CONSTRUCTION TECHNIQUES OF TRADITIONAL BİRGİ HOUSES

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ABSTRACT

CONSTRUCTION TECHNIQUES OF TRADITIONAL BİRGİ HOUSES

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The aim of this study is to create reliable and comprehensive information, for its potential usage in conservation efforts, regarding the construction techniques of the traditional houses in Birgi, town of Ödemiş, İzmir.

For this purpose, the studies that were carried out about the history and the general characteristics of the house zone were surveyed. The planning and conservation efforts of the settlement, formation, and development have been surveyed throughout the history of the town. According to the gathered information via the literature studies, the informations collected from the site surveys in the regional scale were evaluated and characteristics of the traditional Birgi house were identified. The houses where the construction techniques and their multiplicity can easily be observed were identified and the whole or a part of these houses was documented in various details.

The systems used in the houses and the divergences of these systems were grouped and the same features were surveyed in all houses. This system and the transitions among the systems used in the main houses were classified, drawn in detail, and defined based on the differences and the similarities.

Performed literature and site surveys were evaluated together; the usage frequency of the techniques used in the construction of the houses was recognized.

Keywords: Traditional House Architecture, Construction Technique, Birgi

ÖZ

BİRGİ GELENEKSEL EVLERİNDE KULLANILAN YAPIM TEKNİKLERİ

Diri, Filiz
Yüksek Lisans, Restorasyon, Mimarlık Bölümü
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Bu çalışmanın amacı İzmir ili Ödemiş ilçesine bağlı Birgi Beldesi'nde bulunan geleneksel konutların yapım teknikleriyle ilgili, muhtemel koruma çalışmalarında kullanılmak üzere, güvenilir ve bütüncül veri oluşturmaktır.

Bu amaç doğrultusunda, bölgenin tarihi ve genel özellikleri hakkında yapılmış olan çalışmalar incelenmiştir. Bölgenin tarih içinde yaşamış olduğu süreçler içerisinde yerleşimin oluşumu, gelişimi ve yerleşime yönelik planlama ve koruma çalışmaları araştırılmıştır. Literatür çalışmasından edinilen bilgiler doğrultusunda arazi çalışmalarında bölgesel ölçekte toplanan bilgiler değerlendirilmiş ve geleneksel Birgi konutunun karakteristik özellikleri saptanmıştır. Kullanılan sistemlerin tekniklerini ve zenginliğini okunabilir şekilde taşıyan yapılar belirlenmiş, bu yapıların bütünü ya da bir bölümü, değişen detaylarda belgelenmiştir.

Evleri oluşturan sistemler ve sistemlerin değişiklik gösterdiği noktalar gruplanmış ve bütün yapılarda aynı noktalar incelenmiştir. Ana yapılarda kullanılan bu sistem ve sistemler arası geçişler, farklılıkları ve benzerlikleri doğrultusunda gruplanarak, detaylı çizim ve tanımları yapılmıştır.

Yapılan literatür ve arazi araştırmaları birlikte değerlendirilmiş, evlerin inşasında kullanılan teknikler, kullanım sıklıkları saptanmıştır.

Anahtar kelimeler: Geleneksel Konut Mimarisi, Yapım Tekniği, Birgi

To my family…

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INTRODUCTION

1.1. PROBLEM DEFINITION

The first studies regarding the denomination and qualification of houses that are called "Turkish House" (Arseven,1928, Eldem,1944 Küçükerman, 1973, Bektaş, 2001), "Ottoman House" (Arel, 1982, Eldem, 1984), "Turkish Civil Architecture" (Aksoy, 1963), "Anatolian Vernacular House" (Sözen, Eruzun, 1996), "Turkish *Hayat* House" (Kuban, 1995), "Traditional Dwelling in Anatolia" (Asatekin, 1994) by different scholars, first start in 1920s.

According to Şahin Güçhan (1995, 2007), typological studies related to the Ottoman houses can be divided into three main groups, which are 1) studies focusing on plan scheme and space characteristics of houses (Eldem, 1954; Kuban, 1982; Küçükerman, 1973, 1991; Asatekin, 2005), 2) studies focusing on the regions, which the houses are located in, and the regional features (Aksoy, 1963; Kuban, 1966; Tanyeli, Kazmaoğlu, 1979; Eriç, 1979), and 3) focusing on the historical development of these houses and their interaction with different cultures (Arel, 1982; Cerasi, 1998, 2001; Tanyeli, 1996).

The traditional Ottoman house that have been survived since 15th century refers to a construction type whose main framework was set depending on the user's everyday life and affected by all the cultures existing in Anatolia and its neighborhoods. Traditional Ottoman house started to spread in the 17^{th} and 18^{th} centuries rapidly (Uluengin, 2000: 78) and to differentiate before the 19^{th} century (Arel, 1982: 34).

Especially in the big cities (İstanbul, Edirne, Bursa etc.), the large houses, belonging to wealthy users, have richer characteristics in comparison to those of the ordinary ones. On the other hand, the small-scaled houses or village houses are the result of the dominant economic factors and local traditions. The general characteristics of the traditional Ottoman house are represented best neither by large-scaled houses, nor by small-scaled ones, but by those, which may be called as modest-scaled houses[1]. In spite of the varieties caused by the regional differences, some main physical and social principles, such as the relationship between the closed and open places, can be observed in all houses. The Ottoman housing tradition influenced the western regions of Anatolia, Thrace, Bulgaria, Macedonia, Epirus, Thessaly, Albania, Bosnia-Herzegovina, the big Siberian cities, and the coastal and the southern cities of Romania (Cerasi, 2001: 24-25, 39). Even though some differences based on region, climate, topography, accessible materials and temporal variations exist, some characteristics related to the main construction style of these houses have been remained unchanged (Eldem, 1954: 11-12).

Traditional Ottoman houses have generally three floors and a garden, and the ratio of openings to the total facade surface in the ground floor and upper floor(s), construction materials, and planning are normally different from each other

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[1] According to Arel (1982: 80-81):

" Three main opposing development approaches can be idenitied in Ottoman period:"

-In the village houses, symbolizing a primitive consistency to the environment, in architechtural ambiant model, which is ongoing since the oldest perods of Anatolia is observed. The main reason for the permanenecy of this model is that in these settlements the living styles and economical relations have rarely chaged and therefore the house types taken from a previous cultural stratum can meet the necessities.

-In big cities and capitals, the architecture includes certain design schemes that have been institutionalized in housing sector. These schemes are consistently protected inspite of the variations in styles and advancement in constructions due to their symbolized content. The cultural contents are lost in time and yet they are still used as as models of space hierarchy. Thus, it is observed that these schemes change hands in altering society conditions and are synthesized by rising social classes.

- In the environments remaining between these two extremes of social stratification, local traditions are used not as they are, but by adapting them according to the cultural requirements of Ottoman period, even though traditional construction features are intrinsic to the cultural schemes. Cultural schemes, on the other hand, are applied as adapted to local conditions and within the their limit these housing types which are the genuine production of Ottoman combination are the representatives of the house category called as "Turkish House".

(Kazmaoğlu, Tanyeli, 1979: 31-33). The Ottoman traditional houses are generally surrounded with high coutyard walls. The ground floor is generally covered using compressed earth or stone (Eldem, 1984: 16). The ground floor is mostly composed of service spaces, such as barn, straw deposit area, depot and toilet, which are indirectly related to the housing necessities of the building (Ödekan, 1995: 420). The ground floor, formed according to the terrain shape, is more massive and closed to the exterior to provide privacy.

In some of the houses, a mezzanine is found as well, which comprises rooms used in winter or janitor rooms and does not cover the whole ground area of the building (Arel, 1982: 34). In the upper floor(s), different living units (the rooms) are used for different functions in different hours of the day and the top floor (in the houses having more than two floors) have a geometric plan scheme and display "certain spatial relation types" (Arel, 1982: 34). The upper floor façade facing the street generally sticks out from the ground floor plan by means of the projections supported by lintels or braces. On the courtyard façade, on the other hand, the projection exceeds the ground floor level towards the courtyard or garden, by timber posts (Arel, 1982: 35). The upper floor on top of the stone or adobe masonry ground floor walls has timber frame walls with infill. The areas between the load bearing timber posts and braces are filled using different infill materials (stone, brick, adobe) that may vary from region to region or these areas are left as they are and covered at both sides by timber laths or reed (Uluengin, 2000: 204). In these floors, certain modules are used based on the plan configuration and timber structure (Uluengin, 2000: 204).

Traditional houses are constructed according to their local constraints and availability of resources. In course of time, knowledge-based solutions that are unique to the locality were produced and transmitted from generation to generation, with experience. In this context, the traditional houses present important local and unique features, which are subjected to conservation. In Turkey, studies having a certain level of construction details of traditional Ottoman houses are not given sufficient importance. Yet, in order to conserve the physical integrity of a historic house, subjected to conservation, all interventions that may affect the load bearing

systems and architectural characteristics of the house should be evaluated after examining the original system to ensure the compatibility.

The construction techniques used in different settlements were searched within the limits of master of PhD dissertations carried out by a number of researchers. There have been found a significant number of qualified and efficient documents also on Birgi, where a lot of planning and conservation efforts have been made since the 1940s. However, there are no comprehensive and detailed documents about the traditional construction techniques.

This thesis aims to fill this gap, regarding the definition of the original construction techniques of traditional houses that can be used in conservation studies and to provide a basis for future studies to be carried out in neighboring settlements where similar construction techniques exist. Within this framework, Birgi, which is one of the best preserved historical settlements in Turkey, was selected as study case and the original construction techniques of Birgi traditional houses were tried to be defined (for further information on the selection criteria for Birgi and the houses chosen to study in detail, see 1.3. Methodology, pp. 6-8).

1.2 AIM AND SCOPE OF THE STUDY

In the restoration and conservation work of buildings; primarily, the place and the components belonging to the physical integrity of the studied object should be properly analyzed. Within this framework, the aim of this study is to create reliable and comprehensive information, regarding the construction techniques of the traditional houses in Birgi town of Ödemiş, İzmir, in order to serve in future conservation interventions.

For this aim, the general characteristics and the historical development of the Ottoman / Turkish / Anatolian House and Birgi Settlement in general were studied via literature and site surveys. These studies focus on Birgi settlement apart from its

villages and on the traditional Birgi houses. The main study area covers almost the whole settlement of Birgi. In this settlement, the zones that have different street patterns, different traditional housing density, and different functions were selected. In the zones where the traditional houses form the majority of existing structures, general façade characteristics of buildings were surveyed based on the readibility of the original architectural features, construction techniques and used materials.

The traditional houses in Birgi are grouped into four, according to the information gathered from the literature, their general façade configurations, façade components and their qualitative and quantitative characteristics. The houses, belonging to the fourth group, were built by the help of construction masons coming from the neighboring regions to provide the big-scaled construction demand emerged after the fire in 1922. These houses have the general characteristics of the regions in the close vicinity of Birgi (for further information, see Chapter 2.4, pp. 73). The houses belonging to this group were excluded from the scope of this study, since they do not reflect the characteristics of traditional Birgi houses.

The first three groups are dated to earlier periods and have similar characteristics (for further information, see Chapter 2.4, pp. 71-72). These houses are the focus of this study. The oldests of the surviving examples of these houses are dated back to 18th century. The houses demonstrating the most representative characteristics of these groups and those having readable construction techniques were examined in detail, considering their load bearing systems, as well as plan and façade elements (for further information on the selection criteria for the houses chosen to study in detail, see 1.3. Methodology, pp. 7-8. In total, 32 houses, 9 of which are from 1st group, 11 of which are from 2nd group and 12 of which are from 3rd group as well as 4 ruins were surveyed. Observations were documented by means of photographs, drawings, and in written forms whenever necessary. Information regarding the construction techniques of traditional Birgi houses was gathered within a certain system, defined and evaluated (for further information, see 1.3. Methodology, pp. 7-10).

Within the framework of the experience gained at the end of this study, information that should be used and produced in future studies regarding the construction techniques of traditional houses were obtained.

1.3. METHODOLOGY

Traditional settlement pattern and the traditional houses in the settlement of the historical Birgi have survived with little changes in general. Since there have been no big changes in daily life styles of the users, the houses continued to be used without requiring much modification. Additionally, the absence of abrupt fluctuations in the economic status of the users has helped the houses to survive without much change. As Birgi is not easily accessible by intercity transportation, it has not been in public eye and has not been exposed to the destructive effects of tourism as occurred in many traditional settlement areas. Thanks to the ongoing conservation studies since 1940s and the respect given by the local people to the settlement and its history, Birgi is the one of the most conserved settlement in Turkey. Many conservation studies have been carried out and continue in these days on the traditional tissue, monuments, and constructions in Birgi. However, even though most of these studies provide favor for the conservation of the settlement, improper interventions damage the houses due to the wrong decisions or lack of detailed and sufficient research.

There are a lot of studies and documents about Birgi and Küçük Menderes Basin. Yet, there is not sufficiently detailed study considering the construction techniques of the traditional houses. For this reason, the historic settlement of Birgi was selected as study case.

Seven main steps were followed in this study. These are: 1) collecting and analyzing the written and visual materials in the relevant literature, 2) pre-site survey, 3) site survey, 4) documentation, 5) analysis, 6) evaluation, and 7) conclusion steps.

In the first step, the written and visual materials related with Ottoman / Turkish / Anatolian House and Birgi Settlement in general, and also those focusing on traditional houses in Western Anatolia, especially Birgi houses, were collected and examined. This literature survey concentrated on the following topics:

A) Documents and thesis studies that are related to
    i) Ottoman/Turkish/Anatolian Houses
    ii) Geographical, historic and architectural features of the Küçük Menderes basin and Birgi settlement
    iii) Traditional houses in Western Anatolia and especially Birgi houses
B) Reports and documents related with planning and conservation history of Birgi
C) Regional Conservation Committee decisions on Birgi Settlement
D) Cadastral maps
E) Research sheets/maps/illustrations prepared in different times

The information obtained at the end of the literature survey was used throughout the study whenever necessary. General information related to Ottoman Houses were presented in Chapter 1, and those related to Birgi settlement, traditional West Anatolian houses, and traditional Birgi houses were presented in Chapter 2. Following literature survey and its assessment, a two staged site survey was planned. Then, the area to study in the pre-site survey was determined roughly based on the literature analysis.

In the second step, the pre-site survey was conducted in Birgi, between 18.07.2009 and 26.07.2009. In this study, first, maps and drawings were checked, and then the accuracy of the information gathered from the written materials was controlled. Central Birgi settlement and its neighboring were documented by means of photographs. The primary aim of this pre-survey was to understand the general features of Birgi (see Fig. 6-7, 9) and defining the zones, which still preserve their traditional architectural characteristics (see Fig. 8). In addition, the traditional Birgi houses were tried to be dated based on their architectural qualities formerly defined

in literature. The differentiations that are seen in traditional Ottoman houses are also observed in traditional Birgi houses. Birgi houses are classified into four groups based on the similarities and the differences observed in mass and façade elements. Locations of different types of traditional houses are defined (see Fig. 36). The results of these observations are presented in Chapter 2.

The 4th group houses are excluded from the scope of this study, and only the first three group houses were included in this thesis work, for the aim of defining the construction techniques used in the traditional Birgi houses. The houses to be studied in detail were selected on the basis of certain characteristics related to original construction techniques and its variations. The houses selected according to the criteria that were determined in the pre-site survey are as the followings:

- Houses representing different types previously determined for traditional Birgi houses.
- Houses originally designed as dwelling and still used for this function. Empty houses that have also been used as a dwelling for a long time.
- Houses where the original construction techniques are readable.
- Houses keeping their original features, which have not been subjected to any restoration and / or significant repair.
- Houses not having subjected to partial cancellations and/or additions, which may affect the physical integrity and / or prevent the visibility of the original features.

The extent of the information that would be collected from the houses to be studied in detail, and the system of information collection were decided in this step.

In the third step, the site survey was conducted, between 01.08.2009 and 23.08.2009. The primary aim of this survey is to understand how Birgi houses were built and defining the construction techniques used. Utmost attention was paid in order to select more or less the same number of examples from the different groups of houses within the limits of the selection criteria. Unfortunately, the numbers of selected

houses could not be the same for each group because a) some houses are not accommodated, b) construction techniques are not always readable, and c) some residents did not give permission for survey. A system for survey was defined. According to this, from foundation up to the roof, where system section changes, all details would be documented by the use of photographs, sketch drawings, measurements, and written observations. The ruins were important to unit-based detailing, whereas the houses keeping their physical integrity are crucial for especially the integral functioning of the units. 32 houses and 4 ruins (see App. A) were determined to study and documented in detail. The remains of the collapsed houses were also desired to be included in the study, particularly to observe the construction techniques of the foundation, but no examples appropriate to this aim could be observed.

During site survey, the local masons that are known to have worked in Birgi, using traditional techniques, and the tools they use in construction stage were sought. However, the local masons do not live any longer and the construction tools could not be reached.

In the fourth step, the drawings prepared in the site survey were drawn in AutoCAD in a systematic manner including site plan, all plan levels, schematic structural system drawings, and system sections having all necessary details (see Fig. 1). 18 of the houses, studied in detail, where different details are observed, were drawn using this system (see App. B-C).

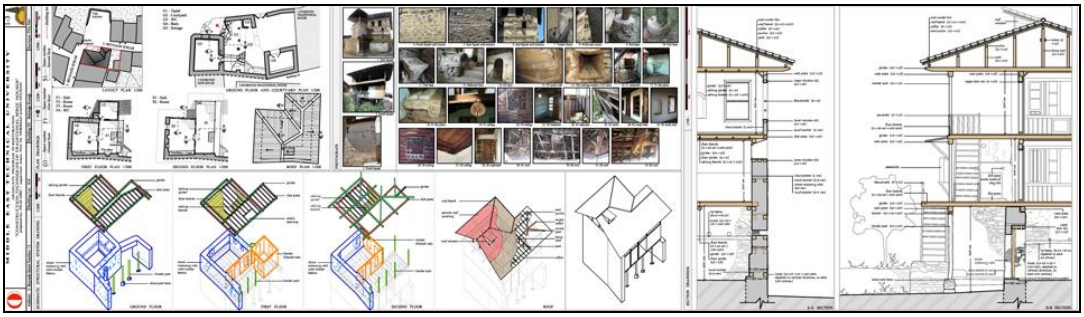

Figure 1, Design of the documentation system.

In the fifth step, different load bearing and architectural elements were put together and grouped based on their different features (for further information, see App. C, see Chapter 3). These variations are defined according to the construction techniques, used materials, forms, and finishings. The components and working principles of each element were defined. The results of this step were presented in Chapter 3.

In the sixth step, information collected throughout these documentations was tabulated in a systematic manner to see typical and unique construction details used in traditional Birgi houses (see Fig. 182). By using the results obtained from the table, construction details of traditional Birgi houses are defined starting from foundation up to roof considering each condition. These results are the most important contribution of this thesis, which aims to create reliable and comprehensive information in order to be used in future conservation interventions, regarding the construction techniques of the traditional houses in Birgi. Together with the results of the table, the information gathered from literature survey was evaluated and compared as well. The results of this step were presented in Chapter 4.

In the last step, where main conclusions obtained at the end of this study were drawn, the importance of the studies about the construction techniques used in historical houses was underlined and an evaluation regarding the methods that should be used in such studies was made within the limits of the experience gained in this study. The necessity of information resources, used or could not be used in this thesis, as well as their apparent or potential contribution to similar studies were evaluated. The results of this step were presented in Chapter 5.

CHAPTER 2

HISTORY OF BİRGİ AND THE CHARACTERISTICS OF BİRGİ TRADITIONAL OTTOMAN HOUSES

2.1. GENERAL FEATURES OF BİRGİ

2.1.1. GEOGRAPHICAL FEATURES

Birgi is located in West Anatolia, at the Küçük Menderes Basin, which is situated between Bozdağlar and Aydın Mountains, and is a town of Ödemiş commune and İzmir province (see Fig. 2).

Figure 2, Location of İzmir in Turkey Map" ("Map of Turkish Cities and Communes" was used as template taken from www.haritalar.web.tr - last visit June 2009)

Birgi has the geometrical coordinates of 38 23' 89'' northern latitude and 26 06' 82'' longitudes. Bozdağlar Mountains and Salihli Commune of Manisa Province are located at the north, Kiraz Commune of İzmir Province at the east and Ödemiş Commune of İzmir Province at the southeast of Birgi. It is situated 51 km away from Salihli, 9 km to Ödemiş, and 41 km to Tire. Birgi is connected to İzmir and Adnan Menderes Airport in İzmir with an asphalt road, which are 120 and 90 km away, respectively. Due to the new roads contstructed after 1970's, Birgi is no longer a passageway for the region (Sarıkaya, 1968: 23). Birgi gets access to regional centers over Ödemiş. Touristic centers of Selçuk, Efes and Kusadasi are located in its close vicinity

Birgi is situated at 356 m. above sea level. It is settled at the skirts of Bozdağlar, which is located at the north of Birgi and whose peak is 2195 m high, and at the transition zone between these mountains and the bottom land, where Küçük Menderes River flows[2] (see Fig. 3).

The rough terrain, on which Birgi is situated, has been beneficial for centuries from security point of view, by acting as a natural fortress. The area where the settlement has grown is the alluvial cone (see Fig. 4), formed by Birgi River at the skirts of Bozdağ Mountain[3] (Vardar, 2005: 83).

[2] As Eruzun (2000: 19) mentions, Birgi has not been settled at the slopes of Bozdağ Mountain as other settlements in Küçük Menderes Basin have since these areas are intensely wooded with chestnuts, walnuts etc., but at the mountain skirts, which is the transition area of the region.

[3] Rivers, flowing down from the slopes, gather alluvial deposits they eroded at the skirts where the slope decreases. These deposits in the form of semi-cones are called alluvial cones. These alluvial cones may then be transformed into agricultural areas. (http://www.cografya.gen.tr - last visit April 2009).

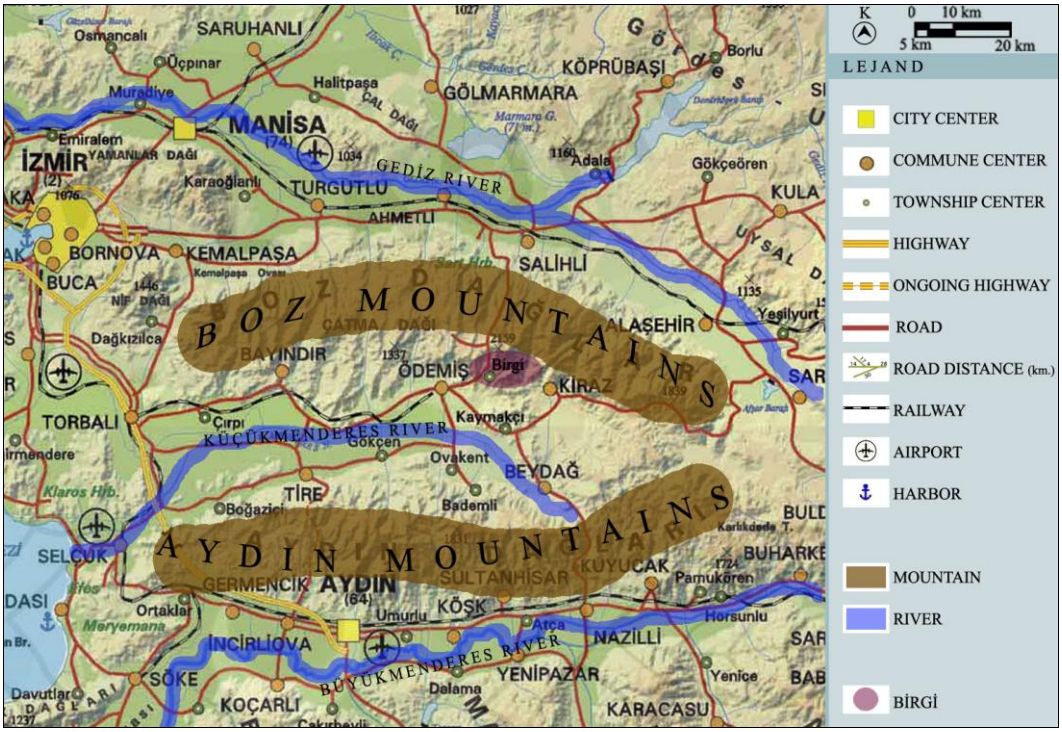

Figure 3, "Physical Map of Birgi and its close Vicinity" formed by using as template "Physical Map of Turkey" which was prepared by General Command of Mapping (www.kgm.gov.tr – last visit June 2009)

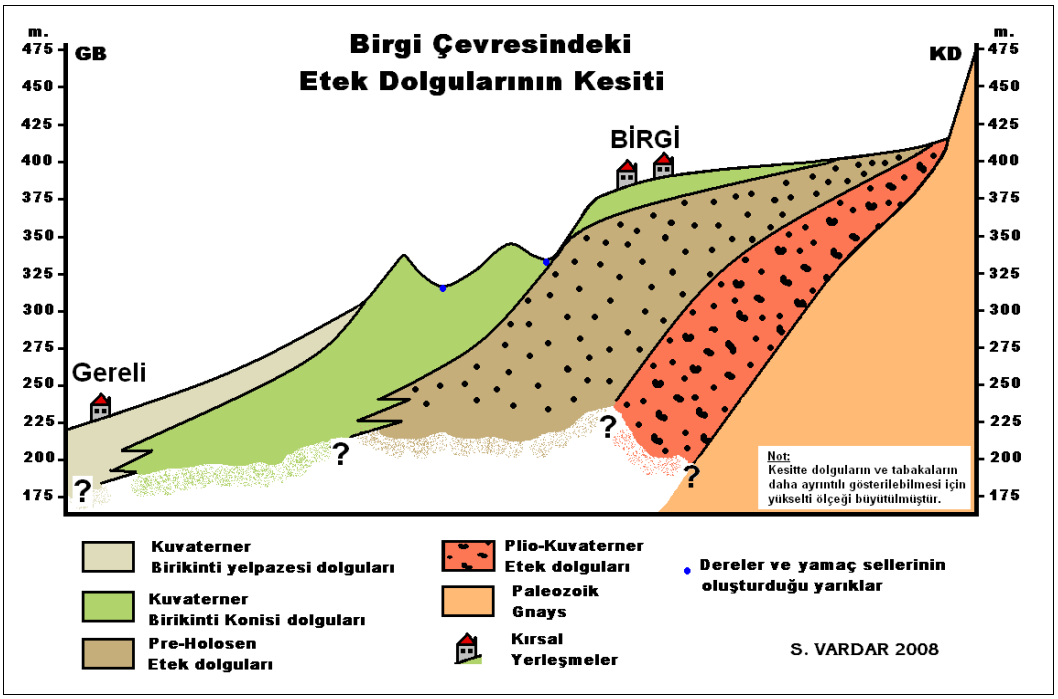

Figure 4, Section of the infills at the skirts around Birgi (Vardar, 2008)

According to the "Ödemiş – Birgi Development Eligibility Status Report and Report for Local Commissionary of Public Works Including Information Serving as Basis for Future Master Plan"[4], the settled area belongs to quaternary period, rocks are generally hard and limeless, and schist, mica and slate layers are typically present (Altınoluk, 2007: 172).

Birgi River formed by spring water coming from Bozdağlar Mountains flows in north-southwest direction and reaches to Küçük Menderes River by splitting the settlement from one end to the other. The most important water source of Birgi is Birgi River (see Fig. 5). All houses located at the center of Birgi Commune are provided with drinking water. The flow rate of Birgi River increases during winter and springs, while during summers the river capacity decreases due to temperature and increased agricultural activities. The river sometimes completely dries up. For the aim of preventing the river to spill over in certain periods of time, Birgi River was reclaimed by Municipality of Birgi and State Hydraulic Works.

Sasalı River, which is currently dried up completely, is located at the south of Birgi River (see Fig. 5).

[4] Since the mentioned report could not be found, the book entitled "Traditional Urban Tissue: Birgi" of Altınoluk (published in 2008), where the report is explained at pages 171-180, was used.

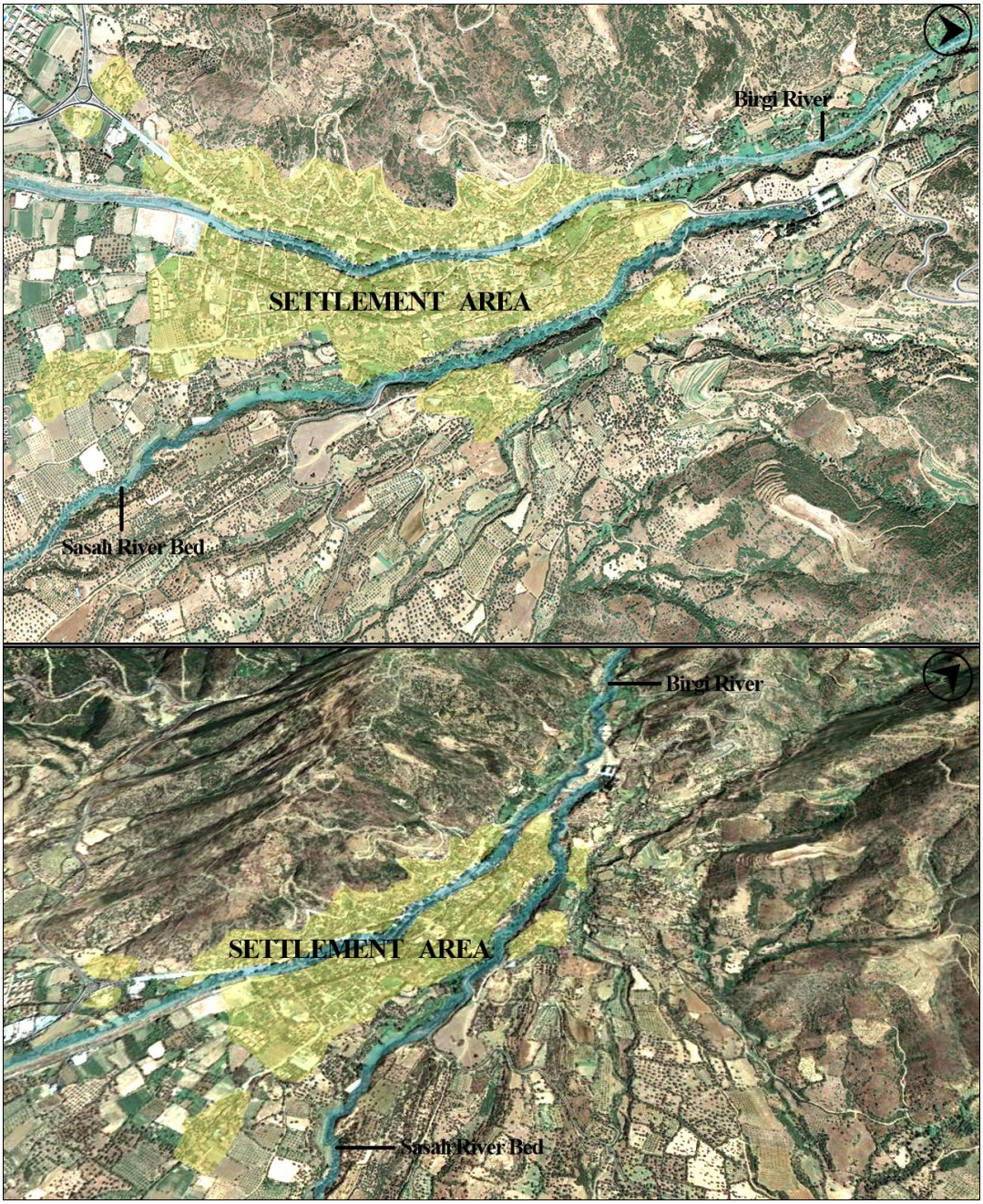

Figure 5, Geographical Position of Birgi (Google Earth).

Mediterranean climate is prevailing in Birgi. Birgi, which is located at 38 degrees north latitude, is influenced by westerlies, prevailing between 30 and 40 degrees latitudes (Çınar, 1990: 11). The climate is hot and arid in summers, and warm and rainy in winters. According to the 1975-2006 records of General Directory of Meteorology, the average temperature value is 17.8 degrees centigrate. The lowest temperature record is 5.9°, and the coldest months are January and February, while the highest temperature record is 33° and the hottest months are July and August.[5]

In the region, where the plant communities involved in the Eastern Mediterranean flora family (Holaktis Flora), maquis shrublands and especially olive, which has economic value too, are common. There are mostly coniferous trees along Birgi River and at the skirts of Bozdağ Mountain, while in Birgi there are plane trees, redwoods, bay trees and fruit trees as well in addition to coniferous trees.

2.1.2. SETTLEMENT PATTERN

Birgi Commune is composed of 9 villages apart from the center, which are Bucak, Cevizalanı, Elmabağı, Hacıhasan, Kemerköy, Kışlaköy, Kutlubeyler, Ovacık, Üçkonak and Yılanlı. The central settlement area of Birgi comprises of three main zones, separated from each other by Birgi and Sasali Rivers. The settlement is composed of four quarters, which are Kurtgazi Quarter at the western part of Birgi River, and Camikebir, Cumhuriyet and Gazi Umurbey Quarters at the eastern part of Birgi, extending along in the northeast-southwest direction. At the south of the currently dried up Sasalı River, on the other hand, there are Sasalı and Taspazari areas (see Fig. 6).

[5] The lowest and highest temperature records, amount of precipitation, relative humidity, soil temperature, ground surface temperature and insolation data can be found from the measurement records of General Directorate of Meteorology taken at the station of Odemis and from the website of General Directorate of Meteorology Meteoroloji due to the Ministry of Environment and Forestry of Republic of Turkey.

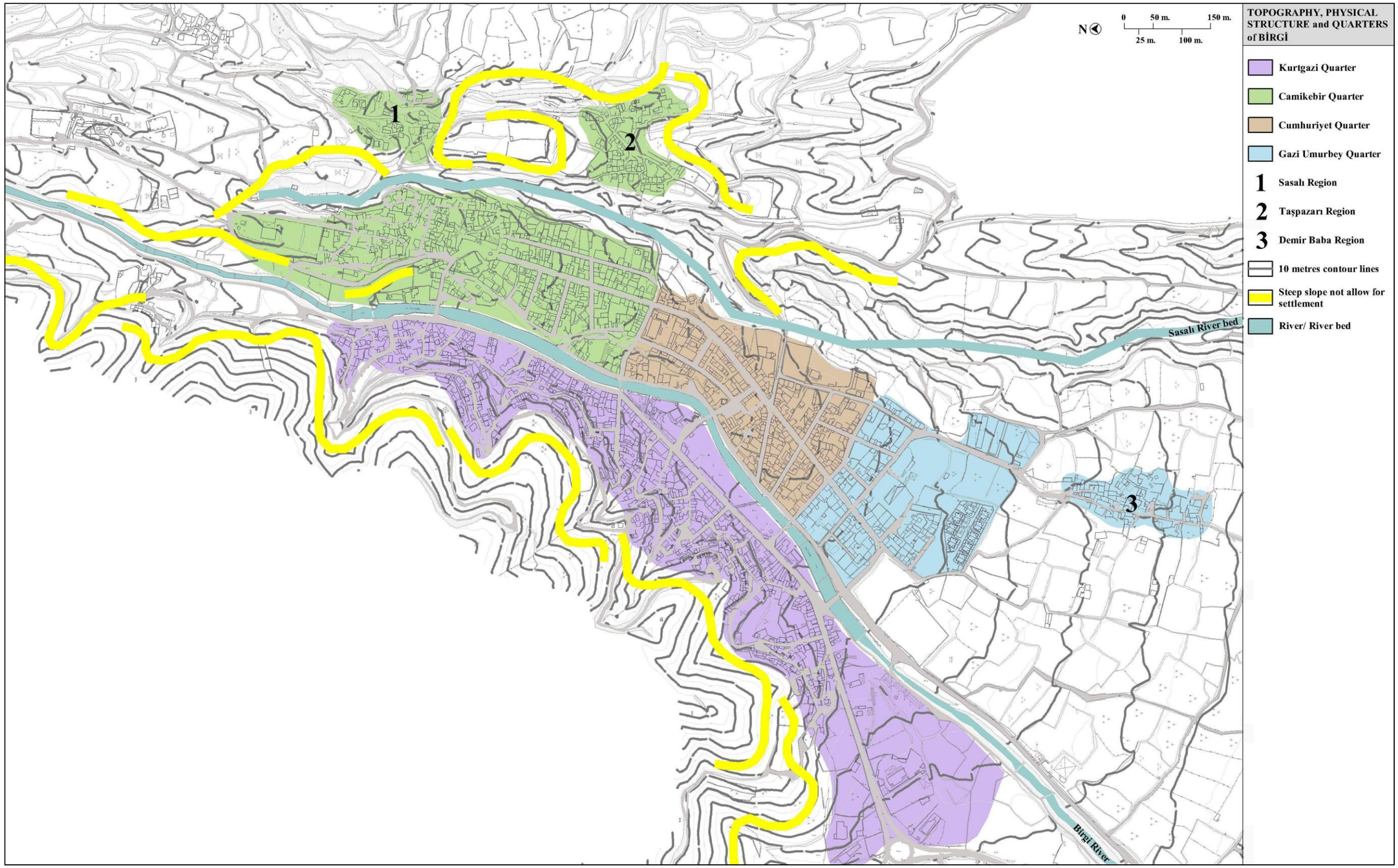

Figure 6, Topography, geographical structure and central quarters of Birgi

The settlement areas, found at the west and east of Birgi River, rise towards northeast and north directions, respectively, with an slope changing between 5% and 20%. The terrain is limited at both ends by means of the slopes till 50%. Birgi and Sasalı Rivers running along northeast-southwest direction divides the settlement area into three main parts. The urban tissue of Birgi is found to a large extent found between Birgi and Sasalı Rivers. Other settlement areas are located at the west of Birgi River and east of Sasalı River (see Fig. 7)

Sasalı River located at the east of Birgi River is also called Tabakhane River due to the tanning yards that were around it during Ottoman Period. The stream bed of Sasalı River separates Sasalı and Taspazari areas connected to Camikebir Quarter from the settlements at the west of the river. At both settlement areas, the slope gets larger towards north. The slope, where Sasalı and Taspazari areas extend, is rougher than western parts. The urban tissue in these areas is in the form of small sections.

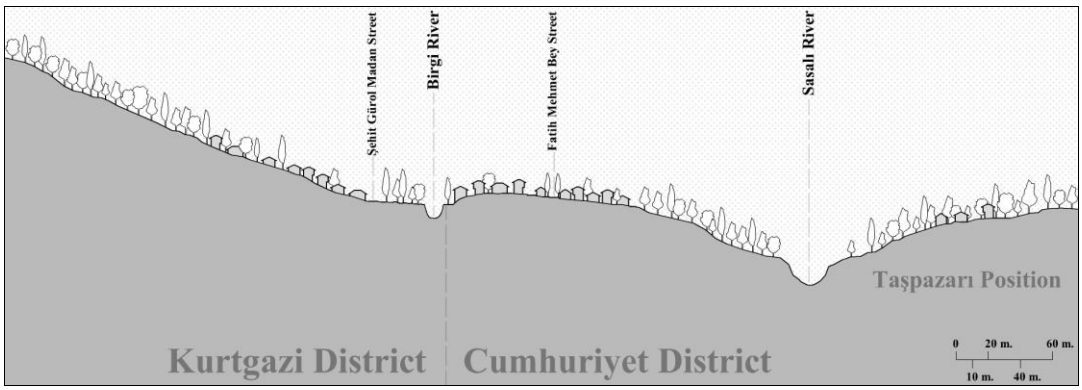

Figure 7, Transverse section in the east-west direction showing the terrain slope of Birgi center.

There are two different street pattern in Birgi settlement (see Fig. 8). The former of these is organic street pattern. Although these areas have been partially damaged by a variety of factors, the integrity of the tissue has been conserved till today. The latter, on the other hand, is the grid-iron street pattern, which were extensively damaged after 1922 fire and 1939 river flooding, and re-opened to habitation with 1947 Birgi Master Plan. The number of historical buildings in these areas is not so many to form

a tissue (see Fig. 8).

The two main road axes of the settlement are Fatih Mehmet Bey and Şehit Gürol Madan Streets, extending in the northeast-southwest direction. The vehicular and pedestrian streets have been mostly formed in accordance with the topography. Only the southern half of Cumhuriyet Quarter and the streets at the Gazi Umurbey Quarter, except for Demir Baba area, have a grid-iron order. Especially the streets at the Kurtgazi Quarter, the northern half of Cumhuriyet Quarter , Sasalı Region, Taspazarı Region and a part of the streets located at the Demir Baba Region are not suitable for traffic due to the slope and/or width of the passageway.

The street pavements in Birgi settlement differ from each other. While the traditional pavement, which is slate and river boulders, can be commonly observed at the Sasalı, Taspazari and Demir Baba Areas, it is used on several streets alone partially at the rest of the central settlement area. Transversely placed slate and parquet stone covering can be seen at the areas which were repaired. Asphalt and concrete are observed at the other parts. In the areas, where house tissue become sparse, and at the side roads surrounding the settlement area, earth paths are found.

Three sub-centers can be said to exist in Birgi Commune. The first of these is the commercial center located at the Fatih Mehmet Bey Street and at the southern half of Cumhuriyet Quarter. In this area, there is a traditional bazaar (*arasta*) and shops around it. Cumhuriyet Square, surrounded by the commercial buildings and the library, which is not currently in use, coffeehouses and ÇEKÜL House, is also a nodal point. The roads extending from Fatih Mehmet Bey Street to the two silk weaving workplaces, only one of which is currently functioning, to the health center, post office and Demirli Shop intersect each other at Cumhuriyet Square. The former abattoir area of the settlement is now the host of restaurants, feedlots, poultry farms and a small amount of other commercial activities, spread dispersedly out of the commercial center (see Fig. 9).

The second of these sub-centers is the administrative center located at the north half of Cumhuriyet Quarter and the west of Mehmet Bey Caddesi extending from Aydınoğlu Square to Cumhuriyet Quarter at the southeast. The primary school, municipality, sheltering house, guesthouse, wedding hall and Agricultural Credit Cooperative (*Tarım-Kredi Kooparatifi*) are found in this sub-center. Gendarmeria building is located on the same axis, at the west of Birgi River (see Fig. 9).

The third sub-center, on the other hand, is Aydınoğlu Square surrounded by a variety of historical buildings and coffee houses. This square is a touristic center. The Aydınoğlu Square located at the geometrical center of Cumhuriyet Quarter is at the same time a nodal point. Aydınoğlu Mehmet Bey Mosque, which is the most important of the touristic values of the settlement is located in this square. The Aydınoğlu Square is the starting point of all touristic tours organized for Birgi. The square is located at the intersection point of the roads from Aydınoğlu Mehmet Bey Mosque to tomb of İmam-ı Birgivi, Çakırağa Mansion and Cinaralti Pension, which is the only pension of Birgi (see Fig. 9).

