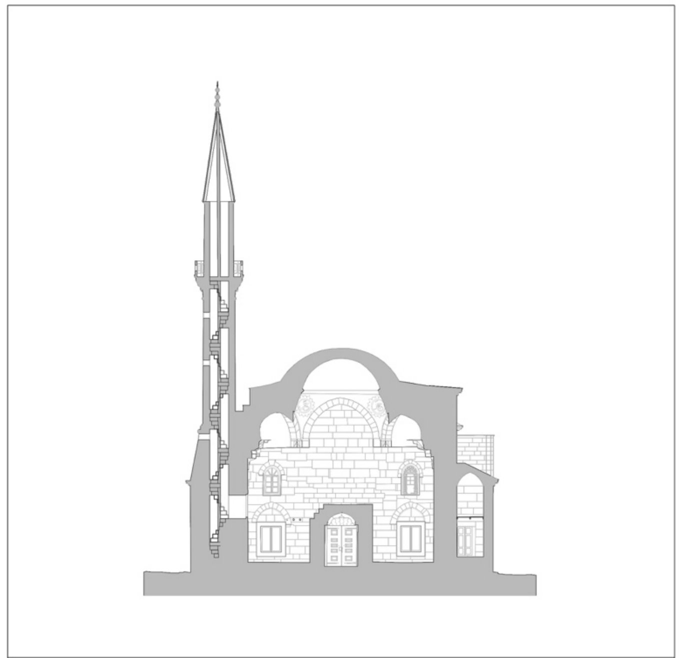
Section AA 0 2 4 8 12 20 m



Section BB 0 2 4 8 12 20 m



Section CC 0 2 4 8 12 20 m



Section DD 0 2 4 8 12 20 m

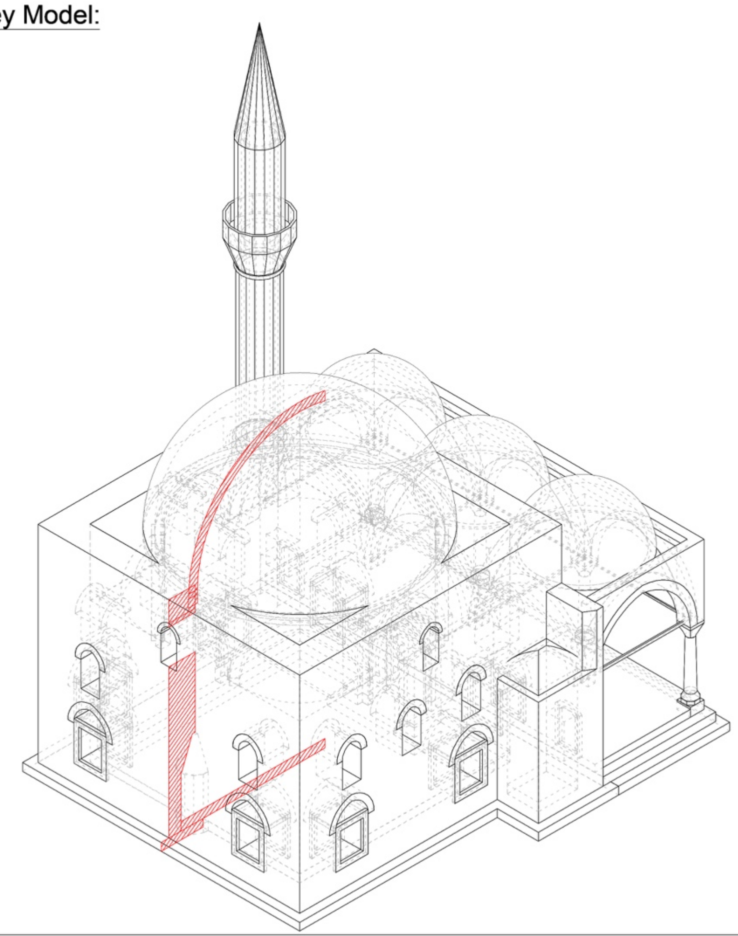
Figure 219: Catalogue 2.2 (Havsa) Sections

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas

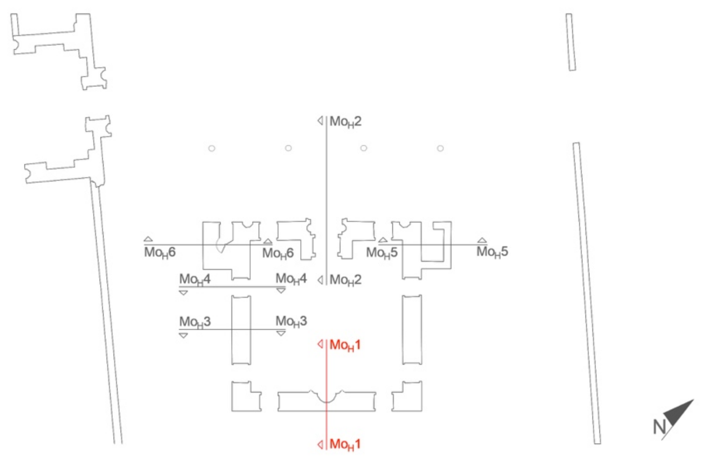
Mosque	1 Mass	2 Measured Drawings	3 System Details

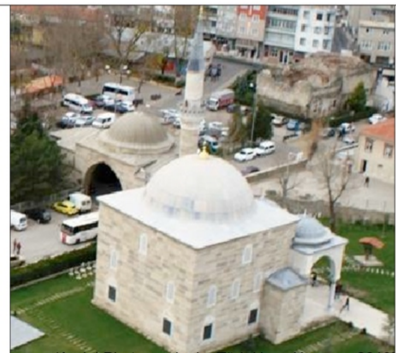
Section Mo_H1	Section Mo_H2	Section Mo_H3	Section Mo_H4	Section Mo_H5	Section Mo_H6

Key Model:



Key Plan:




(Aerial Photographs by Turk Hava Kurumu, 2013)


Archive of the Directorate General of Foundations in Ankara

(Photographs taken by Author in 2014-16)
(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)

Key:

Documented Elements:

Hypothetical Elements:
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Restoration:

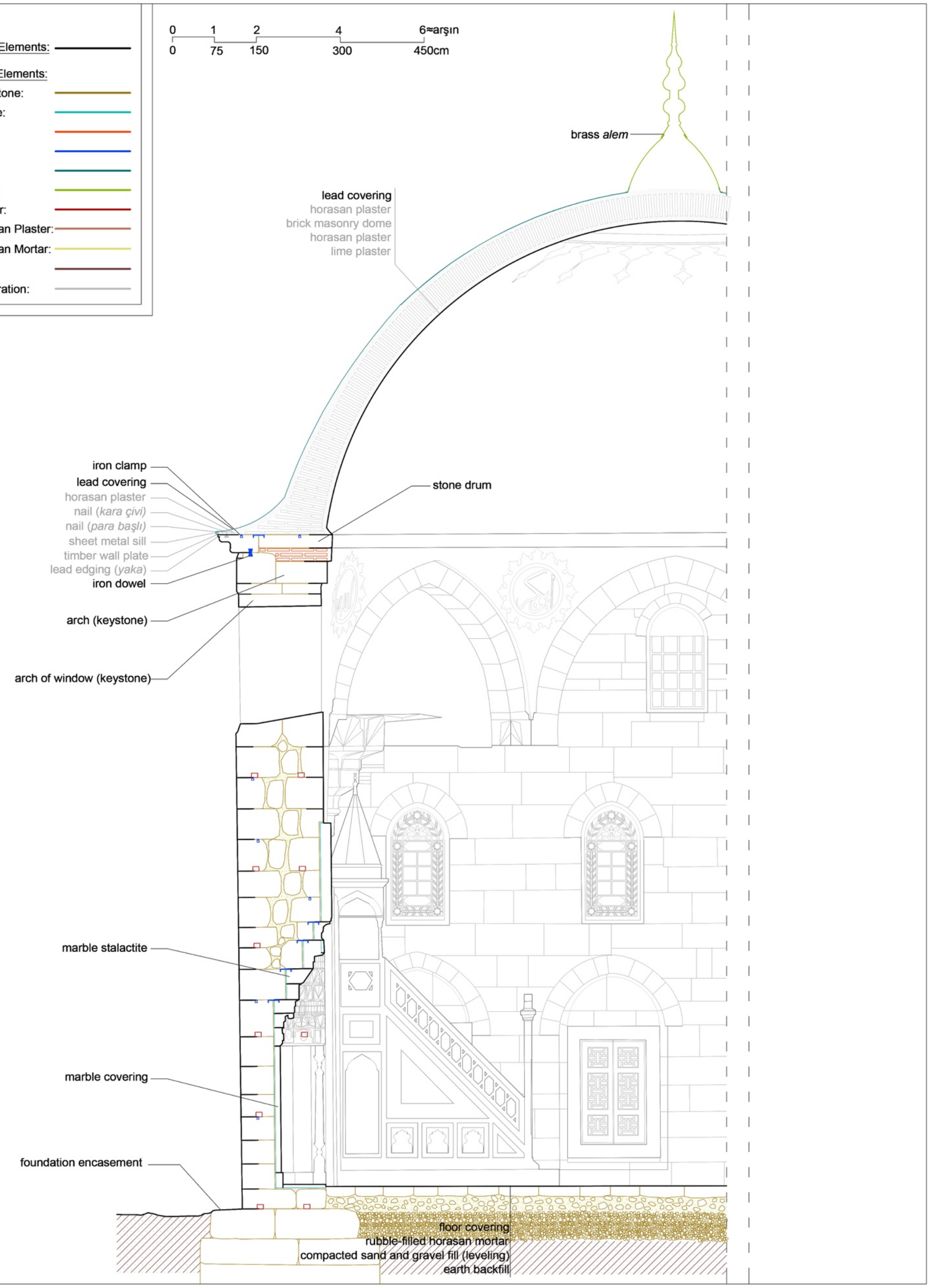


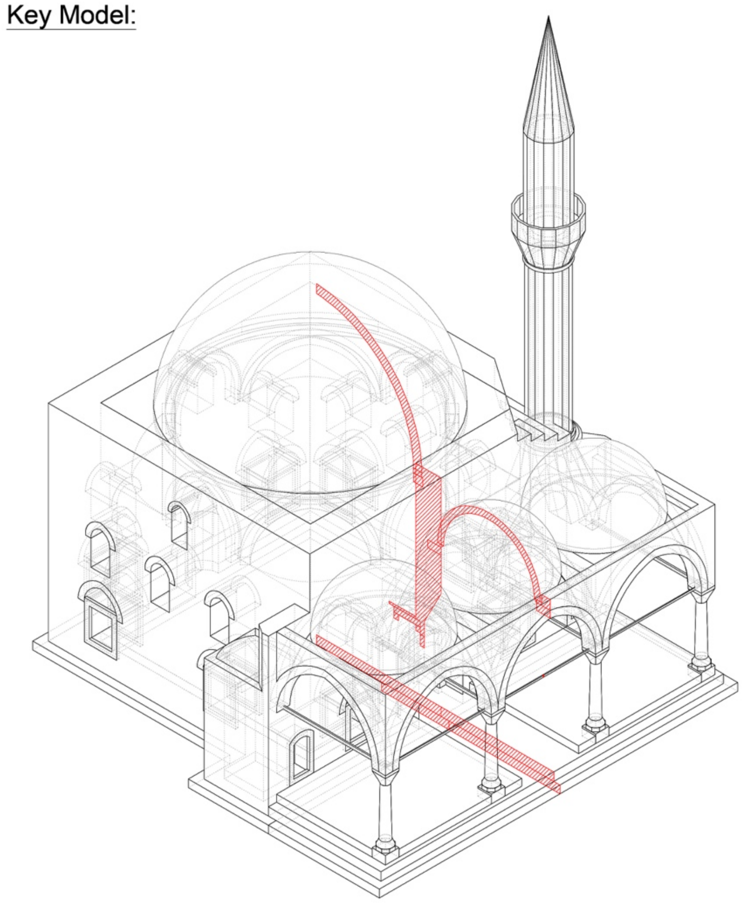
Figure 220: Catalogue 2.3.1 (Havsa) System Detail 1

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas

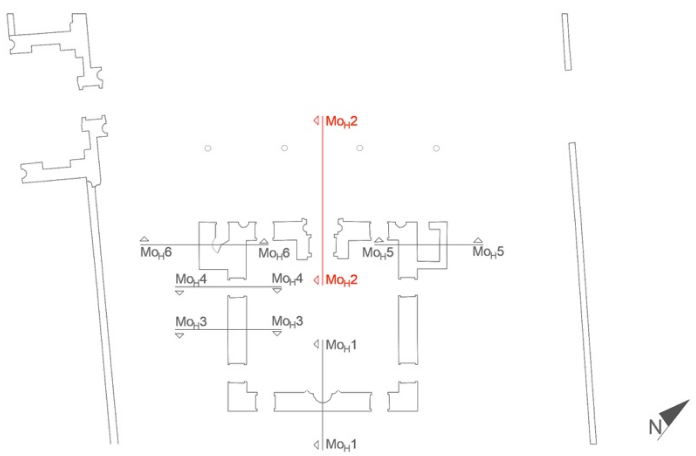
Mosque	1 Mass	2 Measured Drawings	3 System Details

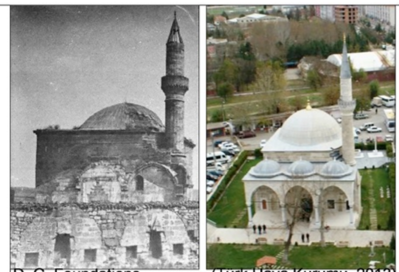
Section Mo_H1	Section Mo_H2	Section Mo_H3	Section Mo_H4	Section Mo_H5	Section Mo_H6

Key Model:

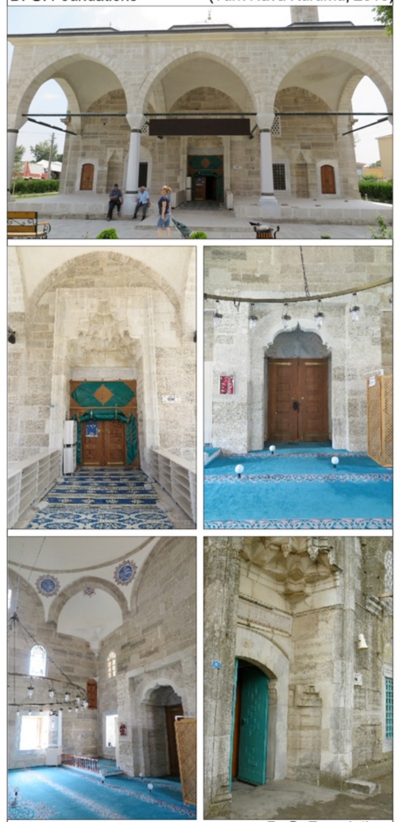


Key Plan:

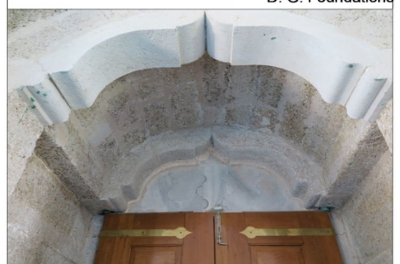




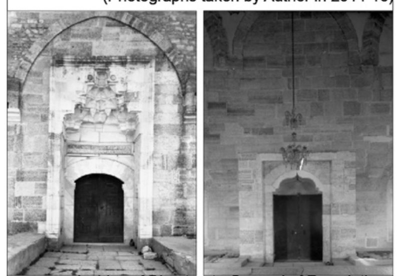
D. G. Foundations (Turk Hava Kurumu, 2013)



D. G. Foundations



(Photographs taken by Author in 2014-16)



Archive of Directorate General of Foundations

(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)

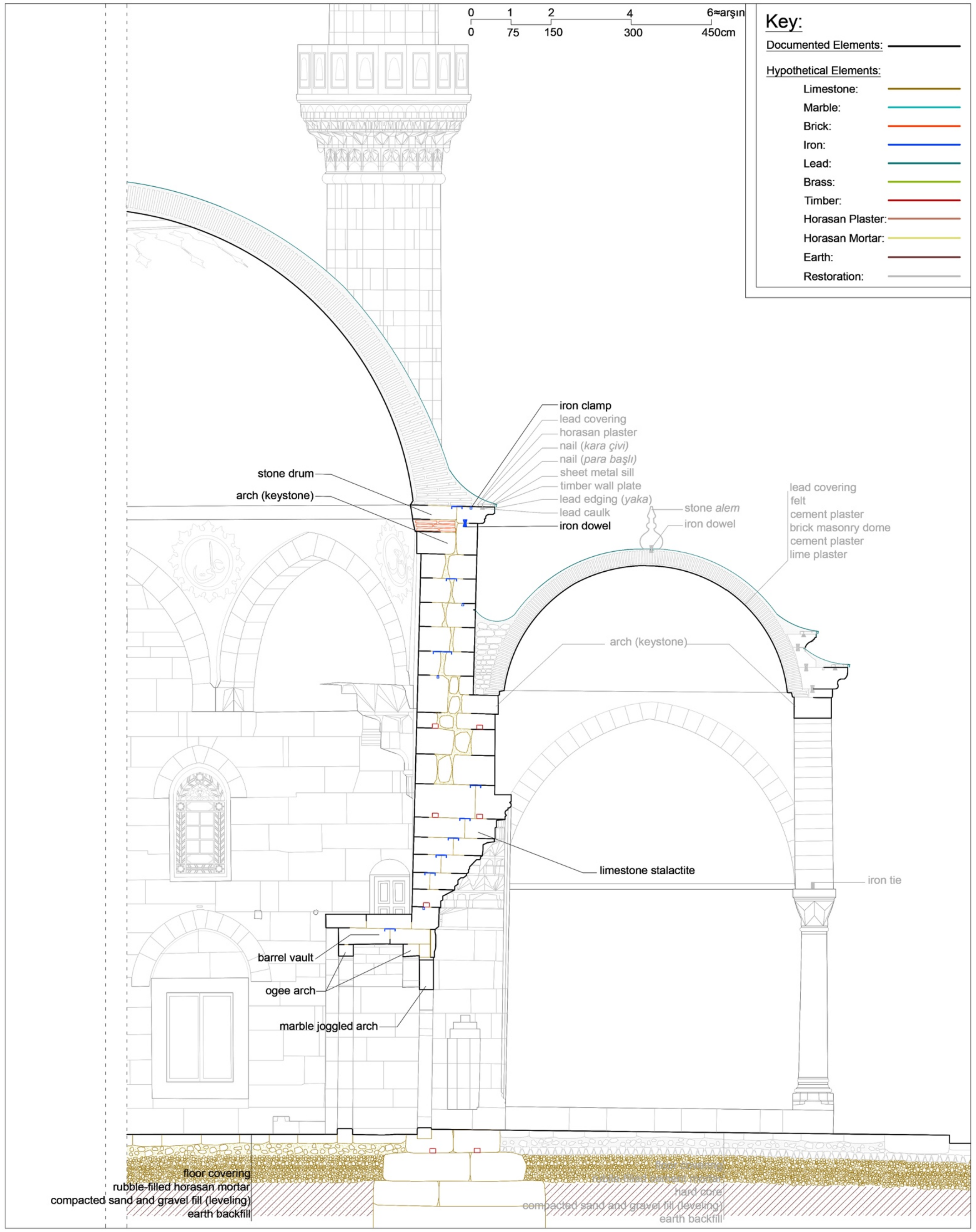


Figure 221: Catalogue 2.3.2 (Havsa) System Detail 2

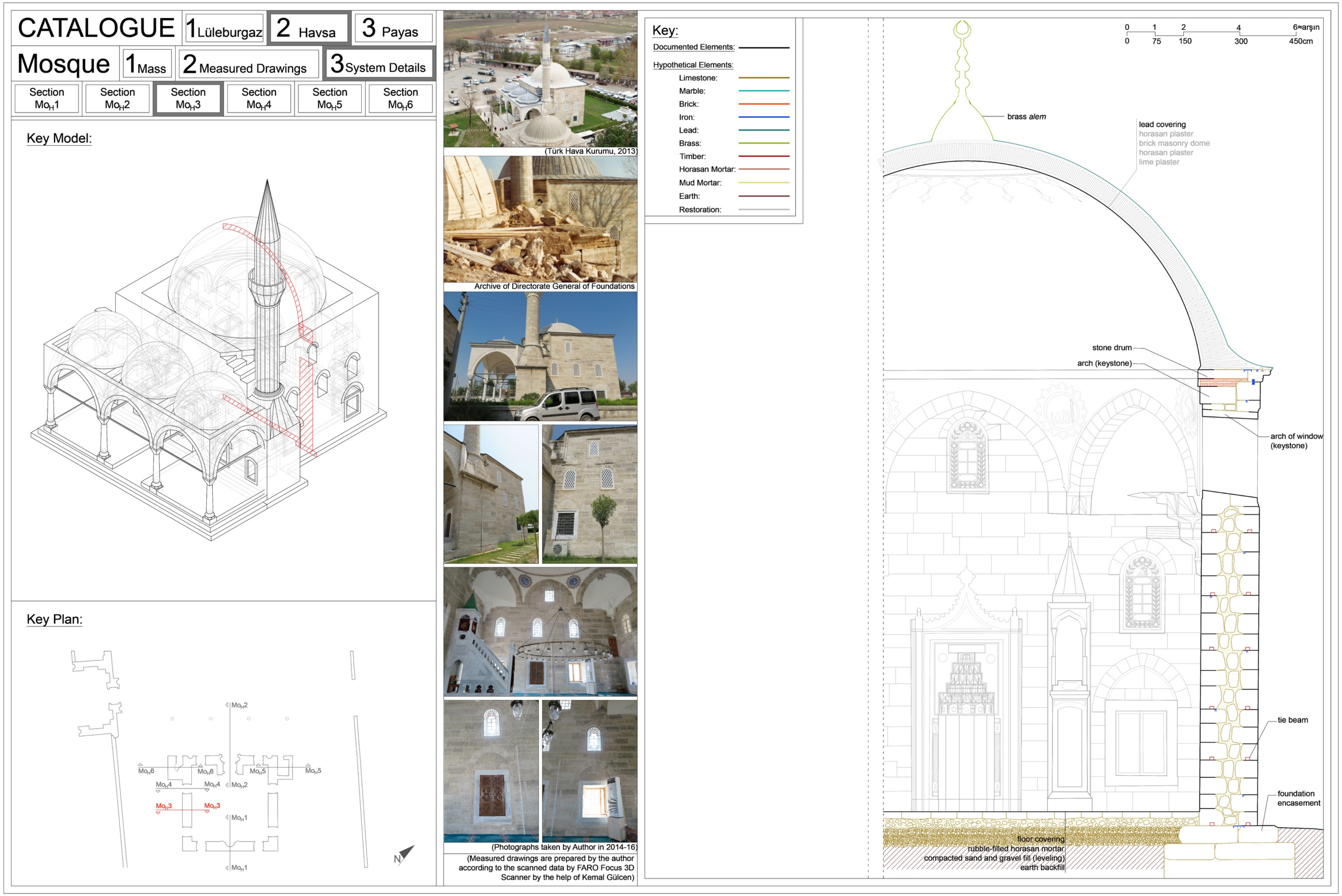


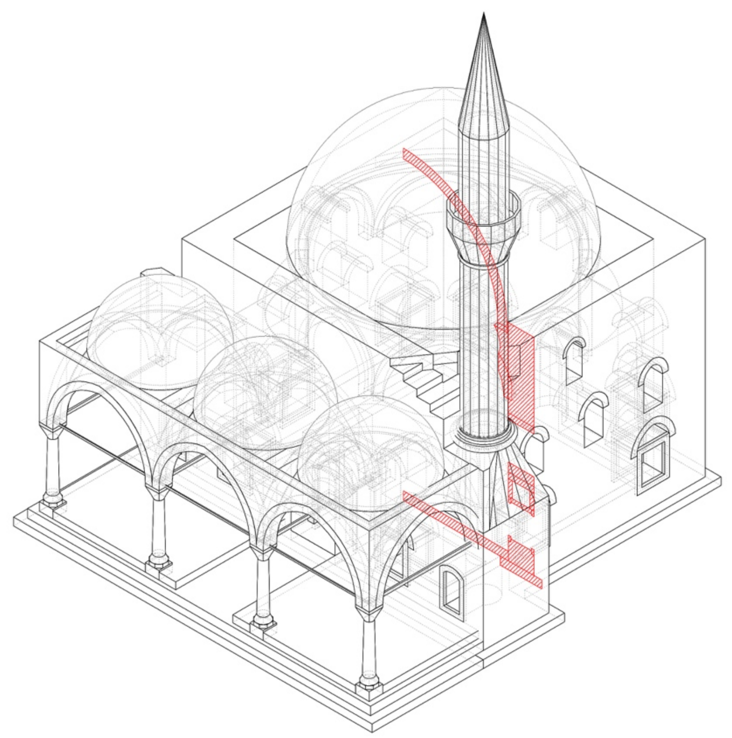
Figure 222: Catalogue 2.3.3 (Havsa) System Detail 3

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

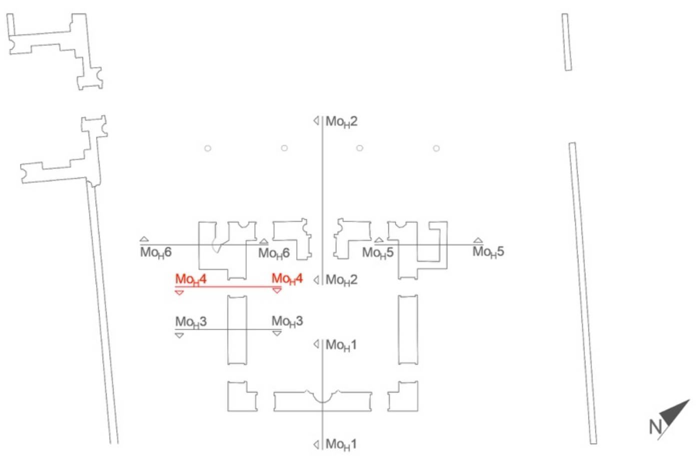
Mosque | 1 Mass | 2 Measured Drawings | 3 System Details

Section Mo_H1	Section Mo_H2	Section Mo_H3	Section Mo_H4	Section Mo_H5	Section Mo_H6

Key Model:



Key Plan:



(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)

Key:

Documented Elements:

Hypothetical Elements:
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Restoration:

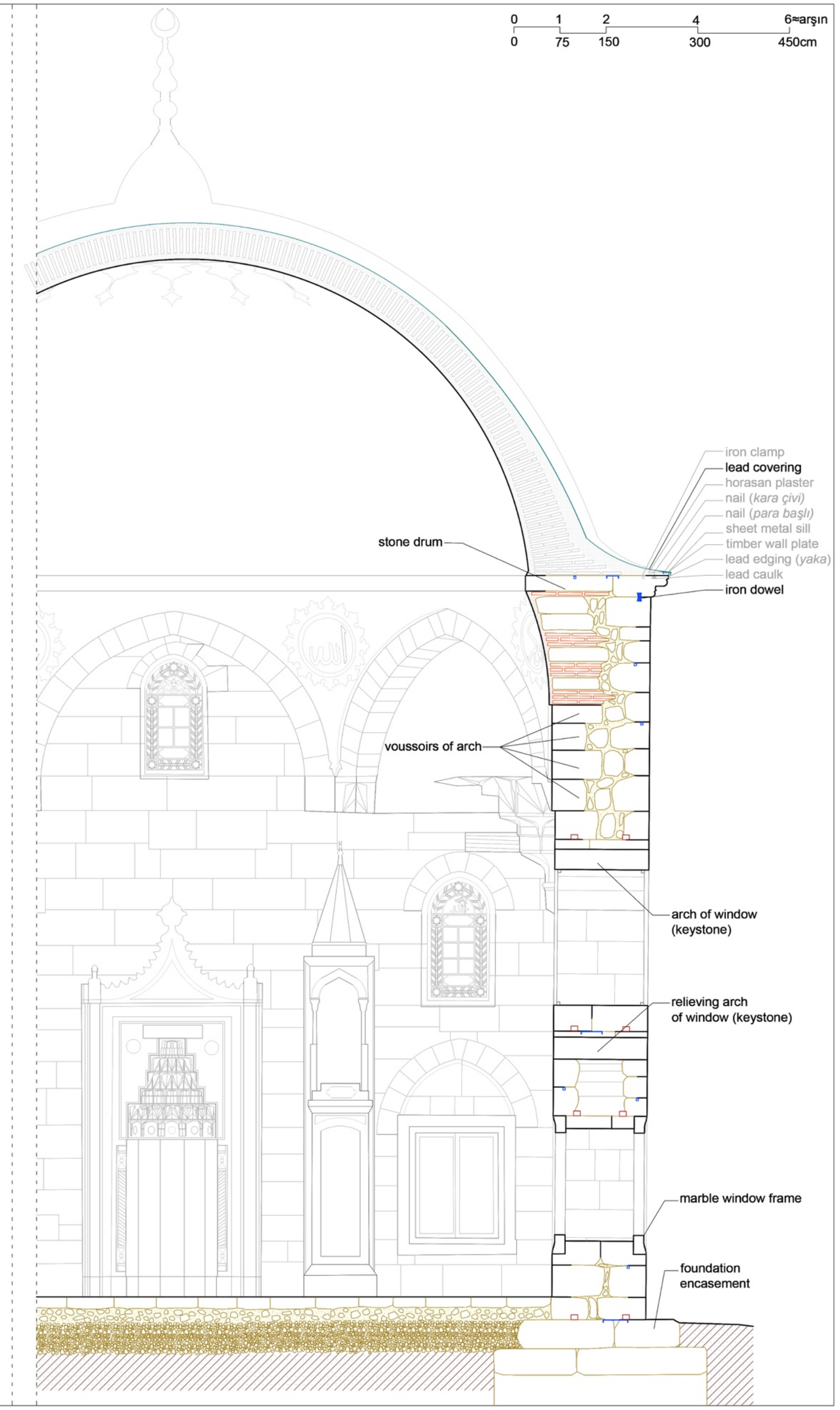
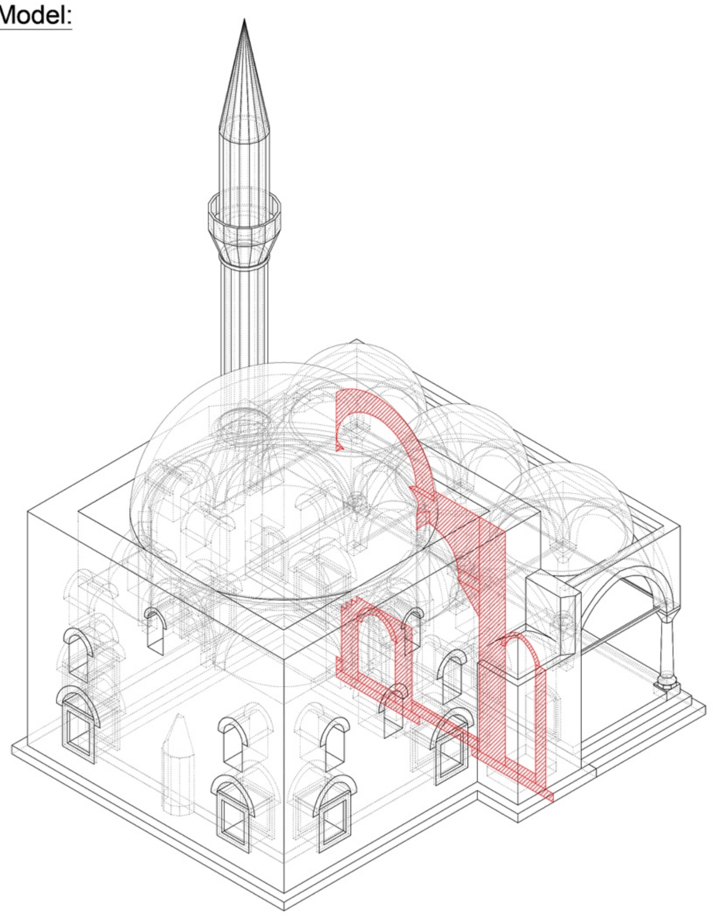


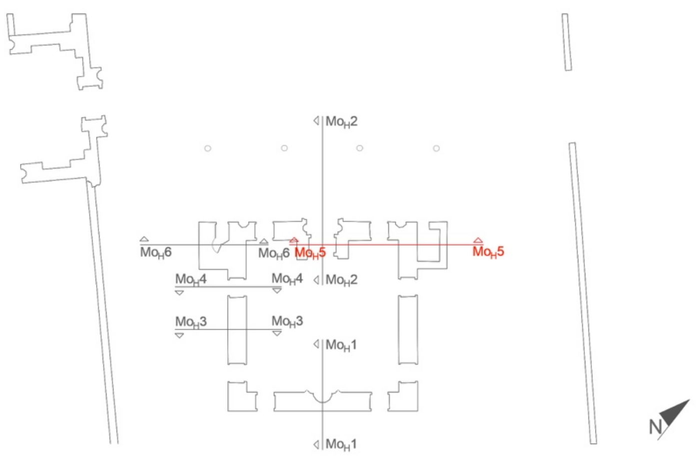
Figure 223: Catalogue 2.3.4 (Havsa) System Detail 4

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas		
Mosque	1 Mass	2 Measured Drawings	3 System Details	4 Element Details	
Section Mo_H1	Section Mo_H2	Section Mo_H3	Section Mo_H4	Section Mo_H5	Section Mo_H6

Key Model:



Key Plan:



(Türk Hava Kurumu, 2013)

(Photographs taken by Author in 2014-16)

(Measured drawings are prepared by the author according to the scanned data by FARO Focus 3D Scanner by the help of Kemal Gülcen)

Key:

Documented Elements:	
Hypothetical Elements:	
Limestone:	
Marble:	
Brick:	
Iron:	
Lead:	
Brass:	
Timber:	
Horasan Plaster:	
Horasan Mortar:	
Earth:	
Restoration:	

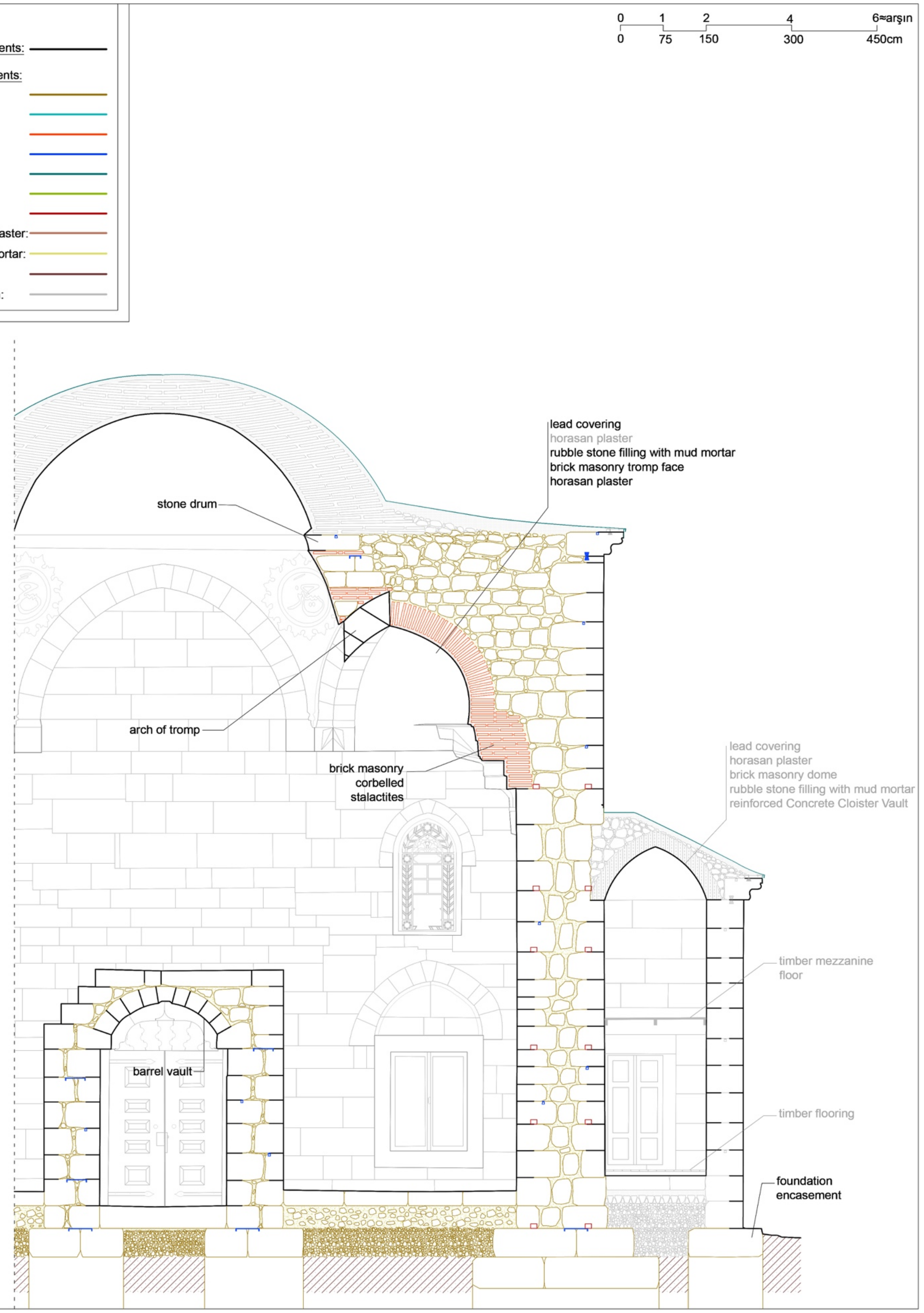


Figure 224: Catalogue 2.3.5 (Havsa) System Detail 5

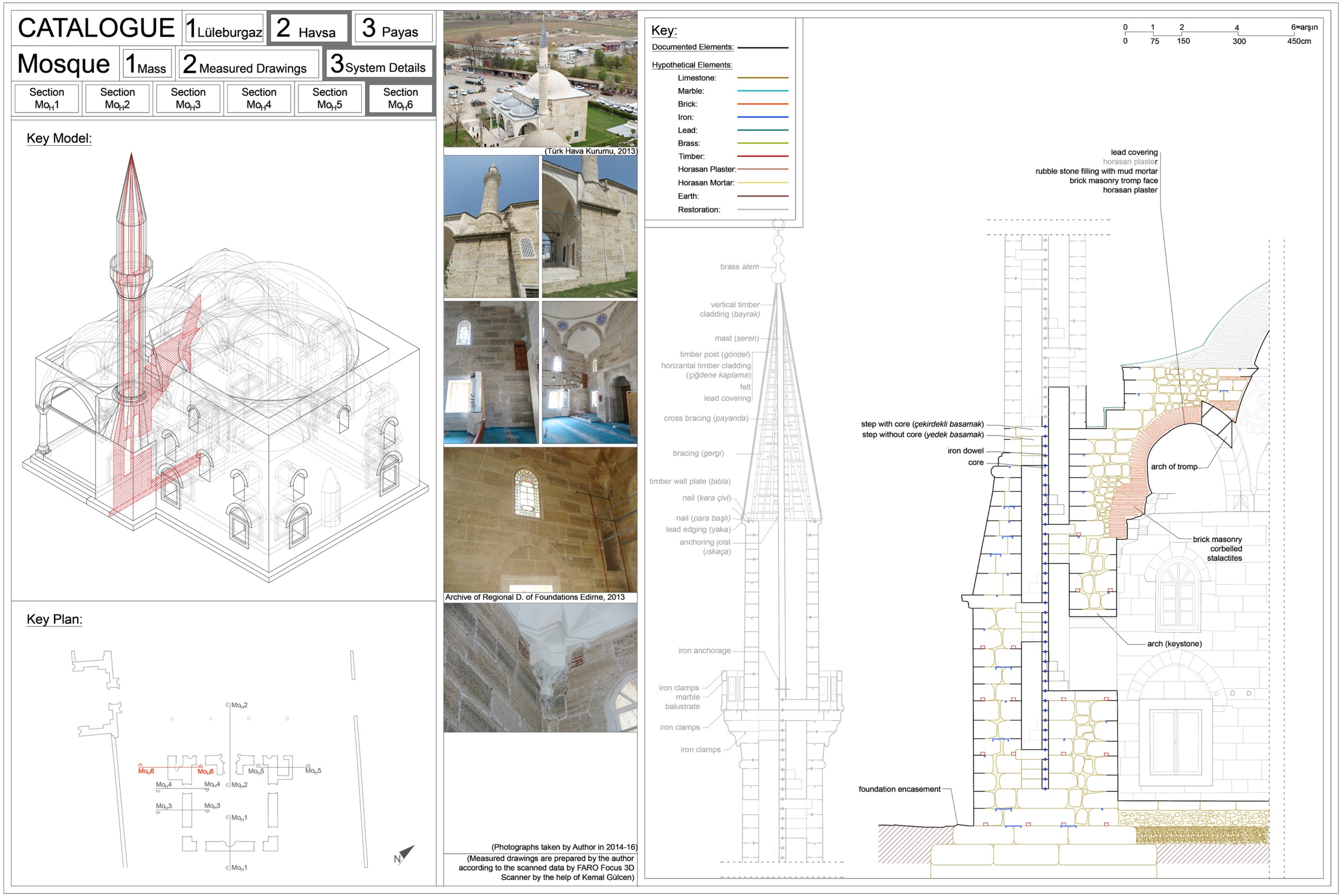


Figure 225: Catalogue 2.3.6 (Havsa) System Detail 6

CATALOGUE | 1 Lüleburgaz | 2 Havsa | **3 Payas**

Payas Sokullu Mehmet Paşa Complex

Current Complex
Restitution

Town: Baiae, Baiai, Bajassı, Beyyas and Bayas,Yakacık, Payas,پاياص

Location: The 42nd *menzil* on the ancient pilgrim route *named "Anadolu Sağ Yolu" and/or "Şam-ı Şerif"* to Mecca from İstanbul. It is after the town of Kurtkulağı and before the town of İskenderun.

Construction Date: Between 1567 and 1574 (Inscription Panel)

Donor: Grand Vizier of Sokullu Mehmed Paşa

Architect: Mimar Sinan

Buildings recorded in *Vakfiye*[1]:	Buildings cited in the manuscripts about Mimar Sinan:			Still Existing Buildings of the Complex:
	TE²	TB³	TM[4]	
mosque			●	●
tekke (*hanikah*)				●
kervansaray			●	●
tabhane				●
imaret			●	●
bakery (*ekmekçi fırını)*				●
shops (*arasta, dua kubbesi*)				●
hamam				●
sıbyan mektebi				●
fountain				●
toilets				●
port				
bridge				●

According to Evliya Çelebi (2006, pp. 60-63)

> *"...cami, han, imaret, mescit, medrese, çarşı pazar ve tatlı hamamı bütün kargir güzel binaları tamamen mavi saf kurşun ile örtülü mamur bir şehirdir ki bütün hayrat ve hasenatı gazi ve şehit Sokollu Mehmed Paşa yapısı olup o bolluk zamanında temel nazırı Sinan Ağa vilayet halkının arzıyla 7 bin kese masraf gösterirler. ... Nice yüz hayratları imaretinde yemeğini yemişiz, ama bütün hayratlarının en gerekli ve önemlilerinden, hazıların geçiş yeri olan bu Payas şehri tehlikeli derbent iken imar edip güvenli bir yer oldu. Hala bir bakımlı ve süslü, bağlı ve bahçeli ve güllük gülistanlık bir şirin mamur şehirdir. Bütün amber kokulu toprak gibi toprak, kireç ve cıbız (alçı taşı) ile örtülü 850 mamur hanelerdir"*

[1] Sokullu Mehmed Paşa's Vakfiye. 29 Zilhicce 981 (H) / 21 April 1574 (M). In the Archive of Directorate of General Foundations in Ulus Ankara. In the #572 record book on the 27-62 pages and in the queue of 20. In the Turkish records, it is in the #2104 book on the 442-78 pages and in the queue of 323. Trasnlated by Mevlüt Çam.
[2] Tezkiretü'l-Ebniye (Record of Buildings) is written by Sai Mustafa Çelebi based on the narratives of Mimar Sinan and it is mainly composed of the lists of his buildings (Crane, Akın (trans.), Necipoğlu (ed.) 2006).
[3] Tezkiretü'l-Bünyan (Record of Construction) explains the life of Mimar Sinan and his constructions. It is also written again by Sai Mustafa Çelebi based on the narratives of Mimar Sinan (Crane, Akın (trans.), Necipoğlu (ed.) 2006).
[4] Tuhfetü'l-Mi'mârin (Choice Gift of the Architects) gives brief information about the life of Mimar Sinan and building lists of him at the end (Crane, Akın (trans.), Necipoğlu (ed.) 2006).