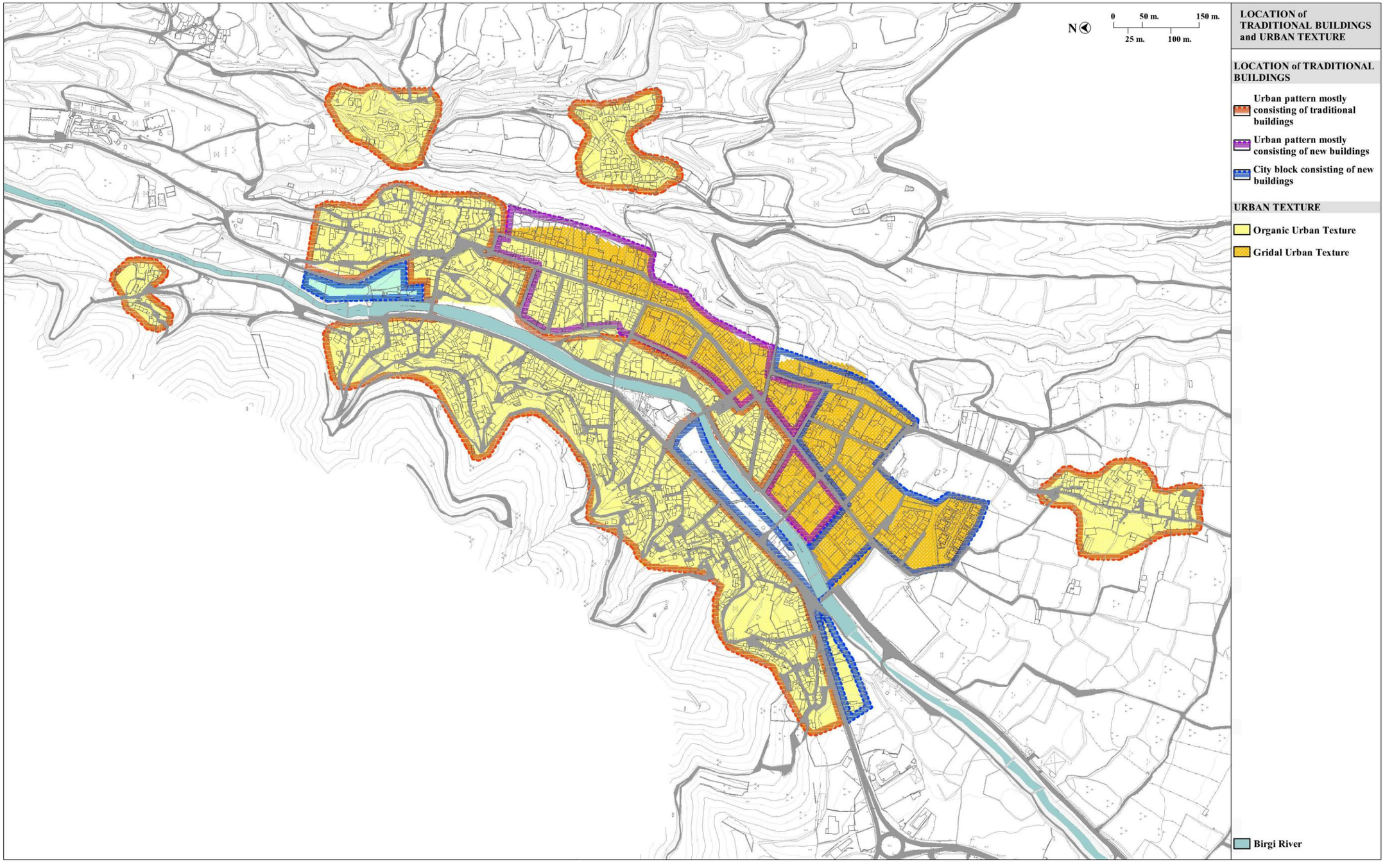

Figure 8, Location of traditional buildings and urban texture

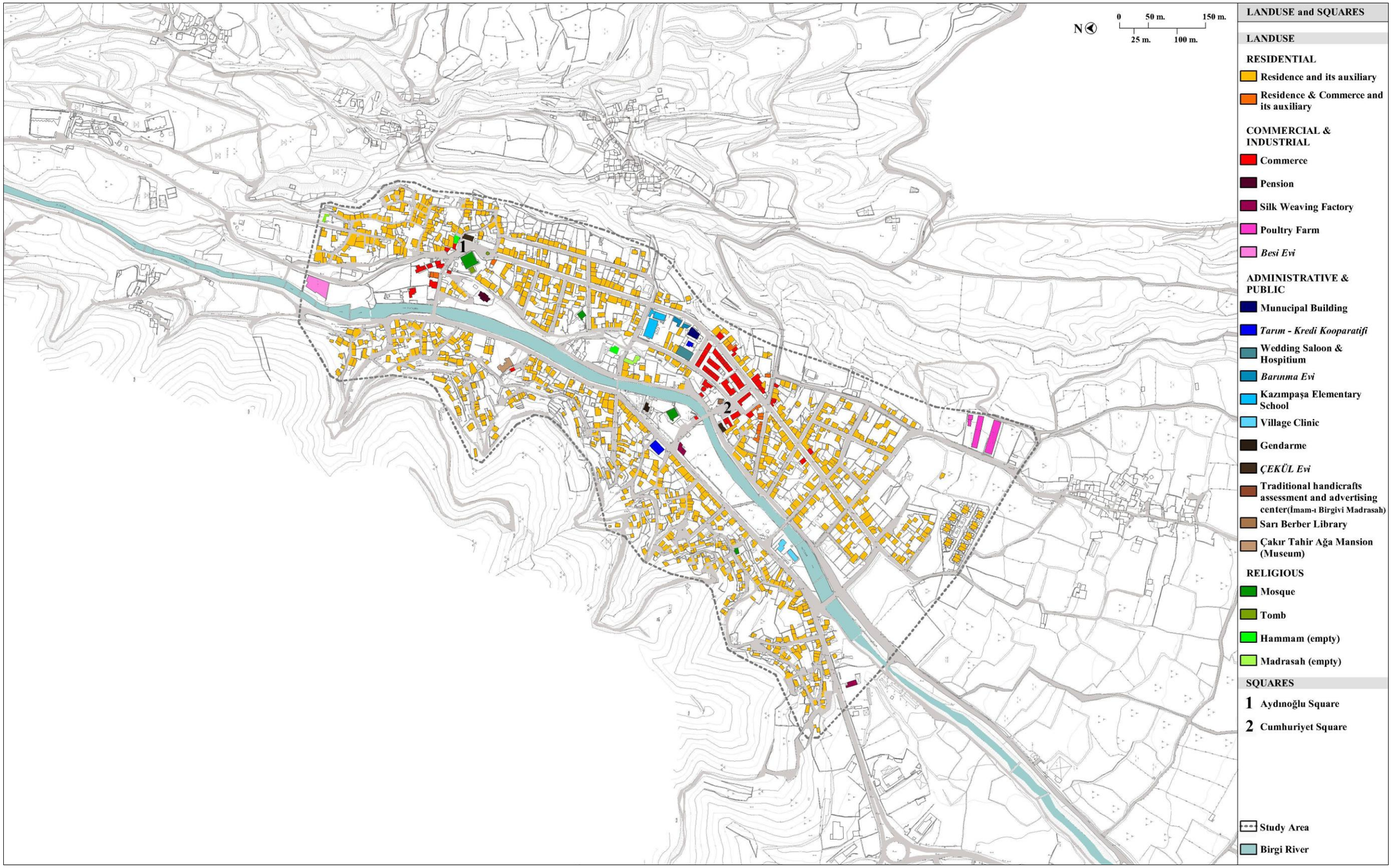

Figure 9, Landuse and squares

2.1.3. SOCIAL, DEMOGRAPHICAL AND ECONOMICAL STRUCTURE

According to the Republic of Turkey Prime Ministry Institute of Statistics (Türkiye İstatistik Kurumu) records, the population of Birgi center was 4406 in 1990 and 2661 in 1997. Therefore, between these two population censuses, there is a decrease of 39.6%. Among the reasons for this decrease, the trend of migration and having fewer children among families due to economical problems, young people leaving Birgi for studying in cities and not turning back because of the scarcity of work opportunities can be listed. (Yavuz, 2005: 17). According to the Republic of Turkey Prime Ministry Institute of Statistics records, the population of the center of Birgi between 2000 and 2009 is as follows:

Table 1, Census results of Birgi Commune central settlement (http://tuikapp.tuik.gov.tr – last visit May 2010)

	Male	Female	Total
2000	1425	1413	2838
2004	1251	1300	2551
2007	1380	1355	2735
2008	1277	1345	2622
2009	1265	1336	2601

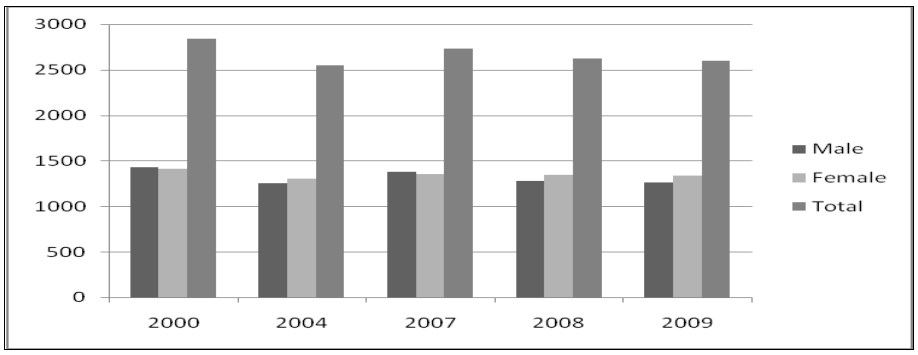

Figure 10, Census results of Birgi Commune central settlement (http://tuikapp.tuik.gov.tr)

During the period from 2000 to 2009, a total decrease of 237 occurred, and only during the period between 2004 and 2007, an increase happened in Birgi population (see Fig 10).

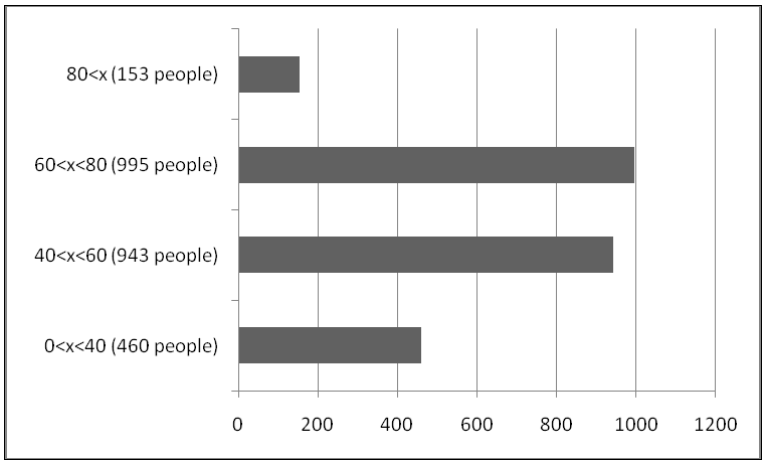

Figure 11, Distribution of population by age intervals (Municipality of Birgi 2004 data)

According to the 2004 data of the Municipality of Birgi, while the total population is 2551, 18% of it (460 people) is under 40, 37% (943 people) is between 40 and 60 and 45% (1148) is above 60 (see Fig 11).

Birgi was decided to be a municipality in 1887. The municipality was founded in 1889. In addition, a post office opened in the former community center building with the town council decision dated 14.4.1954 and a gendarmerie station, founded in 1915, are present. In 1960's, there was an office of general register, as mentioned by Gül (1960: 5). "The Limited Cooperative for the Development of Birgi and its Villages" aiming to assess the local agricultural products and resolving the irrigation problems was founded in 1997.

"Society for the Protection, Repair and Sustenance of Aydınoğlu Mehmet Bey Mosque and Historical Religious Buildings" which aim at contributing to the repair and maintenance of historical and religious buildings financially, and "Birgi

Research Center" of Çekül Foundation, which started to work in 2003 are the non-governmental organizations found in Birgi.

Health center has been giving service since 1985. However, according to the 2004 data of the Municipality of Birgi, the social security is still a common issue in Birgi (see Fig 12).

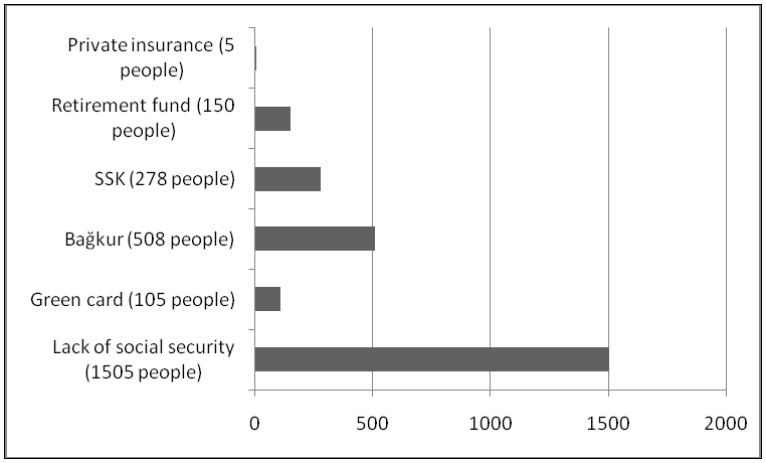

Figure 12, Distribution of population by social security condition (Municipality of Birgi 2004 data)

59% of the population (1505 people) not having social security at all is a problem to consider for Birgi, where elderly people compose the majority of the total population (45% of the population is above 60).

There are Birgi Kazım Paşa Primary School and Uğur Mumcu Public Library opened in 1993 by the Ministry of Culture which are currently not in use.

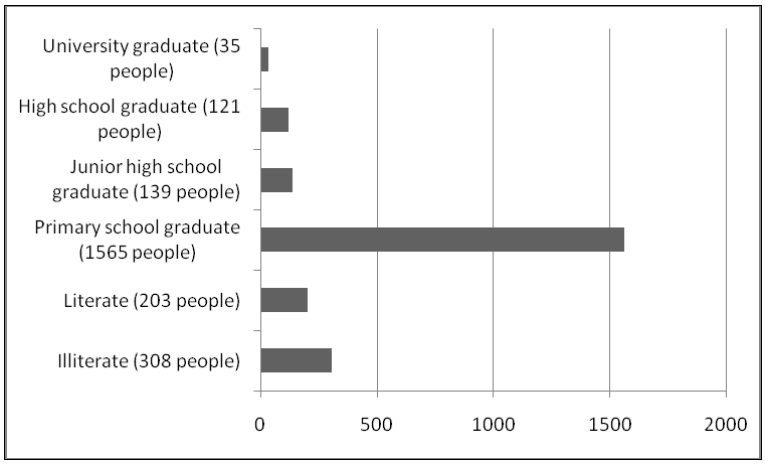

Figure 13, Distribution of population by educational status (Municipality of Birgi 2004 data)

According to the research prepared by the Municipality of Birgi in 2004 and realized with the participation of 2371 people (93% of total population), 87% of total population is literate. On the other hand, those who did not complete the compulsory schooling period, which was modified as 8 years in 1997 is 12.5% (295 people) of the total population (see Fig 13). People who continue to education after compulsory schooling period are 6.6% (156 people) of the population. For the young girls who did not continue their education, a variety of courses is opened with the cooperation of the Directorate of Public Education of Ödemiş.

Birgi has a general surface area of 21100 decares. 6930 decares of these are dedicated to agricultural activities, while 13296 decares are forest land. The biggest problem for agriculture is irrigation, which also The Limited Cooperative for the Development of Birgi and its Villages is trying to resolve since 1997. The other problems for farmers are lack of economically owned land sizes per person, lack of modern agricultural instruments and limitations in marketing of local products. (Gümüşoğlu, 2008: 124-131).

Regarding the distribution of population by occupation (see Fig 14) it is seen that even though the wageworkers and traders form the biggest group after farmers, their ratio in the total population is very low (see Fig 14).

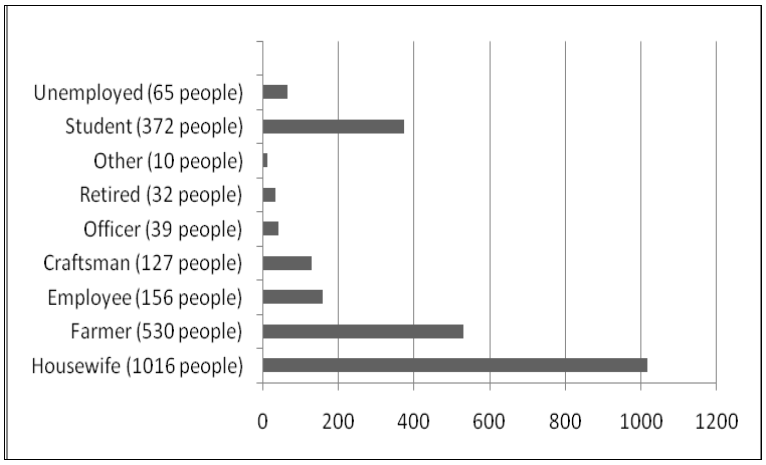

Figure 14, Distribution of population by occupation (Municipality of Birgi 2004 data)

The level of income of Birgi people is very low, according to the results gathered at the end of a public survey carried out in 2007 (Gümüşoğlu, 2008: 150) (see Fig 15). The number of people earning less than the minimum wage, which is gross 585 TL per month (http://www.calisma.gov.tr – last visit April 2009), is 54.5 % among 121 participants (see Fig 15).

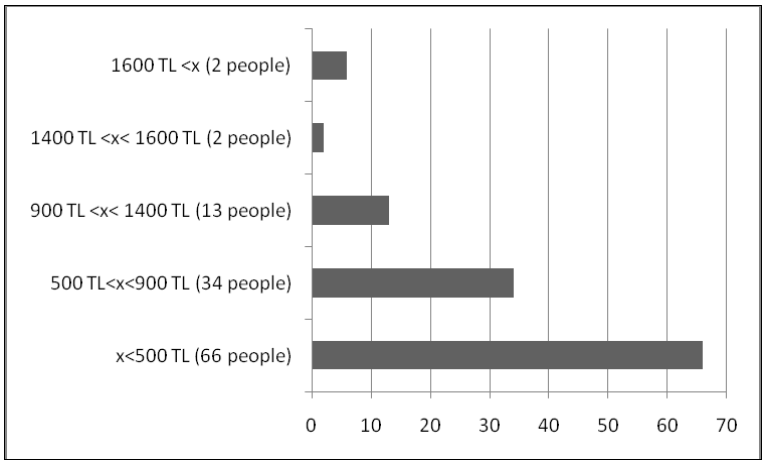

Figure 15, Distribution of population by monthly income (Gümüşoğlu, 2008: 150)

2.2. HISTORY OF BİRGİ

It is considered that Birgi and its close vicinity have been used as a settlement area since Late Bronze Age (Özcan, 2007: 5). The history of this region, hosted many different cultures in the course of time can be investigated under 4 main headings.

Before Aydınoğulları Principality:

The earliest information regarding Birgi's close vicinity is found in Hittite texts and correspondances in the late Bronze Age (Özcan, 2007: 5). The commanding power of the area was called Arzawa (see Fig 16), and was mentioned either as a kingdom or a city or sometimes as a confederation in the Hittite documents written in cuneiform script. (Houwink ten Cate, 1970: 71, Heinhold-Krahmer, 1977: 4, del Monte-Tischler, 1978: 42, Coşkun, 1989: 481, Karauğuz, 2002: 107).

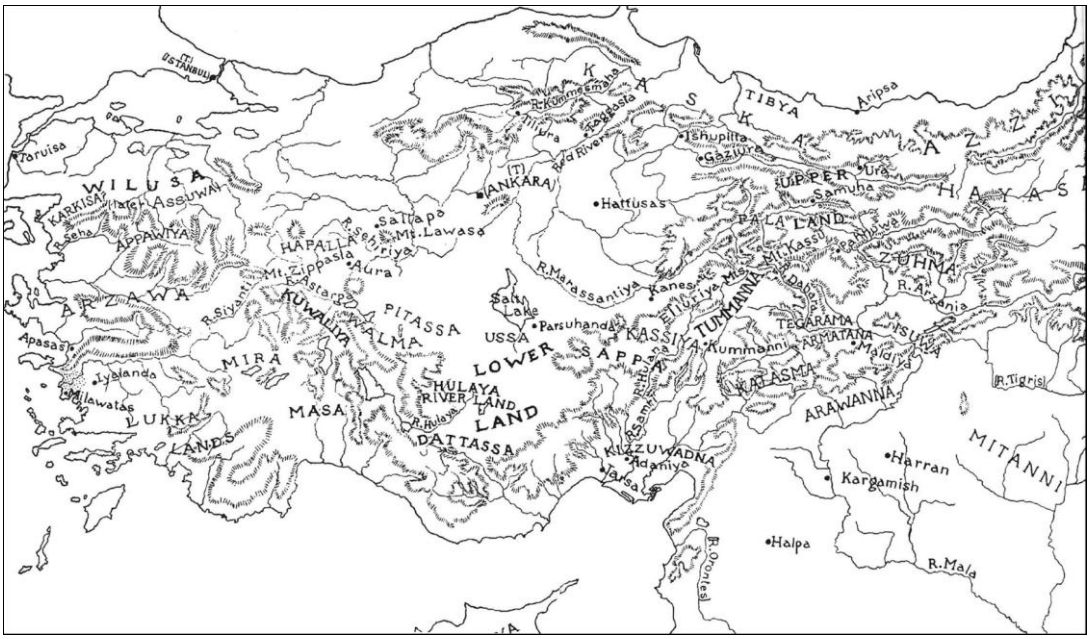

Figure 16, Anatolian political map prepared by Garstang ve Gurney'in (1959: 84) based on Hittite documents written in cuneiform script

Throughout history, Birgi has been called Berk, Dios Hieron, Christopolis, Pyrgion, Bergi, Berki and Birgi (Yavuz, 2005: 93-96), and has become a charming ground for many travelers.

The close vicinity of Birgi falls under domination of Phrygian, Persian, Alexander the Great and Roman Empire in chronological order (Kiel, 2001: 5). In the Birgi settlement area and around, artefacts belonging to antiquity were found, which are partially exhibited in the garden of Çakırağa Mansion, currently in use as an open-air museum. At the east of Sasalı River, in Asar Tepe, located at the west of Sasalı and Taşpazarı areas, the remains of the foundation of a castle can be seen. (Yavuz, 2005: 98).

The Upper Küçükmenderes region where Birgi is situated was the southern half of the Lydian State (see Fig 17). At the L'illustration de L'orient, it is mentioned that the Persian king Keyhusrev named this place Berk in those years when he ended Lydian Kingdom (Yavuz, 2005: 11). It is also known that Birgi was settled during Lydian, Persian and Hellenistic periods; however, the existance of an urban formation cannot be mentioned (Yavuz, 2005: 99).

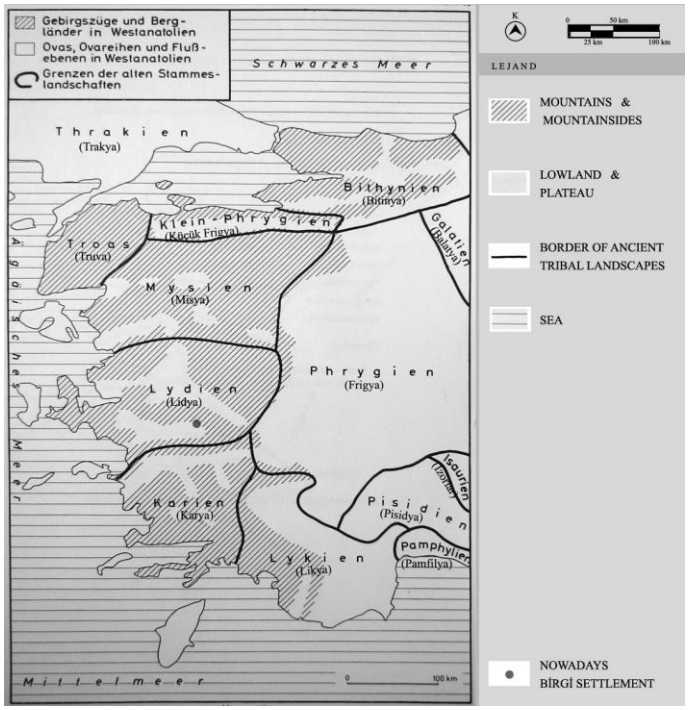

Figure 17, Parts of Western Anatolia and localities where ancient people settled. According to the map published in 1915 by Banse, communities settled in Western Anatolia in antiquity and location of current Birgi in that period (Stewig, Turfan, 1968: 56,57)

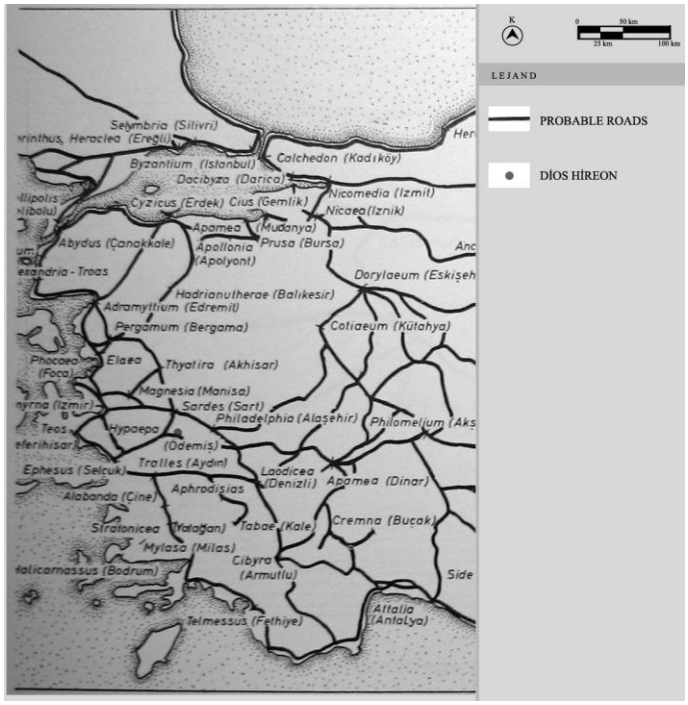

Figure 18, Road network in Western Anatolia in the Roman Period according to the map published in 1958 by Bean Calder (Stewig, Turfan, 1968: 100, 101)

Birgi was mentioned as a city for the first time during Roman period (1st century A.D.) with the name of Dios Hieron[6]. In this period, Birgi is the second city established after Hypaipa[7] (Günlüce Village) (Yavuz, 2005: 99). In the related sources, it is mentioned that there was a small settlement, today called Bozdağ, in close vicinity of the settlement, above Hypaipa, at the slopes of Mount Tmolos, settled around an important Zeus Temple called Dios Hieron (Kiel, 2001: 5). In that period, a road (see Fig 18) extended from Ephesus to where currently known as Üzumlu Village, to Hypaipa and Dios Hieron, and from here to Kelas (Coloe, Kiraz) over Semit (Üçkonak Village) (Yavuz, 2005: 99). Another road passing thrugh Birgi and that was continued to be used until 1970's starts from Hypaipa, goes by Bozdağ and reaches to Sardis (Salihli) (Yavuz, 2005: 99).

According to Yavuz (2005: 102), Dios Hieron must have been influenced from the earthquakes, which occurred in 17 A.D. and at around 2nd century A.D. which highly damaged Western Anatolian settlements, and the destructive illness coming from Babylonia (see Fig.13). After Christianity was accepted as the official religion, according to Ramsey (1961: 114), the name of the city was chaned into Christopolis, meaning "city of Jesus", so as not to use the name of the principal god of Paganism[8]. Yet, on the map where episcopacy and metropolitan centers are depicted in 600's by Meer, the settlement is shown with the name of Dios Hieron and shown as a center of episcopacy (Stewig, Turfan, 1968: 122, 123) (see Fig 19). According to the mentioned map, the closest centers of episcopacy are Hypaepa and Colae, and the closest metropolitans are Ephesus and Sardis.

[6] Dios Hieron means Sacred Place of Zeus, Worship Place of Zeus or Zeus Temple (Yavuz, 2005: 95).
[7] Hypaipa was established at the Upper Küçükmenderes Basin, at 9 kms west of Birgi and 4 kms northwest of Odemiz, at the skirts of Aipos Hill of Mount Tmolos (Bozdağ) (Ünal, 2001: 4).
[8] In the Middle Byzantine terminology, the word "police" was used for the capital cities and "kastron" was used for the denotation of other cities (Mango, 1980: 73).

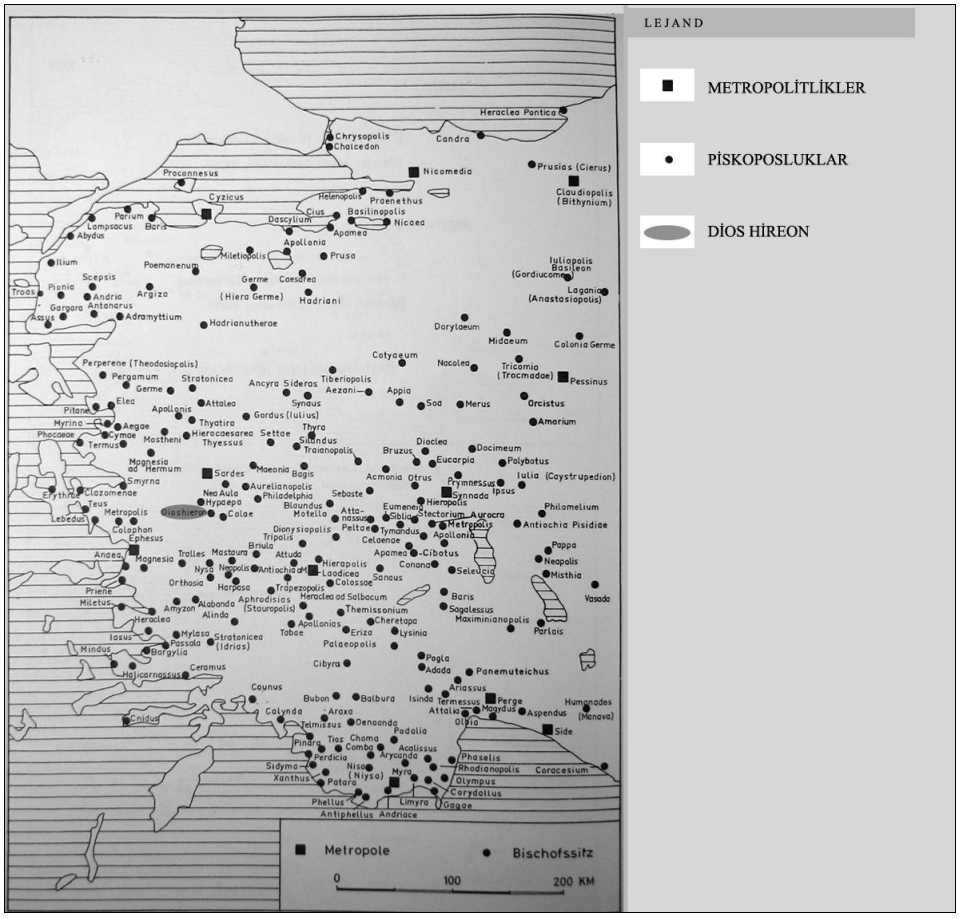

Figure 19, West Anatolian centers of episcopacy and metropolitans depending on Byzantium in 600 A.D. according to the map pubished in 1959 by .Mohrmann Van der Meer (Stewig, Turfan, 1968: 122, 123).

Although in the VI. and VII. Centuries, after the collapse of the classical civilization, the majority of the ancient cities disapeared due to the decrease in population, this settlement must have been survived and started to develop in the X. century when the Bizantium Anatolia began to come through and lived its heydays in the first half of the XIII. century (Kiel, 2001: 5-8).

According to Duyuran (1954), this city is a metropolitan in the Byzantium period and was called Pyrgion[9], which means tower-castle in Greek. Kiel (2001: 6) suggests that the tower, mentioned about in 879, must have been in the long and narrow hill over

[9] Pyrgion means bastion place, castle or tower in Greek (Yavuz, 2005: 96).

which Birgi is situated, covered a surface area of not more than 130 x 120 meters and surrounded with ramparts. At the east and west of current Birgi and at the south of the Great Mosque, the remains of rampants, constructed of pieces of stone and brick mixed with mortar, are readable. Based on the total area the rampants surround, Kiel (2001: 7) argues that the population of Pyrgion must have been around 500-650. In the list of episcopates issued during the rule of II. Andronikos (1282-1328), the name of Pyrgion was mentioned for the first time as a metropolitan (Kiel, 2001: 4-5).

At the second half of XIII. century, Byzantine focused on the re-conquest of Balkans and ignored Western Anatolia. Therefore, the custodians in the area, whose fees were not paid, left the borders (Demir, 1999: 7). The Turkish repression, on the other hand, increasingly continued and the prevailing power altered (Kiel, 2001: 8).

Aydınoğulları Period:

After the loss of Ayasulug, Tire and Birgi, the Byzantine domination at the Kaistros (Küçük Menderes) Valley definitely ended, and yet the new political authority in the area became visible only in 1308 (Kiel, 2001: 9). After the conquest of these three cities, Mehmed Bey and Sasa Bey10 started to compete, while, at first, they had been cooperating (Kiel, 2001: 10). It is written on the inscription panel of the main door of the Great Mosque[11] (see Fig 20), which was constructed in 1312, that Mehmey Bey conquered the city in 1308 and established Aydınoğulları Principality (Ünal, 2001: 76, 79). In 1310, Sultan Sah Tomb was constructed by Aydınoğlu Mehmet Bey for the name of his sister Hanzade Hatun binti Aydın. This building is placed at the southeast of the great Mosque and its outer walls were completely renewed during the following repairs (Daş, 2001: 124, 126).

[10] It is argued that, in Pyrgion that was first conquered in 1304 by Sasa Bey, Sasalu Masjidi was constructed (Yavuz, 2005: 104). However, it has not been proven that the mentioned masjid is the same with the existing structure. According to Ünal (2001: 9), Sasalı Quarter that survived Ottoman Birgi must be the region where the Turkmens devoted to Sasa Bey were settled when he first conquered the city.

[11] For the inscription panels of Birgi Great Mosque see: Uzunçarşılı, 1929: 110,111, Riefstahl, 1931: 102-104, Riefstahl, 1941: 81,82, Akın, 1968: 105-107, Zıllioğlu, 1985: 175.

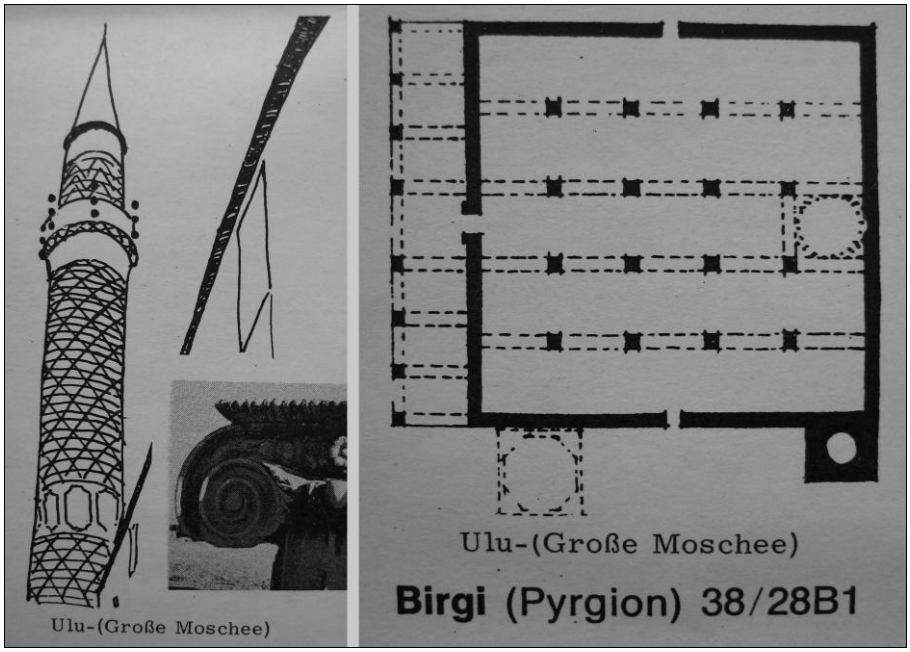

Figure 20, Great Mosque of Birgi (Codex Kultur Atlas, Teil 3, 38/28B1, Codex-Verlag)

The city starts to be called Birgi after being taken by the Turks (Altınoluk, Yavuz, 1994: 32). Birgi has been the capital city of Aydınoğulları Principality and became to be the most developed center of its time.

In 1333, the Arabic traveler İbn Battuta was greeted as a guest in the summerhouse of Mehmet Bey in Bozdağ and in the Bey Palace[12], for two weeks (Parmaksızoğlu, 1981: 30-31). Ibn Battuta (2004: 418-423), while telling about his impressions about the social life and physical settlement of Birgi, gives information not only about the architectural features of the Ahi Community Convents, the shelters of dervishes and madrasahs, but also about their surroundings.

When Mehmet Bey died in 1334, Aydınoğlu Mehmet Bey Tomb was constructed, by his sons, at the western part of the Great Mosque and Mehmet Bey was buried here (Daş, 2001: 119, 123). Today, there are no visible signs from the madrasah and

[12] Weben, visiting the city in 1891 (1892: 16), suggests that the main remains seen on the platform at the east of the city, which is called Kale (Castle) and is currently abandoned, belong to Aydinogullari Palace.

treasury that are known to be once at the south of the tomb, and the headstones are missing (Daş, 2001: 115). In the reign of Umur Bey, who took the helm of the principality in 1334 until 1348, Birgi was fastly developed, especially from the economical point of view. Egyptian Sihabud-Din el-Umari, who tells about Birgi in his geography book written in 1340's, underlines the prosperousness and high military power of Birgi (1991: 183-202). In this period, coins, called *Jilyat*, were monetised also due to the commercial activities that Umur Bey carried out with the West (Dural, 2004: 23). Keles (Kiraz), Bademiye, Tire, Ayasulug (Selçuk) and İzmir Kadifekale are the most important cities with Birgi (Dural, 2004: 49).

During the sovereignty of Hızır Bey (1348-1360), commercial activities increase and Küçükmenderes River was started to be used as a trade route (Altınoluk, 2007: 35). Sihabuddin el-Umari, at his book of geography, which is called Mesalik-ül Ebsar and published at the first half of the XIV. century, mentions that Küçükmenderes river was used for shipping trade and Aydınoğulları principality gained much commercial favor out of it (Yavuz, 2005: 115). Ayasulug became the new capital city during Hızır Bey Period (1348-1360) (Yavuz, 2005: 114).

İlter (1969: 81) dates the Güdük Minare Masjid, which is placed at the southwest of the settlement and does not have an inscription panel, to the second half of the XIV. century based on its architectural features.

Birgi and Aydınoğulları principality, remain at the Ottoman helm, from 1390 when Aydınoğlu Isa Bey gives Birgi as a gift to the Ottoman Emperor, Yıldırım Beyazit, till 1402 when Timur reestablished Aydınoğulları Principality after beating Beyazit in Ankara War (Kiel, 2001: 17). During the last years of the domination of Aydınoğulları Principality, a civil rebellion rose (Rebellion of Şeyh Bedreddin[13]). This movement posing a threat against the established system was rigorously quashed in 1416 at the rocky Karaburun Peninsula at the north of Çesme (Kiel, 2001: 19).

[13] The leadership of this rebellion was assumed by Şeyh Bedreddin and the commander Börklüce Mustafa, defending that all religions are equal and should share everything.

Ottoman Period:

After all lands of Aydınoğulları Principality joined to Ottoman Empire in 1425, Ottomans took the control of Birgi (Dural, 2004: 59) and Birgi became a part of Aydın Sanjak, whose center was Tire (Yavuz, 2005: 116). Aydınoğulları Principality, famous for the marine navigation[14], brought in the major part of its income from profiteering and trading with Venetians-Genoese's (Altınoluk, 2007: 22, Kahyaoğlu, 2000: 97).

A few number of buildings in Birgi belonging to this period reached today. Archival documents tell about the presence of some other buildings; however, no traces from them have been left. These structures are Aydınoğlu Mehmet Bey Madrasah, which was a part of Aydınoğlu Mehmet Bey Complex, Sultan Sah Madrasah constructed for the name of the sister of Aydınoğlu Mehmet Bey, Hanzade Hatun Tomb constructed for the name of the daugther of Aydınoğlu Mehmet Bey, Aydınoğlu Gazi Umur Pasha Tomb, Darulhuffaz belonging to Azize Melek Hatun, who was the daugther of Umur Bey, Aydınoğlu Isa Bey Mosque, Aydınoğlu Isa Bey Tomb, Hafsa Hatun Fountain constructed for the name of the daughter of Isa Bey, Silahtar Aga Zaviye (Hermitage), Huri masjidi constructed for the name of the daughter of Aydınoğlu halil Bey and Seyh Muhiddin Zaviye (Akın, 1968: 137-183).

The oldest informations about Ottoman period Birgi (see Fig 21) are the data coming from the *Mükerrer Defteri* no T.D. 1/1 dated 1451 (Kiel, 2001: 25-26) (see Table 2). According to the *Mükerrer Defteri* no T.D. 1/1 dated 1451, there was a total of 241 houses in the city (Kiel, 2001: 26). These houses, 235 of which were Muslim (number of houses changes between 18 and 46), and 6 were Christian, were distributed in nine quarters, one of which was Christian (see Table 2). From these records, it is also understood that one of the christian houses became Muslim (Kiel,

[14] Aydınoğlu Beyliği döneminde gemilerin Küçük Menderes Irmağı'nı kullanarak iç kısımlara kadar girebildikleri bilinmektedir (Akın, 1968: 46). Adagüme (Ovakent) civarında, gemilerin bağlandığı "babaların" olduğu söylenmektedir (Fevzi Tapkan ile yapılan görüşme, 30.07.2009).

2001: 26). Kiel (2001: 26) argues that the population of Birgi must have been 1100-1200 at that period.

Another source giving information about the population of Birgi is the *Mufassal Defteri* of the Province of Aydın no T.D. 8 dated 1475 (Kiel, 2001: 27) (see Table 2). The number of quarters was not altered between 1451 and 1475, however the total number of houses increased from 241 to 262 (see Table 2). According to this document, although there seems to be a Christian quarter composed of three houses, 11 of 159 Christian houses became Muslims afterwards (Kiel, 2001: 27). As Kiel mentions (2001: 27), it is possible that a part of these converts were the Christians, who immigrated from villages to the town and accepted Islam, the dominant religion. The total number of houses in Muslim quarters, on the other hand, changes between 6 and 68.

According to the *Mufassal Tahrir Defteri* no T.D. 148 dated 1528-1529 (Kiel, 2001: 29), between 1475 and 1528 Birgi town slowly but consistently developed (see Table 2). As in the other Ottoman cities, also in Birgi, the physical settlement was developed by the establishment of new quarters (Kuban, 1968: 63). The number of quarters increased from 9 to 17 and the total number of the houses in these quarters increased from 262 to 330 (see Table 2).

Mufassal Tahrir Defteri dated 1528 (Kiel, 2001: 29) shows that the tendency for a part of the Christian houses, immigrating to Birgi, to become Muslims continued (see Table 2). For example, the number of Christian houses increased from 3 to 19 between 1475 and 1528 and according to these registrations, at least 21 of the heads of the families were converts (Kiel, 2001: 30). Between 1475 and 1528, four new quarters were established to settle 33 nomad *yörük* families immigrated to the city (Kiel, 2001: 30) (see Table 2). It is possible to deduce that the economical condition of the city was strong, considering that Christian and *Yörük* communities immigrated here.

Even though there are differences between the information regarding the population given by *Anadolu Muhasebe Defteri* no T.D. 166 dated 1530 and *Mufassal Tahrir Defteri* dated 1528-1529, these divergences are ignorable (Kiel, 2001: 31). At the wakf section of the *Defter*, the Great Mosque, still surviving in 1530, three masjids, a madrasah, a primary school, five monasteries and a *zaviye* (convent) called Kalenderhane were listed (Kiel, 2001: 31).

The *Defter* no T.D. 87, which was normally undated, was dated to 1545 based on the information it offers and comparison of this information with those from other *defter*s, and it was understood that there were 13 quarters and 463 houses in Birgi (Kiel, 2001: 31-32). In addition to the Kefere Quarter, composed of 33 houses, a new Christian quarter of 22 houses were formed. 35 of the heads of the Muslim families were converts (Kiel, 2001: 32). After this date, the first accessible data regarding the population of Birgi belongs to 1573.

According to the *Mufassal Tahrir Defteri* that was dated to 1573, between 1545 and 1573 the number of quarters in Birgi increased from 13 to 19 and number of houses from 463 to 796 (see Table 3). Kiel (2001: 32) argues that, based on the information this *defter* offers, besides Seydi Ahmet Mosque and three new masjids, which are decisively known to be built, the other three quarters must have had their masjids as well.

In 1573, Ottoman Birgi reaches to a peak point in its progress. Also other cities in Aydın Sanjak start to enlarge. İzmir, Nazilli and Birgi enlarge by 35%, 32% and 25%, respectively (Kiel, 2001: 33). The enlargement of Birgi is slower but more than the others, and keeps taking migration from the surroundings (Kiel, 2001: 33). According to the research of Kiel (2001: 20) carried out by comparing a variety of tables from the registers regarding population and taxes, Birgi in 16th century was greater than İzmir, Aydın, Söke and Ödemiş, and it became one of the biggest cities in Western Anatolia during the period between 1425 and 1573.

During the period between XV and XVII centuries, when developed commercial activities provided much favor with the Ottoman economy, serious investments were made to the wakf buildings and alterations happened in the urban tissue (Tosun, 1983: 13).

There are three extant public baths in Birgi. The first of these is the Çarşı Hamam at the northeast of Great Mosque, whose sogukluk is currently used as a local store. Çarşı Hamam does not have any inscription panel and was dated to XV century by S. Çakmak (2001: 131) based on its architectural features. The second is Sasalı Hamam, which is placed at the southwest of Sasalı Region, at the skirts of Asartepe and at the banks of Sasalı river bed. It is known that this bath was once used as an oil production workshop as well. This hamam does not have an inscription panel either and no information is available regarding its construction date. Based on its plan characteristics, Çakmak (2001: 134) suggests that this hamam must be from XV century. The last hamam, named as, Şeyh Muhiddin Hamam, whose *soyunmalık* section is now completely demolished, is placed at the north of Derviş Ağa Darülhadisi (Demiralp, 2001: 104). S. Cakmak (2001: 140) dates this building to the end of XV or the beginning of XVI century based on some documents that are considered to be related to this building as well as its architectural features.

İmam-ı Birgivi Madrasah, constructed by Hoca Ataullah Efendi in front of the Great Mosque in 1571 (Kiel, 2001: 32), is now used as the Birgi Cultural Center. The inscription panel mentions the currently not existing masjid, constructed by Hasan, son of Hacı İbrahim, in Yeni Quarter, the school constructed by Şeyh Hüsam and the school in Kalenderhane Quarter (Kiel, 2001: 33). It is probable that new buildings like monasteries, *han*s, *hamam*s etc. were built while the city was growing, however no sufficient information on these is available.

Katip Çelebi (1732: 637), in 1640, tells about the geographical position and general characteristics of the town in his geography book called Cihannüma. In 1653 and 1668, earthquakes occurred in Birgi, however registrations regarding loss of life and property are not available (Gül, 1960: 27).

At the documents of wakf, dated 1658, of Derviş Ağa Darülhadisi (Çukur Madrasah), which is a part of Derviş Ağa Complex composed of a mosque and a darülhadis, and was constructed by Derviş Ağa, it is written that the building was once surrounded with Sarı Bey Masjid, Hacı Himmet House, a han and a road (Demiralp, 2001: 109, 113).

At the southeast of Birgi River, at approximately 50 meters south of Küp Uçuranlar Tower[15] (Pandakuz Tower / Kumbaşı Tower), which is thought to belong to Byzantine period by Uzel and Türkoğlu (1991, 25), there is Sarı Berber Library, which does not have an incription panel or any architectural feature that might help to date the structure. Işeri (1998: 51) dates Sarı Berber Library to the second half of the 17th century based on the building's wakfiye dated 1673 and found at the Regional Directorate of Foundations of İzmir.

The information from the *Avarız Defteri* no M.A.D. 3032, dated 1662, the number of quarters in the town decreased from 19 to 18 and the number of taxpayer men decreased from 796 to 398, 341 of whom are heads of their families (Kiel, 2001: 36,42). The population of Birgi decreased by 30% between 1573 and 1662, due to the results of Celali Rebellions and the trend of migration from the villages of Birgi to Tire (Kiel, 2001: 36, 40).

In spite of the decrease in population, the registrations belonging to that period as well as the extant inscription panels show that the construction of monumental buildings continued. Existing Derviş Ağa Mosque, placed at the west of Birgi River and at the south of the settlement, is dated to 1663 (Kuyulu, 2001: 90). Kale Madrasah, not having any inscription panels, is dated to XVI or XVII centuries by Y. Demiralp (2001: 103), based on the plan scheme, construction materials and architectural features of the building.

[15] After 1939 flood of Birgi River, while the bazaar was being dislocated, the houses around this tower that was then used as a deposit, were expropriated (Interview with Ahmet Tezcen, 30.07.2009).

Famous traveler Evliya Çelebi, who visited Birgi in the summer of 1671 and was hosted in Sogancizade and Arif Çelebi mansions, in his book Seyahatname (Zıllioğlu, 1985), mentions the general characteristics of Birgi as well as Derviş Ağa Mosque, Madrasah and Hamam, Sultan Hanım Gülsüm Fountain, four bridges to Aydınoğlu Madrasah and 47 mills.

At the same book, Evliya Çelebi (Zıllioğlu, 1985) tells also, about what happened in Birgi and its surroundings during the first 10 years of XVII century. From these writings, it is understood that Cennetoğlu from Birgi, who was the leader of Celali Rebellion, repaired Birgi Outer Castle and settled there with his men and that this castle was demolished by Murat Pasha after the death of Cennetoğlu to prevent the survivals to settle there again (Zıllioğlu, 1985: 564-567). While seeking Cennetoğlu, who was later on trapped at the north of Birgi, caught in Denizli in his way to inner parts of Anatolia and was tortured to death, more than half of Birgi was destroyed and the majority of the people was either killed or forced to migrate. At the end of these events, the prosperous and developed Ottoman Birgi vanished (Kiel, 2001: 34,35). Darkot (1944: 632-634), based on the information conveyed by Evliya Çelebi regarding the numbers of quarters and houses in Birgi, argues that the population of Birgi must have been not less than 15.000 in that period.

According to *Avarız İcmal Kaydı* no T.D. 806 dated 1676, in that period, there were 19 quarters and 345 houses in Birgi (Kiel, 2001: 37, 42). Between 1662 and 1676, the number of quarters increased, whereas the number of houses decreased (see Table 8).

English traveler Chishull (1993), who tells about the condition of Birgi in 1699, mentions that he was hosted in a Han, which does not exist anymore. While Birgi formering being a city, letting in immigrants from the surroundings, by the end of 17th century it turns to be a city, which migrates (Gümüşoğlu, 2008: 114).

An earthquake of extreme hazard occurred in 1739, and yet there is no registration regarding loss of life and property (Yavuz, 2005: 124).

Karaoğlu Mosque with no inscriptions, having also a madrasah (Karaoğlu Madrasah), which is told to have 7 cells but was demoslished in 1935 by Directorate of Foundations, is dated to 1171/1157 by İ. H. Uzunçarşılı (1929) and to 1762 to B. G. Yavuz (Kuyulu, 2001: 91,98).

There are eight historical fountains in Birgi. Except one, none of them has an inscription panel indicating the construction date. These fountains were all constructed using, rubble stone, slates and brick pieces. Bıçakçızade Fountain (Koca Fountain), which is the one with inscription panel, is dated to 1807-1808 (Ünal, 2001: 162). Among the historical fountains of Birgi, this is the only one that is still functioning. Another of these fountains is Beyler Fountain, next to the ruins of the building called Bey Mansion, and does not have an inscription panel.

Any information related to the constrcution dates of the furnaces, distributed homogeneously throughout the areas, where the historical street tissue has been preserved, and which are mostly still in use, could not be gathered.

Texier visited Birgi in the autumn of 1835. He mentions about the close surroundings, nature, spolia used in monumental buildings, recent flood disaster, bridges and Birgi houses painted of different colors (Texier, 1961: 246-252).

Temettuat Defteri dated 1844 indicates that Birgi had 16 quarters and 772 houses (Kiel, 2001: 42, 49). During the period between 1676 and 1844, the number of quarters decreased, while the number of houses became more than double of the previous number (see Table 8).

Table 2, Numbers of quarters and houses in Birgi according to *Mükerrer Defteri* no T.D.1/1 dated 1451, *Aydın Vilayeti Mufassal Defteri* no T.D. No.8 dated 1475 and *Mufassal Tahrir Defteri* no T.D. 148 dated 1528-1529 (Kiel, 2001: 26-27, 29)

1451		1475		1528-1529	
Name of Quarter (total: 9 quarter)	*Number of Order (Total: 241 order)*	*Name of Quarter (Total: 9 quarter)*	*Number of Order (Total:260 order)*	*Name of Quarter (Total:17 quarter)*	*Number of Order (Total:314 order)*
Dernek Pazarı	18 muslim order			Dernek Pazarı	16 order
Kazı	20 muslim order	Kazı	29 muslim order	Kadı	15 order
				Kadı Mahallesi (cavalrymen)	10 order
Ahi Germiyan	26 muslim order	Ahi Germiyan	33 muslim order	Ahi Germiyan	33 order
Sinli	46 muslim order	Sinli	35 muslim order	Sinli	23 order
Hisar İçi	40 muslim order	Hisar İçi	44 muslim order	Hisar İçi/Cami	17 order
Sasalu	19 muslim order	Sasalar	13 muslim order	Sasalu	20 order
Taşbazar	20 muslim order	Taş Pazar	29 muslim order	Taş Bazar	35 order
Samut	46 muslim order	Samad	68 muslim order	Samud	68 order
Demür Boğa	6 christian order	Timur Boğa	6 muslim order	Timur Boğa	9 order
		Kefere	3 christian order	Kefere cemaati	19 order
				Sarı Bey	17 order
				Hızırlık	1 order
				Kızıl Mescid	8 order
				Vakkaslu nomad *yörük*s	13 order
				Danişmendlü nomad *yörük*s	5 order
				Kutlu Beylü nomad *yörük*s	2 order
				Eğrice Dere nomad *yörük*s	13 order

Table 3, Numbers of quarters and houses in Birgi according to *Mufassal Tahrir Defteri* dated 1573, *Avarız İcmal Kaydı* dated 1662, *Avarız İcmal Kaydı* dated 1676 and *Temettüat Defteri* dated 1884 (Kiel, 2001: 42)

1573		1662		1676		1844	
Name of Quarter (Total: 19 quarter)	*Num. of Order Total: 620 order)*	*Name of Quarter (Total: 18 quarter)*	*Num. of Order (Total: 398 order)*	*Name of Quarter (Total: 19 quarter)*	*Num. of Order (Total: 345 order)*	*Name of Quarter (Total: 16 quarter)*	*Num. of Order (Total: 77 order2)*
Ahi Germiyan	39	Ahi Mescid	35	Ak Mescid	29	Ak Mescid	78
Hisar İçi	118	Cami-i Kebir	27	Cami-i Kebir	38	Cami-i Kebir	135
DemirBoğa	18	TimurBoğa	17	Demir Boğa	19	Timur Baba	33
Dernek Pazarı	30	Dernek	9	Dernek	11	Dernek	38
Harab Mescid	28	Harab Mescid	23	Kızıl Mescid	24	Kızıl Mescid	42
Hızırlık	43	Hızırlık	17	Hızırlık	15	Hızırlık	70
Kadı	26	Kurd Kadı	16	Kurt Kadı	11	Kurt Gazi	42
Kutlı Bey	15	Kutlu Bey	14	Kutlu Bey	14	-	-
Samut	130	Samet Baba	37	Samud Baba	14	-	-
Sinle	62	Sine	32	Sine	24	Sene	77
Saru Bey	37	Sarı Bey	19	Sarı Bey	22	Saru Bey	77
Sasalu	97	Sasalu	12	Sasalı	25	Sasalı	6
Taş Bazar	54	Taş Bazar	25	Taş Bazarı	22	Taş Bazar	23
Cami-i SeydiAhmet	8	-	-	-	-	-	-
-	-	Börekci	12	Börekci	14	Börekci	41
Mescid Hacıbula	20	-	-	-	-	-	-
-	-	Çakal Dere	37	Çatal Dere	20		-
Mescid Hacı İsa	24	-	-	-	-	-	-
-	-	Çörek Baba	28	Çörek Baba	9	Çörek Baba	19
Mescid Hacı Kerim	14	-	-	-	-	-	-
-	-	Dereli	22	Dereli	16	-	-
Hacı Kadı	7	-	-	-	-	-	-
-	-	Manastır	16	Manastır	13	Manastır	12
-	-	-	-	Tekke Samud Baba	5	-	-
-	-	-	-	-	-	Karataş	13
Cemaat-ı Kefere	26	-	-	-	-	Rumiyan	56

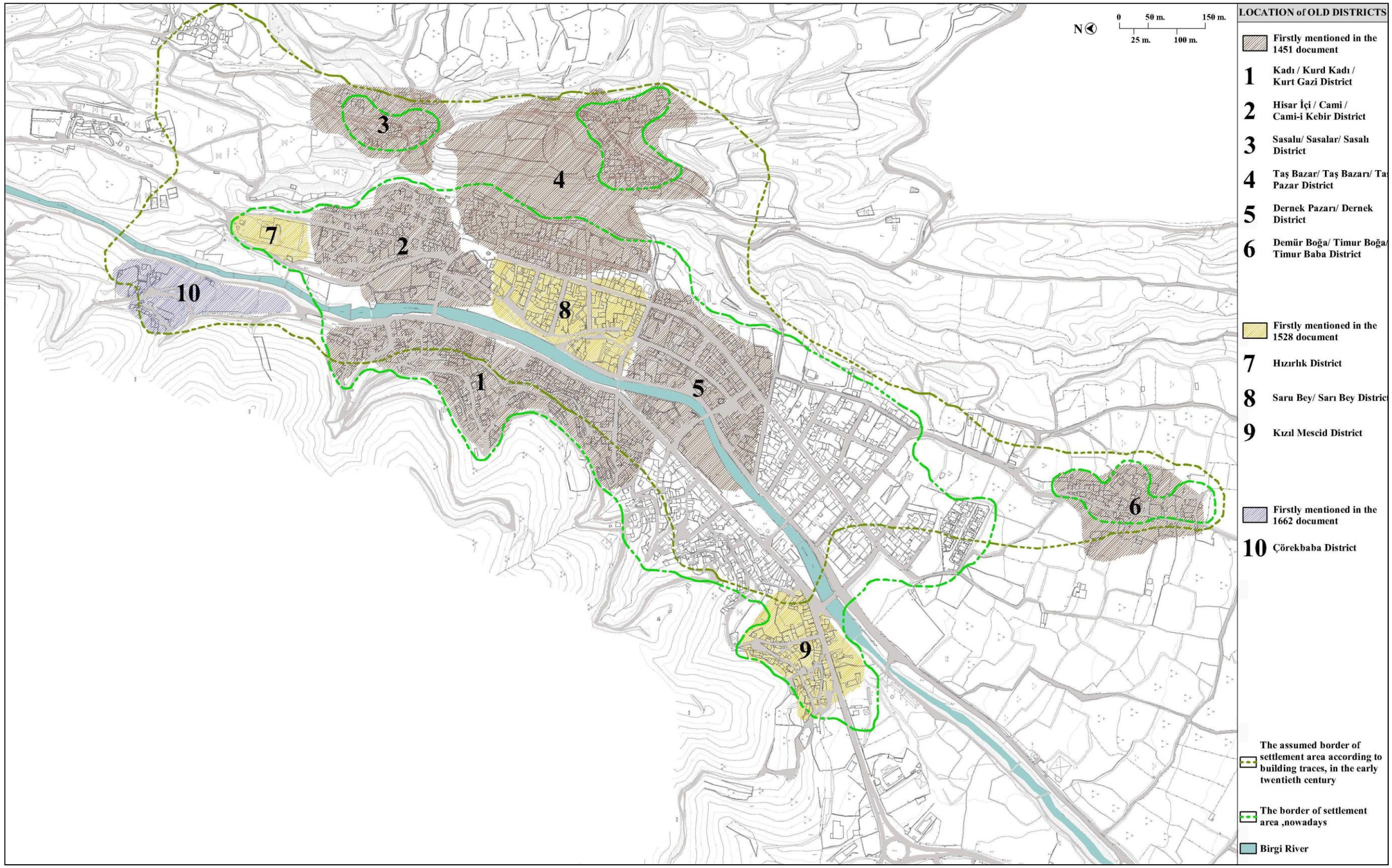

Figure 21, Map showing the location of the quarters with known positioning of Ottoman Period Birgi (Kuyulu, 2001: 91, 153, Demiralp, 2001: 109, Çakmak, 2001: 135, individual interview with Emin Başaranbilek on 06.08.2009)

It is known that earthquakes that continued forty days accured in Birgi in 1846 and 1850, however there are no registrations regarding the loss of life and property (Gül, 1960: 27).

During the reorganization of Aydın Sanjak in 1864, Birgi, which was a town until then, became a district after 1867 and was connected to Ödemiş. Dural (2004: 30) argues that it was a mistake to accept Birgi as a district, supported by landowners trying to avoid Birgi to be a town, considering that a town would cause expenses. Gümüşoğlu (2008: 80), on the other hand, says that this is not a sufficient reason by itself. Birgi had lost its potential to be a center from 18th century onwards, on a variety of grounds. At the last quarter of the 19th century, after Ödemiş line of the İzmir-Aydın railway was completed, old pack trails were of no use anymore and the accessibility and commercial importance of Birgi decreased. In 1865, pestilence was seen in Birgi and its close vicinity (Yavuz, 2005: 128).

According to the information on the housing fabric, physical environment, and monumental buildings of Birgi given by Weber (1892: 15-21) who visited Birgi in 1861, the population was around 2500. Weber (1892) mentions also the frequently met fountains, the demolished houses of Aydınoğlu Beys at the east of the river, octagonal tower (Küpuçuranlar Tower), a madrasah built with spolias taken also from the tower, and two bridges, one of which was medieval.

Turkish Republic Period:

The Greek Army that started to move in 1919 from İzmir towards inner parts invaded first Ödemiş and then Birgi. According to the researches carried out by Gümüşoğlu and his team by means of oral history techniques (Gümüşoğlu, 2008: 84), during invasion, a major part of Birgi people escaped to Bursa, Aydın, Usak and even to Konya. According to the results gathered at the end of the same study, while escaping, lots of people, mostly elders and children, lost their life', due to appalling travel conditions. Nearly all of the survivals returned to Birgi afterwards.

The city remained under invasion until the victory of Turkish National Army on August 30, 1922. While the Turkish Army was getting closer to the town, Greek militia forces left in town by Greek Army started big fires causing more than the half of the town disappear (Gümüşoğlu, 2008: 85-87) (see Fig 24). These fires and the invasion resulted in the destruction of nearly all houses at the southeast of Birgi River, high losses of life among Muslim community and also the departure of Greek people, even those irrelative to the invasion, who harmoniously lived together with Muslim people for years and who, according to the information taken from the file no 22 dated 1963 of the Asia Minor Research Center (Altınoluk, 2007: 31), earned their lives out of running olive oil production workshops, shoemaking, tailoring, carpentry and construction works. Construction workers from close vicinity of Birgi, including Denizli, Tavas, İzmir and Çal, started to come to Birgi to build new houses for Birgi people who lost their houses[16].

Birgi River, which frequently flooded before the rehabilitation, flooded on September 29, 1939 (see Fig 22-23). Four bridges are collapsed, a *han* and a large part of the historical Çarşı quarter that was flooded completely were demolished, old commercial buildings were ruined and three people died (Kiel, 2001: 53, Dural, 2004: 46). The physical measurements, sediment analyses and interviews indicated that the depth of the flood was around 4.5 meters and the maximum width of the area covered with water was around 102 meters.

During this flood, lightening stroke the telephone exchanger, and the police department next to the Derviş Ağa Mosque and the local office of CHP were all flooded (Güneş, 1997: 89). Following the flood, the bazaar was transferred to its current location and the previous bazaar area was converted into an olive grove (Vardar, 2007: 83). Derviş Ağa Mosque that had been repaired in 1946, was also damaged by this flood (Kiel, 2001: 53). The construction of the large bridge over the river was completed in 1940.

[16] Interview with Ahmet Tezcen, 30.07.2009.

After the fire in 1922 and the flood in 1939, the undamaged sections of Birgi traditional settlement tissue were defined by the Bank of Provinces and the previous borders of the settlement were examined based on the traces left by the buildings (Bank of Provinces Archive, 1972). According to these studies, it was understood that approximately 80% of Birgi settlement was damaged after the fire and flood.

Figure 22, Water trace on northern façade of Derviş Ağa Mosque after 1939 flood (Photographic Archive of the Municipality of Birgi)

Figure 23, Condition of Taskopru after the flood (Photographic Archive of the Municipality of Birgi)

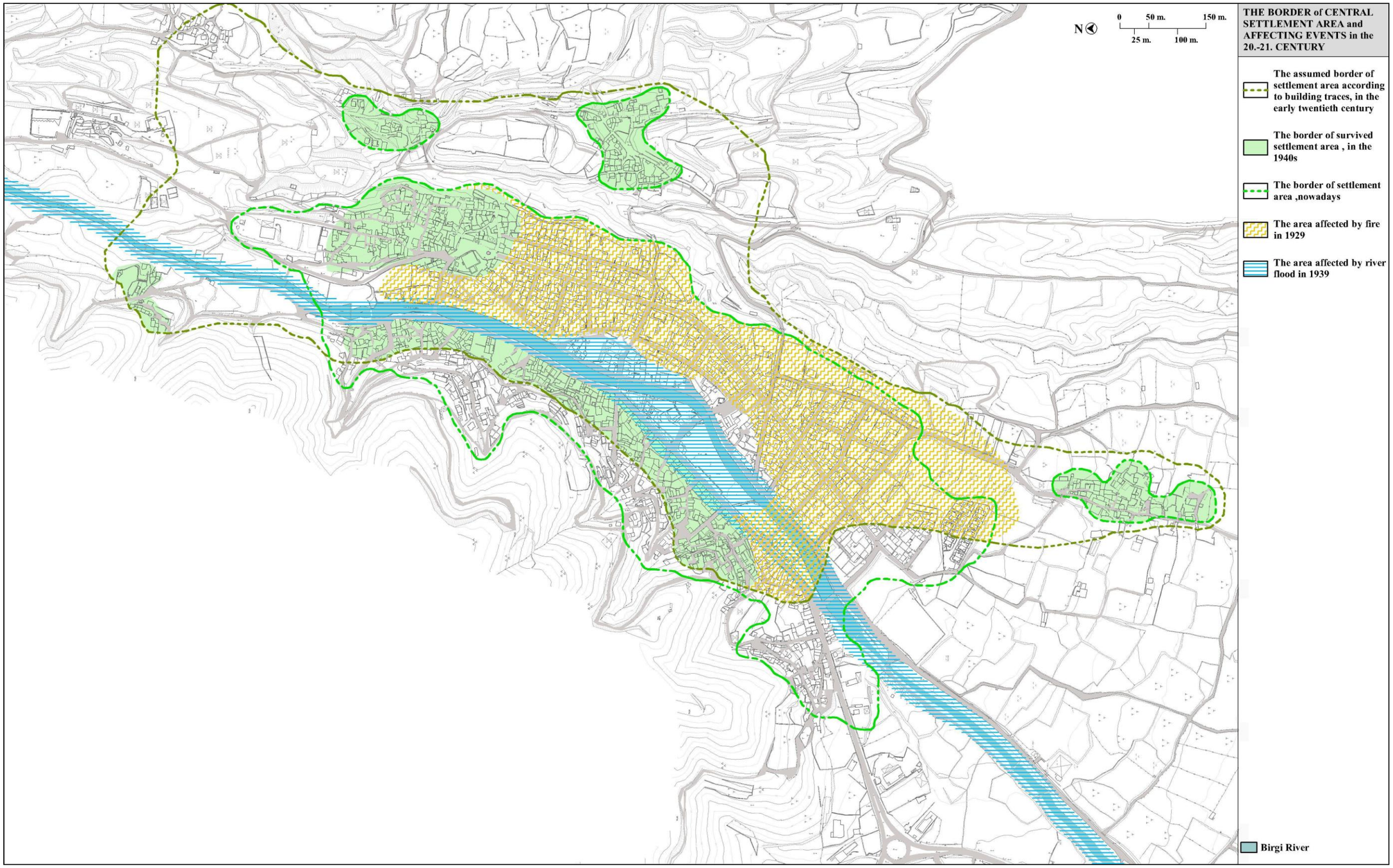

Figure 24, Areas covered by the central settlement of Birgi in the beginnings of 1900's (Bank of Provinces Archive, 1972), 1940's (Bank of Provinces Archive, 1972) and today. Areas affected by 1922 fire and 1939 flood

Because of the cold weather causing frosts in 1941 and 1942[17], Birgi people, mostly engaged in agricultural activities, incurred big economical loss and due to these economical problems, especially fig producers immigrated to Ödemiş and İzmir (Gümüşoğlu, 2008: 115).

The earthquake in 1944 caused damage in the Great Mosque and several other buildings, and total collapse of the famous madrasah of Aydınoğlu Mehmet Bey (Kiel, 2001: 53).

The condition of Birgi in 1945 is worked through, not only from those days' but also today's perspective, by the "Ödemiş – Birgi Development Eligibility Status Report and Report for Local Commissionary of Public Works Including Information Serving as Basis for Future Master Plan" prepared by Kemal Ahmet Aru, Orhan Safa and Celile Berk. According to this report, the population of Birgi is 2490 in 1935, 3235 in 1940 and 2799 in 1944. Main source of income of the town is agriculture and the production of leather and silk may be listed among the common trading branches. The substructure used in the town is old and consequently, problems are confronted. Although there was not a fire department, there were five permanent municipal workers, responsible of firefighting whenever necessary.

During the first years of the Republical period, the town was reconstructed with an architectural style peculiar to that period and characterized with straight, and wooded at both sides' streets with grid-iron pattern. During the reconstruction of the town, some historical buildings, being ruined and disfunctional, were demolished. These buildings include Karaoğlu Mustafa Efendi Madrasah that was demolished in 1935 by the order General Directorate of Foundations, and Hacı Osman Madrasah, constructed in the beginning of XVIII century and demolished in 1944 (Kiel, 2001: 53).

[17] One person who died due to the cold weather had widespread newspaper coverage (Güneş, 1997: 11).

At the intersection area of 1. Beyzade and 3. Beyzade Streets, where historical remains are currently visible, Şefik Özmen Han, which was used as a house at the beginning and as a *han* in 1940's, after losing its interest', was collapsed due to lack of maintenance (Interview with Ahmet Tezcen ve Fevzi Tapkan, 30.09.2009).

In 1947, there was a primary school, community center, agricultural credit cooperative, five bread bakeries, a *han*, a *hamam* belonging to the municipality, 20 street fountains, one slaughterhouse, approximately 80 shops and deposits, four tanning yards[18], around 50 manual weaving looms for silk production, one olive oil factory and two oil workplaces functioning in Birgi (Altınoluk, 2007: 173,179, Yavuz, 2005: 138).

After 1960's, the economical problems were started to be reduced and this affected the population. Relatively wealthier Birgi people, finding historical houses uncomfortable immigrated to Ödemiş due to Birgi's accessibility problems during until 1970's (Gümüşoğlu, 2008: 115). Students, who want to continue their education after secondary school, left Birgi and most of them have not returned due to the scarcity in work opportunities. This situation helped, on one hand, historical urban tissue to survive till today without degenerating and, on the other, provided that empty houses were consumed away and even collapsed due to lack of maintenance and environmental conditions.

"The survey carried out in 1990 by the planning team in the leadership of Cengiz Eruzun showed that more than half of the people have been living in the same house for 20 years. In town, migration occurs generally from Cami Kebir Quarter to Kurtgazi and Cumhuriyet Quarters, and from Kurtgazi Quarter to Cumhuriyet Quarter. 36 % of the residents of Kurtgazi Quarter and 25.4% of the residents of Cumhuriyet Quarter are the families coming from Cami-i Kebir Quarter." (Gül, 1995: 23)

[18] During the interview made with Rıfat Doğan on 30.07.2009, it was learned that in the beginning of 1940's, there were 14 tanning yards at the banks of Sasali River, however they started toget closed one by one, after fabrication started in Izmir.

By this survey study, it emerges that people tended to leave Cami-i Kebir and Kurtgazi Quarters where the historical houses were located. The reasons for this in town migration tendecy must be the heavy repair and maintenance expenses of old houses, legal requirements and certain comfort conditions that traditional houses do not completely offer. The migration from these two quarters, heavily covered with old houses, towards the quarters, where mostly post Republican houses are present, results in increasingly more traditional houses being left empty and worn out.

According to the survey carried out in 1990 by the planning team under the leadership of Cengiz Eruzun, emigration rate is 35% to Ödemiş, 26% to İzmir and 29% to other regions of Turkey, which sums up 18% annually (Gül, 1995: 25).

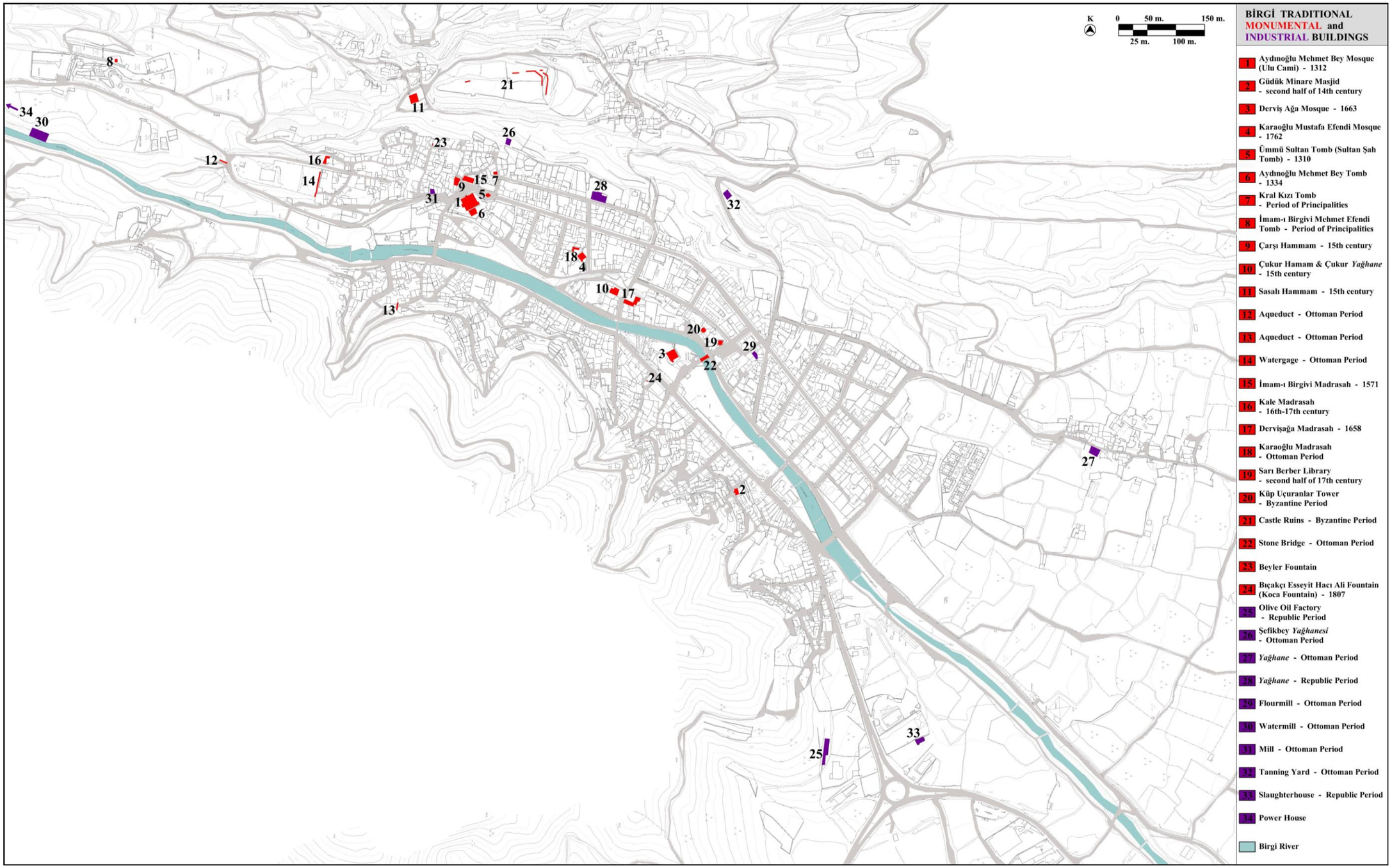

Figure 25, Historical monumental and industrial buildings of Birgi

2.3. PRESERVATION HISTORY OF BİRGİ

Preservation studies in Birgi started in 1940's (see Fig 26). In 1940, when Çakırağa Mansion was about to get dismantled, repair works started with the efforts of Ödemiş Mayor Mustafa Bengisu (1880-1942), Ödemiş District Governor and İzmir Governor Kazım Dirik Pasha (Altınoluk, 2007: 25).

In Ödemiş Master Plan Competition made in 1944, the team of Kemal Ahmet Aru, Orhan Safa and Celile Berk won. The jury composed of Şefik Refik Soyer, H. Prost, Recai Akçay, Muammer Çavuşoğlu, Niyazi Erzin, Şekip Akalın, Mithat Yenen, Mutahhar Başoğlu, Paul Bonatz, Ernst Reuter, and Gustav Oelsner underlined the importance of Birgi in their report, which they thought to have been ignored (Ödemiş Master Plan Competition Jury Report, 1944: 18-20):

> Our jury considers that it is not correct that Birgi does not profit from its natural and historical values and not considered as a suburb of Ödemiş, even though it is not very far from Ödemiş. In our opinion, it is advisable that Birgi, located on the way to Bozdağ, should be accepted as a suburb of Ödemiş and its planning should also be done, since transportation and communication means will get easier in the future.

In line with the jury report, the winning team prepared a master plan also for Birgi in addition to the Ödemiş master plan (Journal of Architecture, 1944: 18) (see Fig 27-29). According to the plan, against flooding risk, the bazaar was carried to the east of the river, to a square where the visual connection with the old bazaar place is not drifted away. The official buildings were gathered together around a small square at the east of the river and a second commercial area was planned at the south of this square. After building quay walls at the banks of the river, it was suggested to open walkways parallel to the river and reinforce the areas carrying risk of flood by timber.

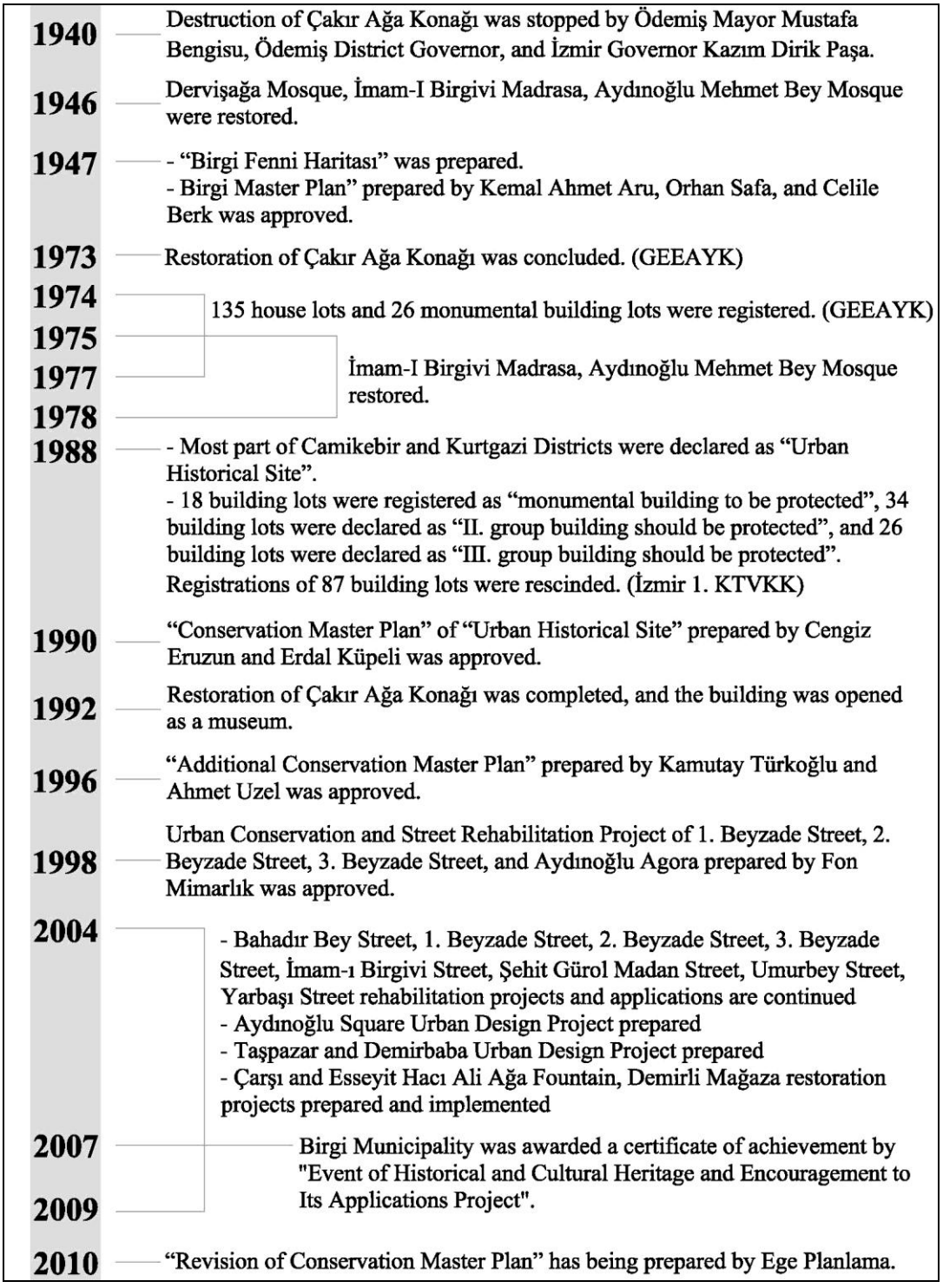

Figure 26, Preservation studies in Birgi

As seen from the “Birgi 1:2000 Master Plan Explanation Note” (Safa, Aru, Berk, 1946), in 1945, the population of Birgi was 2799 and the settlement area was 45 hectars, therefore amount of area per person was 161 meters square. The potential of population increase was calculated based on the census values in the last 10 years and the master plan was prepared so as to sustain 6000 people (Safa, Aru, Berk, 1946: 2, 3). It was planned that 4500 people were domiciled at the vacant lands within the settlement area and 1500 people at a vacant land of 15 hectares at the south of the town, in such a way that the amount of area per person would be 100 meters square (Safa, Aru, Berk, 1946: 3). This new area is chosen to be residential because of “the convenience of direction, suitability of slope, proximity to the arrival road from Ödemiş and especially positioning at a higher level than the river” (Safa, Aru, Berk, 1946: 1).

The mentioned plan gave priority to make use of the vacant lands within the historical settlement tissue instead of opening new residence areas. The traditional urban tissue was preserved, and lot sizes and house types to be used in the new structuring was grounded on the historical house types and housing fabric to provide compatibility (see Fig. 8). Historical street tissue was rehabilitated only wherever seen absolutely necessary. Altough, it was not a conservation plan, especially due to these two decisions, 1946 Birgi master plan has played an important role in the preservation and survival of town’s historical fabric.

The map and Master Plan of Birgi was approved in 1947.

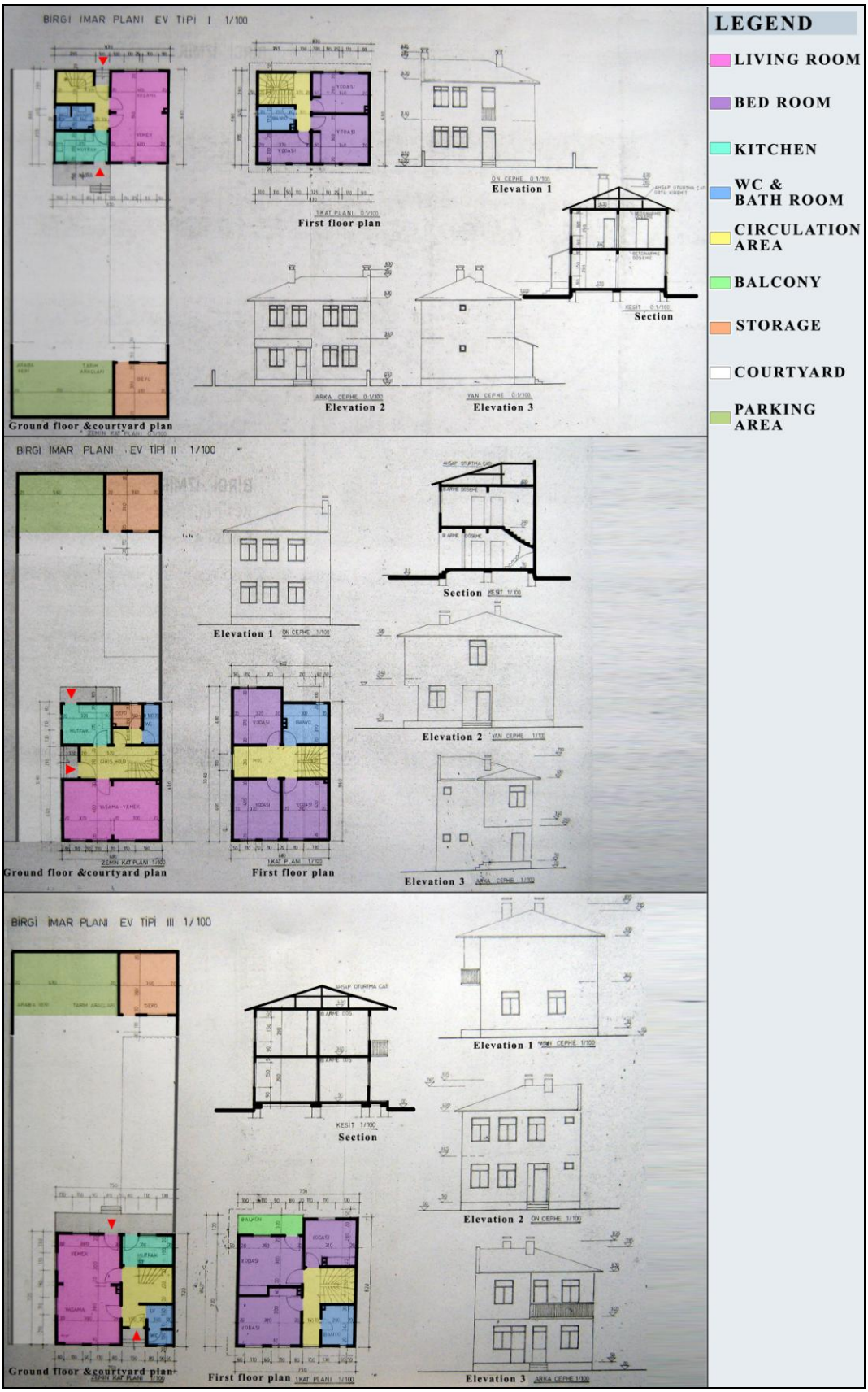

Figure 27, House types, Birgi masterplan (Safa, Aru, Berk, 1947)

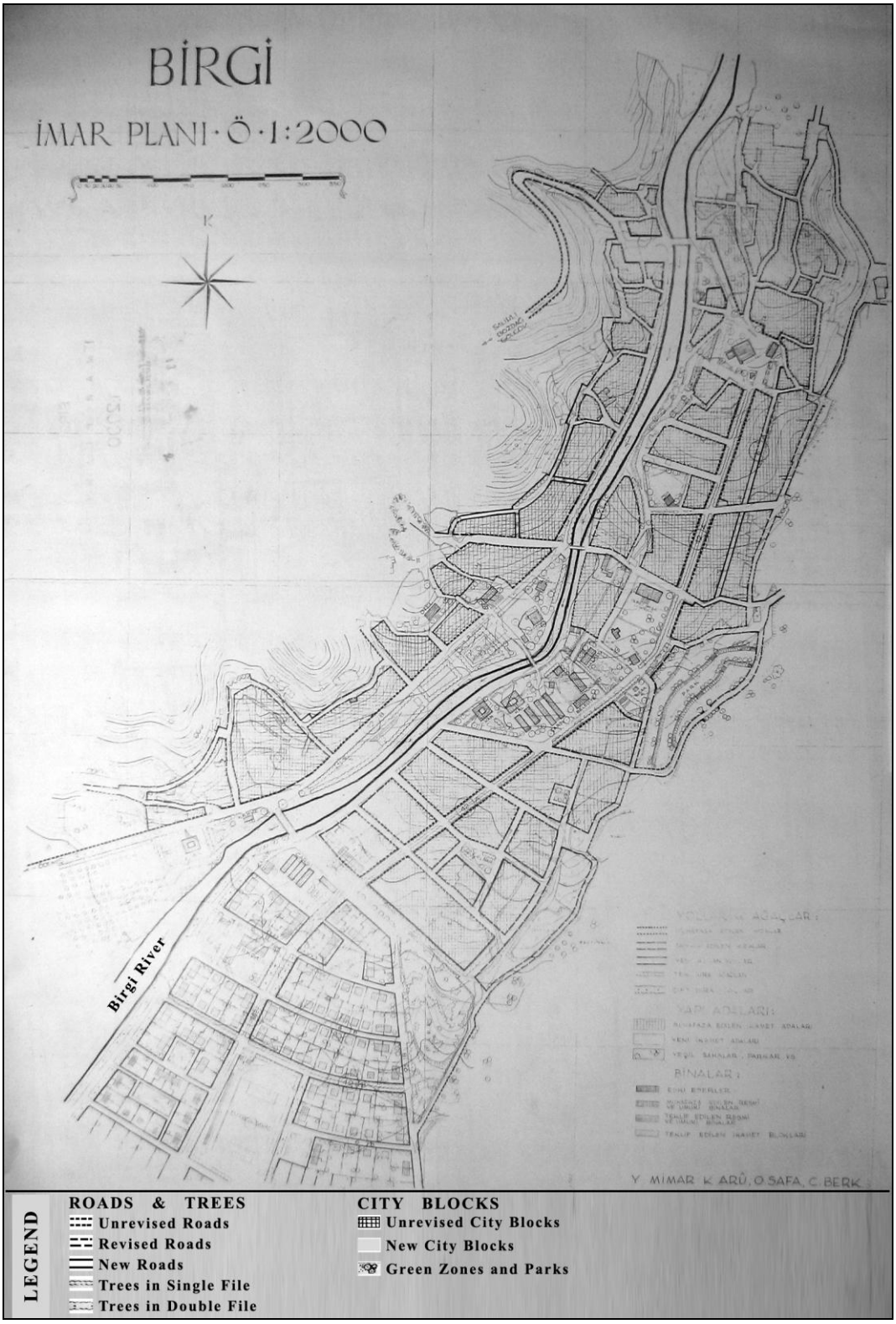

Figure 28, Birgi masterplan (Safa, Aru, Berk, 1947)

Figure 29, Birgi masterplan (based on Safa, Aru, Berk, 1947)

Derviş Ağa Mosque (Kiel, 2001: 53), İmam Birgivi Madrasah and the Great Mosque (Altınoluk, 2007: 25-27) were repaired in 1946. With the decision no 7422 of GEEAYK (High Council of Immovable Monuments and Antiquities) dated 16.09.1973, it was decided to repair Çakırağa Mansion and to determine and register "examples of official and civil architecture that should be conserved". With the GEEAYK decisions no 7658 dated 12.01.1974 and no A-352 dated 12.02.1977, 135 houses and 26 monuments were registered, and it was indicated that Birgi should be declared a protected area and planned accordingly (see Fig. 26). İmam Birgivi Madrasah and the Great Mosque were repaired between 1975 and 1978 (Kiel, 2001: 53).