VGM, 1965 | VGM, 1965 | VGM, 1965 | VGM, 1965 | VGM, 1965 | VGM, 1969 | Archive of Payas Municipality, 1930

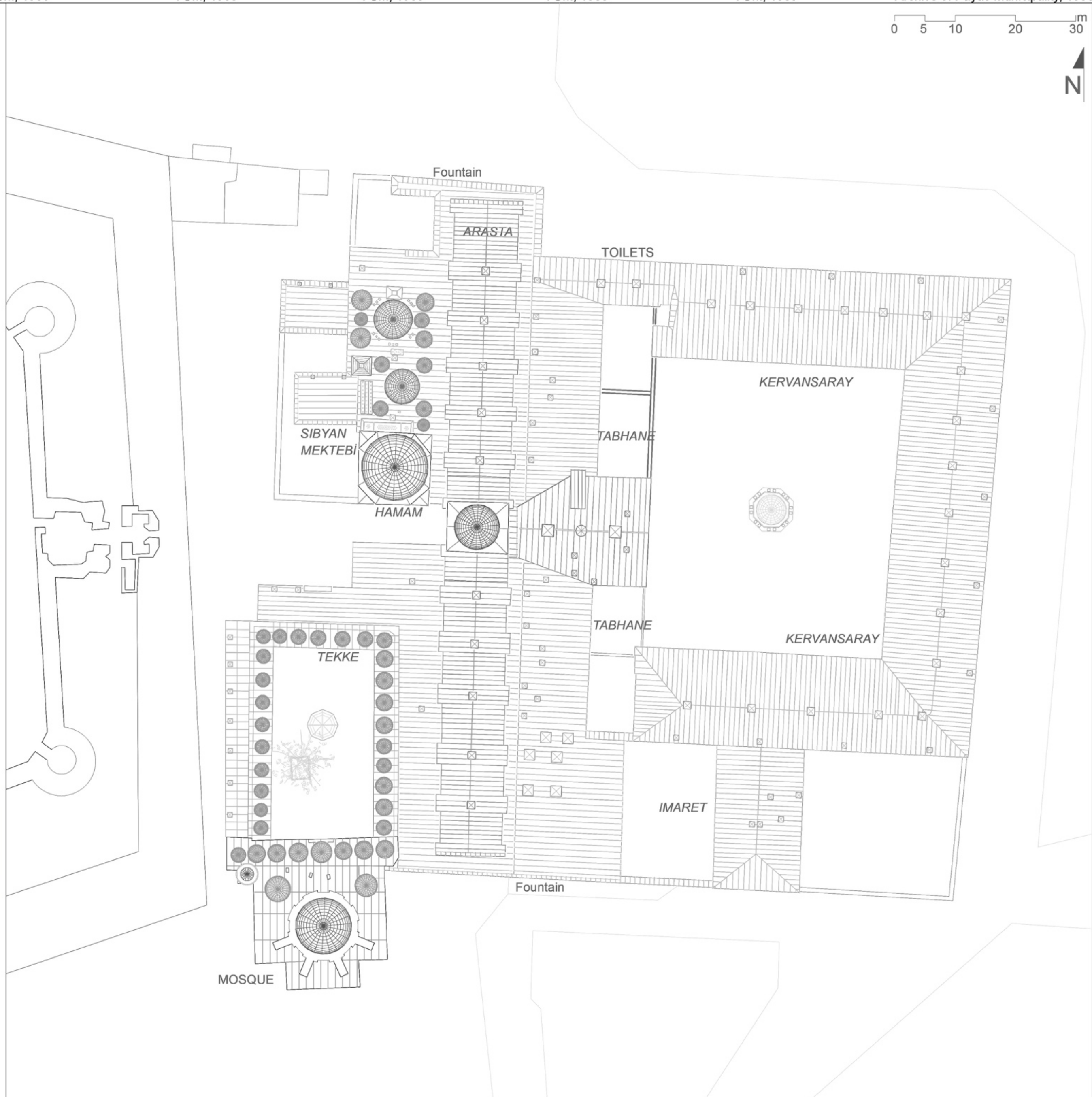
Archive of VGM

Archive of VGM

Archive of VGM

Archive of VGM

Ruins of mosque in Payas, (Magasin Pittoresque, 1843)



(Drawn after the restitution drawing taken from BOAZ Eski Eserleri Koruma ve Mimarlık Ltd. and after drawing of the mosque and *tekke* taken from Işık Proje İnş. San. ve Tic. Ltd. Şti. Drawn according to the information gathered from Sokullu Mehmed Paşa's Vakfiye, Necipoğlu (2005) and Ülgen (Yenişehirlioğlu & Madran, 1989)

Figure 226: Catalogue 3 (Payas) Restitution

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Payas Sokullu Mehmet Paşa Complex

Current Complex
Restitution

Place: Hatay / Payas, Kara Cami Quarter

Location: On the south, there is Kale street, on the west, Payas Castle, on the north, İnönü Street and on the east, Anıt Street.

Site Plan: The buildings of the complex are positioned according to the north-south axis which is the historic road on the route from İstanbul to Mecca. All buildings of the complex are located with reference to this axis. The closed *arasta* is defined by this historic axis. With accordance to their service purposes, the buildings are grouped on the east or west side of the north-south axis. The buildings on the east side of the complex are *kervansaray*, *imaret* and *tabhane*. They serve the visitors with the purpose of accommodation facilities. The other service buildings serving the lodgers such as toilets are concealed among the main buildings in the eastern side of the complex. On the other side, the western buildings are the mosque, *tekke*, *sıbyan mektebi*, *hamam* and bakery. They serve both the visitors and the inhabitants with the purpose of educational, religious, service and hygiene facilities. Additionally, the public fountains are located on the two entrance facades of the long *arasta* as if they are the welcomers. The axis which has the closed *arasta* intersects perpendicularly with another axis directed by the entrance of the Payas Castle. This intersection is highlighted with the *dua kubbesi* which serves as a junction for the four directions. This structure provides entrances to the west and east parts of the complex. Additionally, the axis, the historic road to Mecca, comes from north, passes through *dua kubbesi* and is directed to the bridge on Özer / Payas Stream.

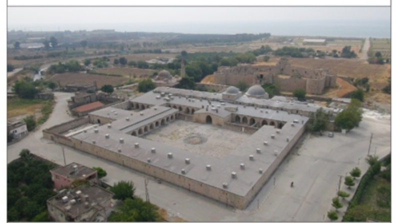
The rectangular east part of the complex is adjacent to the closed *arasta* in a body. The buildings of this part are also located adjacent to each other by sharing common walls. From south to north, the buildings adjacent to the *arasta* are the *imaret* and the *tabhane* with their individual courtyards, and the toilets. Moreover, this east part is bordered on the south by the *imaret* and its courtyard walls. Then, the north and east side of this part is bordered by *kervansaray* with its U-shaped plan provides a central large courtyard. The entrance to this part is from the *dua kubbesi* towards this large courtyard of the *kervansaray*. The other edifices can be reached from the path next to the west edge of this courtyard.

The west part is composed of two groups of buildings. The secondary axis perpendicular to the *arasta* separates these groups. On the south, mosque and the *tekke* constitutes a rectangular group by sharing the common courtyard. There is a *şadırvan* and a monumental olive tree in the courtyard. The mosque sits on the south side and the *tekke* with its U-shaped plan encircles the common courtyard. There are two entrances to this courtyard from the *arasta* and from secondary axis. Adjacent to the north wall of the *tekke*, on east side of the entrance, there is the bakery. On the north side of this secondary axis, the *hamam* sits lengthways adjacent to the *arasta* together with the *sıbyan mektebi* on its west side. Accordingly, *sıbyan mektebi* has entrance on the secondary axis, whereas the *hamam* has entrance from inside the *arasta* next to *dua kubbesi*.

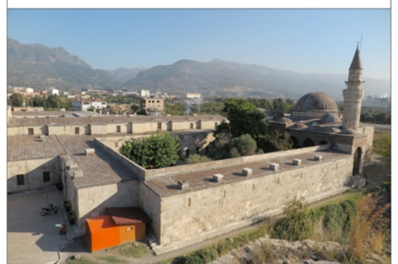
Complex in Lüleburgaz

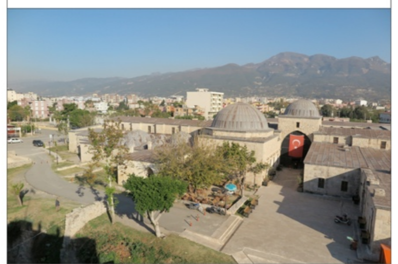
1. Payas Sokullu Mehmed Paşa Complex
2. Payas Castle
3. Bridge
4. Özer Stream
5. Cin Kule
6. Railway
7. D817 - Highway
8. E91 - Highway

(After Maps, last accessed on 26.06.2017)



(Archive of BOAZ Eski Eserleri Koruma ve Mimarlık Ltd., 2013)





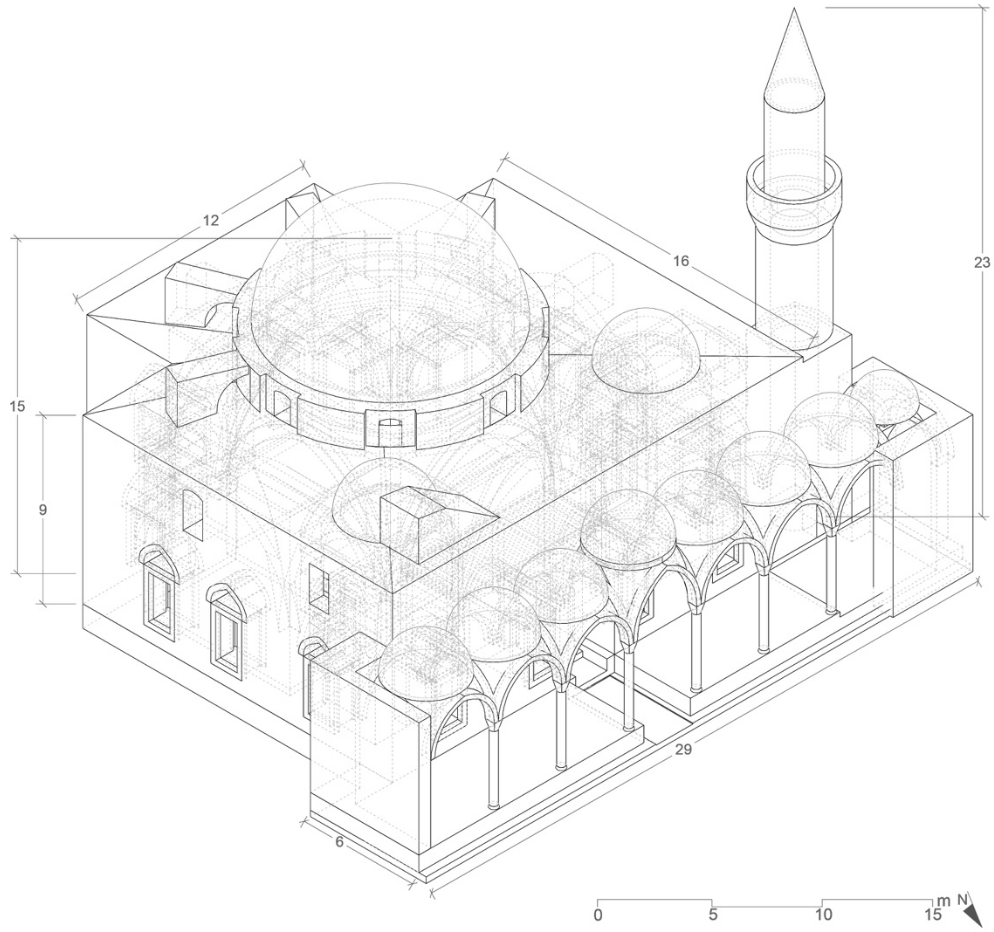
(Photographs taken by Author, 2016)

(Drawn after the measured drawings taken from BOAZ Eski Eserleri Koruma ve Mimarlık Ltd. and after drawings of the mosque and *tekke* taken from Işık Proje İnş. San. ve Tic. Ltd. Şti.)

Figure 227: Catalogue 4 (Payas) Site Plan

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Mosque | 1 Mass | 2 Measured Drawings | 3 System Details



Location: The mosque is at the south-west corner of the whole complex area adjacent to the west side of the *arasta*. On the north, there is the common courtyard encircled by the rooms of the *tekke*. On the west, the deep ditch of the castle declines and on the south, there is an empty space covered with natural vegetation.

Mass: The cross-in-square planned mosque is topped with a single dome in the middle and two small ones on the north corners. The main dome circumscribed by a drum that is articulated with 8 windows and supported by 4 flying buttresses on the south. The south part of the cross-in-square plan, the iwan contains the kıbla, protrudes towards the south from the facade. At the north-west corner, stands the low and thick minaret with cylindrical shaft and single *şerefe*. The asymmetrical last prayer hall is attached to the north facade of the mosque. The longitudinal hall is enclosed by walls on three sides and is open on the north facade. It is topped with 8 domes. The dome which is over the entrance unit is stilted and the dome on the westernmost is a smaller one than the others. Additionally, over the north- east corner of the mosque, there is a trapezoidal protrusion which provides an exit to the roof.