At the "Final Master Plan Explanation Note" prepared in 1981 by Teoman Akdoğan, certain problems and solution suggestions are mentioned. These problems can be listed as follows: i) the accessibility to İmam-ı Birgivi Tomb is not suitable, ii) the roads connecting Birgi to Gölcük and Bozdağ are connected to each other, and iii) Taşpazar, Sasalı, Özkesler and Demirbaba regions are not connected to the central settlement. Regarding these problems, first of all a road connecting the central settlement and İmam-ı Birgivi Tomb is suggested, in such a way that the historical houses located in Camikebir quarter should not be damaged. Secondly, a new bridge at the north of Aydınoğlu Mehmet Bey Mosque, and lastly, new routes providing the connection between distant regions and the centre are suggested.

In Birgi 1:2000 Master Plan Explanation Note, the road allocated for the drinking water bottling plant on the way to İmam-ı Birgivi Tomb upon the request of the municipality, the area allocated for the construction of a separated secondary school building next to primary school and touristic recreation and resting facilities in the area around İmam-ı Birgivi Tomb are also mentioned.

In accordance with GEEAYK decisions no. 7658 and A-352, dated 1974 and 1977, respectively, and the item 6 of law no. 2981 dated 1984, the boundaries of Birgi protected area and the registered buildings were discussed in the Committee Meeting no. 26 dated 07.07.1988 of Cultural and Natural Heritage Preservation Board no.1 of

İzmir within the body of Turkish Republic Ministry of Culture (İzmir 1. KTVKK). As a result of this meeting, by the committee decision no. 432, the registration decisions regarding 87 buildings which have been damaged, lost value, or collapsed during the investigation period were revised. 18 of these buildings had been entitled as "monumental buildings under preservation", 34 "second group buildings under investigation", and 26 "third group structures under investigation", and a part of Camikebir and Kurtgazi quarters had been accepted as "urban protected area" (see Fig22-26).

By means of the same decision, "Principles of Birgi Urban Protected Area Late Period Settlement", "General Decisions for Birgi Urban Protected Area", and "Principles of Repair and Rehabilitation of Houses Registered as Cultural Entities" were defined and it was stated that these principles are valid until a conservation master plan is prepared, which the related authorities are responsible of preparing within a year. No other suggestions were proposed for the close vicinity of the historical settlement.

After the municipality applied to the Bank of Provinces for the preparation of Birgi Conservation Master Plan, in 1990, The Ministry of Culture had Cengiz Eruzun and Erdal Küpeli team prepared the "Conservation Master Plan" regarding urban protected areas (see Fig. 30). This plan included the historical monumental buildings in Camikebir quarter and in whole Birgi. Eruzun and Küpeli stated that the urban and natural areas that are out of protected area boundaries, but contributing to its integrity should also be included in the conservation activities. By means of the plan prepared by the planning team under the leadership of Eruzun and Küpeli, the importance given to the city was increased and not only single buildings or a part of the town, but whole town was registered as "urban protected area" and included in the conservation efforts. The surroundings of the settlement were also registered as natural and archaeological protected area.

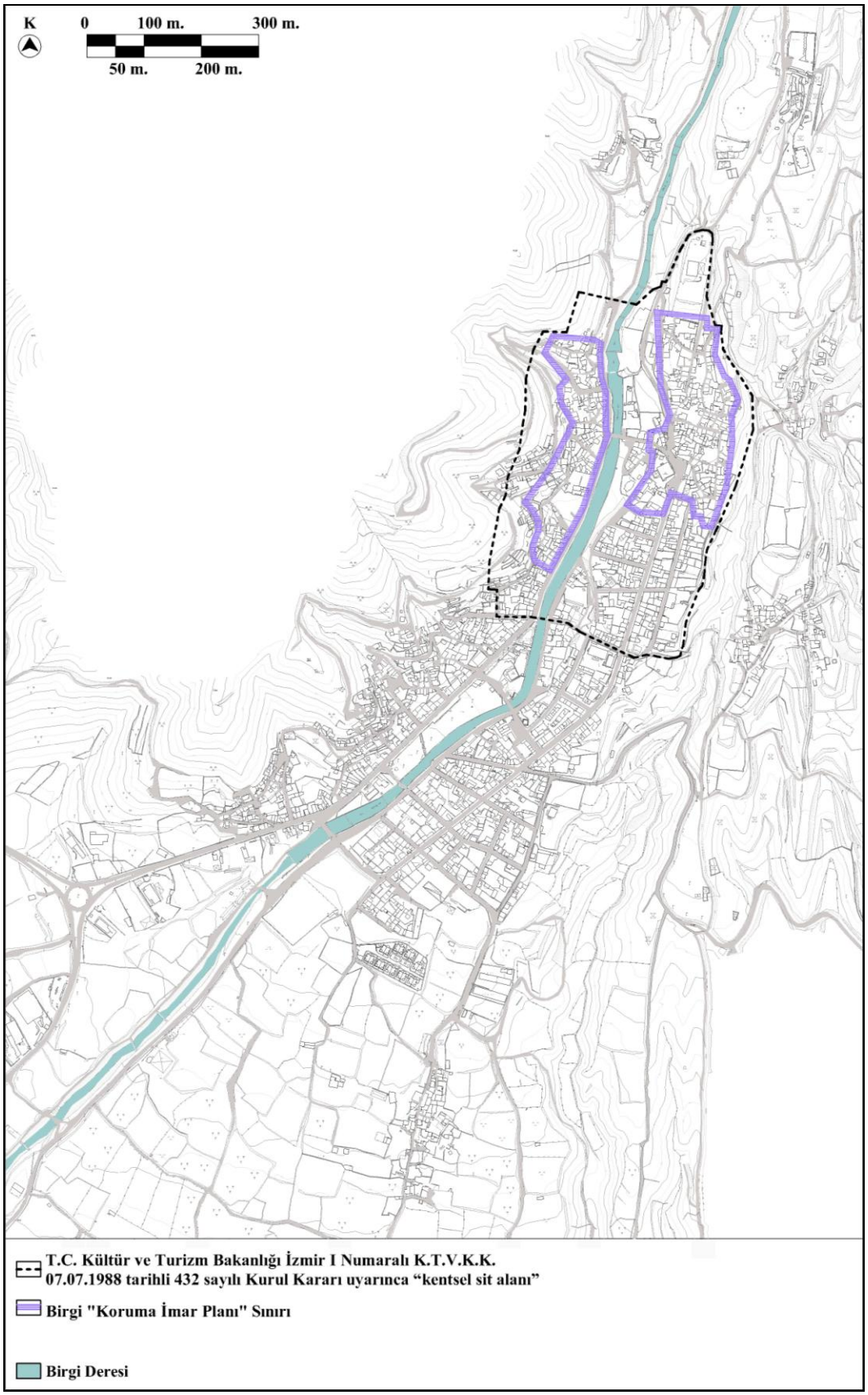

Figure 30, Borders of 1990 Birgi masterplan

In 1992, the repair of Çakırağa Mansion[19] was completed and the building was put in service as a museum (Kiel, 2001: 53).

After the advice of Eruzun and Küpeli to take urban protected areas as a whole together with surrounding urban and natural tissue, "Additional conservation master plan" was decided to be prepared as well. The plan, prepared by Ahmet Uzel and Kamutay Türkoğlu, aimed at proving the continuity of 1990 plan decisions, was taken in effect by means of the decision no. 5963 dated 11.04.1996 of Cultural and Natural Heritage Preservation Board no.1 of İzmir (see Fig. 31-32). The plan was designed so as to include suggestions made by Eruzun and Küpeli. It regulated the relationship between the settlement and its cclose vicinity so that Birgi historical urban tissue could be preserved.

[19] The photographs of the great Mosque and Çakırağa Mansion found in the book of Riefstahl (1920) on his impressions about Anatolia, including Birgi are important (1941: 19-26).

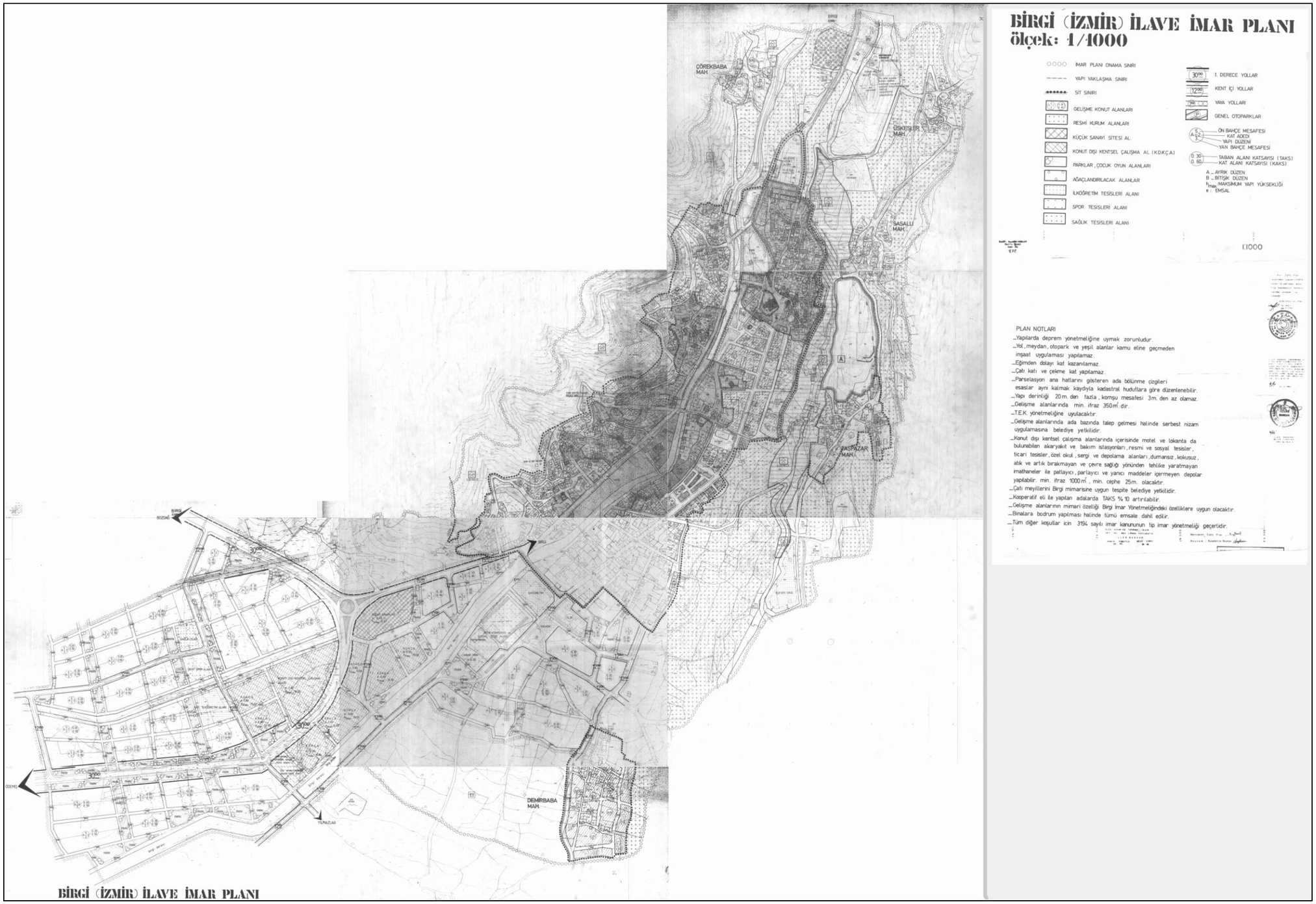

Figure 31, Additional masterplan of Birgi (Uzel, Türkoğlu, 1996

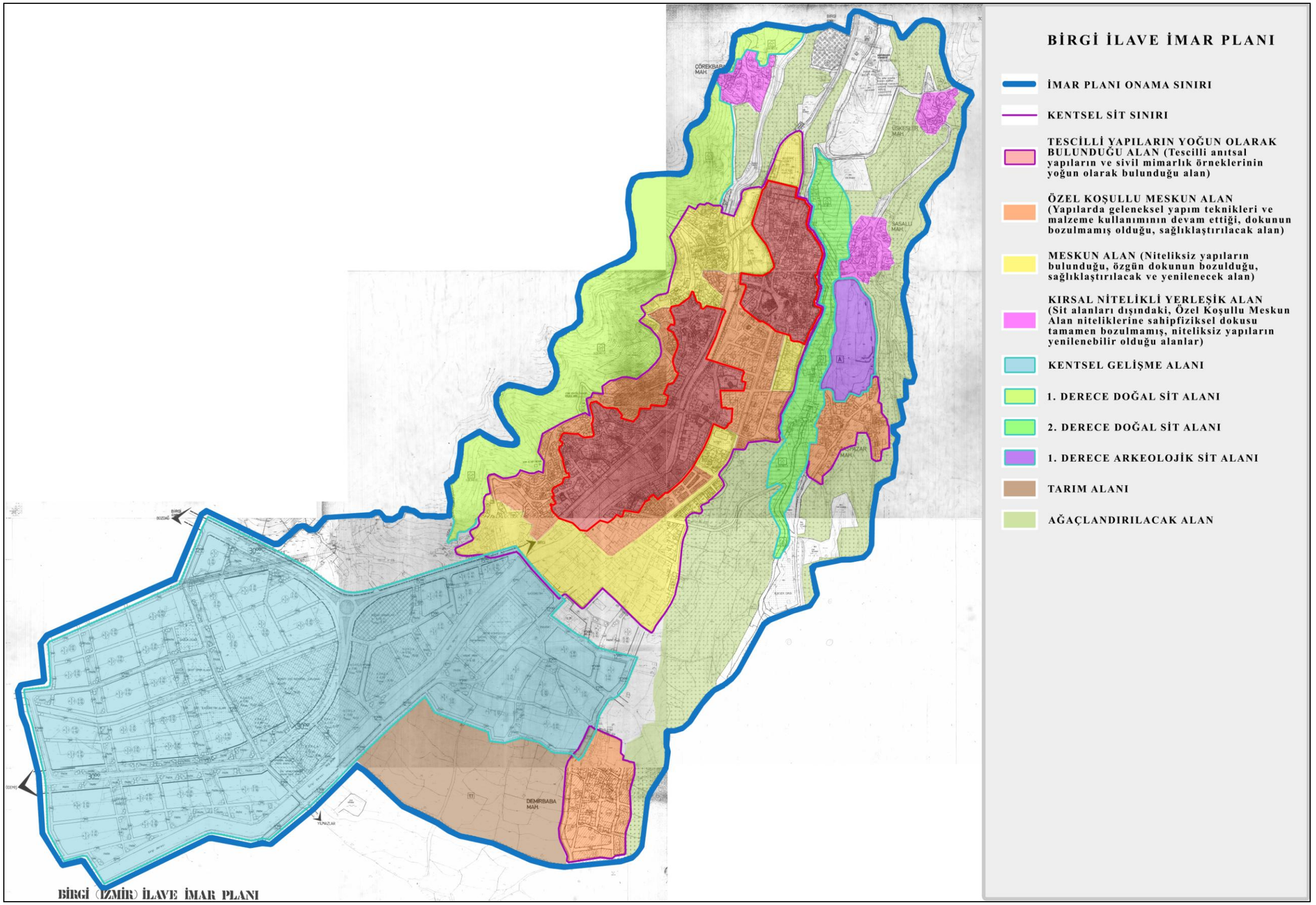

Figure 32, Additional masterplan of Birgi (based on Uzel, Türkoğlu, 1996)

In 1988, urban design and street rehabilitation projects covering the Bahadır Bey Street, 1. Beyzade Street, 2. Beyzade Street, Beyzade Street, and Aydınoğlu square were performed by Fon Architecture (see Fig. 33). This study is the first example among the street rehabilitation studies in Birgi. Since 1998, a lot of street rehabilitation studies have been carried out to preserve the buildings of the settlement, to change local people's view on preservation, and increase their interest on street rehabilitation. Thanks to these efforts, Birgi Municipality has taken the Certificate of Appreciation given by the Event of Historical and Cultural Heritage and Encouragement to Its Applications Project in 2007 (Görgülü, Dedehayır, 2008: 92-94).

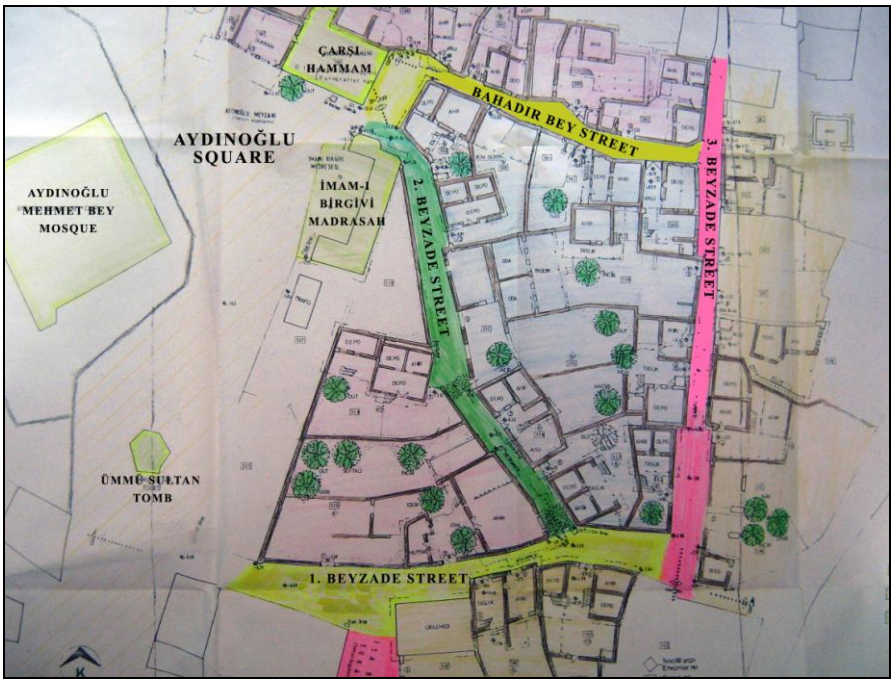

Figure 33, First of street rehabilitation works in Birgi (based on Fon Architecture, 1998)

The revision studies carried out by Ege Planning Joint Stock Co. for the solution of ownership inconsistencies in the "Additional Conservation Master Plan", digitization of the plan, demonstration of the buildings that were later determined as cultural entities on the plan, inclusion of Sasalı region and the solution of divergences between plan and plan notes have been continuing since July 2009.

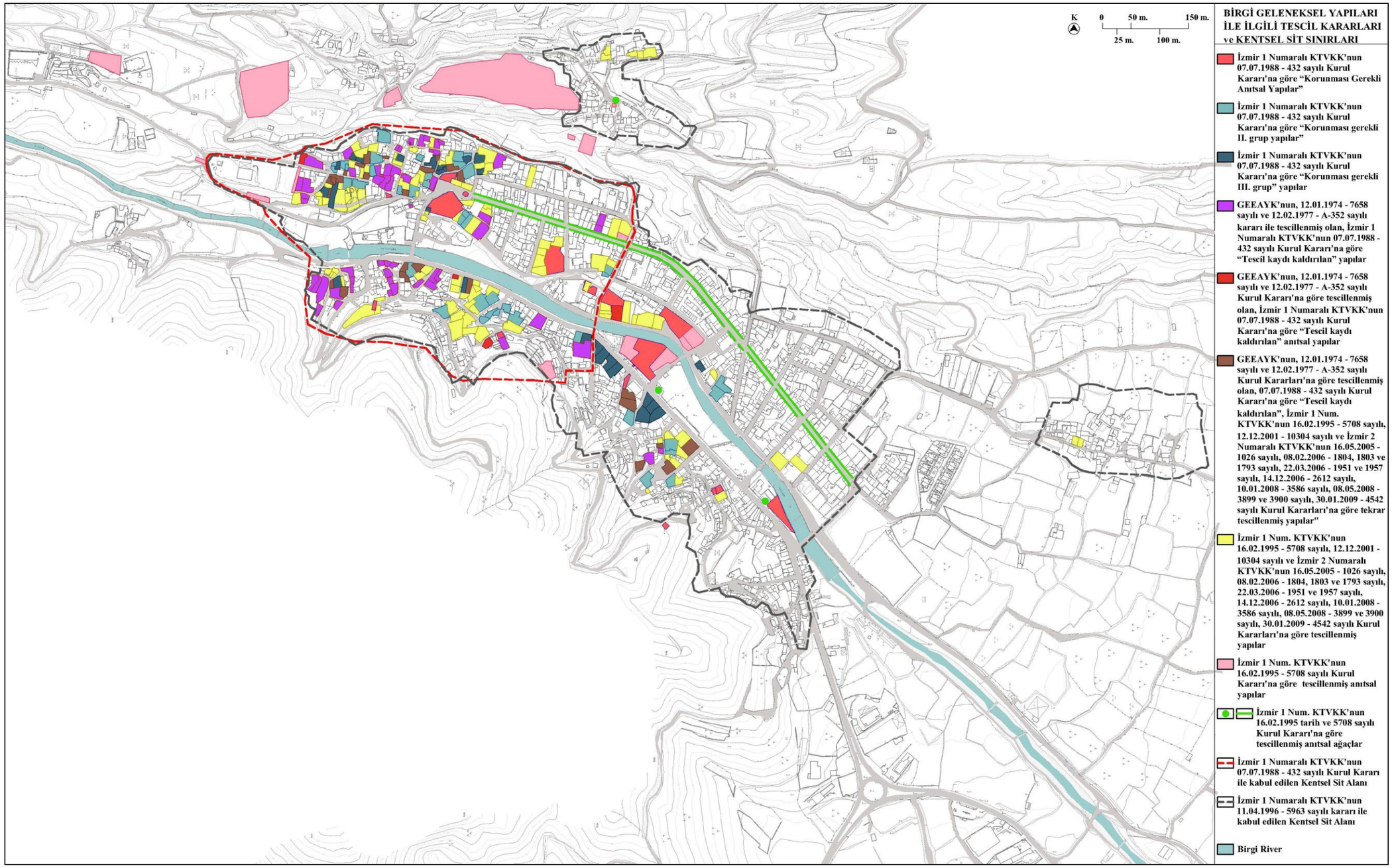

Figure 34, Registry records on Birgi traditional Houses

2.4. CHARATERISTICS OF TRADITIONAL BİRGİ HOUSE

The settled areas in the Byzantine and Aydınoğlu Principality periods in Birgi continued to be inhabited in the Ottoman period as well. This situation in this area provides the existence of traces both from the Byzantine and Aydınoğlu principality, and from the Ottoman period. Therefore, the ancient monumental and structural remains from the Byzantine and Aydınoğlu Principality and the physical features of the Ottoman settlement tissue can be followed easily in Birgi.

Because of the river floods occurred in various periods, earthquakes, 1922 fire, and 1939 flood, some of the traditional Birgi houses have been affected badly. This effect is observable sometimes locally, as structure-based, and sometimes regionally. Traditional settlement tissue is still observed in the places where the non-damaged (structurally) traditional houses are in abundance (see Fig. 8).

In these areas, the Ottoman settlement tissue can be followed roughly and the variations depending on the topography, the building dates, and the construction techniques can be recorded in accordance with the regional and structural style. However, there are some places in southeastern part of the Cumhuriyet Quarter that display both grid-iron and organic street pattern at the same time.

Birgi traditional houses have several characteristics same as the traditional Ottoman houses existing in different settlement all of which are located in western Anatolia.

Kuban (1995) defined the early period traditional Ottoman houses in western Anatolia as the houses with galleries and limited details. In the upcoming years, the houses in this region as in the other regions show differences on the basis of being pastoral or urban. Nearly all of the houses in the rural settlements have open or semi closed spaces connected directly to the street, due to the need of open spaces relating with the daily life style and needs (Oliver, 2003, 166). On the other hand, the configuration of the houses in the urban settlements that need less connection with the street are more enclosed than those in the rural places (Kafesçioğlu, 1955, 8).

The houses located in western Anatolia, as mentioned in the section of 2.4.1.3 as well, were differentiated beginning from 19th century. Regarding to this subject, there are three main groups, although different names are being used in related studies:

- Traditional Ottoman house
- *Adalar-Sakız* type
- Transition type between the Traditional Ottoman house and *Adalar-Sakız* type

In some of the settlements of the cities located in western Anatolia the examples of only one type mentioned above, can be seen, while in some of others, all three examples can be observed at the same time.

The first group defined as the traditional Ottoman house- mentioned in 2.4.1- comprising the house type, which is built by using masonry ground floor, and timber skeleton system[36], in some of which the projections can be seen, is represented generally by 2 or mostly 3-floors. The usage of the plan scheme with exterior *sofa* has been changed considering the climate. In addition to this, the first group includes also the houses that were built based on the plan schemes with both interior and exterior *sofa*. According to Eldem (1984: 62-63), these houses show major similarities relative to the traditional houses in the Marmara region.

The accessible materials, which are used frequently in construction, are stone and timber. In places close to the ancient settlements, in the structure of walls, some reused materials can be seen like colon base and capitals especially used as decorative elements. According to Kürüm (1998: 30), these houses are surrounded by high courtyard walls projected along the street in the ground floors and tried to build so that the visual connection with the street in the upper floors is not limited so much. The best examples of these types of houses exist, even at the present time, in Manisa, Kula, Tire, Ödemiş, Birgi, and Buldan (Eldem, 1984: 62).

The second group, on the other hand, is known as *Adalar-Sakız* type and built by using masonry system. They have generally two floors; the projections are totally built by means of timber skeleton system, and timber or metal braces. In this type, the rooms do not display different functions at the same time on the contrary of other type of houses (Urfalıoğlu, 1995, 2: 362, Akyüz, 1993). The houses belonging to this group are observed generally in western coast of Anatolia and in the Aegean islands. Throughout the history, the economic relations between the Aegean islands and the coastal areas have generated an intense cultural interaction among the character of the houses. For this reason, the house architecture in the Aegean coast is an integral whole with the ones in Aegean islands (Levi, 2002:275).

The third type, a transition between traditional Ottoman house and the houses of "Adalar-Sakız" type, carries characteristics from both house types in western Anatolia.

Birgi traditional houses, which can be included in *"Traditional West Anatolian Ottoman House Type"*, can be examined in four main groups based on the variations of their façade characteristics (see Fig. 36).

1st group houses:

The first group comprises the houses in which the walls of the ground floor is built by masonry walls with lintels and those of the upper floor (s) are generally built by using timber skeleton system. The houses have 2 or 3 storey high. The distinctive façade characteristics of these houses are higher upper floors in comparison to 3rd and 4th group houses, use of top windows, 100-120 cm wide eaves and rich architectural features. These houses, probably the oldest examples in Birgi, are differentiated among the general tissue for the quality of their architectural elements and/or floor heights, size and decoration. They are dispersed within the settlement area in small numbers so that they cannot form a tissue. They are scattered in the settlement but 14 surviving examples are all located in those areas that went through 1922 fire with little damage.

2nd group houses:

The houses forming the 2nd group are those constructed using masonry system with lintels at the ground floor and timber skeleton system in at least one of the upper floor walls. Even though there are examples with 1 storey only, in most of the cases they have two storeys. Among the distinguishing façade characteristics of these houses, higher upper floors in comparison to type 3rd and 4th group houses, use of top windows, and 100-120 cm wide eaves can be listed. These buildings have similar physical features and form most of the Birgi traditional urban tissue with rhythmic repetitions. This type of houses is located everywhere in a scattered way except the northern side of Gazi Umurbey Quarter and the southern side of Cumhuriyet Quarter. However, most of them are placed in Kurtgazi Quarter, at the northern side of Camikebir Quarter, Sasalı, Taşpazarı and Demirbaba Regions.

3rd group houses:

The third type houses are those dated to the period between the second half of 19th century and 1930's. They are the houses built in the empty places that were affected badly by the earthquake, flood, and the places where 1st and 2nd group houses were damaged or totally collapsed. The houses belonging to this group are the houses in which ground floor is made of masonry with lintels and at least one of the walls of the upper floor is generally built by using a timber skeleton system. They are sometimes one, and commonly two storey high. Although general physical and technical characteristics of these houses are nearly same with those of the 2nd group houses, it is seen that the top windows are not used anymore and the width of the eaves are diminishing to 60 cm. In a small number of houses, on the other hand, the eaves are observed to have been made by using slate in 1-4 courses. The setting area of them is seen same with those of the 2nd group houses.

The plaster is used nearly in all houses for the wall built by using timber frame, but the walls built by using masonry system, on the other hand, left unplastered.

4th group houses:

The fourth group houses were the ones, which were built in Republican Period by means of the traditional techniques in the empty areas left behind the 3rd group houses due to the 1922 fire. Among these houses, one storey high ones are constructed by using stone masonry with lintels, in the two-storey high ones, on the other hand, the ground floor is made of masonry with lintels, and at least one wall of the upper floor is generally constructed by using timber skeleton system. The widths of the timber eaves are 60cm and those of the eaves made of slates are nearly 30 cm. The houses are sometimes two, and commonly one storey high. Opposite to the other groups, in this group, there are examples where plaster is observed on all walls. The houses forming this group are constructed by the masons coming from the close towns in the vicinity (mostly from Denizli, Tavas, İzmir and Çal) to construct the house need caused by fire in Birgi[20]. The houses in this group comprise not only the representatives of Birgi, but also those of near vicinity. The houses are generally scattered in the north and south part of the Cumhuriyet and Gazi Umurbey quarters in the central settlement, which were damaged because of the 1922 fire, and sometimes found in groups. In the Şehit Gürol Madan Street of the Kurtgazi quarter, some representatives of this group are observed. These houses were constructed in a period that reflects differentiation and alteration in the basic principles of the traditional Ottoman house. Therefore, these houses were excluded from this study and not studied in detail.

[20] The interview with Ahmet Tezcan, 30.07.2009.

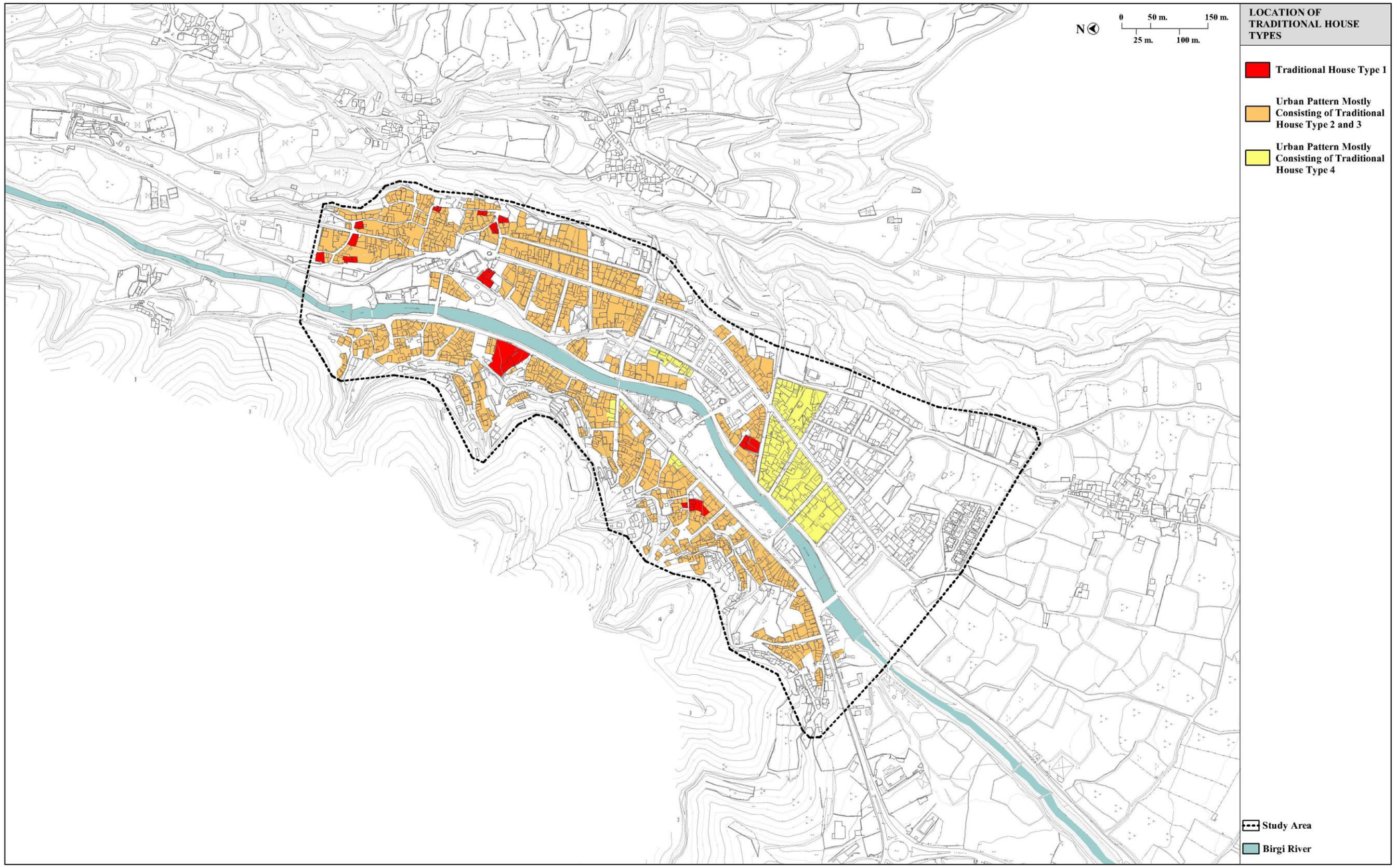

Figure 35, Location of traditional house types

Climate and topography have a great influence on the formation of the traditional settlement tissue in Birgi. Organic pattern of street is conformable with the topography such that they are developed in the areas along the slope of topography. The traditional pavement of some parts of the streets limited by the ground floor walls of the houses and high courtyard and garden walls was conserved till today. In the mentioned covering found mostly in Taşpazarı, Sasalı and Demirbaba Regions, the slate, an easily available material of the reigon and various sizes of river rubble are used.

The widths of the side streets are narrow to be preserved from the climatic conditions and wide enough to allow the way of carriage. They are nearly 3 meters in width. There are corner chamfers to house or courtyard walls located at the intersection level of some streets. There are a small number of dead-end streets in Birgi. As street pavement, slate was used in lateral direction in the canals, which were formed with a decreasing slope at the geometrical centre of the street, and in the perpendicular direction at the side surfaces. The units larger than the stone block used in the sides are generally used at the exterior façade of the house facing the street while smaller ones are used in the interior façade. A way to enable the rainwater to flow is generated by using water channels. The rainwater flowing in various directions with different slopes is canalized to river or groundwater by the drains in the intersection points of the streets (Tosun, 1983: 86).

Aydınoğlu Square at the centre of the city is located at the interseciton point of the two main streets. This square is limited with the Aydınoğlu Mehmet Bey Mosque, İmam-ı Birgivi Madrasah, Aydınoğlu Turkish Bath, coffeehouses, and groceries.

The typical Birgi traditional settlement tissue can be observed clearly in the small streets. The elements of this are observed as the gardens of the monumental buildings and generally with a fountain inside, a furnace or a tree at the intersections of the roads. Today there is only one fountain left and many public furnaces that are still in use in the streets.

Houses and the commercial areas are separated from each other in Birgi. The first one of commercial centers is located at the street of Aydınoğlu Mehmet Bey. The second, on the other hand, is located in the intersection of Cumhuriyet Street and Fatih Mehmet Bey Street. Cumhuriyet Street takes place where the previous commercial centre[21] is relocated in 1940s. The third one is the commercial centre formed by the touristic shops around İmam-ı Birgivi Tomb. Most of the monumental buildings survived from the time of Principalities and the Ottoman period are located randomly at the east side of the river (see Fig. 25).

The traditional houses in the settlement are constructed conformable with the topographical conditions as mentioned before. The dominant order of the housing in Birgi urban tissue is formed with separate order and as 3-4 rows of houses. In Camikebir Street except for the Sasalı Region, Demir Baba Region, and in the eastern side of the Kurtgazi Street, adjacent order is common. These houses are constructed on a straight platform, sometimes forming level differences with each other according to the slope. In the western part of the Kurtgazi and in the Sasalı sections where the slope is much higher, separate order is observed. Since there is different angle of slopes, the houses located in these regions have altering elevations in between back and front streets. Half of ground floors and basements of these houses are below the ground level comprising the basements. In this kind of houses, the entrance is provided from the street at a lower level. The openings of the houses, on the other hand, face generally both streets, but there are also examples openings to one street.

The houses are generally constructed at the borders or corners of the parcels so that the gardens are kept large enough without dividing[22] (see Fig. 36). Thus, at the rearsides of the houses, in the middle of a group or at the side of the groups of houses, green areas are formed by the detached gardens (Ekinci, 2005: 13).

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[21] The old commercial centre located in the region between the south og the Demir Mağaza, Şehit Gürol Madan Street and Birgi River was relocated because of the river flood occured in 1939. This reigon is used as a olive grove today.

[22] It is oberved that the avarage bottom area coefficient (TAKS) of the houses located in structure groups within the Birgi traditional urban tissue is 27 % (Eruzun, 1990: 9).

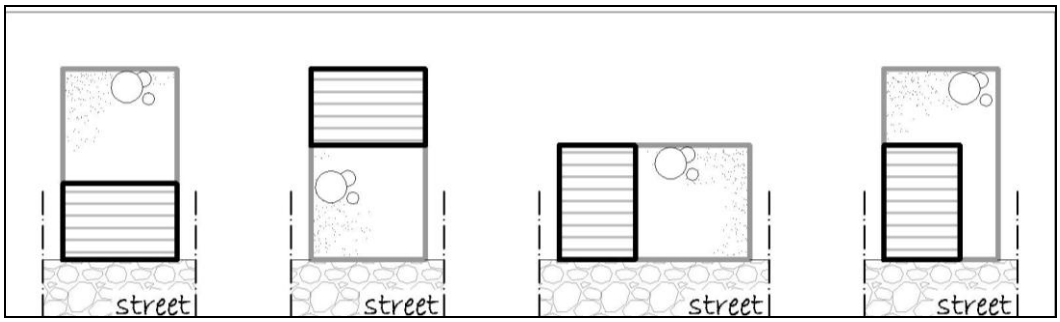

Figure 36, Parcel locations of the houses (service spaces are sometimes located in the house and sometimes at the margins of the courtyard as a separate mass)

Among the traditional Birgi houses, which are generally two storey high, there are a limited number of single storey high and three storey high examples as well as those having a mezzanine. The horizontal lines are dominant in these houses. Due to the construction materials used and the orientation between the floors or rooms, seasonal usage is provided in some of the houses. Stone paved narrow streets are limited by means of stone masonry ground floor walls and at least 2 meters high courtyard-garden walls. These ground floor walls are mostly without openings. The ventilation need of the ground floors facing the streets is satisfied by means of the embrasure windows located above the eye level. One of the most important features of the buildings is slate, being the most easily accessible construction material. Being used in the street and the *taşlık* covering, as well as at the walls of the house and courtyard, slate provides the integrity and the continuity.

The ground floors of the houses have no direct relation with the street except for the two-winged, wide timber doors in the courtyard or main house walls. This situation is conformable with the functional scheme that concerns the privacy in traditional house architecture (Ekinci, 2005: 13). Upper floors are considered as a part of the street with their façade ornamentation, wide elaborate eaves, projections, and window openings. Window openings heights extend to 1m, width are limited to 170cm, they have approximately 1:2 ratios and are rectangular (Gül, 1995: 67). Some of these have shutters. In the first and second groups the shutters are made of timber, while in the fourth group, they are made of metal. The usage of shutter in the 3rd and 4th group is rare. There are also top windows in some of the examples belonging to

1st and 2nd group.

The load bearing elements of 50-100 cm wide triangular or rectangular projections are generally not covered and in almost all of them, except a few examples, timber braces are readable. In some of the 3rd and 4th group houses, the projections are made by using metal braces.

There are changes in the width of the eaves whose bottoms are generally not covered. The eaves are generally in 50-130 cm. in width and the load bearing system of the roof is readable. There are also a small number of examples of eaves that were formed by slate in 20-30 cm. width. All these houses are belonging to 4th group. The roofs of the houses are generally shaped as gables or as hipped roof with 3 or 4 slopes. The slope of the roofs changes between 30% and 35 %. Tile is used as roof covering material. The roof water flow to courtyard or directly to street without conduit.

From the streets, generally there is an entrance towards the *taşlık* and after towards the room. *Taşlık*s are grouped into two based on the number of the faces limited by the house and courtyard walls. In the 1st group, *taşlık*s are surrounded by three faces with the house and courtyard walls and their widths do not exceed 3 m. In this kind of *taşlık*s, the visual connection with the courtyard is weak. The open *taşlık*s belonging to 2nd group, have total or partial visual connection with the courtyard. The separation of the *taşlık* from the courtyard is almost weak in this group. The load bearing posts of the upper floor and covering materials give this separation. There are a small number of examples in which the entrance door opens directly to the courtyard. Though having small dimensions, there are courtyard and *taşlık* in nearly all houses. The entrance doors have generally double, rarely single winged timber material.

The ground floor provides four different types based on the difference of location of the *taşlık* and courtyard in the houses, where there are direct entrance from the streets to *taşlık*s and then to the house: (Figure 37).

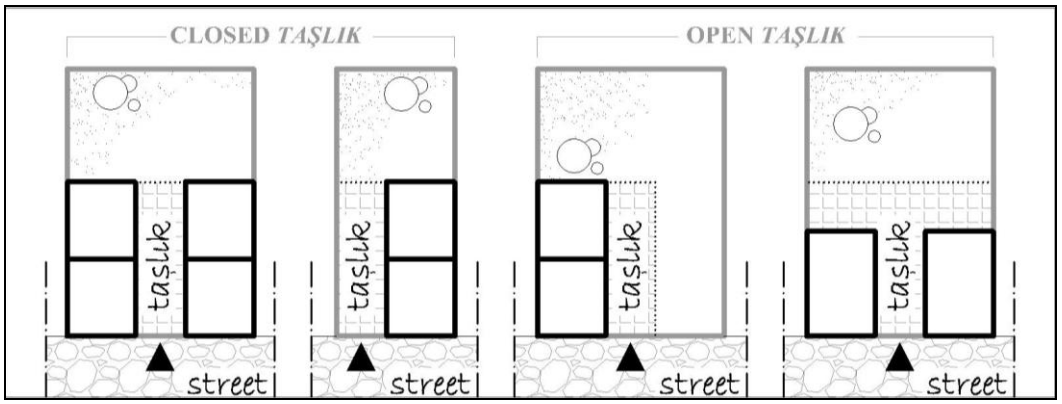

Figure 37, The location of the *taşlık* in the ground floor (Uzel, Türkoğlu, 1991: 35)

In Birgi traditional house, some functional activities related with the production are being held in the ground floor. Generally, barn, animal shed, and high loft are located in the service spaces around the *taşlık*. In a small amount of the houses, they are located as a separate part. In this condition, the area around the *taşlık* is used for the kitchen and rooms. (Uzel, Türkoğlu, 1991: 35). *Taşlık* provides generally the circulation and designed as a service space with the courtyard fountain and a fireplace (Ekinci, 2005: 13).

*Taşlık*s, which have gained this name from the covering material, are covered by slate and river pebbles unique for this region. The *taşlık*s are surrounded by stone walls as in the case of ground floor. The ground floor spaces directed to the *taşlık*s, even if they were not designed as kitchen or room, they do not have openings to the outside except for the small embrasure windows (they are used as a ventilation element in barn, animal shed, and high loft) (Uzel, Türkoğlu, 1991: 35).

The courtyards, as the most important production space in Birgi traditional house, are isolated from the exterior effects and the life outside by high stone walls. The courtyard and the gardens form the open spaces of the houses. The courtyards being used continually except for a couple of months in the winter are terraced according to the slope of the topography. The most important elements of the courtyards- the service spaces (animal sheds, fountains, toilets, and fireplaces) take place in the original design at the corners of the gardens. In the later periods, on the other hand,

these units are started to be constructed close to the main house. The ground is generally covered with earth. The usage of garden do not exist for the small parcels, in big parcels, they are designed at one of the borders of the courtyard.

Barns are generally located in the ground floor of the main building, and sometimes as a separate space in one of the corners of the courtyard. The floor of these spaces is earth. The embrasure windows are used in the walls facing to the street, whereas the windows of maximum 70 cm width are used in the walls facing to courtyard and *taşlık* for the ventilation. The annexes designed separately from the main building are constructed in a rectangular, single storey high space where rubble masonry and slate are used for the walls and over & under tiles for the roof.

The spaces in the ground floor of the houses are not rich architecturally. Some part of *taşlık* and courtyard is covered by slate. Depending on the usage, slates are used in the floors of the rooms or the ground is made of earth. The timber log lintels that are bearing the load of the upper floors are readable. The spaces other than the rooms do not have ceiling covering. Upper floor(s) are generally accessed by means of timber staircases. The plan of this main floor is organized as randomly ordered rooms and *sofa,* although there exist also some plan types without *sofa*. In almost all Birgi traditional house plans, there is an exterior *sofa*, some of which are closed with a window wall to prevent the climatic effects with late additions. In a plan in which the rooms are lined at a corner of *sofa*, rooms are formed as they have the shapes of L or U by adding rooms sometimes to a corner, and sometimes to both corners (Ekinci, 2005: 15). It is possible also to find a plan scheme which is formed by using an interior *sofa*.

It is observed that the plan scheme of the ground floor is same for the upper floors that are formed by the rooms and *sofa* and generally *taşlık* is replaced with *sofa* in the upper floor. Dominantly four main types of plan schemes are used for this floor and they are grouped generally as the ones with interior or exterior *sofa* (Uzel, Türkoğlu, 1991: 36) (see Fig. 38).

Figure 38, The location of *sofa* in the first floor (Uzel, Türkoğlu, 1991: 36)

The rooms are located at two or three sides of the *sofa*s. *Sofa* is named also as "*çardak*" in Birgi and used not only as the circulation place in between the rooms and floors but also as the living place. Rectangular shaped *sofa* is limited by room walls at least at one side of its depths. In these houses, which have the plan schemes with exterior *sofa*, the one or two short sides of the *sofa* are formed by masonry walls and there is a fireplace at least on one of these walls.

Sofa faces the street and/or the courtyard from its open sides. In the examples in which the *sofa*s are open to the courtyard, *sofa* is carried by timber posts. In the open façades of the *sofa*, timber balustrades and timber lattices overlying the balustrades are used in between the posts. For the façades three types of configuration are used, eventhough their materials and the technique are same (Figure 39).

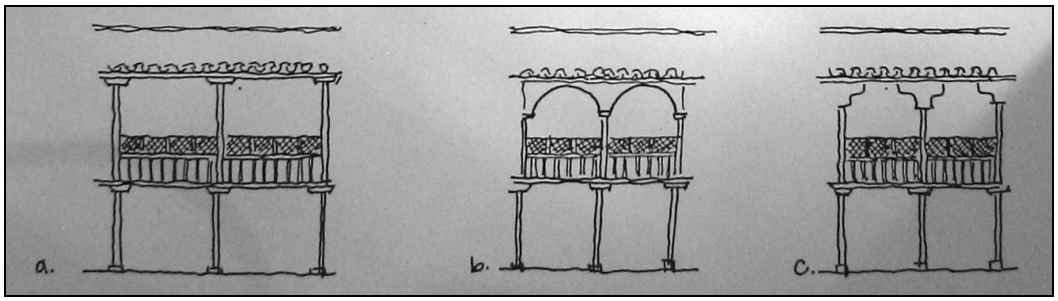

Figure 39, The typology of the façades in which *sofa* is open to courtyard (Uzel, Türkoğlu, 1991: 36)

Sofa, together with fireplace and *abdestlik*, is designed to function also as a kitchen. Fireplace having a semicircular opening has a plain design. *Abdestlik*, in some examples having also a shelf, is located in the courtyard-garden direction of *sofa*. *Abdestlik* is formed as a timber projection at balustrade level. Water used in *abdestlik* flows directly to the courtyard or the garden. Floor covering in *sofa*s is timber. There are *seki*s or *sedir*s, in nearly all houses. The ceiling, on the other hand, is mostly uncovered and therefore the load-bearing system of the roof is easily observed.

Rooms differ from each other in terms of location, size and multiplicity of architectural elements. One of the rooms of houses having 2-3 rooms exhibits the quality of *main room*, due to its larger size as well as a richer sight and furnishing it offers (Ekinci, 2005: 15). Projections located at the main room section are supported by timber or profiled metal braces. There are a few examples of rooms with *seki*. For most of the times, the access to mostly square planned rooms is provided from a corner of the room. In some examples, this corner is chamfered. Rooms except main room are generally plain in terms of architectural elements and decoration. In most houses, there is a cupboard along a wall without any openings except a door. *Gusülhane* is placed inside this cupboard. In the main room, on a wall without openings, generally a fireplace is placed. In many examples, there is a fireplace also in other rooms. Upper floor rooms are opened with windows to *sofa* of exterior space to provide light. At least one of the upper floor windows is positioned in such a way that the entrance door to the house can be seen. There are always timber balusters in main room windows, while this is only a general statement for other rooms. Floor coverings of the rooms are timber. Ceilings, on the other hand, are covered using timber boards and laths. Ceiling covering with *göbek* decoration is used generally in main rooms.

Sun, cypress and spike figures are symbolized at some parts of the walls close to the roof especially in certain 1st and 2nd group houses. Especially the spike figure, which is the symbol of Aydınoğulları Principality, is frequently seen in stone masonry walls in Birgi. In addition, pomegranate, tulip etc. motives are seen in ceiling decorations, doorhandles and staircase handrails.

In the ground floors and at least one of the upper floors of Birgi traditional Ottoman houses, rubble stone, river stones and slates are used in masonry walls. In some examples, tile and bricks are also used. Except a few number of houses, stone masonry is used in exterior walls without plaster, while the interior walls are plastered. In timber frame upper floors, on the other hand, adobe, stone and brick infill is seen. In some houses, timber frame system is covered using reed or laths and no infill is used. Timber frame walls are plastered with mud mortar and lime based plaster. In a few number of Type 4 houses, all floors are constructed using stone-brick masonry system and all walls are plastered.

Roof structure is timber. Timber material is generally used as they are, without processing. Chimneys, in some examples projecting over stone masonry walls, are covered by over & under tiles in two directions on top. Detailed information regarding the availability of stone and terra cotta materials is provided in "Ödemiş – Birgi Development Eligibility Status Report and Report for Local Commissionary of Public Works Including Information Serving as Basis for Future Master Plan". According to this report, there are (1) tile and brick kilns in Ertugrul and Turkonu villages, which are 6 km away from Birgi, (2) stones suitable for construction in the river beds, (3) slate quarries in Bozdağ and (4) soil, which is suitable to make bricks, around Semit village, 2 km away from Birgi (Altınoluk, 2007: 172).

The maintenance of historical houses is difficult and expensive, and some material-based problems exist. Besides, some parts of the settlement, where traditional houses are extensively present, are not preferred any more due to problems related to the tissue and structures themselves. Especially in cases where this tendency can be observed extensively in a large area, the preservation of tissue gets more difficult. The buildings which are not used or maintained for a long time have, not only material based but also structural problems, related to their load-bearing systems. Occur the areas where this problem is common are generally uneven terrains due to slope where the roads are rough and/or narrow, which are distant to the center. The houses are in better condition in certain areas. These areas are positioned on main streets, along the riverbed of the rehabilitated streets.

CHAPTER 3

CONSTRUCTION TECHNIQUES USED IN TRADITIONAL BİRGİ HOUSES

Birgi houses, whose architectural characteristics were defined in Chapter 2, were constructed by using a common technique seen throughout Turkey. The difference in construction techniques between ground floor and upper floor(s) (Arel, 1982: 34), which is a general characteristic of Ottoman Traditional Houses, is met also in Birgi.

Foundations, ground floor exterior walls, most of the ground floor interior walls, at least one of the upper floor exterior walls and all service walls are constructed using masonry system with lintels that was called as "*masonry section" by* Şahin (1997, 173) earlier. On top of the *masonry section,* consisting of one or more floors, the upper *timber frame section* is built (Şahin, 1997: 173). In at least one of the upper floor exterior walls, in the upper floor interior walls, projections, and in some ground floor interior walls, timber skeleton system is used. Timber posts, which are another vertical load-bearing element, are used at the ground floor, upper floor(s) and at the points where no massive component is used in the transfer of roof loads to the ground. It is used especially in the ground floor courtyard-garden façades and upper floor(s) façades facing courtyard-garden and street. Built on top of the timber framed sections,timber made gable or hipped roofs are the complements of the Birgi houses.

In this section, aiming to define local constructional features of Birgi houses, the results obtained at the end of site survey of 32 houses and 4 house remains, are given in detail. During the survey, plan, facade and system sections of all 32 houses are

drawn in scale. Then, at certain parts, from foundation to roof, where cross-sections differ, scaled drawings are made. In each of the 4 house remains, those parts where cross-sections differ are drawn in scale. By means of measurements taken from each point where cross-sections and technical details differ, the structures were documented from foundation to top. A code is assigned to each detail node where cross-sections differ (see Fig. 40). Among a total of 32 houses, 18 examples, which are representative for application techniques at each point where cross-sections differs, was chosen and their drawings were prepared (See App. B). For the aim of defining the features of the construction techniques used in Birgi, information obtained from the documented examples were tabled (see Fig. 182) and

1. detail types for each point were determined,
2. usage frequency of these types were examined.

Information obtained at the end of the assessment of the table is given here and in this way, the construction techniques used in Birgi houses were defined. The details were given in the order from foundations to roof and then to architectural elements, as seen in below:

Foundations
Masonry walls
    Corner chamfer
    Symbols located in/on masonry walls
Timber framed walls
Timber posts
Roofs
    Chimneys
    Roof Windows
    Eaves
Relationship of load-bearing systems located at the transition between floors
Architectural elements
    Projections
    Staircases

Fireplaces

Sekis

Abdestliks

Ceiling coverings

Floor coverings

Door

Windows

Niches

Cupboards

The construction techniques used in Birgi houses are given below in detail:

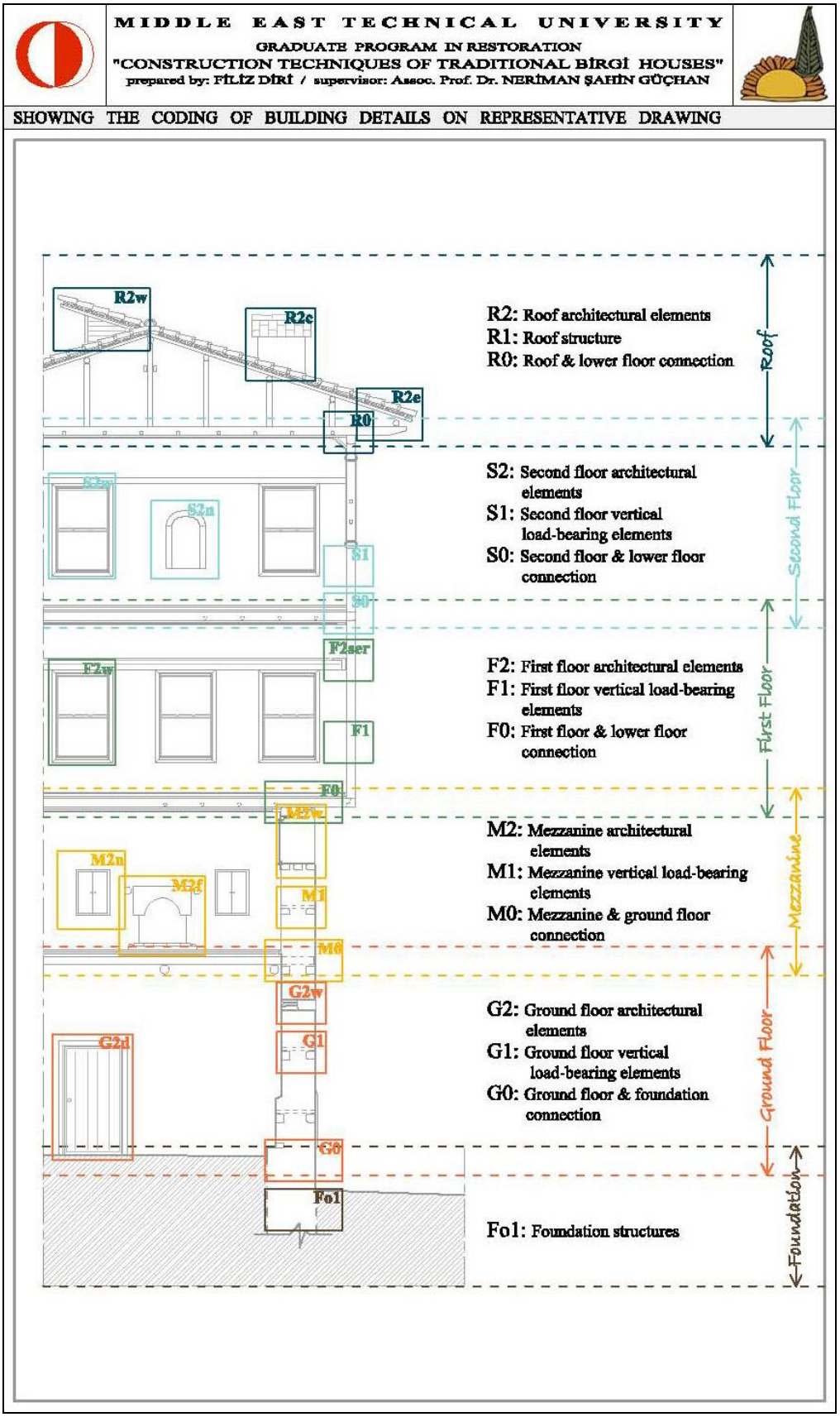

Figure 40, Showing the coding of building details of representative drawing

3.1. FOUNDATIONS

Information regarding the foundations of traditional houses in Birgi is very scarce. During the site study a detailed research on foundations could be carried out only in 4 examples.

As mentioned in previous chapters, Birgi is a hillside settlement located in a area formed by infills of a quaternary alluvial cone (see Fig.3). Boulder pieces are also seen in the region. It was observed that the depth of foundation walls of traditional houses change between 60 and 150 cm, depending on the firm ground beneath the structure. The thickness of foundation walls changes between 70 and 90 cm. In case there is a fireplace at the ground floor, it is presumed that the wall thickness must be larger in this section of the wall; however no such examples could be observed. At the masonry foundation walls, slates as well as rounded stones obtained from river beds and slopes are used, and mud morter is used as binding material. Pieces of brick and roof tiles are also observed in small quantities at the foundation walls of certain structures. No use of timber was seen at foundation walls. In a small number of examples, on the other hand, living rocks under the building were used as a part of foundation walls.

According to Emin Başaranbilek (individual interview on 06.08.2009), to protect the foundation and building from humidity, a foundation pit was opened with a certain slope and the soil was compacted. On this layer, called *kara sulak*, which resists water passage, another compacted layer of rubble was placed to let water passage. At the uppermost section, there is another compacted soil layer, which is about 10-15 cm thick. Water intake is avoided thanks to these layers at different depths and surface slope.

Although number of the surveyed foundation is limited to 4, the foundations of Birgi traditional houses can be divided into 3 main types in terms of construction techniques.

Type 1: Continuous foundation

This type foundation walls are continuous aligned with the ground floor load-bearing walls (see Fig. 41, 43).

The depth of walls under ground level changes between 60 and 150 cm depending on the soil type. The thickness of walls, on the other hand, changes between 70 and 90 cm. The majority of the surveyed walls rise with the same thickness, and yet there are also examples where the thickness gradually decreases as the wall rises.

At these continuous masonry foundation walls, slates, small amounts of brick-tile pieces and rounded stones obtained from river beds and slopes are used. No use of timber was seen at surveyed foundation walls.

Type 2: Composite foundation

The characteristics that distinguish this foundation type from Type 1 is the stone masonry foundation footings used together with continuous foundation walls (see Fig. 42, 44).

Only one example, among the surveyed houses, exhibited such a foundation feature. In this house, the foundation walls continue in alignment with ground floor load-bearing walls. In the aim of shortening the span, along the length of foundation walls, foundation footings are placed, in alignment with the wall, at equal intervals and constructed with the same technique that walls were constructed. The continuous foundation walls are narrower approximately by the half thickness of the footings. The wall sections near the footings, on the other hand, continue with the same width, so that the system is stronger.

At these composite foundations made of continuous masonry foundation walls and footings, slates, small amounts of brick-tile pieces and rounded stones obtained from river beds and slopes are used. No use of timber was seen in the surveyed examples.

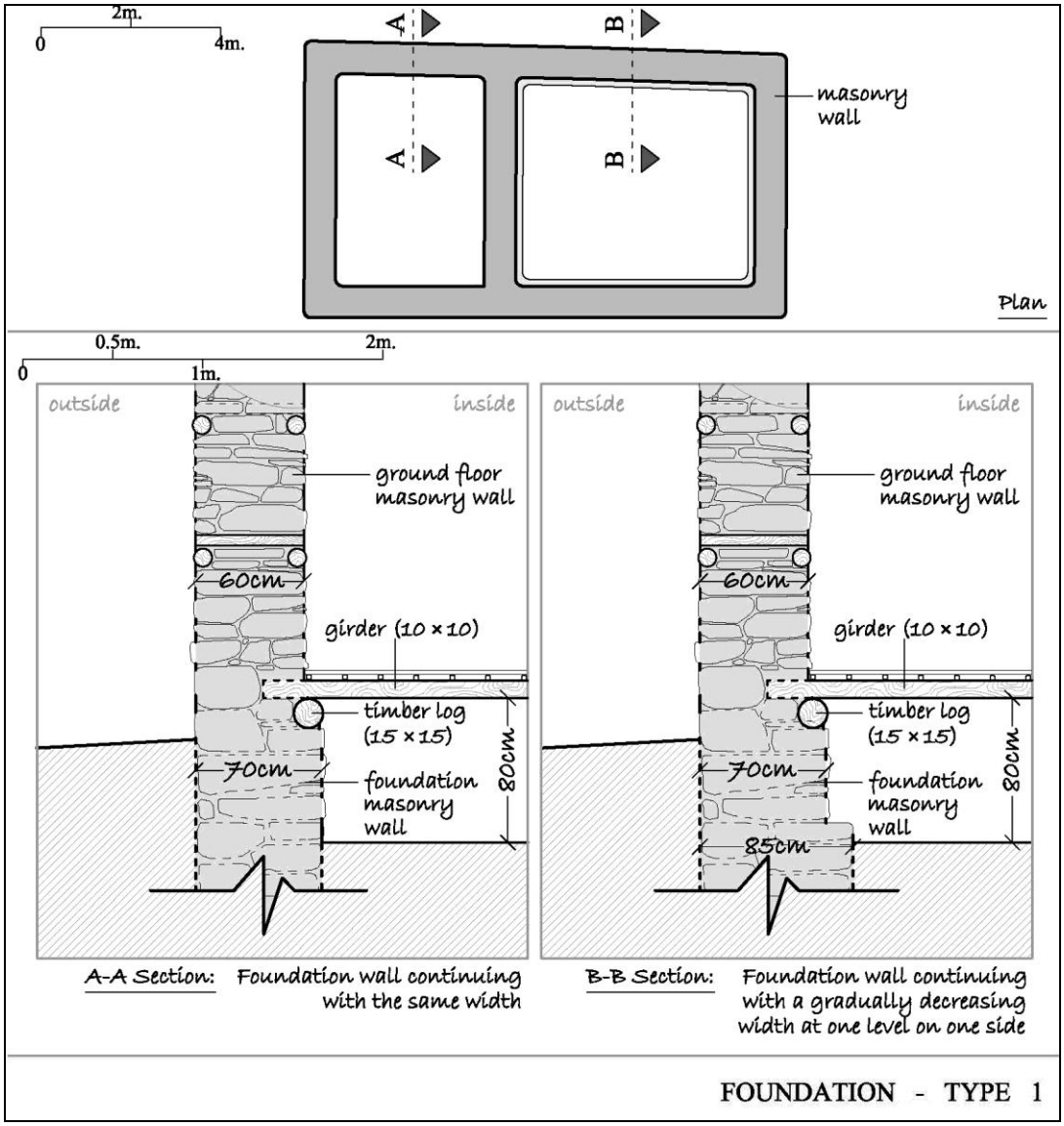

Figure 41, Sections of continuous foundation

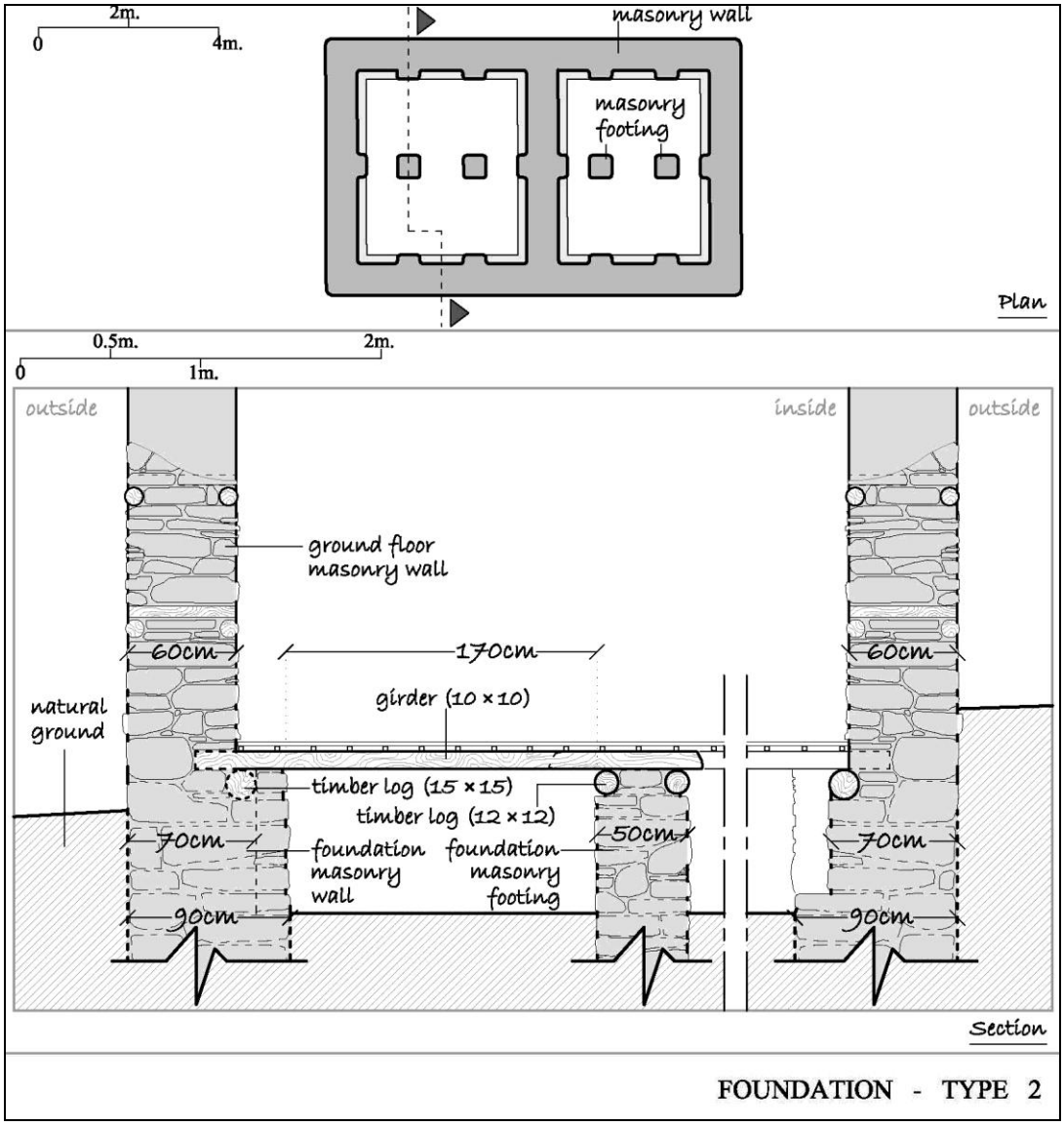

Figure 42, Sections of composite foundation

Figure 43, Continuous foundation (Camikebir Quarter Okul Street No:3)

Figure 44, Composite foundation (Camikebir Quarter Camiönü Street No:20)

Type 3: Rocks as a part of the foundation

In certain houses where the first and second types of foundations were used, rocks, probably carried by previous floods, are seen within the construction area of the house (see Fig. 45, 46). These rocks are used as a part of the main structural system. Walls corresponding to these rocks were constructed directly on them. The foundation walls, on the other hand, were constructed without any special jointing technique, and adjacent to the rock surface, continuing their own axes. This type of foundation was used, for nearly all of the houses located in Kurtgazi Quarter.

Figure 45, Living rock as a part of the foundation (Kurtgazi Quarter 3 Eylül Street Lot No:1301)

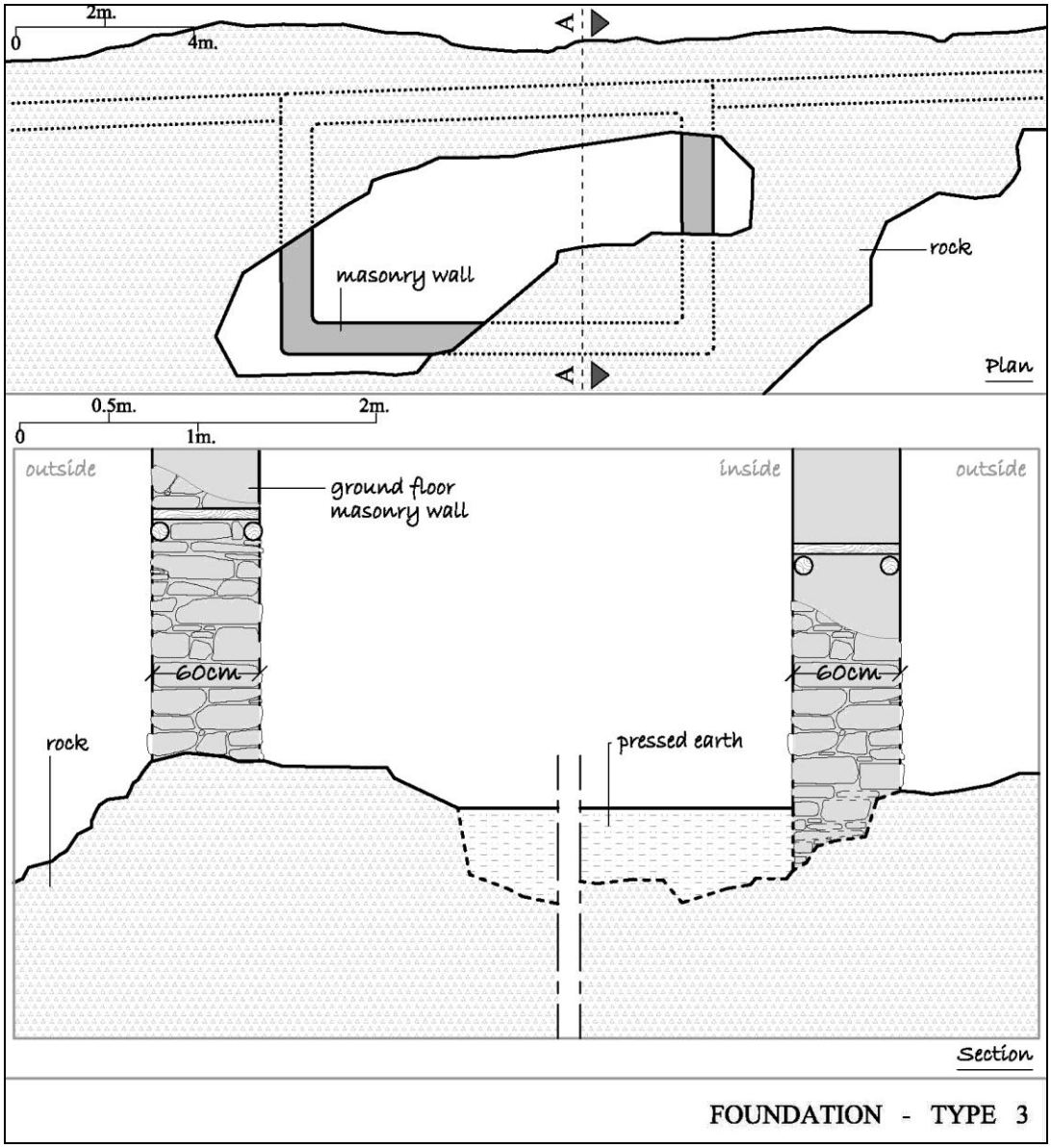

Figure 46, Sections of use of living rock as a part of the foundation, (Kurtgazi Quarter 3 Eylül Street Lot No:1301)

3.2. MASONRY WALLS

Masonry walls with timber lintels are constructed using slates, brick-tile pieces and rounded stones obtained from river beds and slopes. The binding material is mud mortar. The stones obtained from river beds or slopes were sometimes used as they are and sometimes they were broken before usage. The corners were made by using relatively large and cut stones (see Fig. 47). A differentiation at inner and outer surfaces of the walls in terms of sizes of construction materials was not observed.

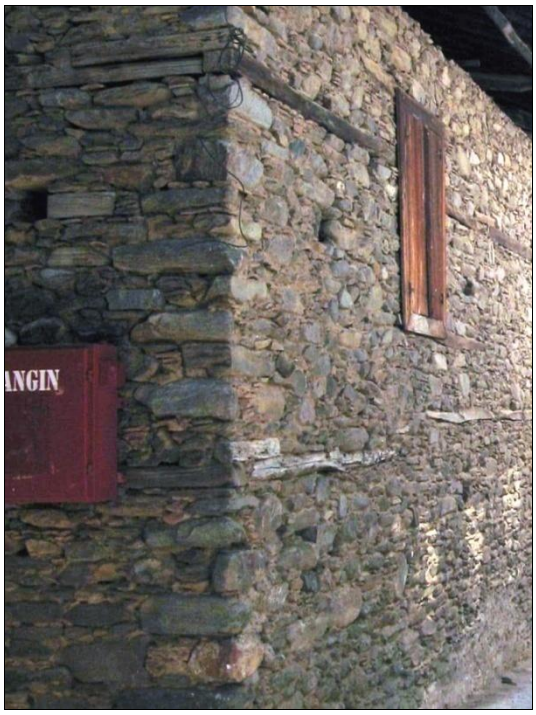

Figure 47, Corner stones used in masonry walls (Camikebir Quarter Karanfil Street No:14)

The thickness of the masonry walls of surveyed examples change between 50 and 85 cm. Exterior walls are generally 65-70 cm and interior walls are 50 cm thick. In one house only, among the surveyed houses, a 30 cm thick masonry wall was observed (see Fig. 66, 67). In this house, the masonry wall is placed at the upper floor of the house, adjacent to the timber skeleton of the outer façade.

For the construction of masonry walls, sitting over foundation walls, firstly, the

corner stones are placed, and then a 50-60 cm high wall is constructed up to this height. The height of the wall is as much as 80 cm, at the upper floors of a small number of examples (3/32) (Fig.182: 1-2, 1-3, 3-8). The wall is elevated by repetition of this process. Each of these sections laid in one session is called *savak*[23].

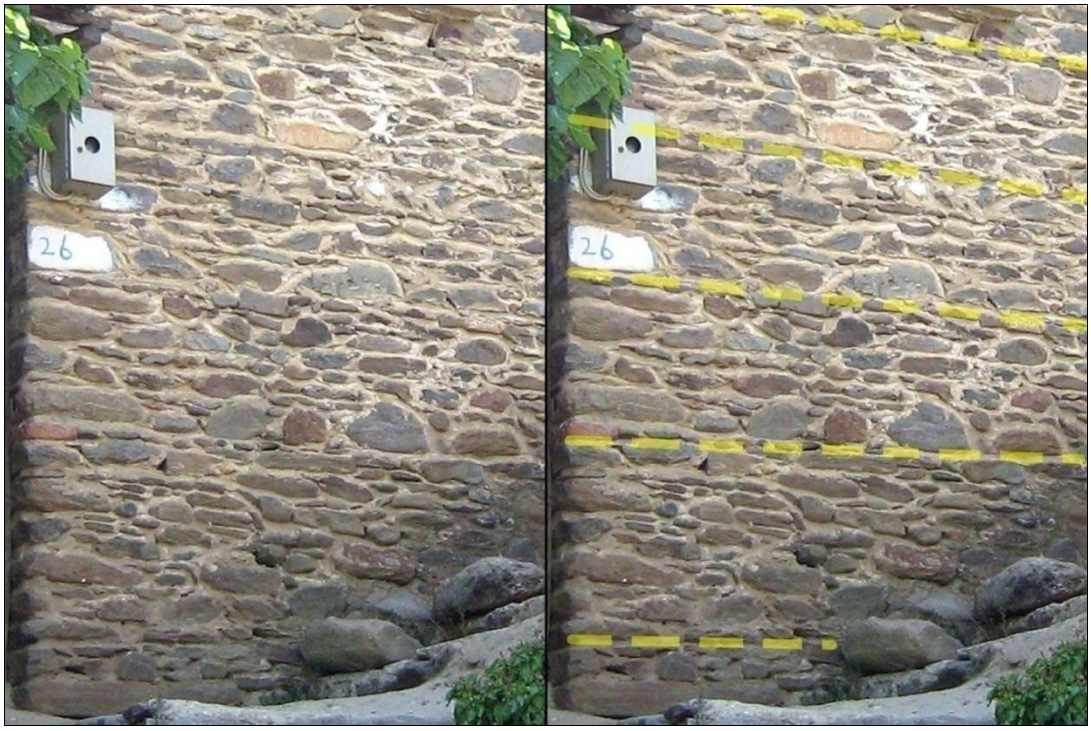

Figure 48, *Savak* levels (Kurtgazi Quarter Lot No: 1560)

Savak levels can be clearly read in certain structures, while in others *savak*s could not be read at all because of the stones, which the masons place in a projected manner at the end of each layer (see Fig. 48, 49).

As the wall is elevated, timber scaffoldings, strengthened at certain intervals by joisting, are built to form a working platform (Kolay, 1999: 20). In the house zone, these joisting start at the upper course of third *savak*. These joists are taken away after the completion of construction. The gaps left the joists are filled in upper floors and are generally left open in lower floors for the aim of ventilation (see Fig. 56).

[23] Individual interview with Emin Başaranbilek on 06.08.2009

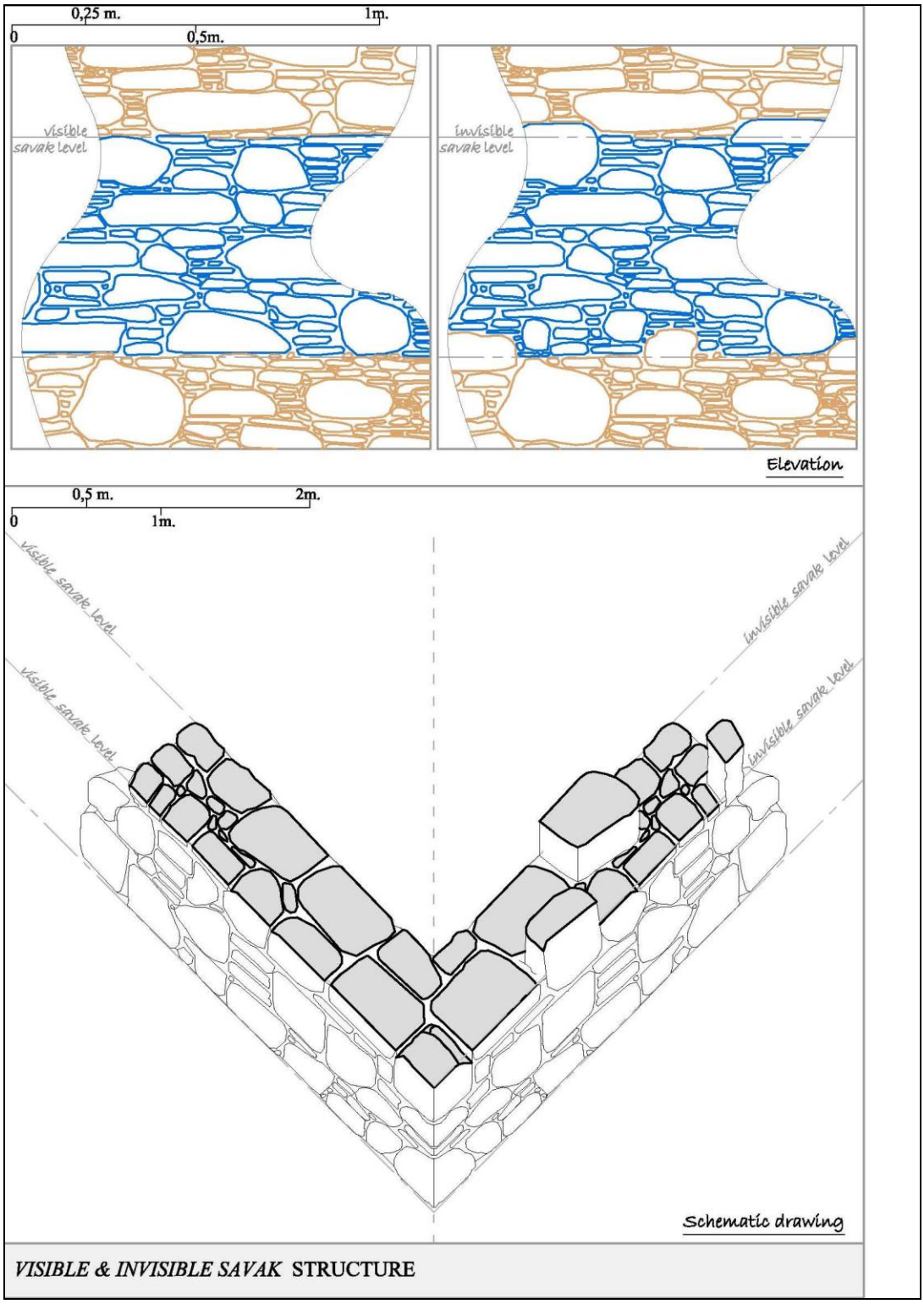

Figure 49, Schematic drawings of visable and invisible *savak* levels

The first timber lintel used in masonry walls is normally placed 50-60 cm up from the ground level, i.e. at the upper course of first *savak*. There are examples where this distance is as small as 20 cm. At the buildings sitting on rocks, on the other hand, this distance may reach to 150 cm. Timber lintels are placed not more than one in every three *savak*s, approximately 150-180 cm from each other. In addition, at the upper and lower sections of windows and door openings, floor changes and under eaves, timber lintels are placed. In these cases, the distance between adjacent timber lintels is as small as 50 cm.

The commonly used cross-sections of timber lintels are rounded, rectangular and square shaped and change between 10 and 15 cm. In a very small number of examples (2/32) (Fig.182: 1-2, 1-9), the dimensions of lintel cross-section reach to 25 cm. Timber logs are used as lintel, generally only after cutting out the knots. However, in certain examples it is fine hewn so that square or rectangular cross-sections are obtained. At several houses, on the other hand, the face of timber lintel towards inside the wall was left as it is, while the other face towards outside is fine hewn. Timber lintels are used at both faces of masonry wall, opposing to each other (see Fig. 50). These two lintels are connected to each other by tie beams having 6-10 cm cross-section, every 50-70 cm. In only 2 examples among the surveyed houses, lintels were fine hewn so as to have square or rectangular cross-sections. In all other cases, the lintels were placed only after cutting off knots. Lintels, in most of the cases, were cut nearly at the same level with the wall surface. Whenever projected, the salience from the wall surface is only 2-3 cm.