Figure 228: Catalogue 5.1 (Payas) Mass

CATALOGUE 1 Lüleburgaz 2 Havsa 3 Payas

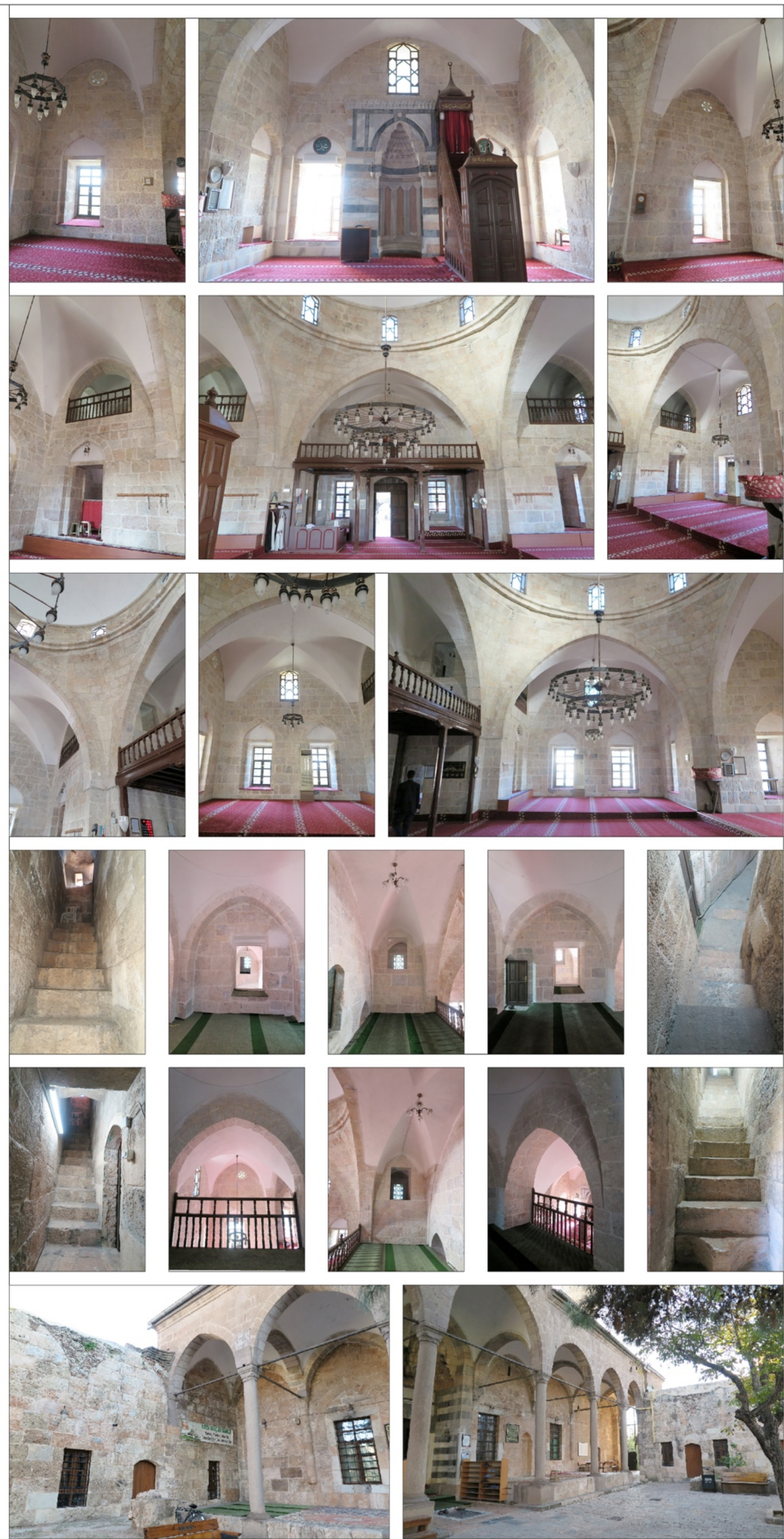
Mosque 1 Mass 2 Measured Drawings 3 System Details

Plan: The domed central prayer space of the cross-in-square planned mosque is enlarged towards the four directions by four iwans. At the north corners of the cross-in-square plan of the mosque, there are small unit spaces with two storeys, whereas the south corners are emptied. The central dome rests on four main arches and pyramidal pendentives. These transition elements create an octagonal base for the inner drum. Then, the inner drum which has 8 window openings provide a circular base for the dome.

The iwans on four directions are topped with cross vaults. The iwan on the south contains the kıbla wall on which the *mihrab* is placed. Adjacent to the kıbla wall, on the west side of the *mihrab* the timber *minber* is placed on the one step raised floor of the iwan. Additionally, the timber *vaaz kürsüsü* is placed at the corner of the south and east iwans. The iwans on the east and west sides are mirror image symmetry of each other. They are raised about one step from the central prayer space. The iwan on the north constitutes the entrance to the mosque and provides entrances to the small unit spaces at the north corners. In this iwan, over the portal there is a second floor which is constructed with timber posts, joists and flooring.

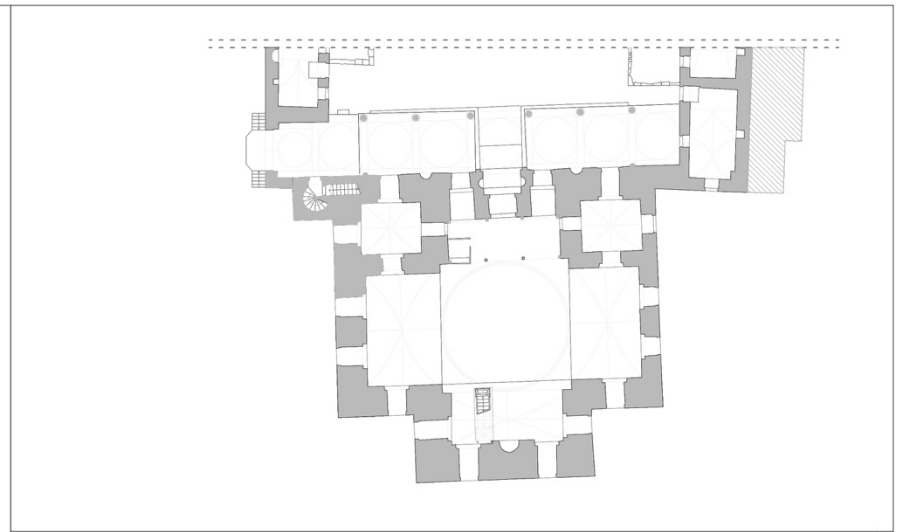
The unit spaces at the north corners of the mosque flanks the sides of the north iwan. These spaces are separated from the main prayer hall by the walls containing windows. The ground floors are one step raised such as the iwans on the west, east and south sides. The second floors of these spaces, the *mahfils*, are rests on the cross vaults that cover the first floor. Then, the second floors are topped with domes resting on pendentives. The *mahfil* floor can be reached from the staircase which is located inside the large north wall of the mosque. This staircase starts from the minaret base, goes up through the north wall, leads to *mahfil* floors and the roof.

The rectangular planned last prayer hall, which is reconstructed in 1982, is a semi open space attached to the north wall of the mosque. The east and south sides of this hall are defined by the walls. On the west side, there is a large door opening with pointed arch leads to outside of the complex. An open colonnade composed of 6 columns borders the north side of this hall together with the adjacent wall of the *tekke* on the west. The last prayer hall which acts as a passage way to the mosque is composed of 8 square units. These units are covered with domes resting on pendentives and divided by pointed arches supported by columns and walls. The square unit space in front of the portal is covered with a bigger and stilted dome and introduces the entrance of the mosque. The dome on the westernmost side, in front of the arched large opening, is smaller than the others. Accordingly, in this hall, the floor of the units that are in front of the mosque façade are raised, but the floor of the entrance unit and the westernmost unit are not.

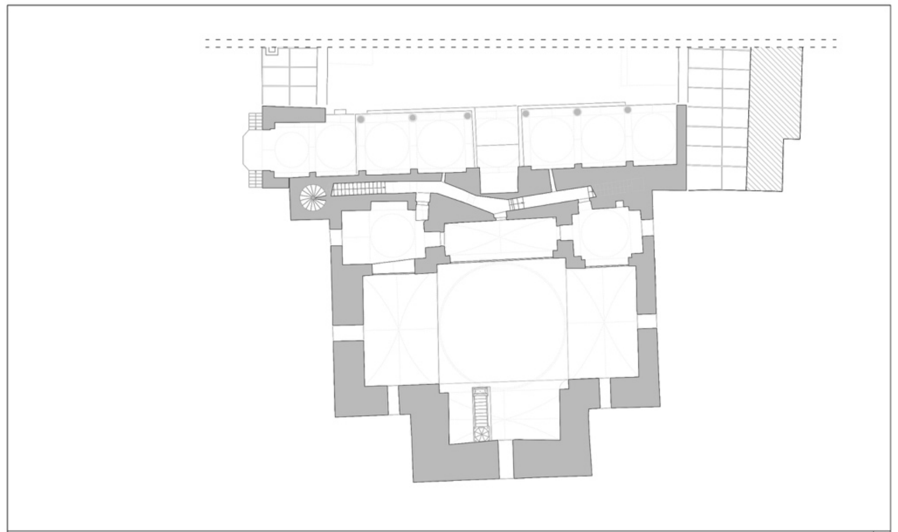


(Photographs taken by Author, 2016)

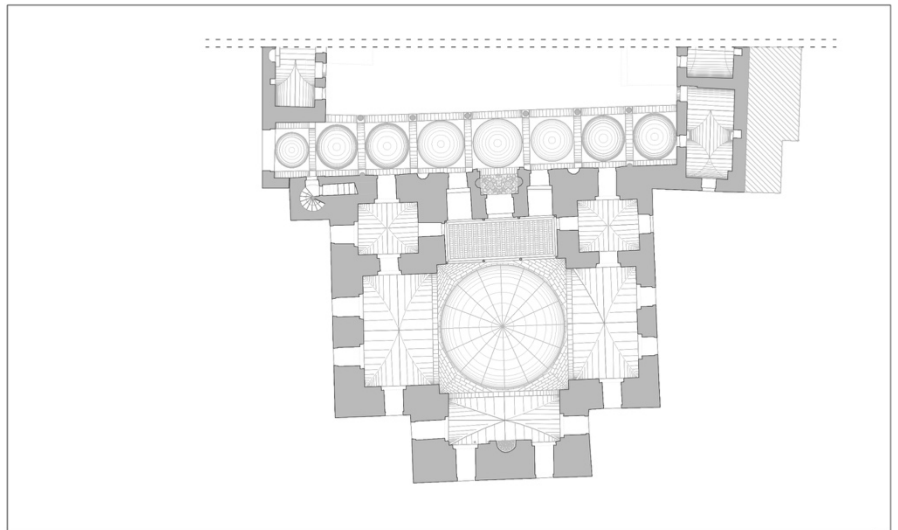
(Drawn after the measured drawings taken from Işık Proje İnş. San. ve Tic. Ltd. Şti.)



Ground Floor Plan 0 2 4 8 12 20 m N



Upper Floor Plan 0 2 4 8 12 20 m N



Ceiling Plan 0 2 4 8 12 20 m N

Figure 229: Catalogue 3.2 (Payas) Plans

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass	2 Measured Drawings	3 System Details

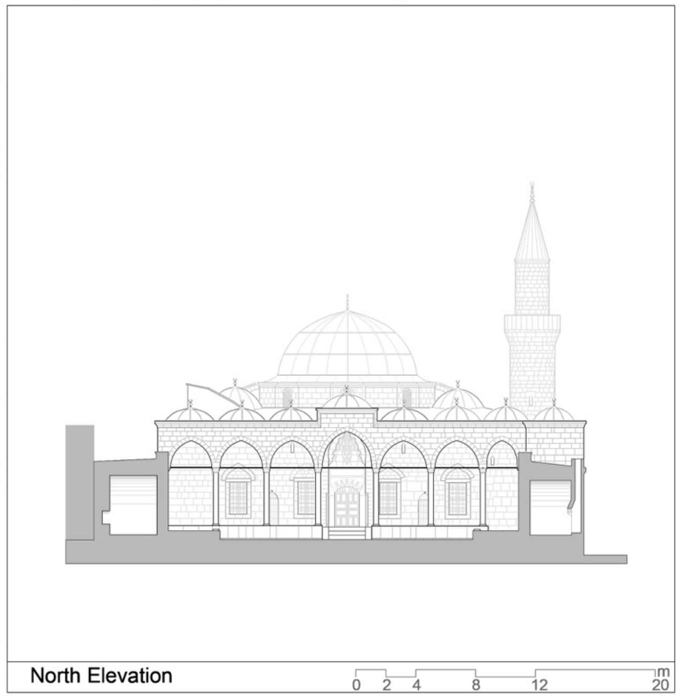
Elevations: The façades of the mosque are composed of modest architectural elements. On all the elevations, the windows are arranged in two rows under the central dome except the entrance facade that have a row. The dome is confined by an octagonal drum arranged as a clerestory with window openings on each face. In addition, the 4 flying buttresses, that support the drum from south, and the minaret, attached to the north-west corner of the mosque, can be observed on all of the facades.

The north façade of the mosque is hindered by the last prayer hall which is facing the courtyard. The north façade of the last prayer hall is composed of 7 large openings topped with pointed arches carried by 6 columns. However, 8 domes are observed on the facade. The west wing of the *tekke*, attached to the north facade, closes the west side of the facade. On this façade, these 8 domes and the arcade can be observed below the two small domes of the corner units and the main dome with drum. The central unit of the arcade, which defines the entrance, has a larger arch and a stilted dome. Whereas the unit falling behind the demolished arcade of the *tekke* on the west, has a smaller arch.

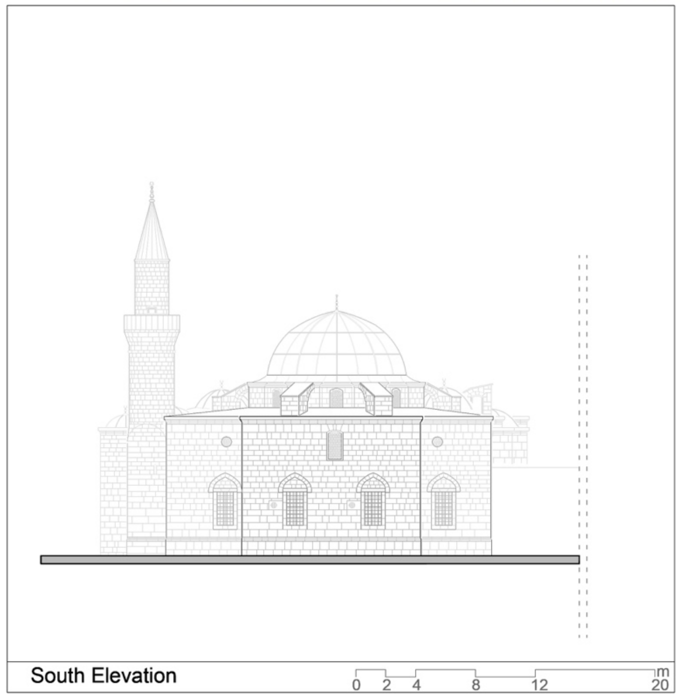
The east and west facades are almost mirror image symmetry of each other. On these facades, the cross-in-square plan organization can be observed. The two-rowed windows are grouped according to their corresponding spaces. There are 3 windows that open to iwans. They are arranged one above the other two and in the middle of them. In addition, there are 2 windows each of which opens to the storeys of the northern corner spaces. The windows on the first row are rectangular ones topped by relieving arches with two centered tangent profile. These windows have grilles with knots. The second row windows that open to iwans are small ones with depressed arches. The windows that opens to the *mahfil* floor are rectangular ones. These upper windows have *dışlık* panels. Additionally, the windows on the side walls of the south iwan can be observed on the east and west facades. They are on the same level and configuration with the windows on the first row. The difference of the west façade is because of the *minaret* attached to the north corner and the last prayer hall's door opening with pointed arch. Accordingly, on the east, the staircase exit jutting out from the roof creates the difference.