Lintels placed on the same wall, in the same direction or those placed on intersecting walls, in different directions are connected directly or indirectly to each other (see Fig. 50). In case, they are directly connected, half-interlaced or lap joints are used besides the nails. In cases where the connection is provided by means of another element, on the other hand, 25-30 cm long and generally 10 cm thick timber elements are connected to both lintels by lap joints. Tie beams, connect lintels and located at both sides of a wall, are placed perpendicularly to lintels and connected to them with half-interlaced or lap joints.

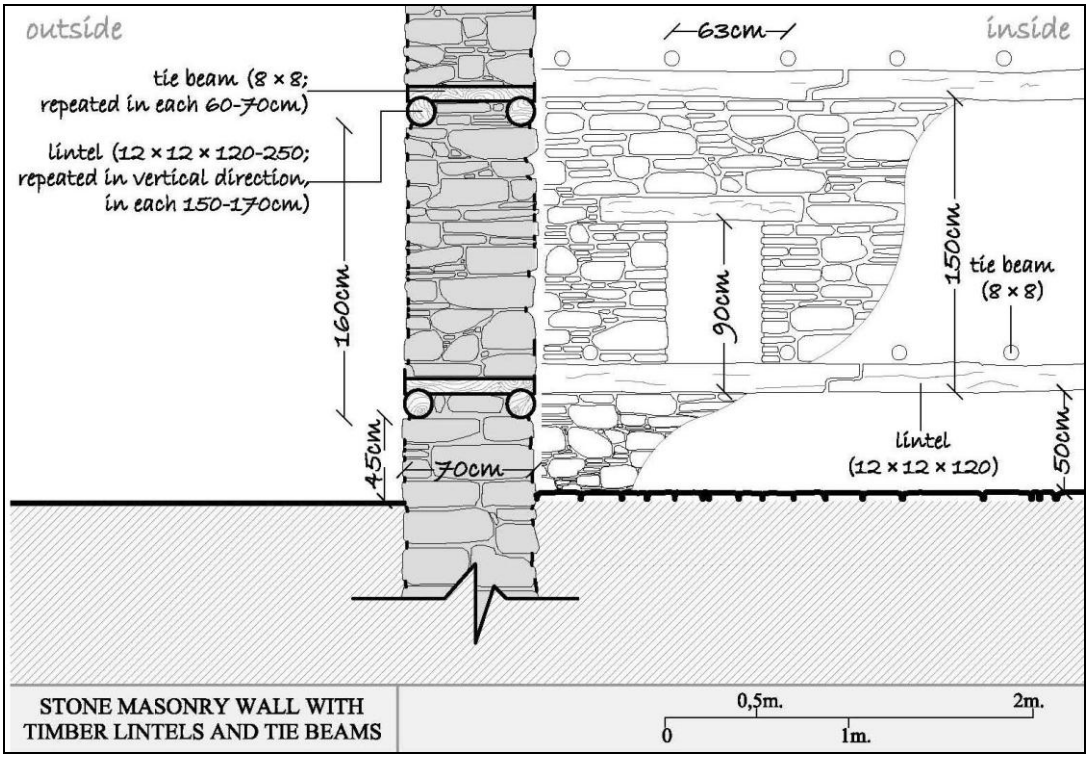

Figure 50, Location of lintels and tie beams on masonry wall (Camikebir Quarter Okul Street No:2)

Lintels are used in masonry walls above the ground floor level. Ground floor interior walls are generally and exterior walls are always constructed using this technique. In upper floors, at least one of the exterior walls and service walls are constructed of masonry with timber lintels. There are examples where the thickness of these upper floor or service walls are less than that of ground floor walls, however, in most of the cases, all service walls are built with the same thickness as ground floor walls.
In the ground floor in certain examples and in all upper floors, interior façades of walls are rendered with lime based rough plaster and then a lime based finishing, and lime washed. The exterior façades are usually not rendered. In the masonry exterior façades of certain houses, there are traditional stucco made on lime plaster.

The masonry walls used in Birgi traditional houses have a rich variety; however, they mainly can be classified in terms of 1) construction techniques, 2) finishings, 3) thickness types. In the first of these, the wall construction technique, the materials forming the walls have different sizes and colors. By using these characteristics,

varieties of walls can be constructed. The construction techniques can be divided into 3 main groups:

Type 1: Coursed rubble stone masonry wall

By means of the usage of relatively large stones of different heights together with shorter river stones, slates, pieces of brick and tile, balanced courses are formed (see Fig. 51). There is not a system or order in the usage of materials of different sizes. This type of walls is defined under the name of "coursed rubble stone masonry wall with different materials of different sizes". In most parts of the historical settlement this type of walls are observed (12/32 house).

Type 2: Semi alternating stone masonry wall

The gaps between the different sizes of stones are intricately filled with small stones from river bed, slate, pieces of brick and tile. In some examples to this type, the gaps are only vertical, while in the others, they are both vertical and horizontal (see Fig. 52). This type of walls is defined under the name of "semi alternating wall". In most parts of the historical settlement this type of walls are observed (19/32 house).

Type 3: Alternating stone masonry wall

Stones, brick and/or tile pieces are placed within the wall in a certain order in a cyclic manner (see Fig. 53). In this technique, stones are surrounded with pieces of brick and/or tiles both in horizontal and vertical directions. There is no standardization in usage instances of materials. This type of walls is defined under the name of "alternating wall". These walls are generally seen in Demirbaba Quarter and in Arif Çelebi Street and around, located in Cumhuriyet Quarter.

Figure 51, Examples to coursed rubble stone masonry walls

Figure 52, Examples to semi alternating walls

Figure 53, Examples to alternating walls

The second feature based on which masonry walls with timber lintels can be classified is the finishing texture. They can be divided into 3 groups in terms of this feature.

Type A: Not rendered

The masonry walls with lintels in Birgi are normally not plastered. Especially semi alternating and alternating walls made of stone masonry, having also decorative elements, are not rendered.

Type B: Seem like pointing mortar joints

Some of the coursed rubble stone masonry walls are plastered with 2-3 cm thick lime based plaster and cleaned out at certain places so as to seem like pointing mortar joints (see Fig. 54). These cleaning sometimes coincide to the stone underneath the plaster, and are sometimes done casually. At the plastered surfaces, lines called corn tassel are formed.

Type C: Plaster with brick pieces

This plastering technique, which was observed in only one of the surveyed houses, was applied on a coursed rubble wall. The wall surface was plastered, and on this 2-3 cm thick plaster, small pieces of brick and tile were inserted, forming horizontal lines on the surface (see Fig. 55).

Figure 54, Plastering technique seeming like pointing mortar joints

Figure 55, Plastering technique with pieces of brick

Masonry walls with timber lintels continue for one to three floors. There are examples where the wall thicknesses decrease at the transition part between two floors. This decrease in thickness happens in the levels of floor change where horizontal load-bearing lintels sit on the wall and mostly at the interior parts of the wall. However, there are also examples (8/32) where the thicknesses of walls change in the same floor. The third feature based on which masonry walls with timber lintels can be classified is the difference in wall thickness in the same floor.

Type I: Same masonry wall thickness though the whole floor

The thicknesses of masonry walls in this class do not change throughout the floor height. In most of the surveyed houses (24/32), this technique was used.

Type II: Slope with decreasing masonry wall thickness though the whole floor

In a part of the surveyed houses (6/32), at least one of the masonry walls with timber lintels is 10-15 cm thicker than the others. There is no window or door opening left in this wall. The wall rises with a slope with decreasing thickness (see Fig. 56, 58). This decrease in thickness may be at one or both façades of the wall. In the former case, the vertical slope of the wall is 3-5%, while in the latter; it is 2-3%. Thickness decrease at the interior side is seen only at the wall parts located in the ground floor (see Fig. 56).

Type III: Gradually decreasing masonry wall thickness though the whole floor

At certain surveyed houses (3/32), the thickness of, at least one, at most three of the masonry walls with lintels, gradually decrease as the wall rises (see Fig. 57, 59). This decrease in thickness may be at one or both façades of the wall. In the cases where the decrease takes place at the interior face of the wall, thickness decreases in 1 or 2 stages, and in the cases where the decrease takes place at the exterior face of the wall, thickness decreases in one stage.

The decrease generally does not exceed 15 cm. There is one example where the total decrease in thickness is nearly 25 cm in 2 stages (see Fig. 59). The mentioned house has 3 floors and relatively large value of decrease in thickness is because the initial thickness of the wall in ground floor is larger than the average, to be able to bear the load.

At the levels, where decrease in thickness takes place, timber lintels are used. Alteration on the wall surface at the levels, where decrease takes place, is sometimes left as it is, but mostly it is sloped using mud mortar, small river rubbles and bricks, and then plastered so that the wall surface seems continuous.

Figure 56, Drawings of masonry wall Type II (Camikebir Quarter İmam Birgivi Street No:6)

Figure 57, Example of masonry wall Type II, Camikebir Quarter İmam Birgivi Street No:6 (wall's exterior façade (left), walls's interior façade (right))

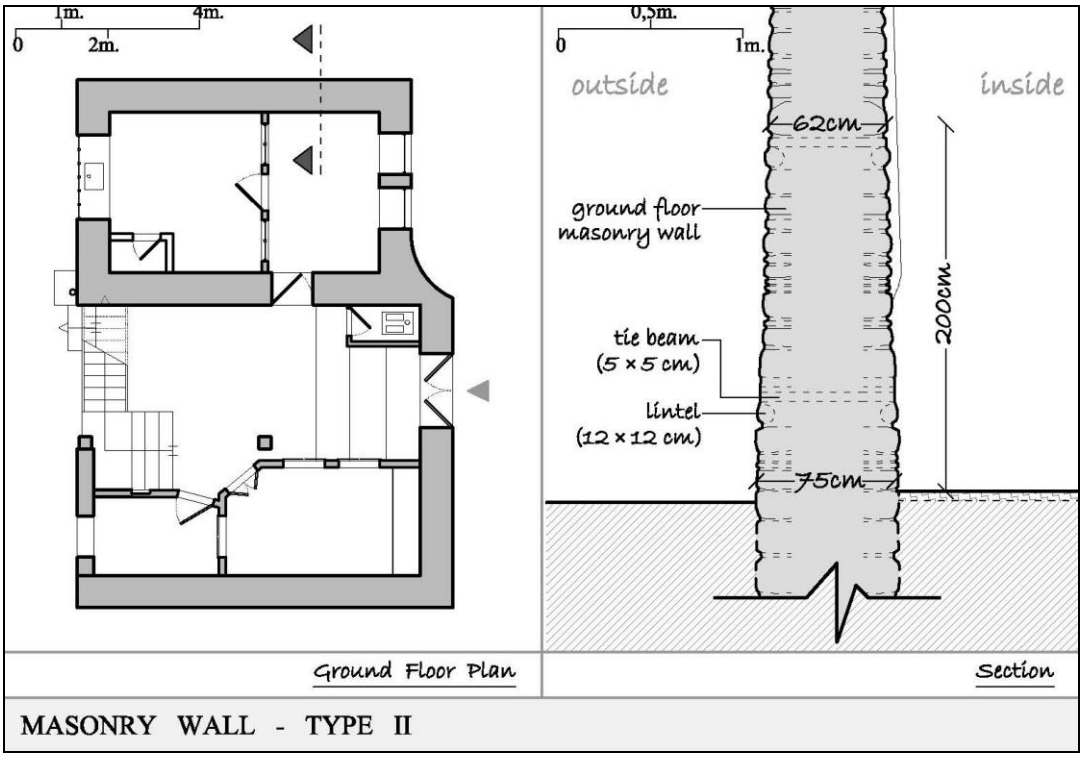

Figure 58, Example of masonry wall Type III (Camikebir Quarter 3. Beyzade Street No:15)

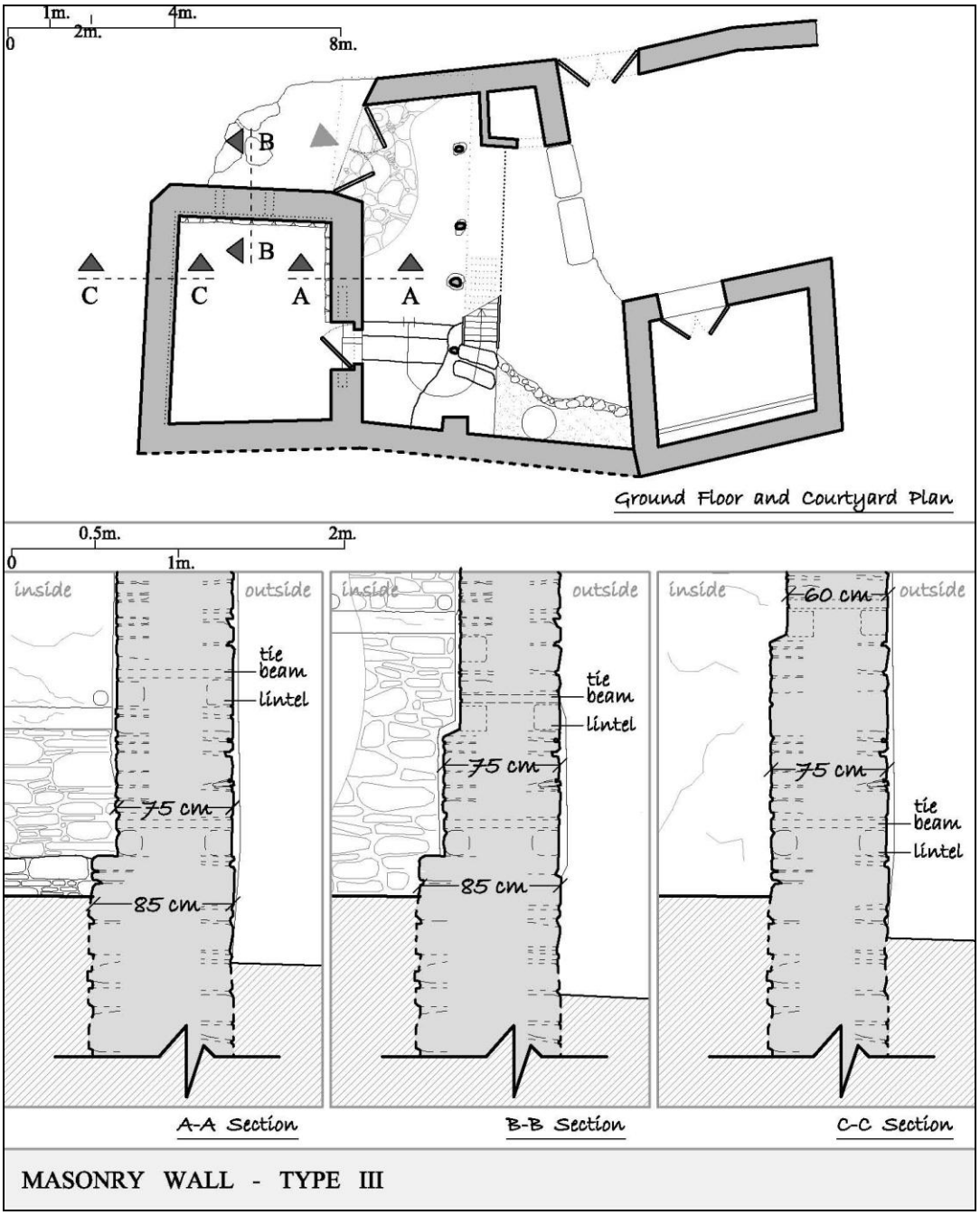

Figure 59, Drawings of masonry wall Type III (Camikebir Quarter 3. Beyzade Street No:15)

3.2.1. CORNER CHAMFER

Some of the ground floor corners of the houses located at street intersections are chamfered. The location of corner chamfers rise up for about 1.5-2 meters and to form an orthogonal corner at the slab level of upper floor, using 3-4 stepped projections. The projections forming the corner chamfer are constructed with slates and bricks used horizontally. The corner chamfers used in Birgi are very rich in terms of construction techniques. Use of spolia and symbols are also observed at corner chamfers, serving to the visuality of streets.

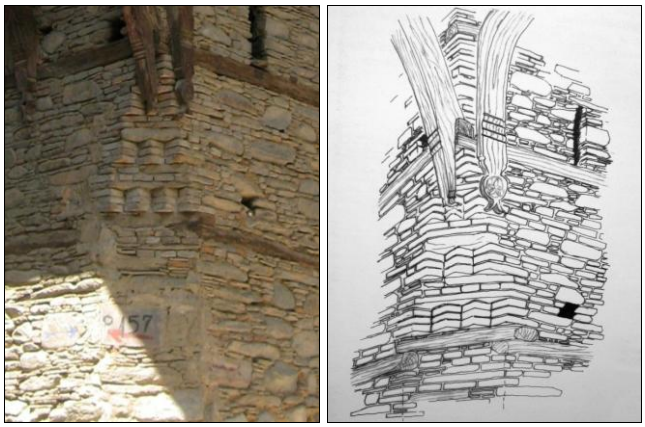

Figure 60, An example to corner chamfer (Camikebir Quarter 3. Beyzade Street Lot No: 553) – photograph (left), axonometric drawing (right) (Tayla, 2007, I: 189)

Figure 61, Examples to corner chamfer (Camikebir Quarter 3. Beyzade Street No: 15, Camikebir Quarter 3. Beyzade Street Lot No: 596, Cumhuriyet Quarter Arif Çelebi Street No:2)

3.2.2. SYMBOLS LOCATED IN/ON MASONRY WALL

In certain houses (4/32), at the exterior façades of exterior masonry walls, there are certain symbols. These symbols are constructed by two techniques. According to the first technique, cypress, sun and spike symbols either are constructed inside the gap left in the wall, or together with the wall (see Fig. 62). The used materials are stone, marble, spolia, slate, brick and tile. Especially these symbols are used together. According to the second technique, sun and ship symbols are constructed by plaster and stone-brick pieces (see Fig. 63). In only one house, this technique is used.

Figure 62, Examples of symbols located in masonry wall

Figure 63, Examples of symbols located on masonry wall

3.3. TIMBER FRAMED WALLS

The height of the timber skeleton systems in a single floor, used in Birgi, changes between 240 and 290 cm, depending especially on whether top windows are present or not. The timber skeleton systems used in Birgi traditional houses are composed of horizontal, vertical and diagonal timber elements (see Fig. 64).

The main frame of the skeleton was formed with beams, as wall and foot plates, and main posts. These elements generally have a square or nearly square cross-section. The thickness of main posts and wall plates change between 10 and 15 cm, and that of foot plates change between 7 and 15 cm (see Fig. 64). The width of the other elements and wall thickness are determined according to the thickness of main posts and plates. In a part of 3rd group houses, neo-classical decorations are observed at main posts (see Fig. 64).

The frame is divided with posts placed one in every 100-180 cm. In the areas where window and door posts are used, this distance gets as small as 30 cm. In the horizontal direction, on the other hand, the frame is divided with sills placed one in every 40-150 cm. These elements have mostly square or rectangular cross-sections and their width change between 7 and 15 cm (see Fig. 64).

Another primary load-bearing element of the timber skeleton systems, used in Birgi, is the main braces placed diagonally between horizontal and vertical primary load-bearing elements. These braces have generally a rectangular cross-section, where width length changes between 5 and 8 cm and depth length change between 10 and 15 cm depending on the thickness of main posts. The timber skeleton, which is basically formed of beams and posts, is then strengthened with vertical studs, horizontal beams and diagonal braces. These elements have generally a rectangular cross-section, where their width changes between 3 and 5 cm and depth changes between 10 and 15 cm depending on the thickness of main posts. The elements are used in such a way that they form smaller areas in exterior walls than in interior walls. (see Fig. 64)

As mentioned before, the primary load bearing elements and studs, which are secondary load-bearing elements, generally have square or rectangular cross-sections. In a small number of examples, on the other hand, it was observed that only those faces of these elements required to be flat surfaces are processed and at the other faces, only the knots are cut off.

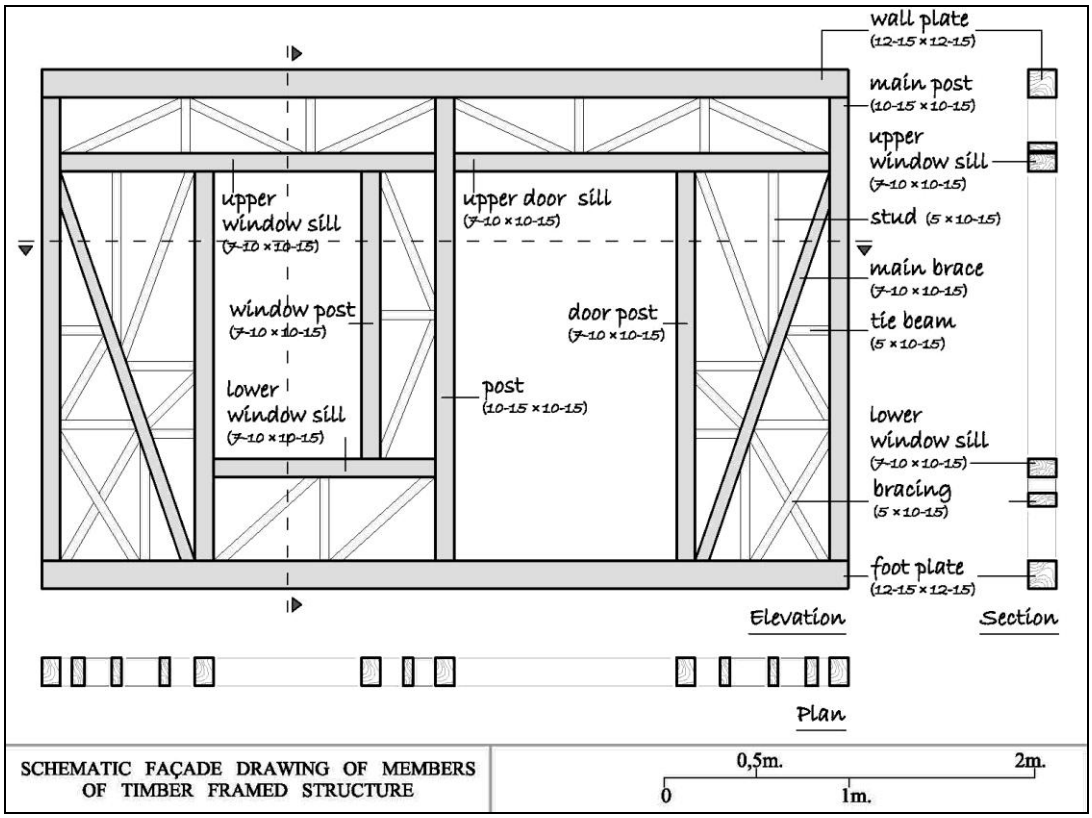

Figure 64, Schematic façade drawings of load-bearing elements of timber framed structure of a room

At the connections forming the timber skeleton, nails are used. Among the surveyed examples, no lap joints were observed. Timber frame walls are rarely used as interior division walls in the ground floors of the houses. These timber frame walls are placed on foundation floor girders. In Birgi, there are no houses with ground floor exterior timber frame walls. In the upper floors, on the other hand, at least one exterior wall and all interior division, walls are constructed with timber frame system.

The walls constructed with timber frame system can be classified under different groups according to their construction technique and finishing features.

The construction technique used in timber skeleton walls can be defined in 3 types according to their construction technique.

Type 1: Timber framed wall without infill or with stalk & straw infill

In this type timber framed walls, the gaps between load-bearing elements are left as they are, without infill. The wall surfaces, on both sides are covered with timber boards, laths, or reeds so as to apply plaster. A variety of covering material can be used. In the majority of the surveyed examples, it was observed that some materials to provide heat insulation such as stalks and straw are placed within the gaps between coverings (see Fig. 71, 74-77).

Type 2: Timber framed wall with masonry infill

In this type of timber framed walls, the gaps between timber elements are filled using different masonry materials. Rubbles taken from the river bed, slate and brick pieces are commonly used infill materials. In only two examples among the surveyed houses (see Fig. 182: 2-4, 3-1), adobe infill were observed. In some examples, the infill material is stone or brick, while in the majority of the surveyed examples, different infill materials are used together (see Fig. 65, 66, 69, 70, 72, 73).

Infill materials are laid in gaps between the timber elements using mud mortar. The level of posts is accepted as the border. An order is not followed in the infilling work, however in the examples with brick, brick-stone and adobe infills, the materials are used in a horizontal way as long as the gap shape allows (see Fig. 65, 66). The narrow, triangular corners where an infill material can not be used, are filled with mud mortar (see Fig. 66). Joint thickness changes between 2 and 4 cm. The thickness of joints is smaller only in the examples with stone infill only.

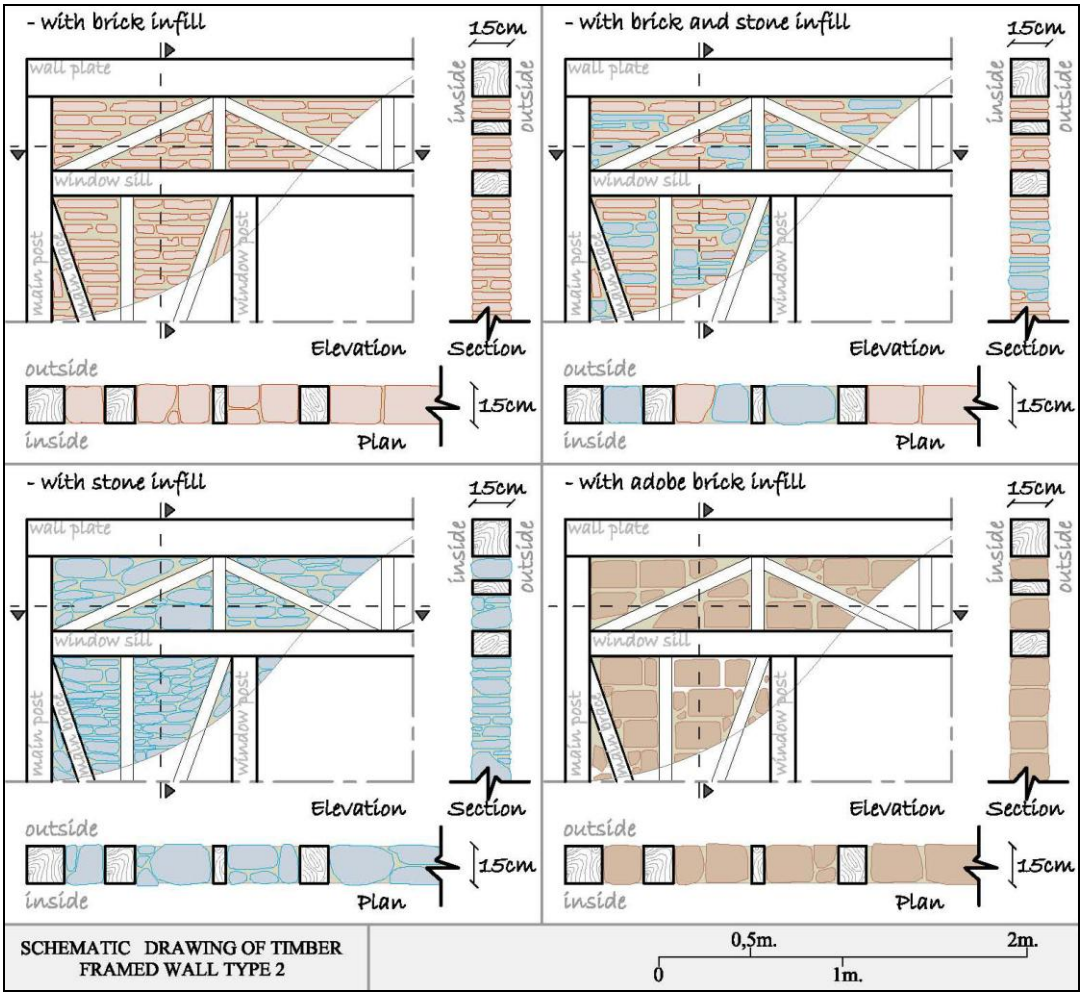

Figure 65, Schematic drawings of timber framed wall Type 2

Figure 66, Timber framed wall Type 2 (Camikebir Quarter 3. Beyzade Street No:15)

Type 3: Double-layered timber framed wall

The system is composed of two wall layers placed inside and outside. Timber skeleton is used at the inner surface while stone masonry wall is constructed at the exterior; adjacent to the other. Therefore, the wall has two layers and two different techniques. The gaps in the timber skeleton section are filled with stone, brick and mud mortar. The construction technique of this part is the same with Type 2. However, the level of posts is no longer the limit of infill. A part of the stones used in infill is placed in such a way that they project about 25 cm, at the post level. The thickness of the masonry wall is approximately 25 cm. The upper and lower sills of windows are used as tie beams. The connection between the inner and outer wall is provided by inserting big stones of the timber skeleton part, towards the stone masonry wall section. The connection between the timber elements, on the other hand, is provided with timber tie beams, perpendicularly placed to the upper and lower sills of windows, at the same level at both sides. These tie beams are repeated in every 60-80 cm. This system is used in only two examples (see Fig. 182: 3-6, 3-10) among the surveyed houses.

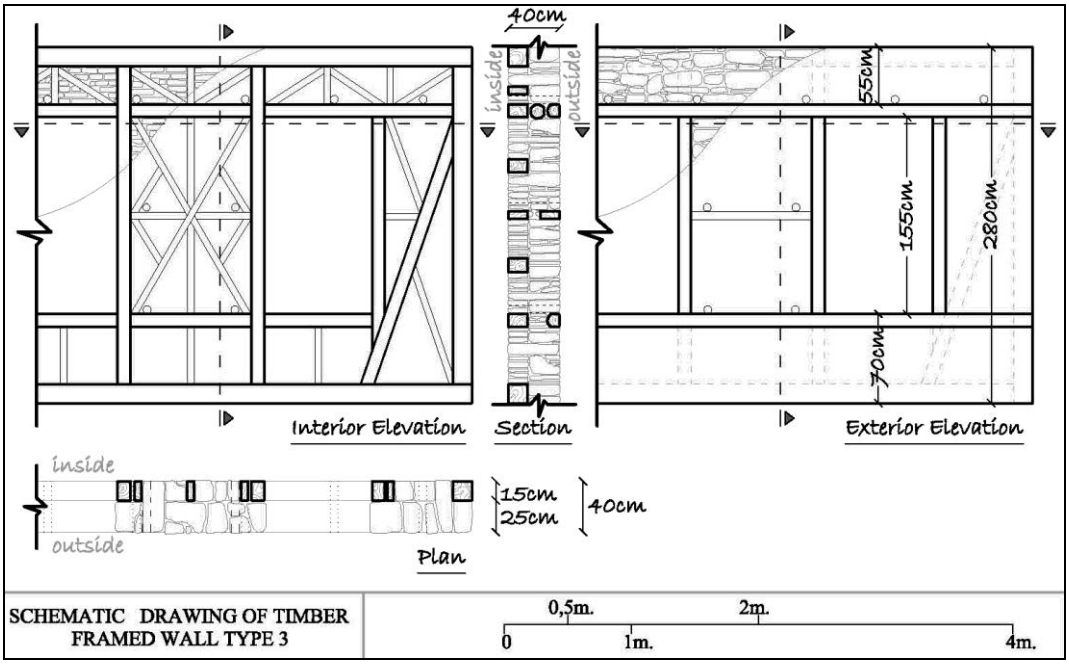

Figure 67, Schematic drawings of timber framed wall Type 3

Figure 68, Timber framed wall Type 3 (Camikebir Quarter Okul Street No:2)

The timber framed walls can be classified under 3 types according to their finishings. Among timber frame walls, only in one example, no surface finishing applied. Except this, all timber frame walls are rendered.

Type A: Mud plaster

This type is seen in the walls where the gaps between load-bearing elements are filled with different materials (see Fig. 69, 70). On the wall surface, mud based rough plaster, and mud or lime based fine plaster and paint are directly applied, without any intermediate material. This is valid for the interior and exterior surfaces of the timber framed Type 2 walls (timber framed wall with masonry infill) as well as for the both or only interior surface of timber framed Type 3 walls (double-layered timber framed wall).

Figure 69, Examples of timber framed wall finishing Type A - Mud plaster

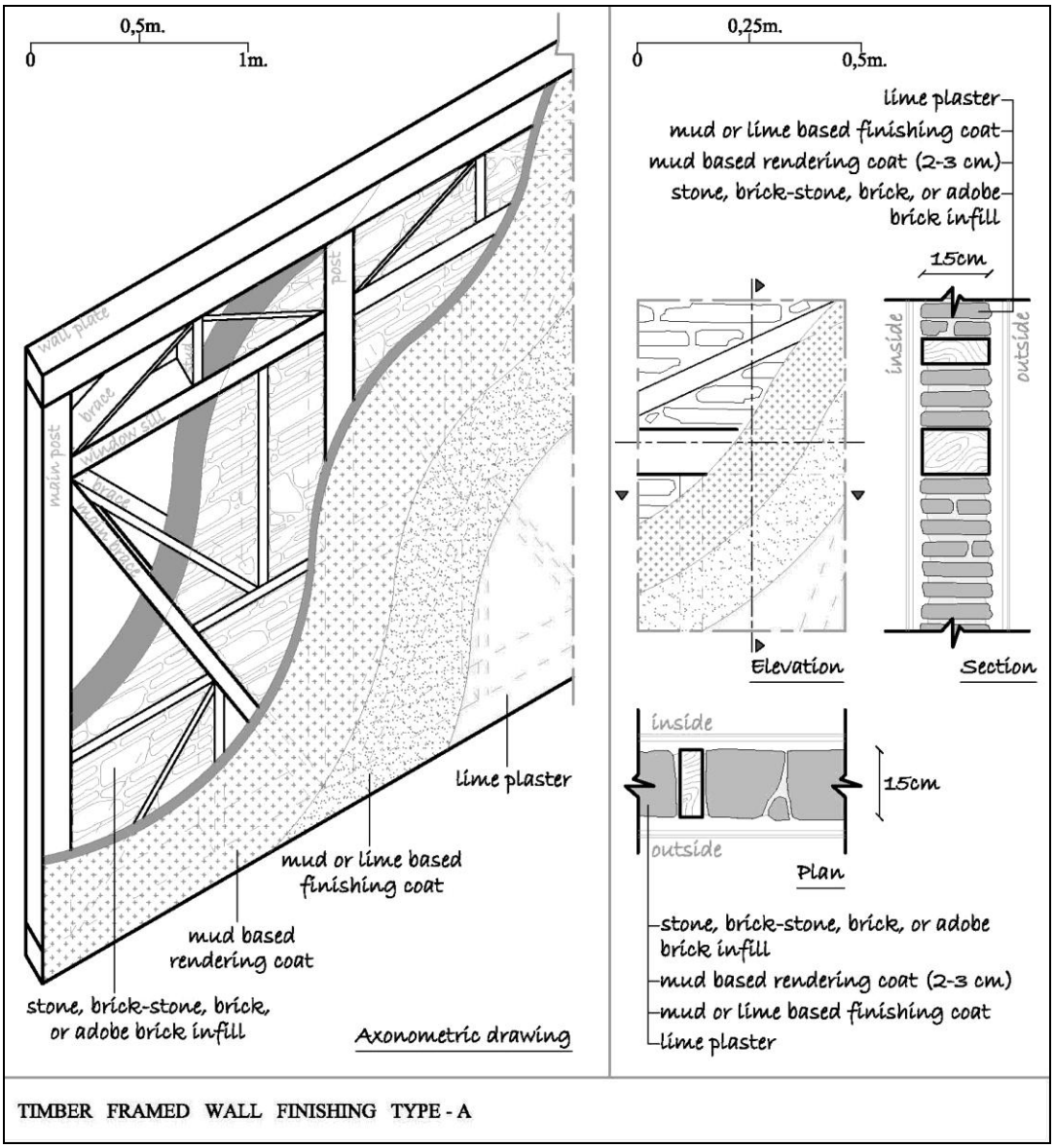

Figure 70, Schematic drawings of timber framed wall finishing Type A - Mud plaster

Type B: Timber plank below the render

This type is used at the timber frame walls Type 1 (timber framed wall without infill or stalk & straw infill) and Type 2. In this system, horizontal or diagonal timber planks are nailed in every 30-40 cm, by leaving a space of 1 cm between them (see Fig. 71, 73). In only one example (see Fig. 182: 2-5) among the surveyed walls, timber laths, in the same level with the infill, are pinned between the plates to be able to coat the timber planks (see Fig. 72).

These timber planks are about 2 cm thick and their width change between 5 and 15 cm. Their length is at most 150 cm. Depending on the length of the surface, on which they are used, their length may be as small as 30 cm, in case they are used for narrow distances like gaps between window posts. On timber planks, 2 cm thick mud based rough plaster, and mud or lime based fine plaster and paint is applied in the respective order. Rough plaster hangs on the system by inserting through gaps between planks (see Fig. 73). In certain examples, notches are made to provide a better coherence between plaster and timber planks.

In most of the walls of Type B there is no masonry infill material, stalk and straw is placed inside the gaps between timber frame system and timber planks to provide heat insulation (see Fig. 72).

Figure 71, Timber framed wall finishing Type B without infill - Timber plank below the render (Kurtgazi Quarter Ufuk Street No: 4, Camikebir Quarter Meydanbaşı Street No:1)

Figure 72, Timber framed wall finishing Type B with infill - Timber plank below the render (Camikebir Quarter 3. Beyzade Street No:31)

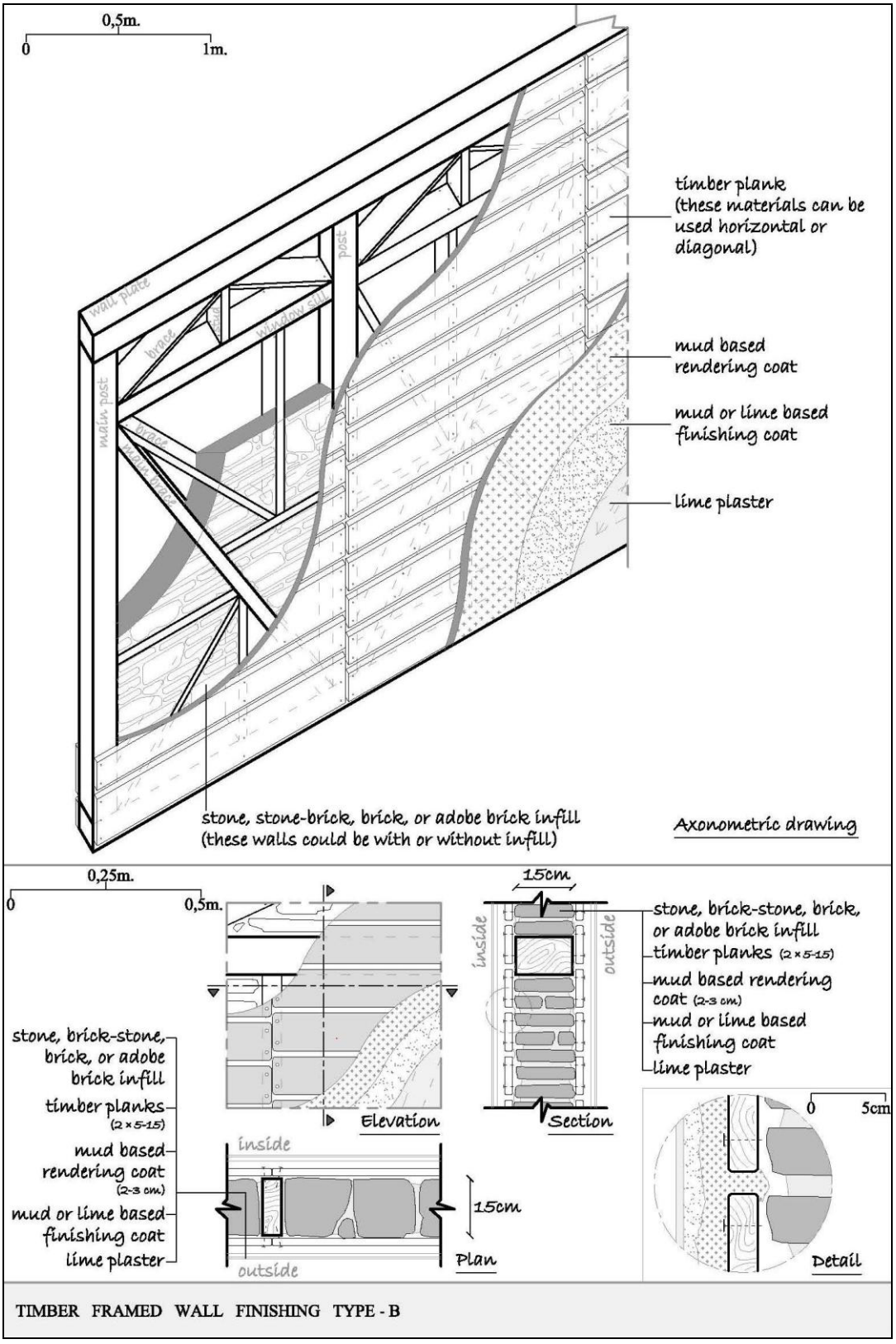

Figure 73, Schematic drawings of timber framed wall finishing Type B

Type C: Timber lath technique (*bağdadi*)

This system is used in the timber frame walls Type 1. In this system, called *bağdadi*, timber laths are horizontally nailed on load-bearing timber elements, one in every 30-40 cm. A distance of 1-2 cm is left between each successive lath. These elements are 1.5-2 cm thick and their width change between 2 and 3 cm. Their length is at most 150 cm. Depending on the length of the surface, on which they are used; their length may be as small as 30 cm. (see Fig. 74, 75)

On timber laths, 2 cm thick mud based rough plaster, and mud or lime based fine plaster and paint is applied in the respective order. Rough plaster hangs on the system by inserting through gaps between laths. In certain examples, notches are made on timber to provide a better coherence between plaster and timber laths. In most of these walls, straw is placed inside the gaps between timber frame system and timber laths to provide heat insulation.