The south facade has a symmetrical organization. The projected south iwan, the *mihrab* wall, has 3 windows in a similar manner with the east and west iwans. Likewise, the side walls of the east and west iwans can be observed on each side of the south facade. There are two rows of single window on each wall. The windows on the first row is the same with the other facades. The upper ones are the circular ones with *dışlık* panels.

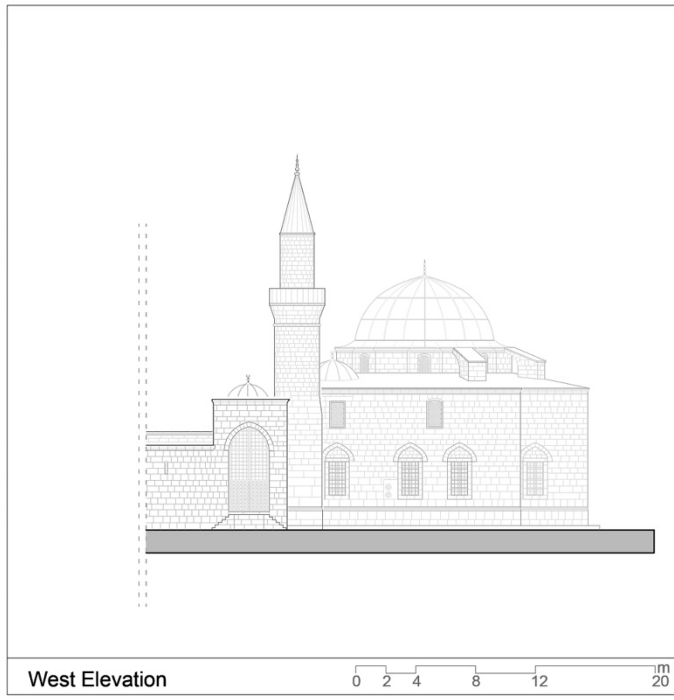
(Photographs taken by Author in 2016)



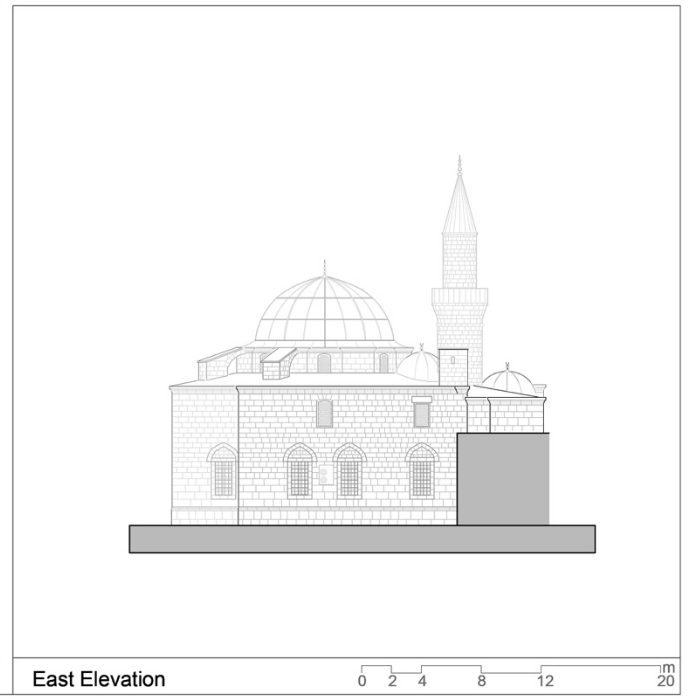
North Elevation



South Elevation



West Elevation



East Elevation

(Drawn after the measured drawings taken from Işık Proje İnş. San. ve Tic. Ltd. Şti.)

Figure 230: Catalogue 3.2 (Payas) Elevations

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

Mosque | 1 Mass | 2 Measured Drawings | 3 System Details

Elevations: The rear wall of the last prayer hall is the entrance façade of the mosque. Due to the attached *tekke* on the west side of the north facade, the facade of the *harim* section of the mosque is shifted a bit towards east. This section on the facade is expressed by articulated impost stones of the arches. This entrance facade carries the portal of the mosque in the middle of the *harim* section facade. On both sides of the portal, there are two windows, having *mihrabiye* niche in between. The windows are rectangular ones topped by relieving arches with two centered tangent profile. They have iron grills with knots. In addition, there are slit windows flanking on both sides of the portal. They enlighten the staircase, inside the north wall, leading to the *mahfil* floor. Then, there is a door on the west side of the entrance facade of the mosque. It opens to the minaret and the staircase of the *mahfil* floor. This door opening is placed in a rectangular frame and topped with a depressed arched composed of white, pink and black marble.

Arch. Elem. of Mosque: The entrance portal, constructed in pink, white and black marble, is set in a high frame topped with a pointed arch. It has a rectangular planned niche which is covered with 6 rows of stalactited hood. In this niche recession, above the door opening, there is an empty rectangular white marble covering which should have been the inscription panel. The door opening is topped with 3 colored marble joggled arch with depressed profile. The *cümle* door which is made of timber is inserted in the door opening. Additionally, on the east and west walls of the portal recession, there are two niches with half decagonal plan and they are covered with 4 rows of stalactited hood. The portal niche is flanked by two attached columns constructed in white marble.

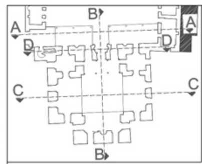
The *mihrab* that was covered with pink, white and black marble has a rectangular frame topped with 2 rows of stalactites in white marble. It has a plan of a semicircular prayer niche which is covered with a hood made of 7 rows of stalactites. The spandrel of the stalactited hood is framed by black marble bands. On the east side of the prayer niche, Arabic letters are inscribed on the white marble.

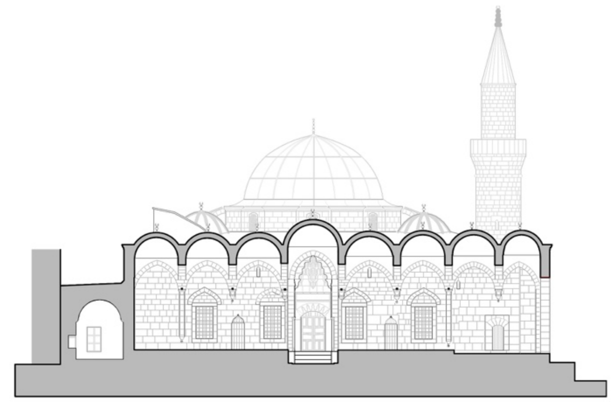
The *minber* which is made of timber is placed on the west side of the *mihrab* adjacent to the south wall.

The *vaaz kürsüsü* which is made of timber is placed at the south-east corner of the central domed prayer place.

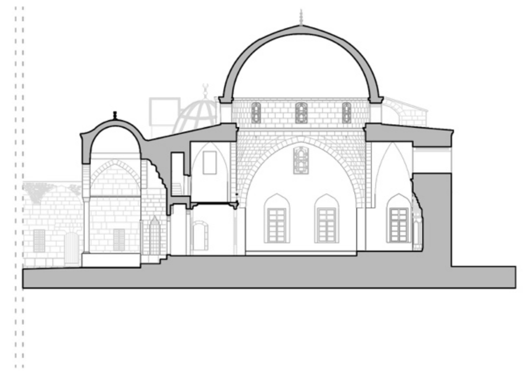
(Photographs taken by Author in 2016)

(Drawn after the measured drawings taken from Işık Proje İnş. San. ve Tic. Ltd. Şti.)

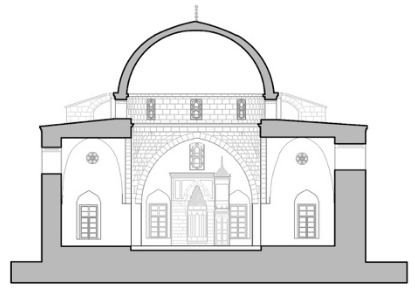




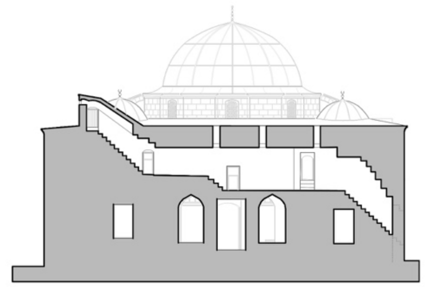
Section AA 0 2 4 8 12 20 m



Section BB 0 2 4 8 12 20 m



Section CC 0 2 4 8 12 20 m



Section DD 0 2 4 8 12 20 m

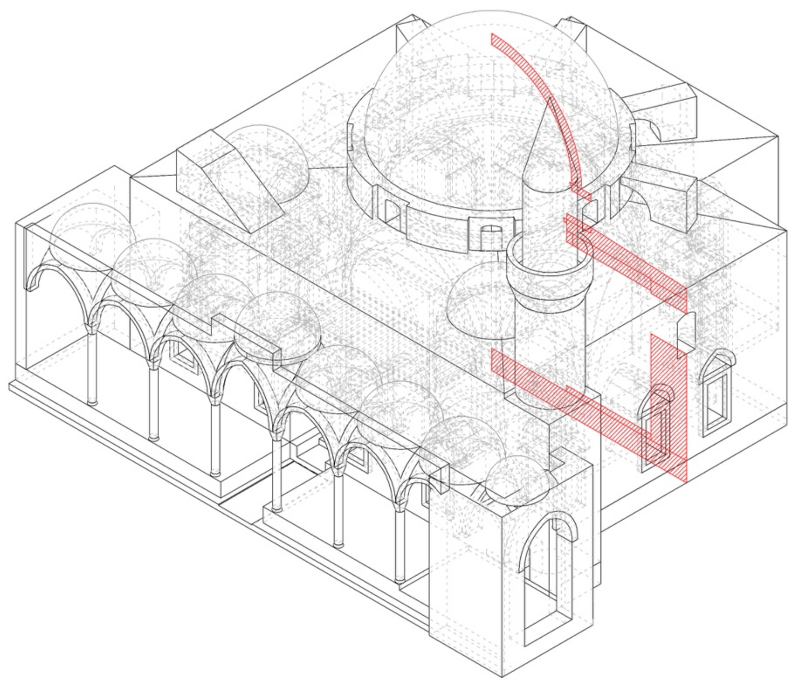
Figure 231: Catalogue 3.2 (Payas) Sections

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

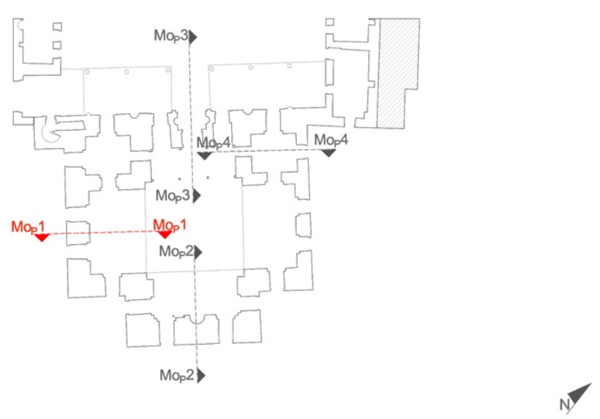
Mosque | 1 Mass | 2 Measured Drawings | 3 System Details

Section Mo_P1 | Section Mo_P2 | Section Mo_P3 | Section Mo_P4

Key Model:



Key Plan:



(BOAZ Eski Eserleri Kor. ve Mim. Ltd. Archive, 2013)

(Photographs taken by Author in 2016)

(VGM Archive, 1981)

(System Detail drawn by author)

Key:

Documented Elements:

Hypothetical Elements:
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Restoration:

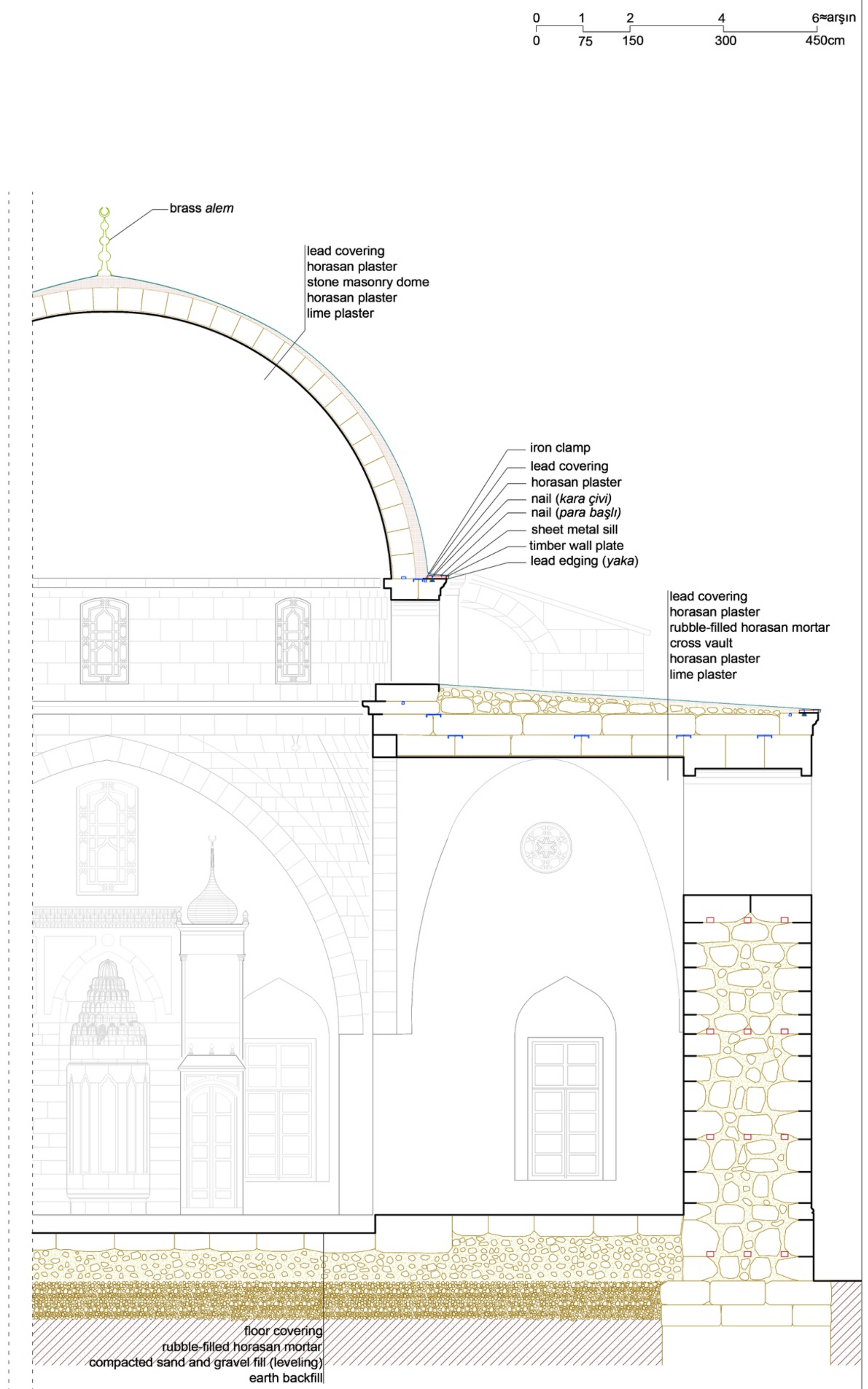


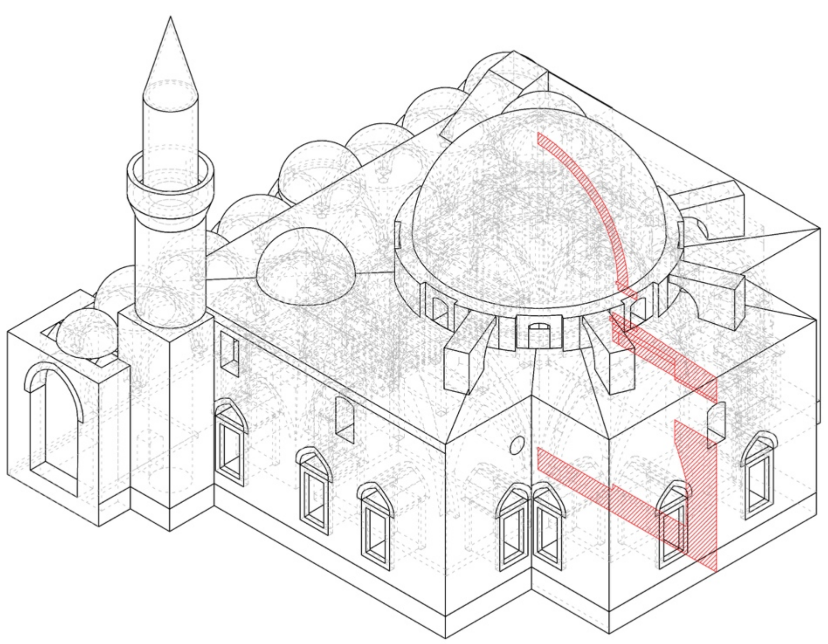
Figure 232: Catalogue 3.3.1 (Payas) System Detail 1

CATALOGUE 1 Lüleburgaz 2 Havsa 3 Payas

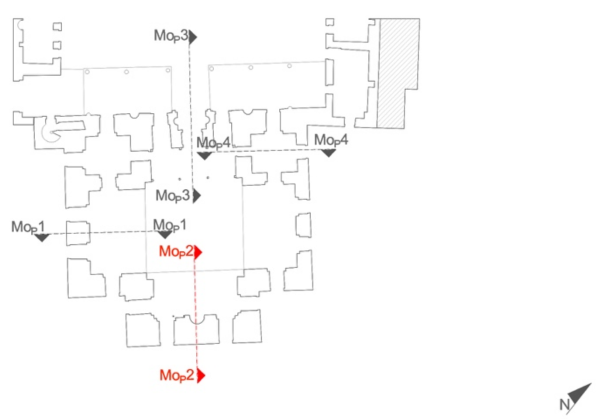
Mosque 1 Mass 2 Measured Drawings 3 System Details

Section Mo_P1 | Section Mo_P2 | Section Mo_P3 | Section Mo_P4

Key Model:



Key Plan:



(VGM Archive, 2007)

(Photographs taken by Author in 2016)

(VGM Archive, 2007)

(Drawn after the measured drawings taken from Işık Proje İnş. San. ve Tic. Ltd. Şti.)

Key:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Restoration:

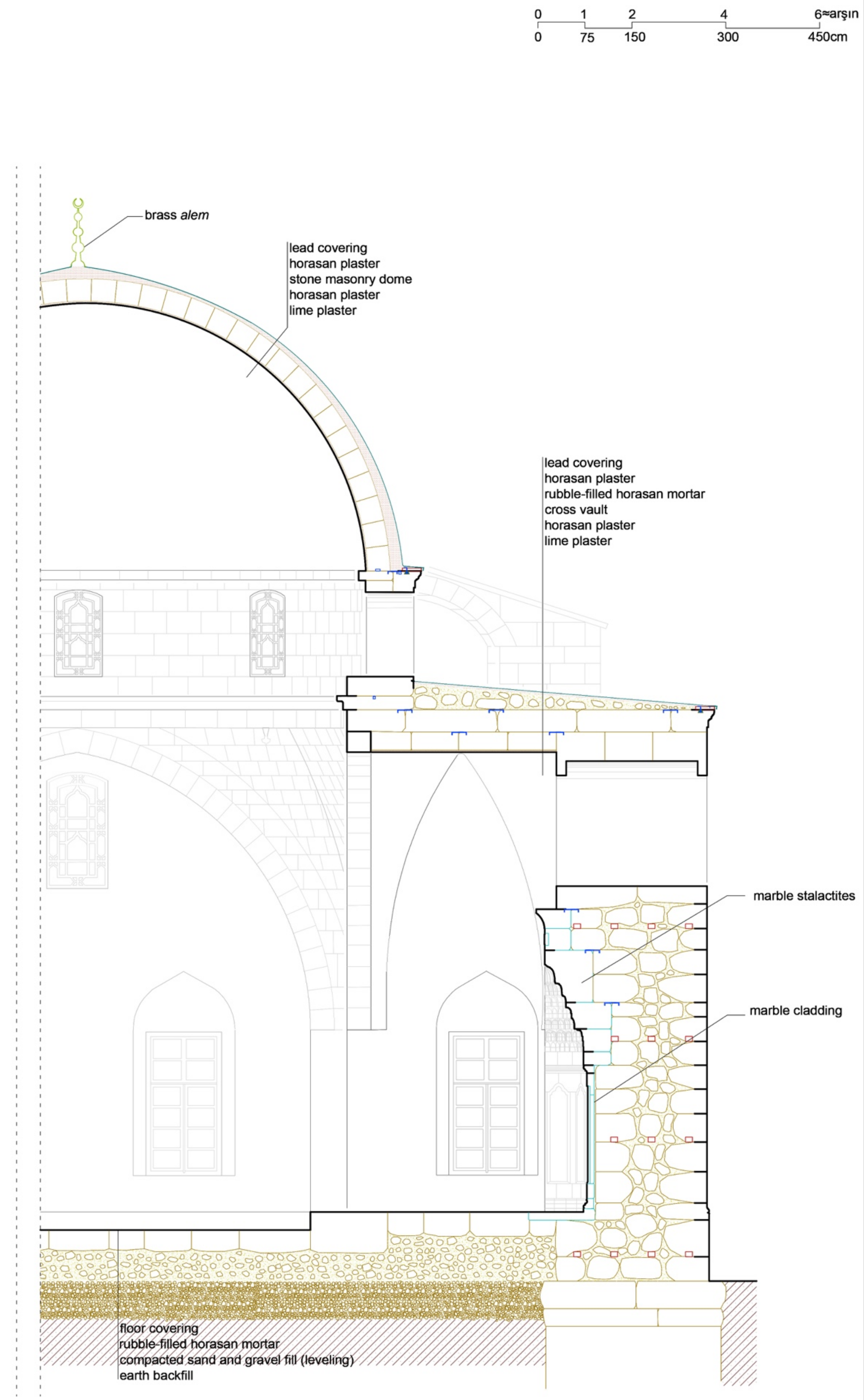
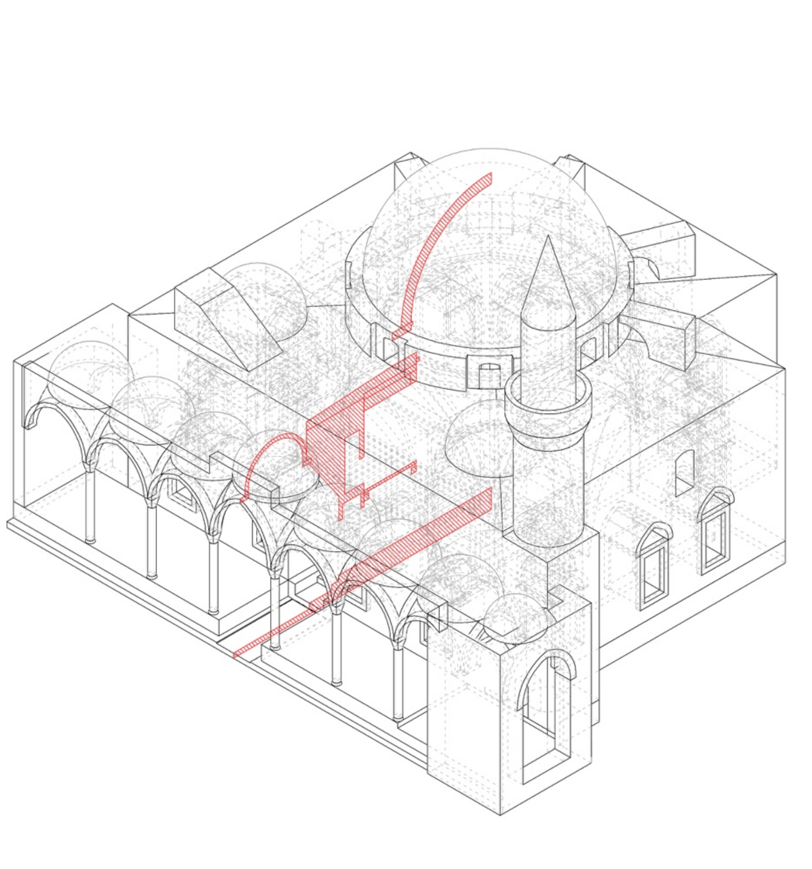


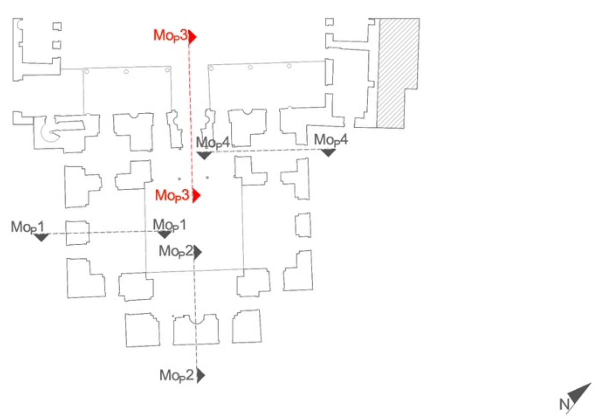
Figure 233: Catalogue 3.3.2 (Payas) System Detail 2

CATALOGUE	1 Lüleburgaz	2 Havsa	3 Payas
Mosque	1 Mass	2 Measured Drawings	3 System Details
Section Mo_P1	Section Mo_P2	Section Mo_P3	Section Mo_P4

Key Model:



Key Plan:



(BOAZ Eski Eserleri Kor. ve Mim. Ltd. Archive, 2012)

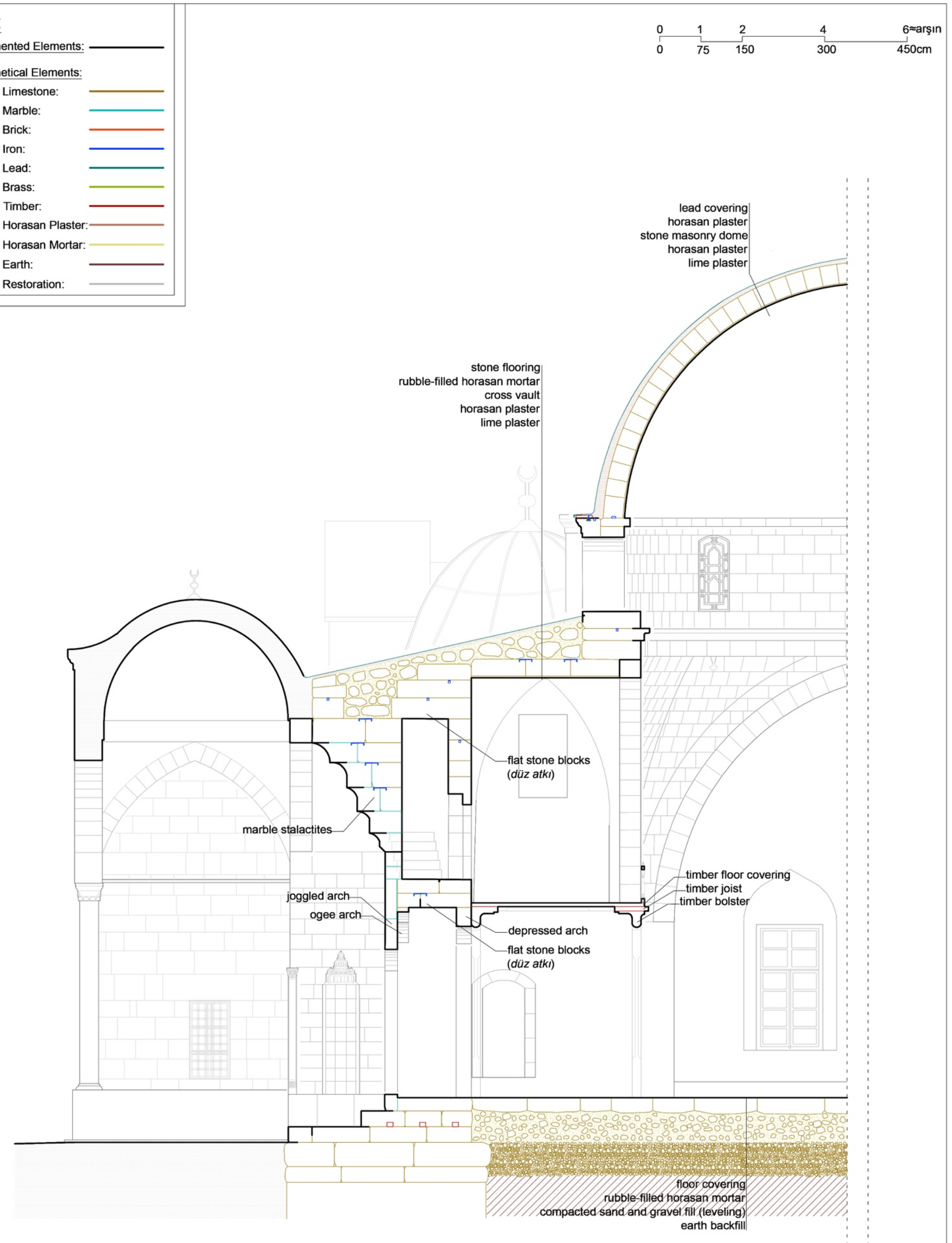
(Photographs taken by Author in 2016)