Figure 74, Timber framed wall finishing Type B - Timber lath below the render (Camikebir Quarter Meydanbaşı Street Lot No: 677, Camikebir Quarter İmam Birgivi Street No:36)

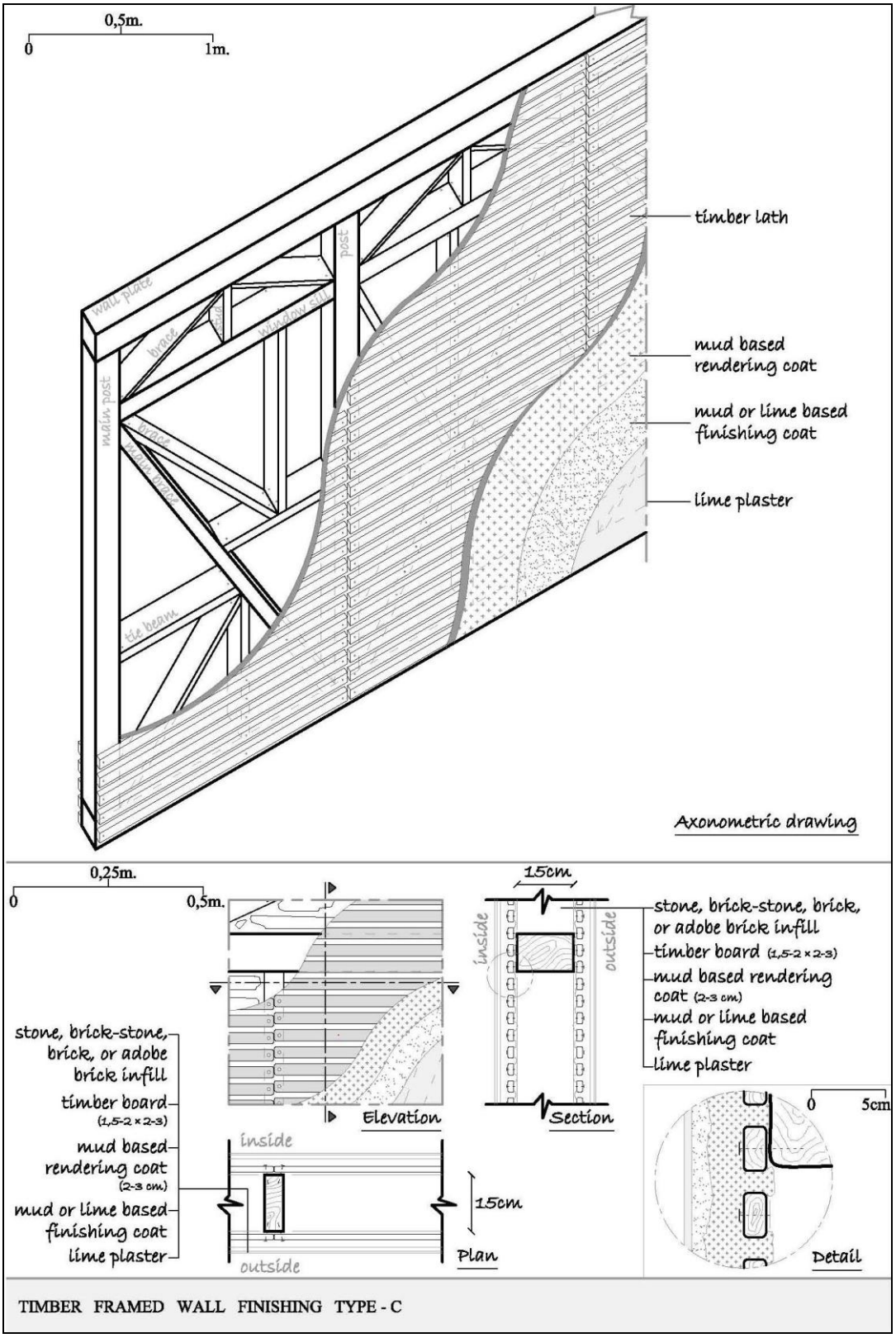

Figure 75, Schematic drawings of timber framed wall finishing Type C - Timber lath below the render

Type D: Reed below the render

There is only one example (see Fig. 182: 2-11) of this type among the surveyed walls. This system is used in Type 1 timber framed walls has no infill. In this system, reeds are horizontally nailed on load-bearing timber elements, one in every 7-10 cm. A distance of 2-3 cm is left between each successive reed. In places, where extra stability is needed, such as where door, window and niche frames sit, timber planks are nailed on the reeds or directly on the structural timbers.

The diameter of the reeds, used beneath the plaster, is 2-3 cm. Their length changes between 50 and 100 cm. On reeds, 2 cm thick mud based rough plaster, and mud or lime based fine plaster and paint is applied in the respective order. Rough plaster hangs on the system by inserting through gaps between reeds.

Figure 76, Timber framed wall finishing Type D (Kurtgazi Quarter 3 Eylül Street No:6)

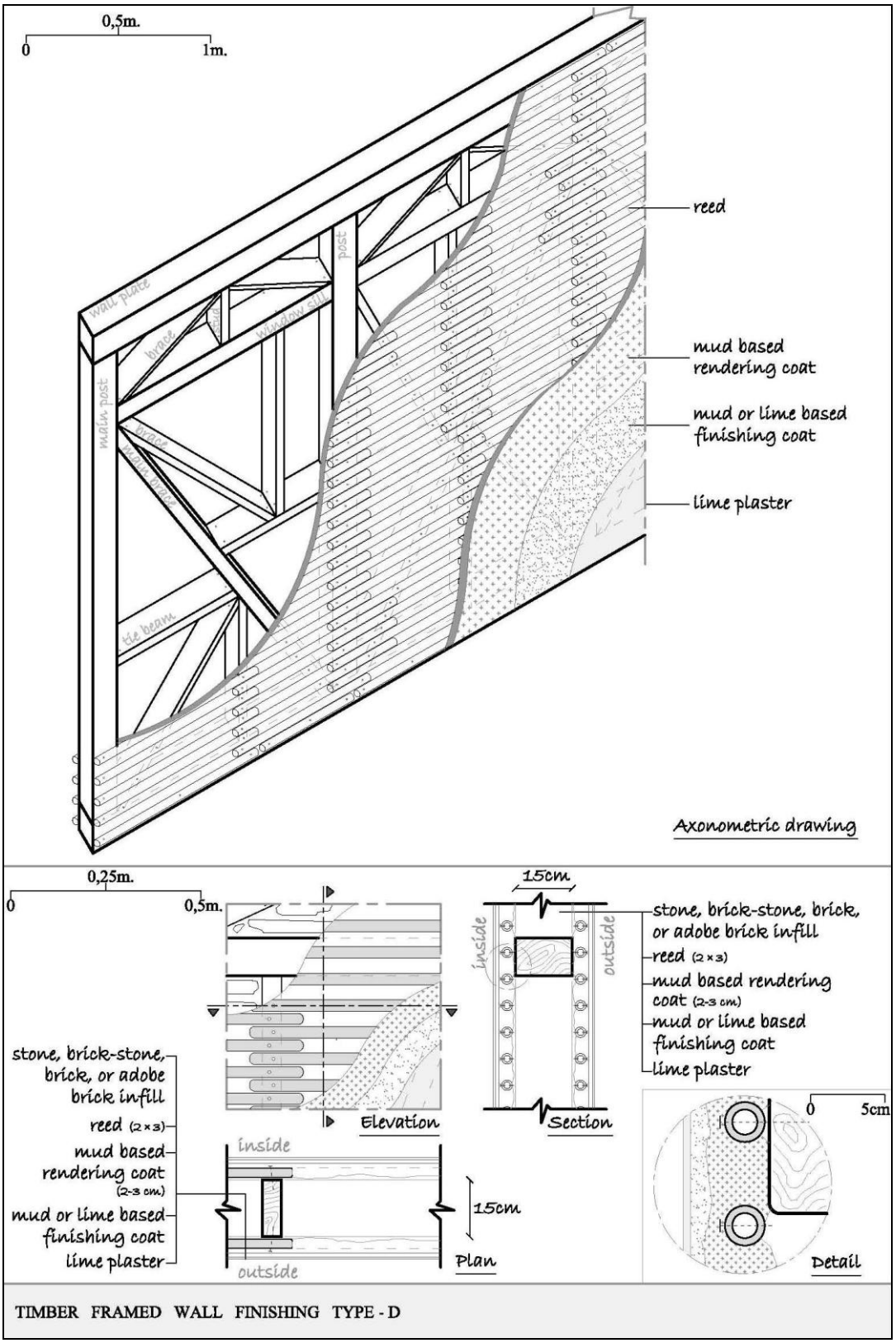

Figure 77, Schematic drawings of timber framed wall finishing Type D

3.4. TIMBER POSTS

In Birgi houses, the load induced by upper floors is transferred to lower floor load-bearing elements, to the foundation or directly to the ground by means of timber posts beside the walls.

The height of timber posts used in these houses change between 240 and 370 cm. They are 10-20 cm thick and have square, rectangular or circular cross-sections. In some of the surveyed houses, the surfaces of timber posts are plane and fine sawn, while in some others they are rough. In only two of the surveyed houses, timber posts used in the street direction are fine cut (see Fig. 78, 182: 1-2, 1-8). In a few numbers of examples, on the other hand, in the timber posts placed in the ground floor, only bark and knots have been cut and no other process was done. Some timber posts, having square or rectangular cross-sections, are covered with timber boards of 2 cm, without changing the cross-section.

When these elements are used at ground floors, they sit on plinths placed on the ground. As plinths, generally 1-3 rows of stone are used. In a few numbers of examples, on the other hand, ancient column capitals, turned upside down so that their wider surface rests on the ground, are used as bases of timber posts (see Fig. 79). On top of these posts, girders between the ground and first floors are placed.

In some cases timber posts are used in upper floors, there are examples with and without foot plate. The plinths or directly timber posts sit on girders or floor girders. They are placed one in every 1-3 m. On top of the posts, wall plates or upper floor girders sit. The connections between timber posts and other elements are provided by interlaces or joints. At the connections between posts and timber elements, nails are also used.

Timber posts are mostly used in *taşlık* and *sofas*. Although timber posts exhibit similar characteristics in terms of construction techniques, especially at the courtyard or street façades of *sofa*s, there are different connection details. According to their connection details with wall plates, they can be classified in 3 groups.

Figure 78, Fine cut timber posts (Camikebir Quarter Meydanbaşı Street No: 1, Kurtgazi Quarter Ufuk Street No: 5)

Figure 79, Use of spolia as plinths of timber posts (Camikebir Quarter 1. Beyzade Street No:10, sağda Camikebir Quarter 3. Beyzade Street No:15)

Detail 1: Plain connection

This type of posts is plain. Girders are directly located on the post without any intermediate elements. This is the most common type of timber posts (24/32).

Detail 2: Post with bolster on top

Girder sits on the post with a bolster, which is nailed from both sides and has different profiles.

Detail 3: Post with ornamented false arch

This detail is used for decorative purposes. A false arch is made on top of the faces of timber posts and wall plates by the use of timber boards. 3-5 cm thick, 35-50 cm long and 5-10 cm wide timber blocks are nailed on top of the posts and girders. Some of these elements are chamfered, in the case that the profile begins concavely. At both sides of these elements, set in the mid-width of post and girder, timber planks are nailed in such a way that planks are in the same level with post and girder. In only four examples among the surveyed houses, this detail was observed (see Fig. 182: 1-4, 1-8, 1-9, 2-8). In the first of these structures, it is used only at the street façade of *sofa*, in the second at the street façade of *sofa* and in the beginning of *seki*, and in the third and fourth in the beginning of main room *seki*.

In both of the 3 surveyed examples (see Fig. 182: 1-8, 1-9, 2-8), these planks are placed diagonally and they are formed of at least 3 pieces. Only one of these pieces have an ornamented profile. In Sandıkoğlu Mansion (see Fig. 84, 182: 1-4), on the other hand, it is known that all these elements are placed horizontally and they all together form the main profile. Timber laths are nailed on profile planks so that a surface suitable to plaster is formed. After the application of lime plaster, whitewash is done.

Figure 80, Examples of timber post Detail 1 – Plain connection- taşlık post (left) (Gaziumurbey (Demirbaba) Quarter Demirbaba Street No: 35), sofa post (right) (Kurtgazi Quarter Hıdırbey Street No: 14)

Figure 81, Examples of timber post Details 2 - Post with bolster on top – Posts located in *sofa* (left, Kurtgazi Quarter Ufuk Street No: 16), (right, Camikebir Quarter Meydanbaşı Street No: 1)

Figure 82, Examples of timber post Detail 3 (Gaziumurbey (Demirbaba) Quarter Demirbaba Street No: 35)

Figure 83, Examples of timber post Detail 3 (Kurtgazi Quarter Ufuk Street No: 5)

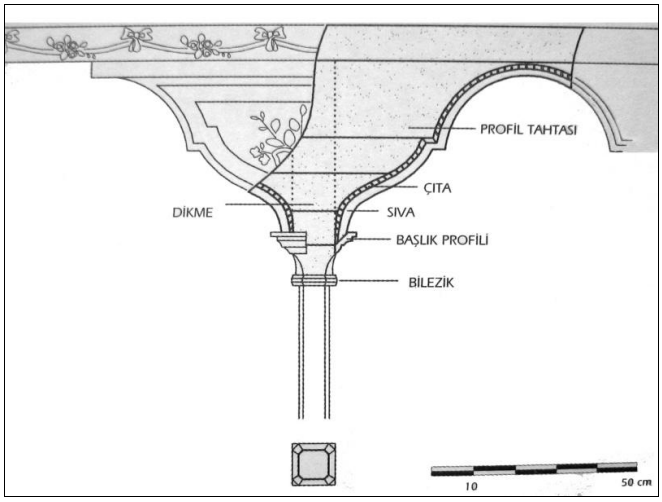

Figure 84, False arch used in the beginning of main room *seki* in Sandıkoğlu mansion (Ekinci, 2005: 52)

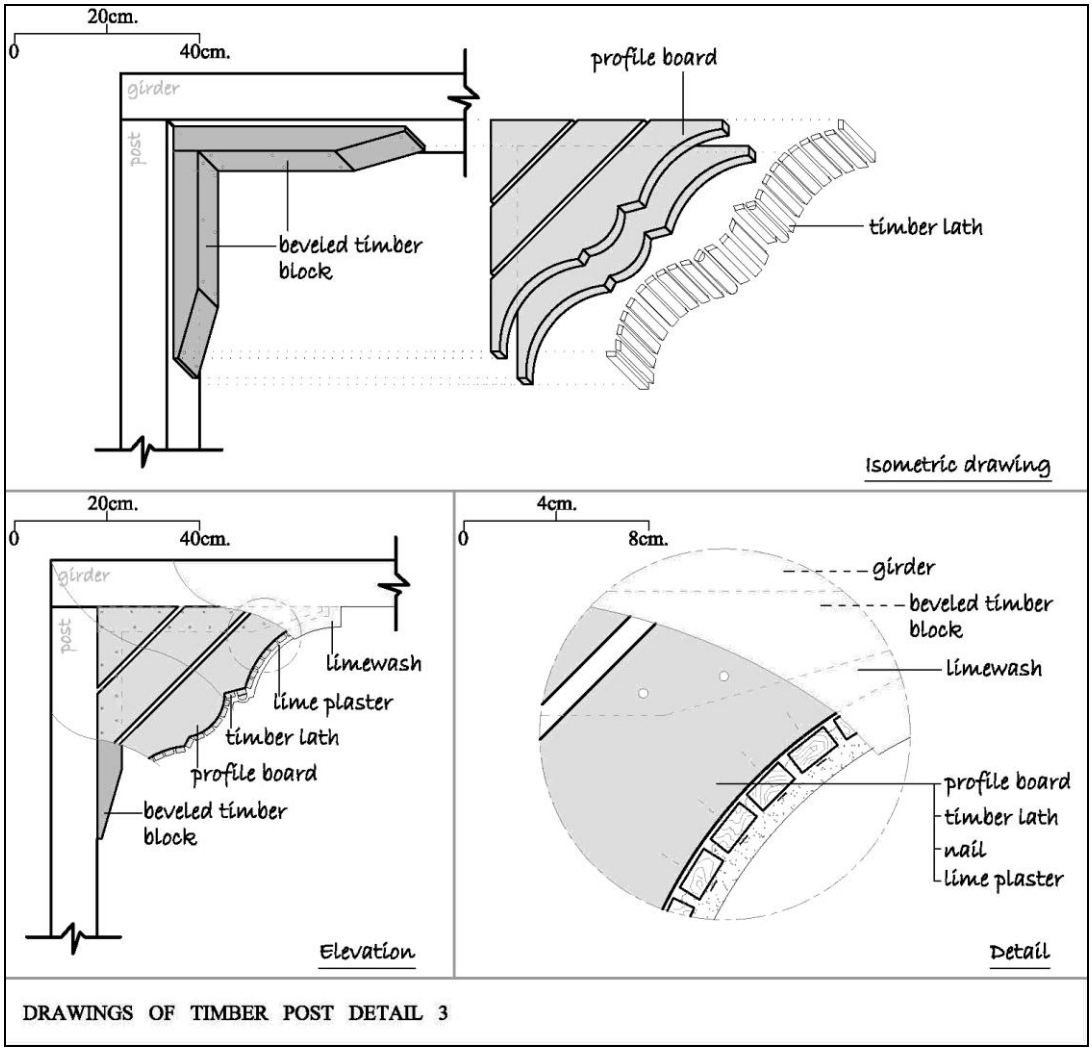

Figure 85, Drawings of timber post Detail 3 (Kurtgazi Quarter Ufuk Street No: 5)

3.5. ROOFS AND ITS ARCHITECTURAL ELEMENTS

The roofs of studied houses are shaped according to the uppermost floor plans. Projections of upper floor wider than 60 cm affected this positioning, while in the case of projections of upper floor narrower than 50 cm, roof plans follow the main direction of exterior timber framed wall. Eave widths change between 20 and 130 cm. As roof covering material, over & under tiles are used. Among the surveyed examples, the roof slope changed between 23% and 30%. Roof heights depend on the slope and roof span.

In all the surveyed houses, roof load is transferred to upper floors load-bearing systems by posts and angle rafters, through girders between roof and upper floor plates. The system is composed of posts, purlins, angle rafters, collar beams, angle braces, and rafters (see Fig. 86).

Timber posts are placed, one in every 100 to 180 cm, on top of the girders, placed between roof and upper floor, or of the upper floor wall plates. In one of the surveyed examples, between girder and posts some wooden elements are posed on it to obtain a plain surface. Posts transfer the load through to the girder and/or wall plates to lower storeys. Their length depends on roof slope and height at their location. Their thickness changes between 10 and 15 cm. The thickness of the posts used at ridge of the roof is normally larger than that of the other posts called as king post. (see Fig. 86, 87)

In most of the houses, posts are connected to collar beams in a single or pair wise manner and are supported by angle braces, angularly placed between either posts and ridges, or girders. There is not an order in the placement of these elements. The most common dimension is 5-10 cm in rectangular cross-sections and 8-8 cm in circular ones. In roofs having more than two sloped surfaces, at the level where posts are located, angle rafters are placed parallel to the slope changes, one in every 2-2.5 m. Angle rafters transfer the load to posts and girders. The thickness of these elements change between 8 and 15 cm, but the most common range is 8-10 cm. Their length depends on the distance between the beginning point of eaves and the line where roof slope changes. At the point where angle braces sit on the girder, which is placed at the beginning of eaves, they are normally chamfered to expand the connection surface. (see Fig. 86, 87)

In almost all the examples, in the perpendicular direction to the roof slope, purlins are placed on top of or between the angle rafters, one in every 2 meters. Purlins transfer the load they bear to posts. The thickness and length of these elements are approximately 10 cm and 2-2.5 m, respectively. The purlin placed at the top point of the roof, on the line where the roof slope changes is called ridge purlin and the

farthermost one placed directly on the girder is called end purlin. Rafters are placed on purlins in perpendicular way, one in every 50-70 cm. The cross-sections of these purlins are approximately 5-5 cm or 5-10 cm. A plain surface, suitable for the placement of tiles, is obtained by placing roof boards on purlins perpendicular to their direction. These boards are 2 cm thick, 10-15 cm wide and 100 cm long, and are placed at mostly one in every 5 cm. The roof boards are then covered with over & under tiles in the parallel direction to the roof slope. (see Fig. 86, 87)

Even though there are examples, where posts, angle rafters, purlins, collar beams and angle braces are fine cut, in the majority of the houses timbers used in the roof structure are only pared and hewn from knots and barks (see Fig. 87). Rafters, on the other hand, generally clear cut and in several examples only, are hewn from knots (see Fig. 87). In the roofs, rain gutter and pipes are not used. Snow & rain water flow directly to the street, courtyard or *taşlık*. The roofs can be divided into two groups in terms of number of sloped surfaces they have.

Type 1: Gable roof with 2 or 3 surfaces

Type 1 examples are gable roofs composed of 2 or 3 differently sloped surfaces (see Fig. 88). Empty areas remaining at the narrow sides between two sloped surfaces are closed with masonry walls without timber skeleton or by covering with timber (see Fig. 89).

Type 2: Hipped roof with 4 or more surfaces

Type 2 examples are hipped roofs composed of 4 or more differently sloped surfaces (see Fig. 90).

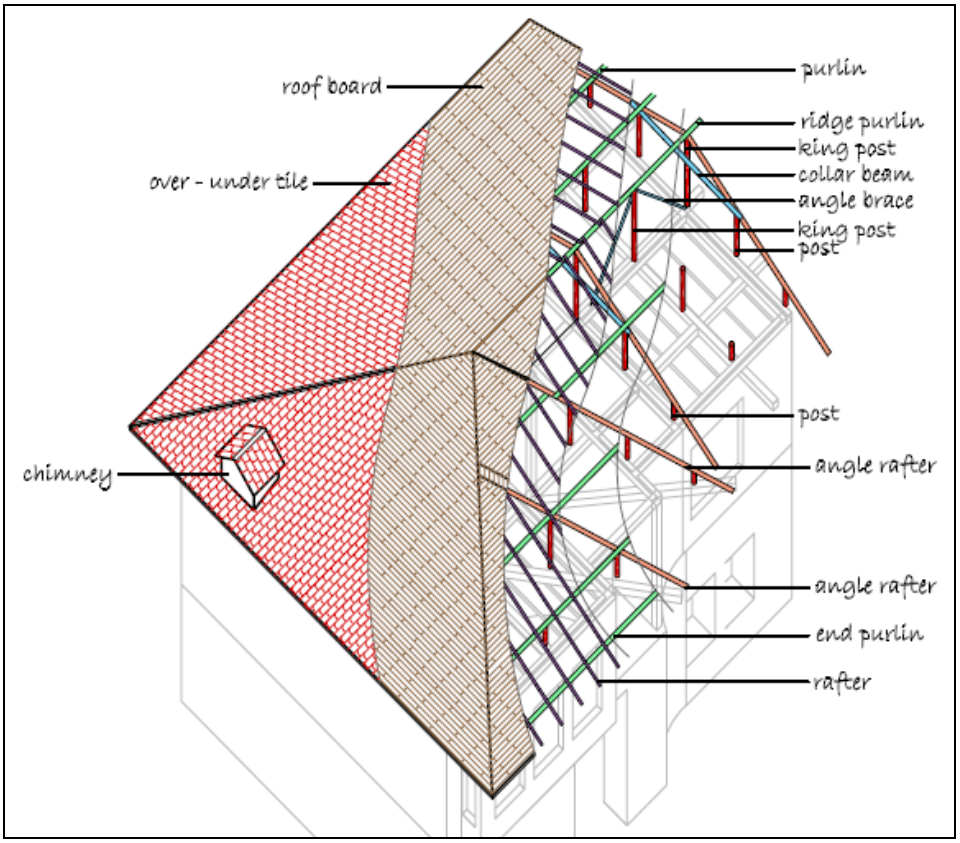

Figure 86, Set roof elements (Camikebir Quarter İmam Birgivi Street No: 6)

Figure 87, Roof elements –girder, post, purlin, rafter, and roof board relation (left) (Camikebir Quarter Meydanbaşı Street No:13), end purlin, rafter, roof board, and over & under tile relation (right) (Kurtgazi Quarter)

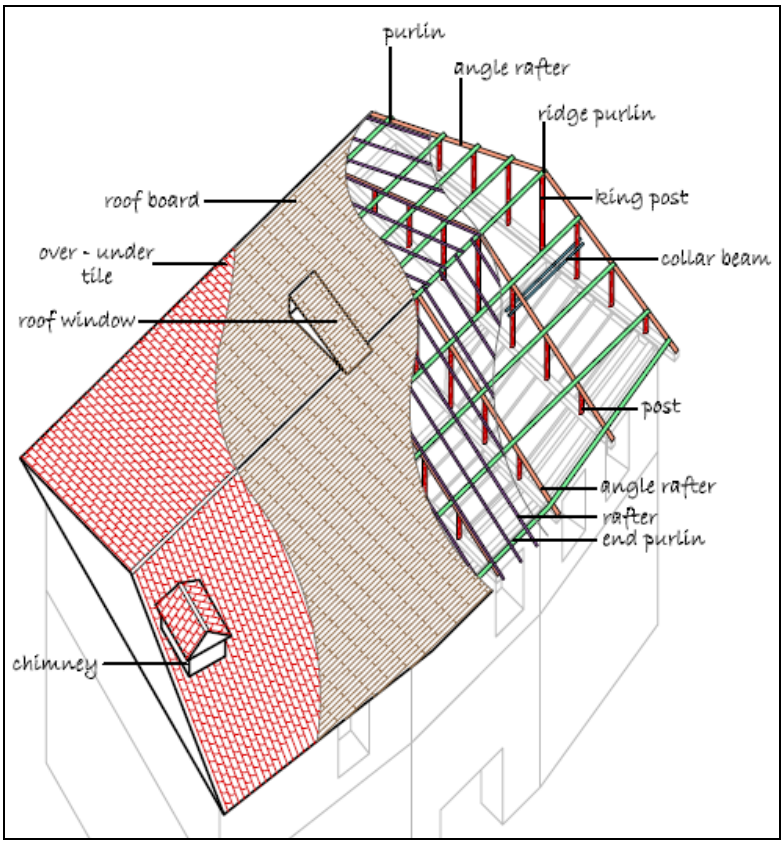

Figure 88, Example of gable roof (Camikebir Quarter 1. Beyzade Street No: 10)

Figure 89, Gable wall (Kurtgazi Quarter Ufuk Street No: 5)

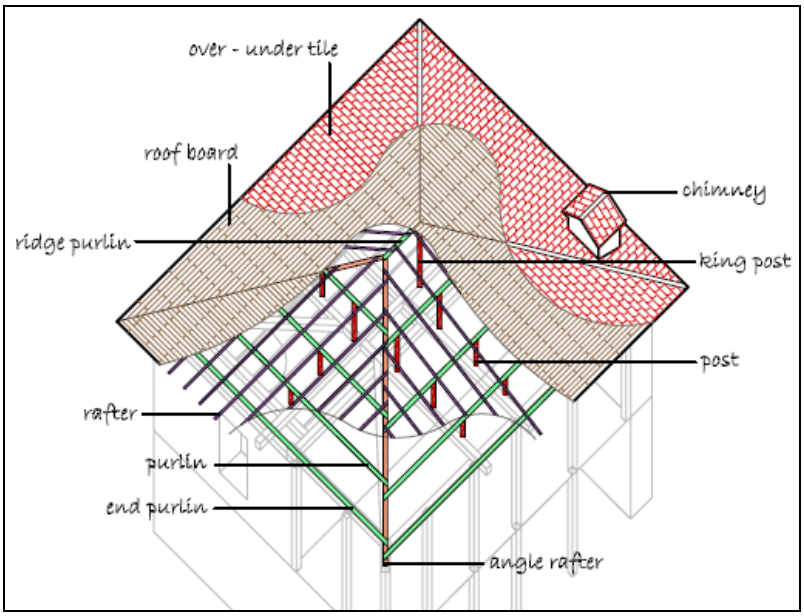

Figure 90, Example of hipped roof (Camikebir Quarter Gül Street No: 15)

Chimneys:

Form of Chimneys in Birgi was shaped depending on masonry wall system. The chimneys remove the smoke of fireplaces, and their number is same as the number of fireplaces. Chimneys have square or rectangular cross-section. The longer sides of rectangular ones extend in the parallel direction of roof slope. Nearly all chimneys are constructed of masonry using river rubbles, slat, brick and tiles (see Fig. 91). A few numbers of chimneys are constructed using only one type of material (see Fig. 91). Information regarding chimney height could not be obtained. Apart from a small number of examples, over & under tiles are used as chimney cap. They may be placed on an interior and/or exterior wall, depending on the location of fireplaces in the plan. Chimney shafts emerge from the roof structure by changing the order of rafters and roof boards by having an opening. Roof skirts at the roof-chimney intersections are covered with over & under tiles so as to prevent water and snow intake. Chimney outlet holes are placed, in most of the examples, approximately 30 cm up in reference to the level of ridge purlin. This situation must be related to the dominant wind direction. However, no information supporting this observation was gathered.

Figure 91, Examples of chimneys – rubble stone masonry chimney caps made of over & under tiles (left), brick masonry chimney (right)

Roof Windows:

Roof windows are present to facilitate to go up to the roof for the aim of maintenance and repair. The window opening is approximately 80-100 to 120-150 cm. The roof windows, which are observed in most of the surveyed examples (3/4), are placed between the ridge purlin and the following one. The ridge purlin onwards, roof slope changes, however slope is kept the same in the area where roof window is located. The window opening is provided by rafter, which is placed on the ridge purlin in the same angle as roof slope, and a stud or brace are placed on the next purlin (see Fig. 92). In one of the surveyed examples (see Fig. 182: 2-11), roof window starts from the ridge purlin level and ends between the ridge purlin and the following purlin. In this example, braces sit on the first floor wall plate. At the ending level of the opening, rafters are cut and connected at both ends to the continuing rafters by means of timber elements of 5 cm diameter.

Roof boards placed between two braces are covered with over & under tiles. There are also examples where supporting studs or braces are used in approximately mid points at side surfaces (see Fig. 92). Diagonal braces, studs and rafters used in roof windows have mostly circular cross-sections of 5-8 cm, and they are generally not fine cut. In some examples, on the other hand, fine cut timber members having a

rectangular cross-section of 5-10 cm are used. The roof windows correspond to the top of the *sofa* where no timber ceiling is used. Roof is reached, through roof window, from *sofa* by means of stairs. Roof windows are constructed using the same construction and covering techniques, however they can be divided into two groups in terms of decorative features.

Detail 1: Simple roof window

In most of the surveyed examples, Detail 1 is used. In this type roof window, side surfaces are not covered and fascia is not used (see Fig. 93).

Detail 2: Decorated roof window

In Detail 2 roof windows, studs are used in the front façade. 2 cm thick fascias are nailed to studs. Fascias are generally profiled (see Fig. 94). Side surfaces of the opening are covered with 1-2 cm thick and 10 cm wide boards.

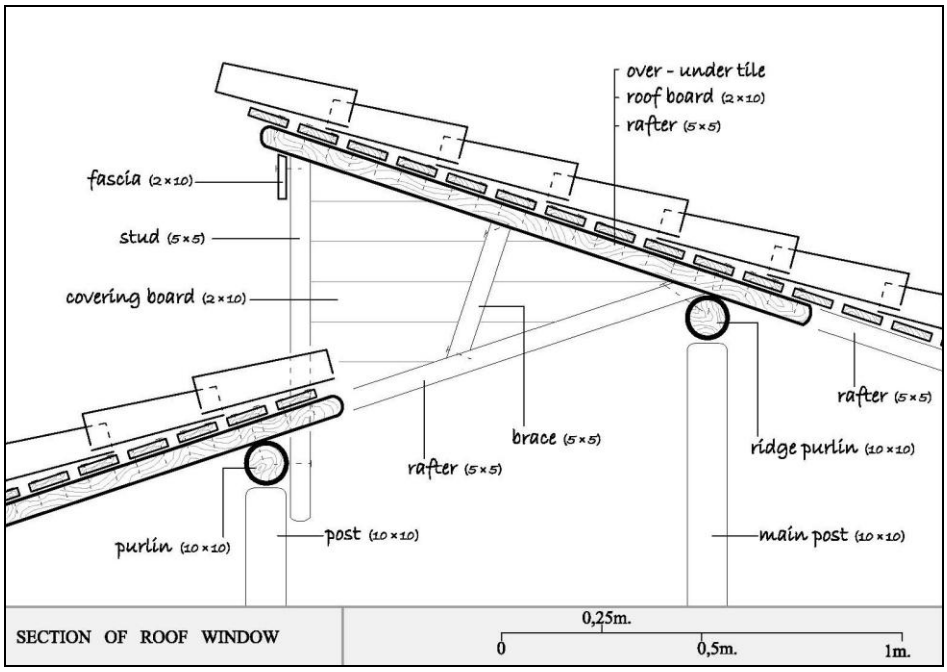

Figure 92, Elements of roof window

Figure 93, Roof window Detail 1 (Camikebir Quarter Meydanbaşı Street No:13)

Figure 94, Roof window Detail 2 (Camikebir Quarter Lot No: 502)

Eaves:

In Birgi houses, the width of the roof eaves, which are the elements not only of the house but also of the street, are ranging from 20 to 130 cm. The material used in the eaves is either timber or slate. In some of the houses, the eaves are not cladded, while in some others they are completely or partially covered with timber planks. Eaves can be divided into 5 groups in terms of their decorations.

Type 1: 100-130 cm in wide uncovered timber eaves

In the eaves, whose width changes between 100 and 130 cm, timber is used as load-bearing element (see Fig. 95, 96). In some examples, it was observed that the width of eaves, not facing the street or the courtyard, and constructed on masonry walls, is as small as 30 cm. There is no cladding under these eaves. These type of eaves are used in the oldest Birgi houses (see Fig. 182: 6/9 of 1st group houses, 10/11 of 2nd group houses).

Type 2: 100-130 cm in wide covered timber eaves

These type of eaves are the same as former ones except for the covering of eaves underside. In some examples, only the eaves facing to the street façade or at a part of side façades, and in some others, all eaves are covered timber planks in a sloped manner. Eave corners are covered sometimes sticking to their original form (see Fig. 98), and sometimes in a rounded form (see Fig. 97).

In the eaves constructed in this manner, covering may be carried out evenly or with a certain slope. In the examples with even covering, the timber elements are connected to girders one in every 30-40 cm (see Fig. 99). These timber elements have a rectangular cross-section of 5-8 cm or a square cross-section of 5-5 cm. covering boards are nailed at the surfaces of these elements and rafters to front faces. In the examples with sloped covering, on the other hand, girders end up 40-50 cm before the rafters. Timber elements are connected to the wall plate and rafter surfaces One

in every 50-70 cm. Over these elements, at the front face of rafters, planks are nailed with a certain angle (see Fig. 97-99). In a part of the oldest Birgi houses with rich features (see Fig. 182: 3/9 of 1st group houses), this eave type is used.

Type 3: 50-60 cm in wide uncovered timber eaves

These type of eaves, whose width changes between 50 and 60 cm, are made of timber (see Fig. 100, 101). In some examples, it was observed that the width of eaves, not facing the street or the courtyard, and constructed on masonry walls, is as small as 30 cm. There is no covering at the bottom of eaves. In most of the 3rd group houses (see Fig. 182: 9/12 of 3rd group houses), this eave type is used.

Type 4: 50-60 cm in wide covered timber eaves

The Type 4 eaves are the same as Type 3 eaves except for covering of eaves under side. In some examples, only the eaves located at the street façade or at a part of side façades, and in some others, all eaves are covered at their bottoms with timber boards in a sloped manner.

In the eaves, constructed in this manner, covering is made with a certain slope. Girders end up at the wall plate level. One in every 50-70 cm, timber elements are connected to the wall plate and rafter surfaces. Over these elements, at the front face of rafters, covering boards are nailed with a certain angle. In some of the 3rd group houses, this eave type is used.

Type 5: 20-40cm in length eaves made of 2-4 courses of slate

Use of slate in eaves is quite unique to Birgi houses. In these type of eaves, whose width change between 20 and 40 cm, 2-4 rows of slate are used in a projected manner at 1 or 2 levels. Brick pieces are also used whenever is needed a plain surface. This eave type is used at all façades in some examples, while in some other this technique is used in certain façades only.

Only one of these eaves could be surveyed in detail (see Fig. 104-105, 182: 3-2). In this house, double layered timber framed wall (see Timber Framed Wall Type 3 - page 125-126) is used on upper floor, purlin is not used in roof structure and rafters sit on angle rafters (see Fig. 104, 105). Angle rafters are connected to ridge purlin from their ends and the other end sits on slate. Rafters and the roof boards nailed on them end up approximately 20 cm before the endpoint of slates. Over & under tiles extend in parallel to roof boards and the last row of over & under tiles are placed on these slate used in eaves, independently of roof boards, and in such a way that they sustain the flow of rain water transferred by the other over & under tiles. Mud mortar with course aggregate is used while placing the last row of over & under tiles on slates (see Fig. 104, 105).

Eaves are not covered. In a part of studied examples, plaster and paint is applied, however these are interventions usually made in later periods. There are no examples where traditional plaster and paint is still readable. In some of the 3rd group houses (3/12), this eave type is used.

Figure 95, Examples of eave Type 1 (Camikebir Quarter 3. Beyzade Street No: 15)

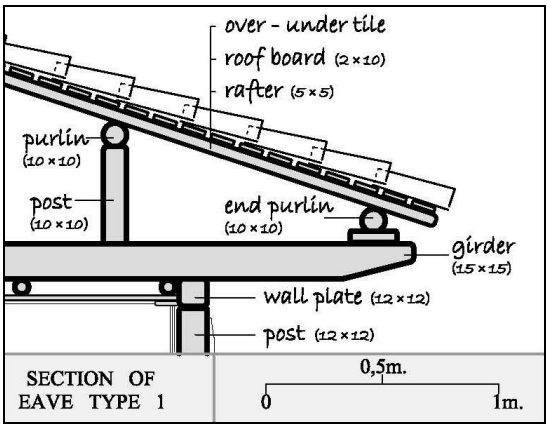

Figure 96, Section of a 100-130 cm wide uncovered timber eave

Figure 97, Example to rounded eave corner (Camikebir Quarter 3. Beyzade Street Lot No: 553)

Figure 98, Examples of eave Type 2 (Camikebir Quarter Meydanbaşı Street Lot No: 677)

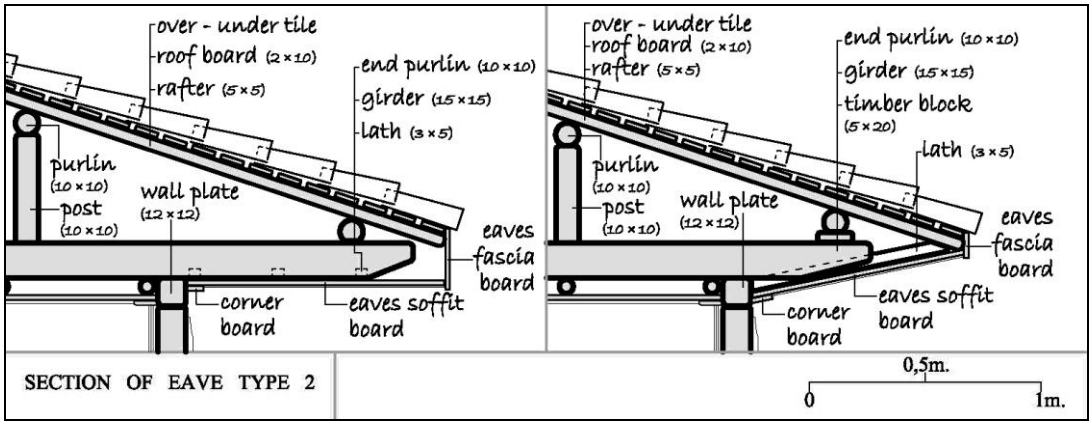

Figure 99, Section of a 100-130 cm wide covered timber eave

Figure 100, Examples of eave Type 3 (Kurtgazi Quarter)

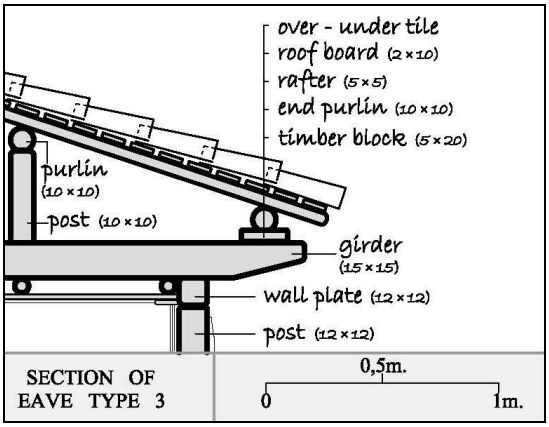

Figure 101, Section of a 50-60cm wide uncovered timber eave

Figure 102, Examples of eave Type 4 (Gazi Umur Bey Quarter Demirbaba Street, Camikebir Quarter İmam Birgivi Street No: 8)

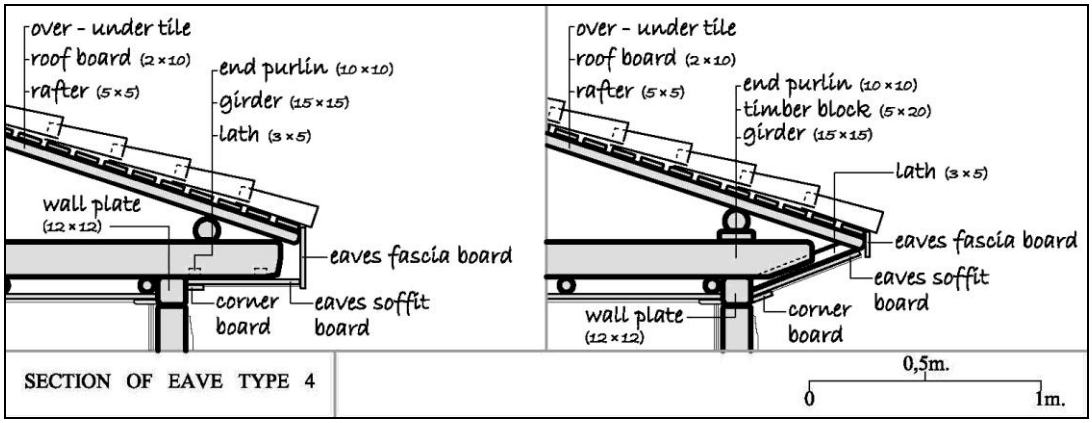

Figure 103, Section of a 50-60cm wide covered timber eave

Figure 104, Examples of eave Type 5 (Cumhuriyet Quarter Umurbey Street No: 51, sağda Camikebir Quarter Okul Street No: 2)

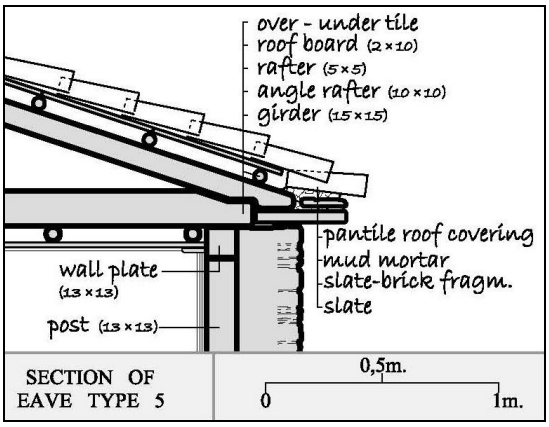

Figure 105, Section of the 20-40cm in length eaves made of 2 courses of slate (Camikebir Quarter Okul Street No:2)

3.6. HORIZONTAL AND VERTICAL CONNECTIONS

There are different details of transition from one floor to another, according to vertical and horizontal load bearing systems. The wall plates and foot plates used at the transition levels between floors have a cross-section of 10-15 cm. For the aim of dividing the span, girders and floor girders are horizontally used. Girders have a cross-section of 10-15 cm, however in a few numbers of examples it was observed that the side length might be as large as 25 cm. Most of the girders are not hewn; they are only pared and cut off from knots.

In the surveyed examples, girders placed in the direction of the short side are not main load transferring elements. They generally span a distance of 3-3.5 m and at most 4.5 m. they are repeated one in every 1.5-2.5 m. The repetition distance depends on the carried load and cross-section size of the plate sitting on the girder. In some examples, timber blocks are used as additional support between girders. These elements transform the load they bear to the walls or posts by means of wall plates they sit on. The cross-section dimensions of floor girders change between 5 and 10 cm, depending on their span. Floor girders may be used by only paring and cutting off the knots or processing so as to form a clear cut rectangular cross-section. In the surveyed examples, floor girders generally span a distance of 3-3.5 m. They are

repeated one in every 50-70 cm. These elements transform the load they bear to the walls or posts by the wall plates they sit on, or by the girders that either they sit on or they are placed in between. The solutions developed at the transition may vary depending on the relationships of horizontal and vertical load-bearing elements used between floors.

Detail 1: Transition from masonry to masonry

In the examples where the masonry wall system continuous for at least two floors, the main construction system does not change, however wall plates are used at floor transition level (see Fig. 106). Wall plates, generally belonging to the shorter of the intersecting, overlap onto the other. If necessary, girders also overlap onto the wall plates of the long wall. Wall construction continuous without leaving a space between girders.

While in most of the cases the wall thickness is the same for two floors, in some transitions, the upper wall recessed, from either inside or outside, so that the wall thickness is decreased. In cases where the recession is made at the interior surface of the wall, wall plates are placed at the ending level of the lower floor wall. In this case, girders continue until the exterior façade of the wall, or only for another 20-30 cm inside the main structure (see Fig. 41-44). In cases where the recession is made at the exterior surface of the wall, on the other hand, wall plates are retracted inside as much as the recession distance and are placed at the ending level of upper floor wall. Girders are placed on wall plates in such a way that they stick out of the ending level of the upper floor for 2-3 cm (see Fig. 106).