Key:

Documented Elements:

Hypothetical Elements:

- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Restoration:



(System Detail drawn by author)

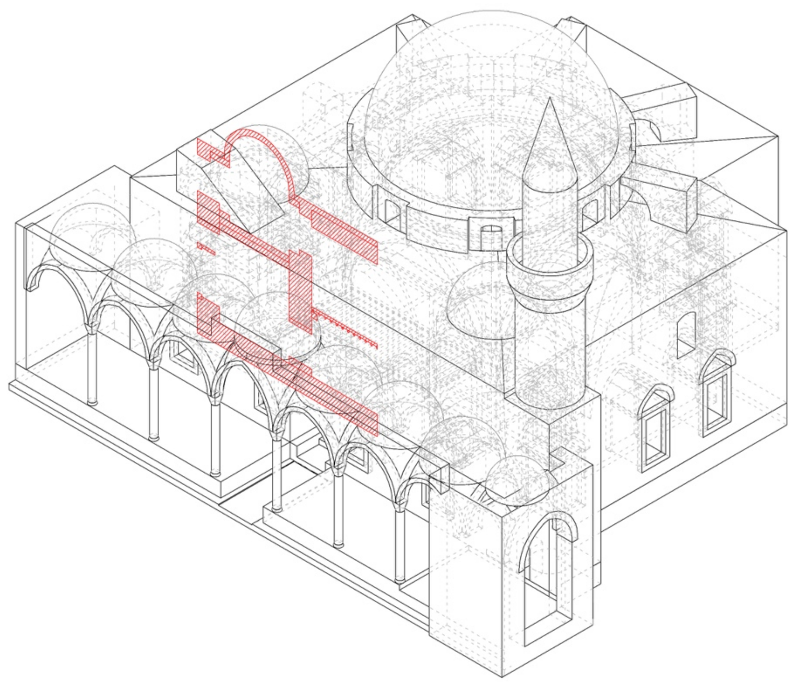
Figure 234: Catalogue 3.3.3 (Payas) System Detail 3

CATALOGUE | 1 Lüleburgaz | 2 Havsa | 3 Payas

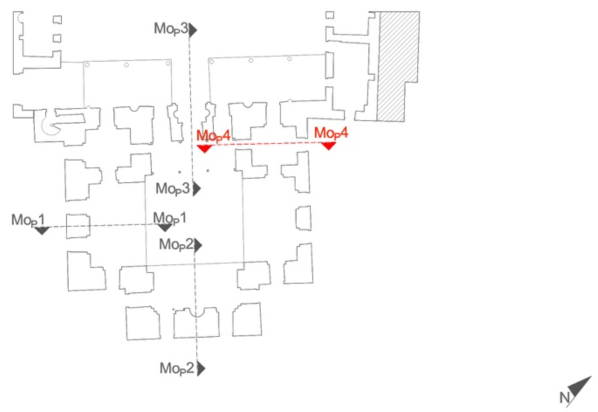
Mosque | 1 Mass | 2 Measured Drawings | 3 System Details

Section Mo_P1 | Section Mo_P2 | Section Mo_P3 | Section Mo_P4

Key Model:

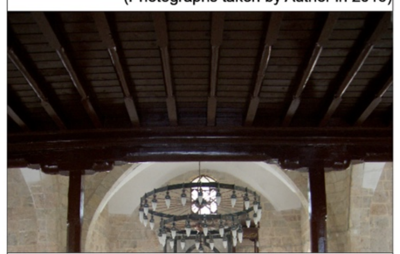


Key Plan:



(VGM Archive, 2007)

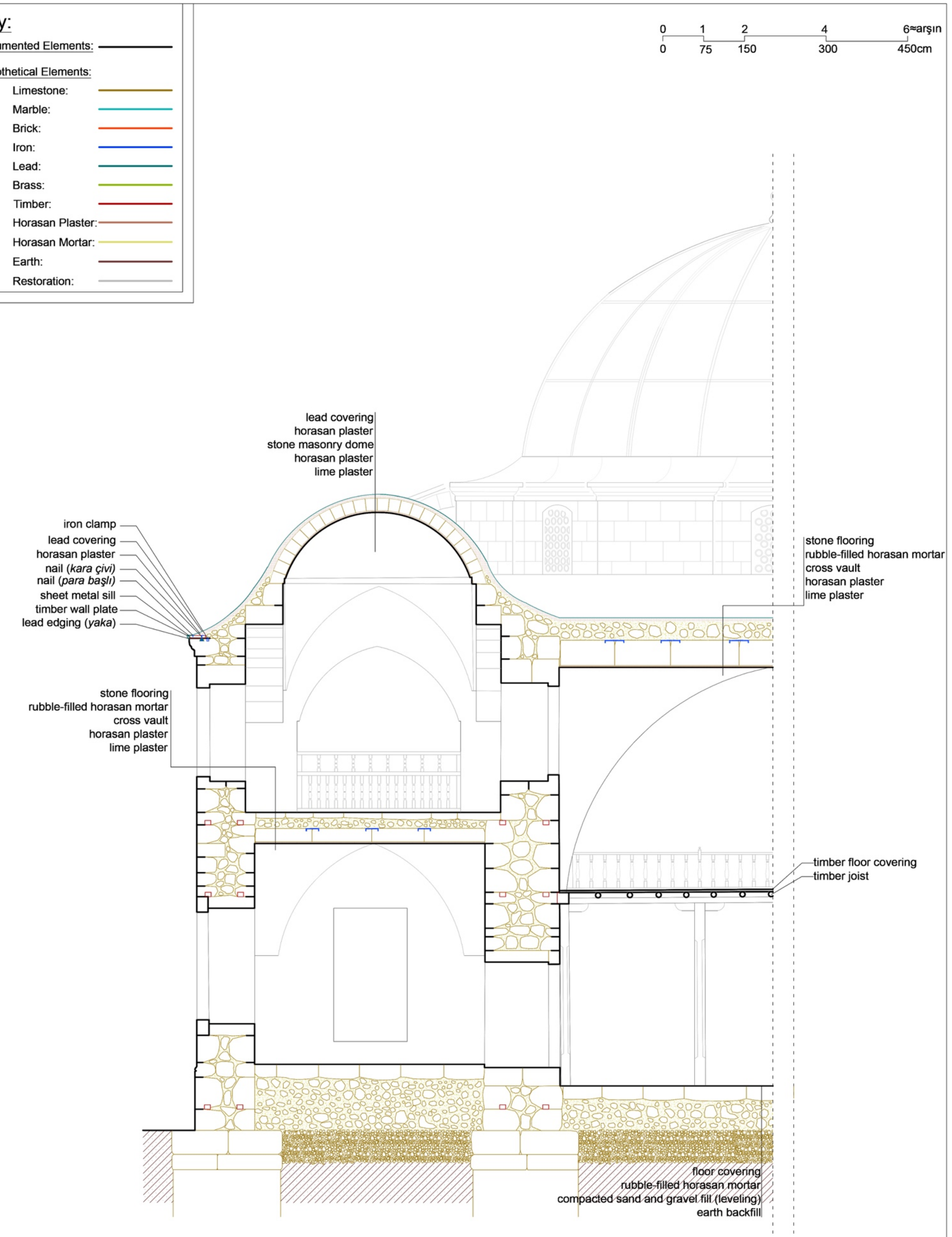
(Photographs taken by Author in 2016)



Key:

Documented Elements:

Hypothetical Elements:
- Limestone:
- Marble:
- Brick:
- Iron:
- Lead:
- Brass:
- Timber:
- Horasan Plaster:
- Horasan Mortar:
- Earth:
- Restoration:



(System Detail drawn by author)

Figure 235: Catalogue 3.3.4 (Payas) System Detail 4

D. GLOSSARY

Acemioğlan: Cadet

Alem (Mahçe): the finial with the form of the small crescent that is placed on top of the domes and minarets.

Arasta: parade of aligned shops

Arşın: 75,7738 cm (Özdural, 1998, p. 113)

Atlısekban: Cavalry

Baş kemer: The arch, on the exterior face of the squinches, resting on the walls of the buildings.

Binaemini: site supervisor

Çekirdekli basamak: minaret steps with core

Darülhadis: Hadith School

Darülkurra: Quran School

Darüşiffa: Hospital

Darüttıp: Medical School

Derbent Teşkilatı: in Ottoman Empire, a civil organization which was consist of civil and local people assigned to secure the trade and pilgrimage routes in addition to the official army of the Empire. In return of their service they were awarded by exempting from taxes or by land tenure of certain soil (Orhonlu, 1990, p. 13).

Dua Kubbesi: Prayer dome

Düz atkı: large flat stone blocks constitute slab

Düzen ipi: A gridded mesh which consists of tied ropes in order to implant the building measurements on the construction site (Ca'fer Efendi, 2005, p. 111).

Ebced Hesabı: Chronogram. A calculation system which gives the numerical values to the letters of the Arabic script. The letters have always the same value and the addition of several values gives the whole value which is generally the date (Redhouse & Wells, 1880, p. 384).

Ferşiye: Lead Covering

Hamam: Bathhouse

Han: Khan

Harim*:* The mosques' interior space which is for prayer between the entrance and the *mihrab*. This large prayer hall is suitable for the crowd to pray together (Devellioğlu, 2013, s. 381).

Hatıl: tie beams which are laid inside the walls, composed of two parallel rectangular cross sectioned longitudinal continuous timber elements

Havaî terazi: A tool which is used for checking the levelling and horizontality

***Horasan* mortar**: the mortar of which the ingredients are *horasan*, lime, water and sometimes sand (Sönmez N., 1997, p. 49).

Horasan*:* Fragmented terracotta substances such as brick, tile, pipe pieces which are in red color. When it is mixed with the lime, they compose a mortar as strong as the cement mortar (Arseven C. , 2017, p. 75).

İki ucu mühürlü urgan*:* A rope which is made of silk and has 75 *terzi zirai* (75x68cm) length. The unit dimensions are marked with the knots on the rope. It was used for measuring the length (Tanyeli & Tanyeli, 1993, p. 126).

İmaret: Hospice

Iskara/ıskare/ızgara/ızkara: a grillage composed of timber linear elements which uniformly distribute the load carried by foundations to the soil (Arseven C., 2017, p. 27)

Kalfa: assistant architect, superintendent

Kervansaray: Caravanserai

Kılıç: The iron linear element which penetrates vertically into the masonry walls for tying the wall to another component or consolidating the masonry wall.

Köşk: Mansion

Küfeki*:* a type of limestone

Kur: the courses of the minaret staircase's steps

Mahzen: Warehouse

Medrese: Madrasa

Mektep: School

Menzil: A station-house, halting-place; a day's journey, or distance from post-house to post-house; a traveling post; a distance (Redhouse, 1861, p. 815). Place to stay overnight during the journey, mansion; the buildings where the ulaks (messengers, postal service) set up or where they exchange horses or spend the night; the buildings where kervans (company of travelers and horses/camels) set up and spend the night (Pakalın, 1993, p. 479).

Mesaha*:* measuring or surveying the piece of land (Redhouse, 1861, p. 785).

Mescid: Masjid

Mihrab: A niche which indicates the direction of Kıbla and Mecca and therefore of prayer. (Goodwin, 1971, p. 459)

Minber: hooded lectern reached by lofty stairs from which the Friday preach is pronounced

Neccar: Carpenter

Odtaşı (seng-i ateş): a dacitic tuff obtained from quarries in Karamürsel

Püştivan: shorter timber elements nailed perpendicular to longitudinal tie beams

Revzen: windows close the upper-row window openings. These windows composed of gypsum panels having holes with glass insets and.

Şakül/çekül: plumb

Sebû*:* Empty terracotta pots or pipes which were placed in the courses of the domes in order to have an acoustical control (Sönmez N., 1997, p. 97). These terracotta elements were used for sound absorption, load discharge, illumination and ventilation (Çelik, 2009, p. 290).

Sengtıraş: stone master or dresser

***Şeşhane* brick**: specialized hexagonal bricks for floor laying with two standardized dimensions. The dimension between the bigger (*kebir*) one's opposite edges is 46,5cm and for the smaller one this dimension is 37,2cm (Sönmez N., 1997, p. 108).

Şadırvan: ablution fountain

Simit: An iron ring which circles gap top of the impost block

Söve: Window frames

Su Yolları Nazırı: water channel superintendents

Tabhane: special hospice for dervishes and travelers in a complex

Tekke: Dervish Convents

Türbe: Tomb

Vakfiye*:* Endowment deeds establishing and describing the purposes, incomes, administration and trust of a *vakıf* (pious foundation); foundation charter (Devellioğlu, 2013, p.1322).

Voussoirs: the stone blocks which constitute the form of the arch with their shapes as wedge and radiating joints. These blocks are the ones between the springing blocks and the keystone of the arches (Cowan & Smith, 2006, p. 327).

Yan sahın: prayer halls surrounding the central main space in the mosques

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EDUCATION

Degree	Institution	Year of Graduation
Ph.D.	METU Department of Architecture	2017
M.Arch	METU Department of Architecture	2011
B.Arch	METU Department of Architecture	2008
High School	Ankara Atatürk Anatolian High School	2004

WORK EXPERIENCE

Year	Institution / Firm	Enrollment
2009-Present	METU Department of Architecture	Research Assistant
2009	ANB Architecture	Intern Architect
2007	Kazova Construction	Intern Architect
2007	Mesa Housing Industries	Intern Architect
2007	Ardeco-CAG	Intern Architect

PUBLICATIONS

2010 Etyemez, L., Altınöz, G.B., "Urban Archaeology and the Re-constitution of Historical Continuity: The Case of Amasya, Turkey," 15th International Conference on *Cultural Heritage and New Technologies*, Vienna / Austria.

WORKSHOPS

2012	"New Technologies and Land Protection: Survey to Design," organized by the Regional Committee Surveyors and Graduate Surveyors of Puglia, the City of Presicce, the City of Laterza. Summer School 2012 Coordinator and Scientific Director: Pietro Grimaldi, Presicce / Italy.

PROJECTS

2013	Conservation and Restoration Project of Andron A Building in Labraunda Archaeological Site, METU Conservation of Cultural Heritage Program, Ankara / Turkey.
2012	Commagene Nemrut Conservation and Development Programme, developed by METU, Ankara / Turkey.

SCHOLARSHIPS

2011-2017	TÜBİTAK(The Scientific and Technological Research Council of Turkey) National Scholarship Programme for Ph.D Students
2008-2011	TÜBİTAK(The Scientific and Technological Research Council of Turkey) National Scholarship Programme for Master Students

FOREIGN LANGUAGES

Turkish (mother tongue), English (advanced skills), Ottoman (reading skills)