Detail 2: Transition from masonry to timber frame

In most of the houses, masonry walls are used in lower floor and timber frame system is used in upper floor. In these examples, in the elevations where there are no projections, the upper floor and lower floor façade are in the same line (see Fig. 107). Upper floor foot plates are placed on the girder sitting on the lower floor masonry

wall or floor girder and lower floor wall plate. No space is left between girders and floor girders (see Fig. 107).

Detail 3: Transition from masonry to timber post

In most of the houses, masonry wall system is used in lower floor and timber posts are used in upper floor. In these examples, in the façades where there are no projections, the upper floor post and the elevation of the lower floor wall are in the same line (see Fig. 108). In the surveyed examples, two systems are followed in these type of details. In the first one, foot plate is used below the upper floor post and it is placed on girders or floor girders. In the second type, upper floor posts sit directly on floor girders or girders. The cavity between girders and floor girders are left as they are, and in some examples their façades are covered with timber boards having approximately 2 cm thickness (see Fig. 108).

Detail 4: Transition from timber frame to timber frame

In the examples where timber frame system is used in both floors, wall thickness does not change. The foot plate of the upper timber skeleton sits on the girders or floor girders of the former floor (see Fig. 109). In the surveyed examples, the cavity between girders and floor girders are left as it is.

Detail 5: Transition from timber frame to timber post

In some of the load-bearing walls, timber frame system is used in lower floor and timber posts are used in upper floor. In these examples, the exterior surface of the upper floor post and the lower floor wall are vertically in the same line (see Fig. 110). The upper floor post sits on the wall plate of the lower floor timber frame system and posts used in the upper floor are always placed in the line of lower floor's

main post or post. This detail is observed in one of the examples[24], surveyed in detail (see Fig. 110).

Detail 6: Transition from timber post to timber frame

In some of the load-bearing walls, timber post is used in lower floor and timber frame system is used in upper floor. In these examples, the exterior façade of the lower floor post and the upper floor wall are in the same line (see Fig. 111). The main posts or posts of the upper floor timber frame system are always placed in the line of the lower floor posts. The foot plate of the upper floor timber frame system sits on the girders or floor girders placed on the timber post wall plate (see Fig. 111).

Detail 7: Transition from timber post to timber post

In some of the houses, timber posts are used in both floors in the same line. In this case, the lower post is normally thicker than the upper one (see Fig. 112). The upper post is positioned in such a way that it does not exceed the external limits of the lower post. In a few numbers of examples, the center of gravity of the posts is aligned on the same vertical direction. In the surveyed examples, two alternative solutions are followed in terms of this type of details. In the former system, the lower floor posts sit on the girders placed on the wall plate and in the latter, upper floor post sits directly on the wall plate of lower floor posts. In both systems, foot plates are sometimes used below upper floor posts (see Fig. 112).

Detail 8: Transition from timber eave to masonry, timber frame, or timber post

In the examples where timber roof eave is used, the same system is used as in the examples where masonry wall, timber frame wall or timber post is used. Girders are placed in such a way to transfer the load to the upper floor wall plates, and according to the roof plan. On top of girders, end purlins are placed in perpendicular directions.

[24] In the house no 15 at 3. Beyzade Street in Camikebir Quarter, the area used as the 1st floor is included in the *sofa* located in the 2nd floor.

In some examples, angle rafters are also used in the same direction as girders. These elements, located on girders end up at least 10 cm before the end purlin (see Fig. 95-103).

Detail 9: Transition from timber eave to masonry or timber frame

Slate is used, sometimes in all eaves of the building and sometimes in a part of them. In the surveyed examples, the eaves, constructed in this way, are placed on masonry wall or Type 3 timber framed wall. Only one of the examples, where this detail is used, was surveyed in detail. In that example, slates are placed on the upper floor wall plate, directly in front of the girder extending towards the wall in a perpendicular way, in such a way that 2/3 of its length sticks out. In this detail, angle rafter sits on girder, and at the same time on the slate part on the wall. The stability of the projection is increased by means of angle rafter (see Fig. 104-105).

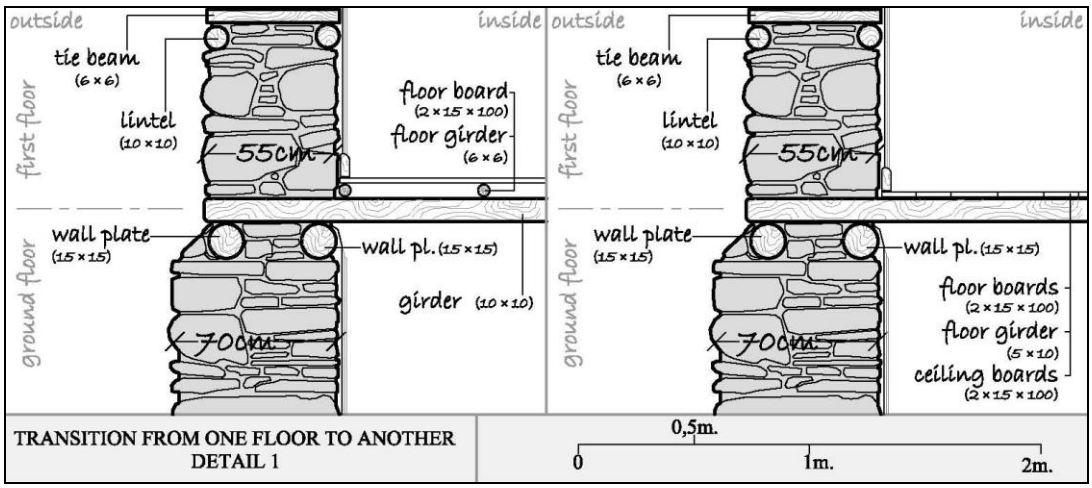

Figure 106, Detail of wall where thickness decreases in upper section by exterior chamfer at the external surface, in case masonry wall continues in both floor; use of girder and floor girders together at floor change (left), use of only floor girders at floor change (right)

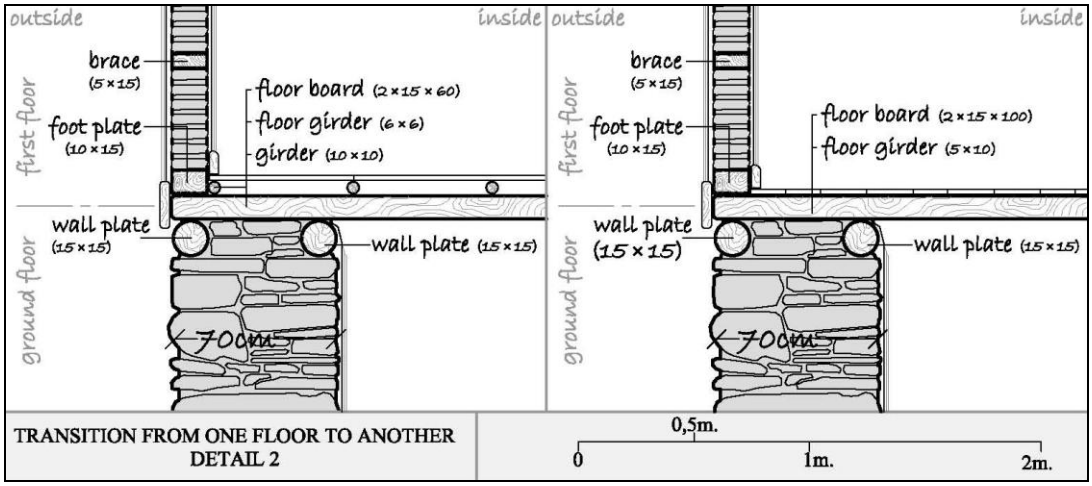

Figure 107, Detail of use of masonry wall in the lower floor and timber frame wall in the upper floor; use of girder and floor girders together at floor change (left), use of only floor girders at floor change (right)

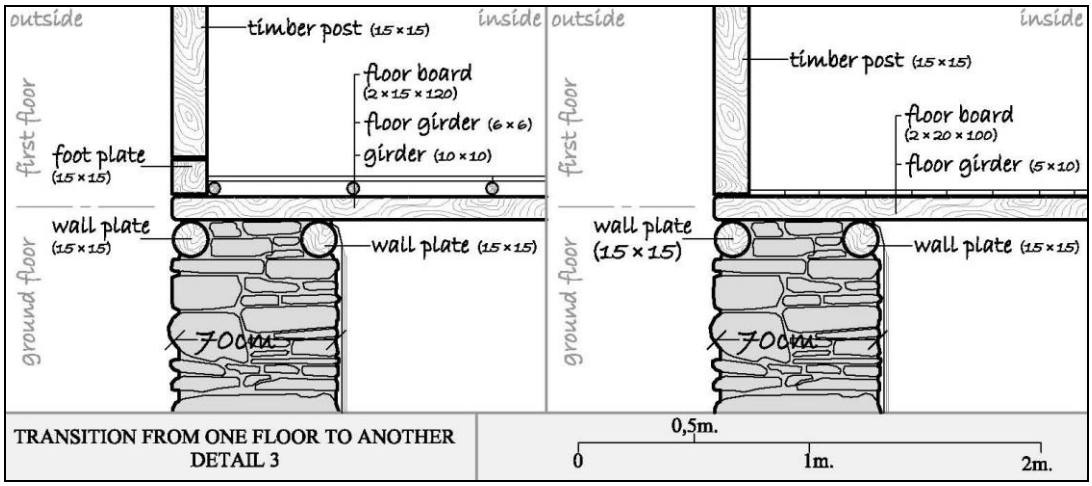

Figure 108, Detail of use of masonry wall in the lower floor and timber post in the upper floor; use of girder and floor girders together at floor change (left), use of only floor girders at floor change (right)

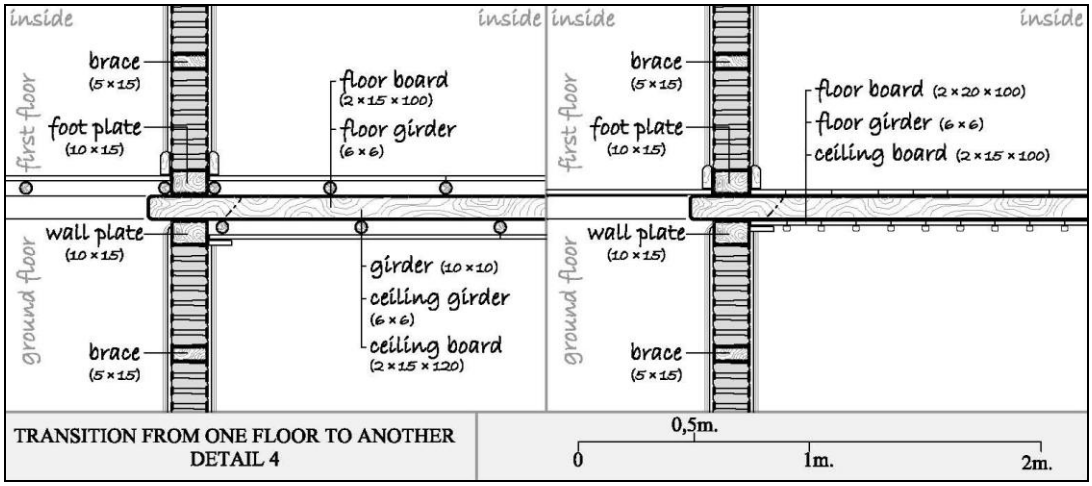

Figure 109, Detail of use of timber frame walls in both floors; use of girder, floor girders and ceiling girders together at floor change (left), use of only floor girders at floor change (right)

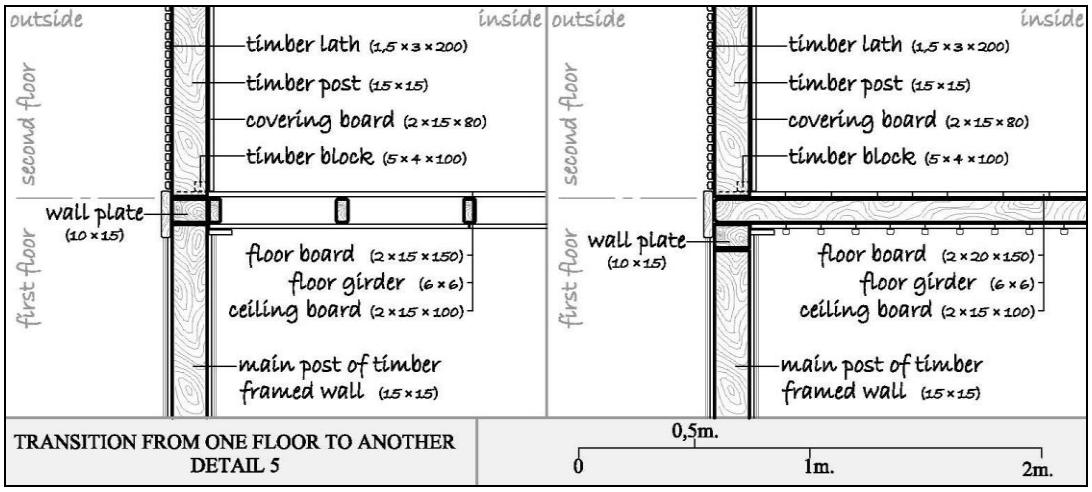

Figure 110, Detail of use of timber frame in the lower floor and timber post in the upper floor; placement of the post on the wall plate of the upper floor timber frame wall (left), placement of the post on the floor girder (right)

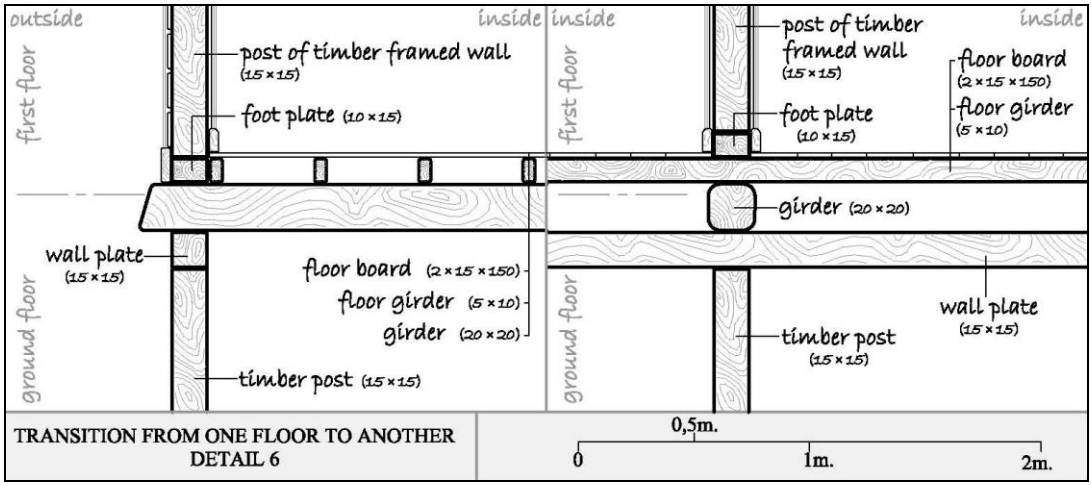

Figure 111, Detail of use of timber post in the lower floor and timber frame wall in the upper floor; placement of the foot plate of the timber frame wall on girder (left), placement of the foot plate of the timber frame wall on floor girder (right)

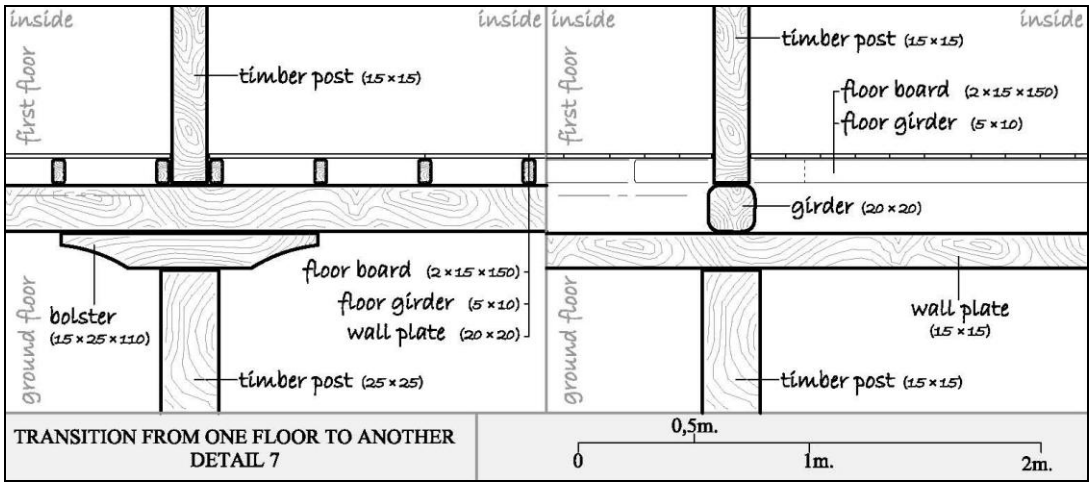

Figure 112, Detail of use of timber posts in both floors; placement of the upper floor timber post on the lower floor timber post wall plate (left), placement of the upper floor timber post on girder (right)

3.7. ARCHITECTURAL ELEMENTS

3.7.1. PROJECTIONS

In Birgi traditional houses, the projections that can be defined as a salience towards the street in the upper floors, function as a part of the timber structure. The

projections, built by the enlargement direct of *sofa*'s or main room's to the street, are used in the whole façade or in a part of it on the corners of two façades along the entire façade. Projections can be divided into two groups according to their form. The first one is the rectangular projections, extending in the parallel direction with the ground floor wall, to which it transfers the load it bears. The second one is the triangular projections extending in a different direction to get better street view. In the examples where this second type of projections is used, the exterior wall of the ground floor that is shaped in accordance with the street is not parallel to the exterior wall of upper floor projection. In such way, rectangular angles to the upper floor plan are obtained. In the houses, only rectangular or only triangular projections are used. However, in a small number of houses, the use of both type of projections is observed. The projections can be divided into 3 main groups in terms of their load-bearing features.

Type1: Projection with simple console

In these type of projections, girders or floor girders, are extended from the ground floor exterior wall surface line towards the street for 20-60 cm. These projections transfer the load they bear to the ground floor masonry walls by means of wall plates they sit on (see Fig. 113, 114).

Type 2: Projection with timber brace

In these type of projections, generally girders, and in a small number of examples floor girders are extended from the ground floor exterior wall surface line towards the street for 50-10 cm and are directly and indirectly supported using braces, placed at an angle changing between 20 and 50 degrees (see Fig. 115, 116). Two different techniques are used in the construction of this type of projections. In the first of these, each girder is supported by a brace (see Fig. 115, 116). In some of the examples, where the distance is short, girders are supported by braces, by skipping one in every two successive girders. In the second technique, at the bottom or top of girders or floor girders, 7-12 cm thick lower projection sills are placed in a

rectangular manner, and supported by projections. In this method, the number and location of braces do not depend on girders and floor girders, and yet in most of the examples the braces are in the same line and number as girders (see Fig. 115, 116).

In both techniques, the lower tip of the braces sits on the ground floor lintel and so, the braces transfer the load to the masonry sections. Braces have normally rectangular cross-sections of 6-8 cm to 12-15 cm. Some of these have a concave shape and these braces are named *eliböğründe* (see Fig. 115, 116). Most of the timber braced projections are not covered. In some of the 1st group houses (3/6), the façade of the girders are covered with planks (see Fig. 115, 116). In only one example (see Fig. 182: 3-9), bottom and side surfaces of the braced projection are covered with using 5 cm thick placed timber laths between braces and planks (see Fig. 71).

Type 3: Projection with covered timber brace

In a small number of 3rd group houses (see Fig. 182: 3-7), braces are covered with profiled planks and timber laths (see Fig. 117). This type of projections is placed at one end of *sofa* and approximately 80 cm wide and 150 cm long.

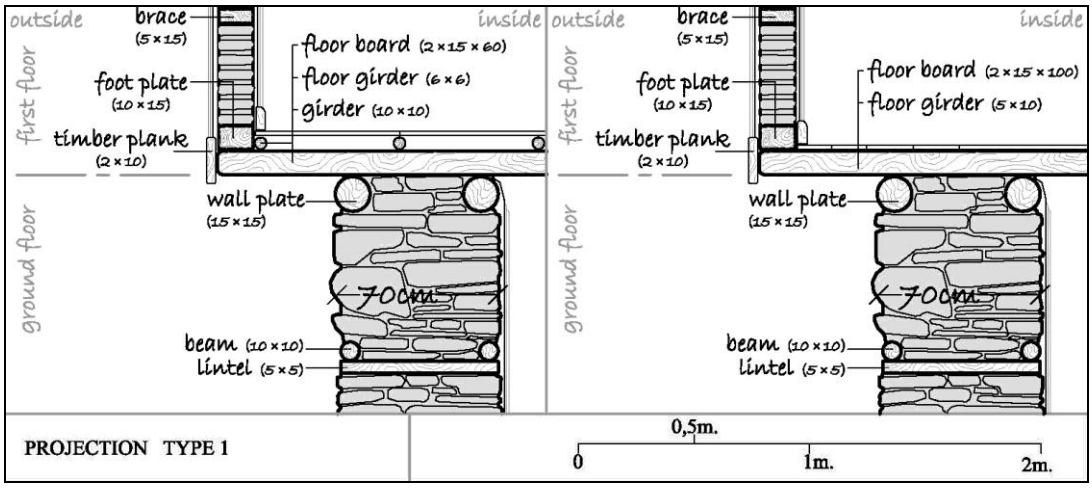

Figure 113, Simple console projection

Figure 114, Simple console projection – projection made with girders (left) (Kurtgazi Quarter Şehit Gürol Madan Street No: 78), projections made with floor girders (right) (Camikebir Quarter Karanfil Street No:23)

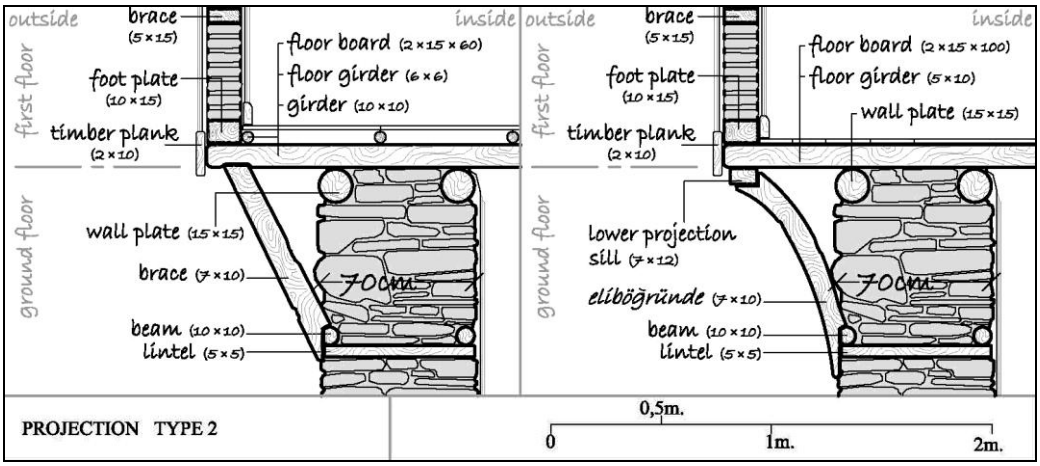

Figure 115, Timber braced projection

Figure 116, Braced projection – projection with girder, *eliböğründe* and lower projection sill (left) (Camikebir Quarter Meydanbaşı Street No:1), projection with floor girder, eliböğründe and lower projection sill (right) (Camikebir Quarter Karanfil Street No:12)

Figure 117, Example to projection covered with profiled planks and timber laths (Cumhuriyet Quarter Umurbey Street No:27)

3.7.2. STAIRCASES

The vertical circulation elements can be divided into 2 groups in terms of the material they are constructed of and construction techniques.

Type 1: Stone staircase

In the stone masonry stairs, rounded rubble stones, obtained from river beds and the skirts, as well as slate, and mud mortar are used (see Fig. 118, 119). In some examples, the use of brick-tile pieces in small amounts is also observed. In the stone masonry construction made in a trench, which is opened as wide as the bottom area of the stairs, after reaching to the ground line, a recession of a step wide is made one in every 10-25 cm height. In the recessed surfaces forming the stair steps, wide slates are used (see Fig. 118, 119).

In the examples used between *taşlık* and *sofa*, the number of steps changes depending on the height difference between the starting point of stairs and *sofa*. The most common total stairs width change between 80 and 140 cm, the width of steps between 25 and 50 cm, height of the first step riser between 10 and 20 cm and that of

the other steps between 17 and 25 cm (see Fig. 118). There are also staircases used in *taşlık* between platforms of different heights. These stairs have generally 3-6 steps. Their width, on the other hand, change depending on the width of the area they are used in. Step widths are about 40-100 cm and riser heights are about 10-20 cm (see Fig. 118). In only one example among the surveyed houses (see Fig. 182: 1-1), a system, composed of one step only, is used to provide vertical circulation between *taşlık* and deposit space placed 60 cm above *taşlık* (see Fig. 120). While constructing the wall below the entrance door of the deposit, a 4 cm thick and 24 cm wide slate is placed in such a way that it extends approximately 20 cm from the wall line (see Fig. 120).

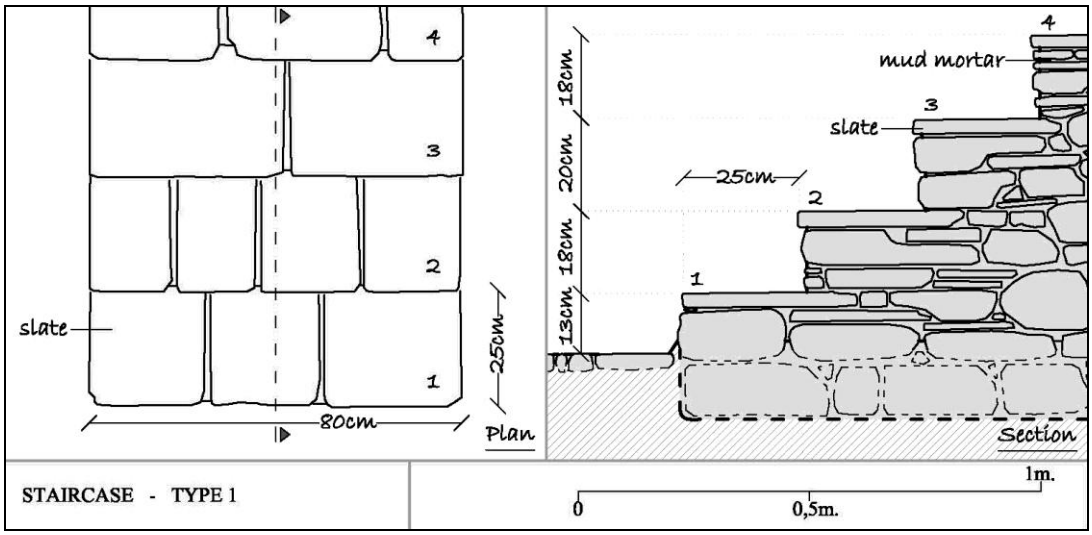

Figure 118, Staircases Type 1 (Camikebir Quarter Gül Street No:15)

Figure 119, Examples of stone staircase (Cumhuriyet Quarter Umurbey Street No:23, Gaziumurbey (Demirbaba) Quarter Demirbaba Street No: 35)

Figure 120, Examples of one step (Camikebir Quarter Meydanbaşı Street No:13)

Type 2: Timber staircase

Most of the staircases connecting the ground floor to the first floor and all of the staircases connecting the first floor to the second floor are constructed of timber (see Fig. 121-124). The stairs are generally one handed and in some examples, two handed or quarter-turn stairs (see App. A: 1-3, see Fig. 182: 1-5, 3-7). The number of steps changes depending on the height difference between the starting and end points of stairs. The total stairs width changes between 70 and 120 cm, the width of steps between 20 and 27 cm, height of risers between 15 and 26 cm (see Fig. 124).

In some examples (see App. A: 1-4, 2-6), the upper floor slab is cleared out as much as the stairs surface area, and in some others from the line, where the height between

the step and upper floor slab is less than 2 meters, onwards. There are examples where the discontinuous floor girders around the stairs opening are connected to each other by means of girders placed at their end point or bottom, however in most cases the floor girders are left as they are.

Strings placed within the stairs opening are connected to the girder or floor girders in the upper floor (see Fig. 122, 124). In the lower floor, on the other hand, if the staircase starts from the ground level, to a stone step or stairs by sill plates , and if it starts from the first floor, to girder and floor girders. In the case that the directions of the staircase and the girders, to which the staircase transfers its load, are the same, an 8-10 cm wide connecting girder is added between the girders and strings are placed onto this element (see Fig. 121, 122, 124). 2-3 cm deep tread slots are made on the strings, one in every 15-26 cm (see Fig. 122, 124). These tread slots continue along the string width, or in such a way that the last 3 cm is left untouched. 3-4 cm wide treads are placed in these tread slots and are nailed. While placing the treads, a small gap is left between tread and string by taking timber flexibility into consideration. In some examples, at the tread-string intersection, supporting blocks are placed under treads.

In a small number of examples (4/32), the riser heights and/or below the staircases are covered with 1-2 m thick timber boards. However, mostly the stairs are not covered. In a part of the surveyed houses, the stairs opening is closed using one or two timber leaves (see Fig. 123). In the daytimes, these leaves are kept open by means of a simple support timber element; they are closed at nights or whenever required for security purposes, with hook locks. On the strings, newels, having a cross-section of 4-6 cm, and one in every 1-2 steps, balusters, having a cross-section of 3-6 cm, are placed and nailed (see Fig. 122, 124). There are profiled newel and baluster examples. Handrails, having a square or rectangular cross-section of 3-6 cm, are placed and nailed on balusters and between newels. Handrail height changes between 60 and 80 cm. In the cases where one side of the staircase is adjacent to the wall, newels and balusters are used on one side only.

Figure 121, Upper and lower connections of the string belonging to the stairs used between the ground floor and first floor (Cumhuriyet Quarter Umurbey Street No:23)

Figure 122, Tread slots where string and steps are placed (left) (Camikebir Quarter Okul Street No:3), stringer and treads (right) (Camikebir Quarter Okul Street No:2)

Figure 123, Leaf and hook lock detail used to close the stairs openings (Camikebir Quarter Okul Street No:2)

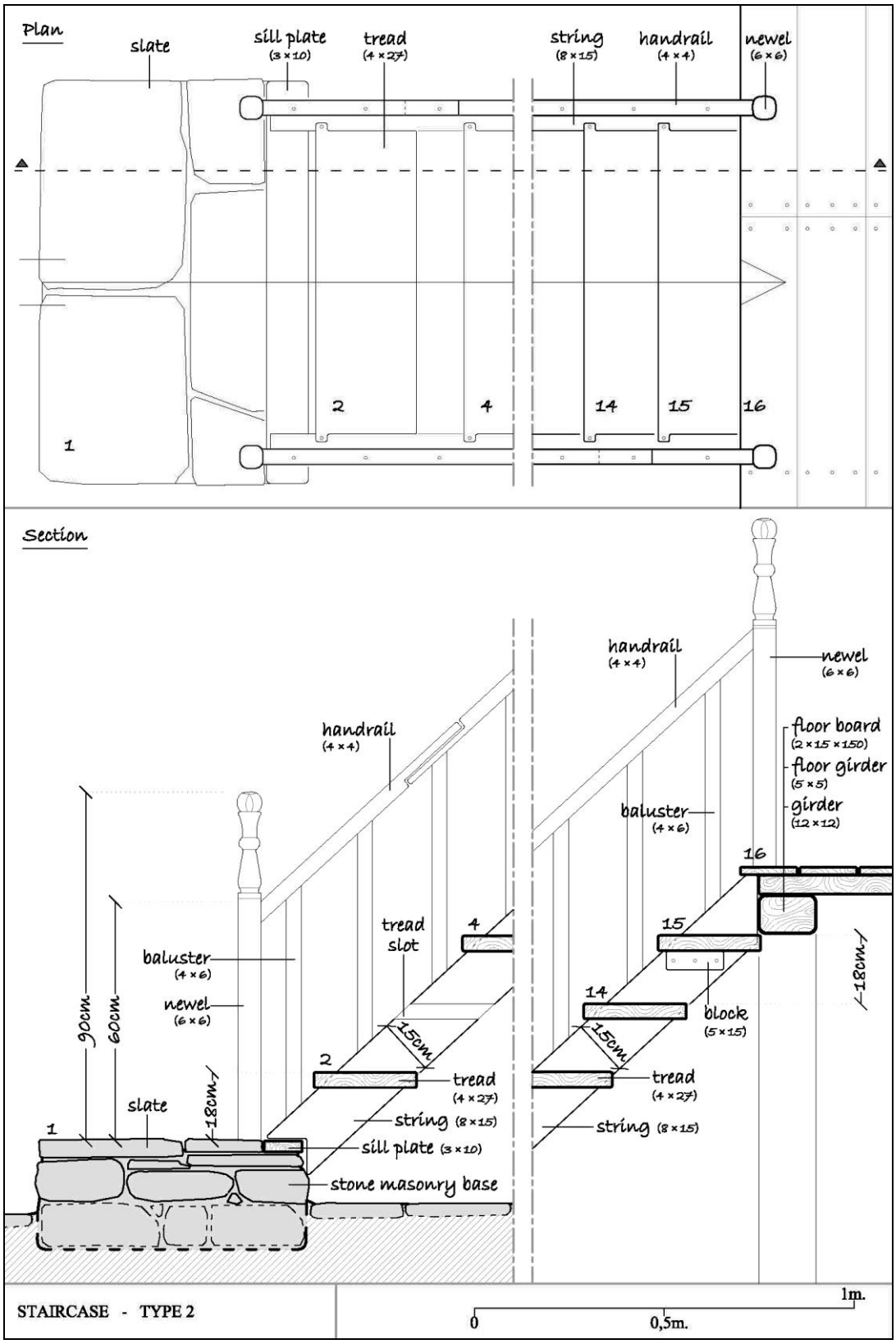

Figure 124, Plan and section of timber staircase sitting on a stone masonry step

3.7.3. FIREPLACES

In Birgi traditional houses, fireplaces are used in *taşlık*, a ground floor room used as kitchen, *sofa* and/or upper floor rooms. In only one example among surveyed cases, the fireplace is constructed on timber frame wall (see Fig. 125, 182: 2-5). The exterior surface of this wall projects towards outside for approximately 30 cm and was supported with timber braces (see Fig. 125). In all the other examples, fireplaces are constructed as a part of a masonry wall. Fireplaces used in the ground level do not form a projection at the exterior surface of the wall.

In nearly all examples, except one, where the fireplaces are used in upper floors, fireplaces end up with the same line with the exterior wall surface, or project towards outside for 15-20 cm (see Fig. 125, 131). This projection starts at the floor change level or 20-30 cm below this level. The projections at the floor change level are formed by means of girders or floor girders extended in a projecting manner from the exterior wall surface. The projections at 20-30 cm below the floor change level, on the other hand, are formed by 6-8 cm wide fireplace girders placed on the slates or main structure, projecting from the exterior wall surface. At the exterior surface of the projecting part, lintels are used at the line of lintels in the masonry walls and connected to each other by means of lintels (see Fig. 125, 131).

In the interior façades of the fireplaces, there are two small niches on both sides of the fireplace. Three different techniques are used in the construction of niches of fireplaces (see Fig. 126). In the first technique, clay pipes are used in main structure and the interior area, left naked, is used as a niche (see Fig. 126). This is the most commonly used technique in fireplace niches. In the second technique, during the construction of the wall, a half brick is horizontally placed at the starting level of the niche (see Fig. 126). Over & under tiles are placed on the half bricks, at side and back surfaces of the niche, and the construction is continued in this way. The interior surface of the formed gap is plastered and painted. In the third technique, on the other hand, three half bricks are horizontally placed on the half brick placed at the

starting level of the niche (see Fig. 126). The opening is limited by means of one half brick placed onto them. The interior surface of the niche is plastered and painted.

Fireplaces are mainly composed of two sections where the fire is placed and smoke is discharged (see Fig. 131). Fire is found in a sheltered niche formed inside the wall. The design of the niche bottom surface depends on whether fire is found of directly on the fireplace bottom face or on an interior element. The interior faces of all these are covered by means of mud mortar with brick and tile pieces. In some examples, lime plaster traces are observed. The second part is used for the collection and discharge of smoke (see Fig. 131). This system has a section, narrowing from the smoke collection area to the discharge point, which is provided by projections of 2-3 cm. In this way, the smoke flow is accelerated and the smoke access to room is provided. The interior faces of these parts are left naked and the main structure can be read.

In a small number of examples (2/32), in the wall structure clay pipes are placed with an increasing slope towards the chimney transition level (see Fig. 127). However, detailed information could not be obtained regarding the construction technique of these examples.

In terms the differentiations taking place in the part where fire is found, the fireplaces can be divided into 3 groups. These are:

Figure 125, Fireplace projections – fireplace projection sitting on girders and supported by braces (left), fireplace projection sitting on slates (middle), fireplace projection sitting on girders (right)

Figure 126, Fireplace niches

Figure 127, Clay pipes used in fireplace projection

Type 1: Simple type fireplace

The widest part of the interior surface of the niche formed inside the masonry wall is 50-65 cm (see Fig. 129, 131). The niche is rounded or has rectangular surfaces. The height changes between 130 and 150 cm. The depressed arch on the front face of the niche, starting from 80-100 cm above the niche starting point is 30-50 cm high (see Fig. 129, 131). It is 10-15 cm thick and 20 cm wide. There are examples constructed using slates and brick. The starting points may be at the same level with niche sides or 3-8 cm recessed or projected in reference to them. The examples of this type do not form a recession or projection on the wall interior face. In some examples, the 50-80 cm high and 2-3 cm thick timber boards, which are as wide as the arch, are placed in such a way that their bottom surface is aligned with the starting level of the arch (see Fig. 129, 131).

The bottom surface of the fireplace niche is elevated by 10-15 cm in reference to the floor ground where it is placed (see Fig. 129, 131). In front of the fireplace bottom, a rectangular hearth of 20/100-30/120 is formed in the same level with the bottom face and adjacent to the interior wall surface. The exterior limits of the hearth are formed by means of timber blocks and fire bricks, and in a small number of examples the exterior corners are chamfered.

While, in some examples, the fireplace niche heightens with the same section, in the majority of the cases, after a height of 45-50 cm, the cross-section enlarges towards back by 5-15 cm. The part, called smoke shelf, where smoke is accumulated, is approximately 30 cm high (see Fig. 131). The smoke shelf is rounded or has rectangular or sloped surfaces. Smoke shelf side surfaces form the throat by narrowing with an angle of 30-35 degrees, and continue to rise with the same slope until the distance between side surfaces is 30-35 cm. At this level, flue is formed and continuous along the masonry wall with the same cross-section (see Fig. 131).

Type 2: *Yaşmaklı* type fireplace

Type 2 fireplaces are the same as Type 1 fireplaces in terms of their construction techniques. The difference between two groups is that the depressed arch constructed on the front face of the niche projects from the wall exterior face by about 5 cm (see Fig. 130, 131). In some examples, this projecting part is limited only to the arch itself, and in some others the upper part of the arch is filled as wall until the level approximately 20 cm above arch top point. These are called *yaşmaklı*.

Figure 128, Hearth formation (Camikebir Quarter 3. Beyzade Street No: 15)

Figure 129, Fireplace Type 1 (Camikebir Quarter Camiönü Street Lot No: 507), Kurtgazi Quarter Kenar Street)

Figure 130, Fireplace Type 2 (Camikebir Quarter Okul Street No:2, Gaziumurbey (Demirbaba) Quarter Demirbaba Street No: 35)

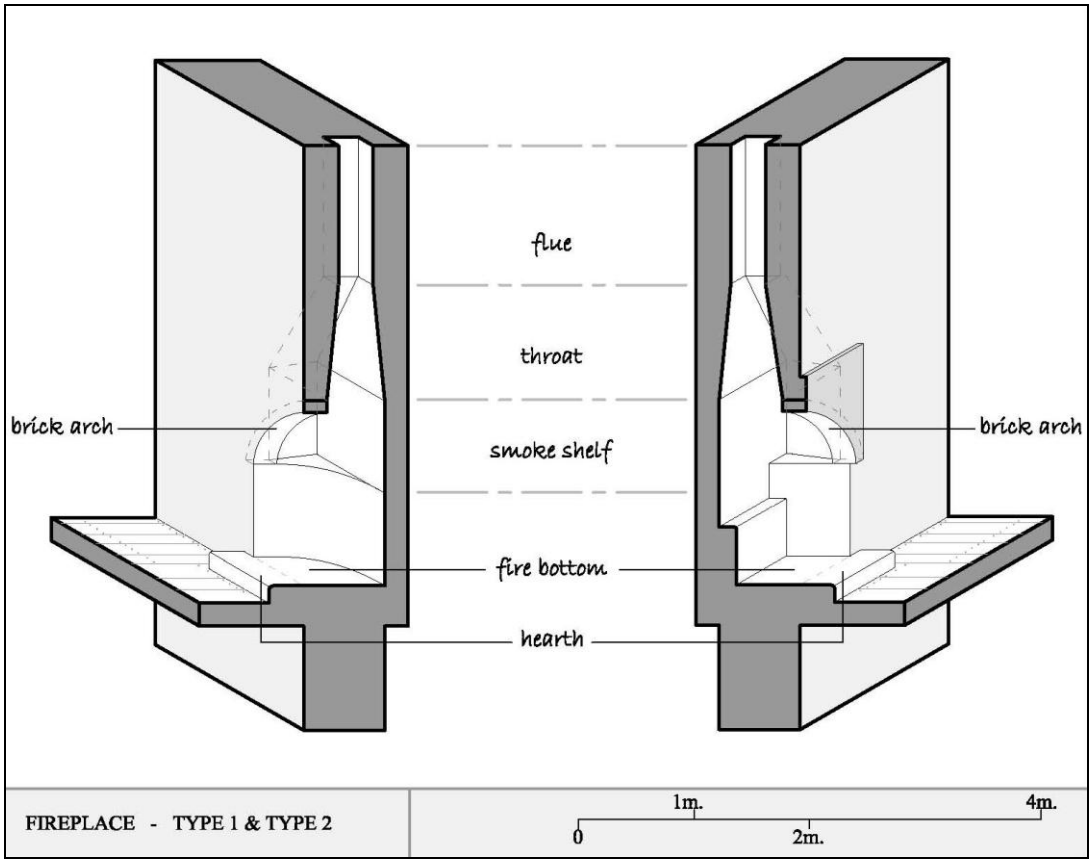

Figure 131, Fireplace Type 1 and Type 2

Type 3: *Mangallık* & *Kandillik* type fireplace

The smoke discharge system of Type 3 fireplaces is the same as that of Type 1 fireplaces. However, in the Type 3 fireplaces, fire is lighted not on the fireplace bottom but inside a brazier placed on fireplace bottom (see Fig. 132, 133). This function differentiation requires a totally different design for the fireplace niche. They are called *mangallık* or *kandillik*.

The widest part of the interior surface of the niche formed inside the masonry wall is 50-55 cm and is rounded (see Fig. 133). Its bottom is elevated from the ground level of the floor, where niche is found, by approximately 30 cm. The arch height change between 100 and 130 cm and its width is 20 cm (see Fig. 132, 133). In the surveyed examples, there are examples where only brick is used. The arch starting points sit in the same level with the niche sides. These fireplaces do not form an recession or projection on the wall internal faces. In some examples, the 50-70 cm high and 2-3 cm thick timber boards, which are as wide as the arch, are placed in such a way that their bottom surface is aligned with the starting level of the arch (see Fig. 132, 133).

Figure 132, Fireplace Type 3 (Sandıkoğlu Konağı (left), Camikebir Quarter İmam Birgivi Street No:5 (right))

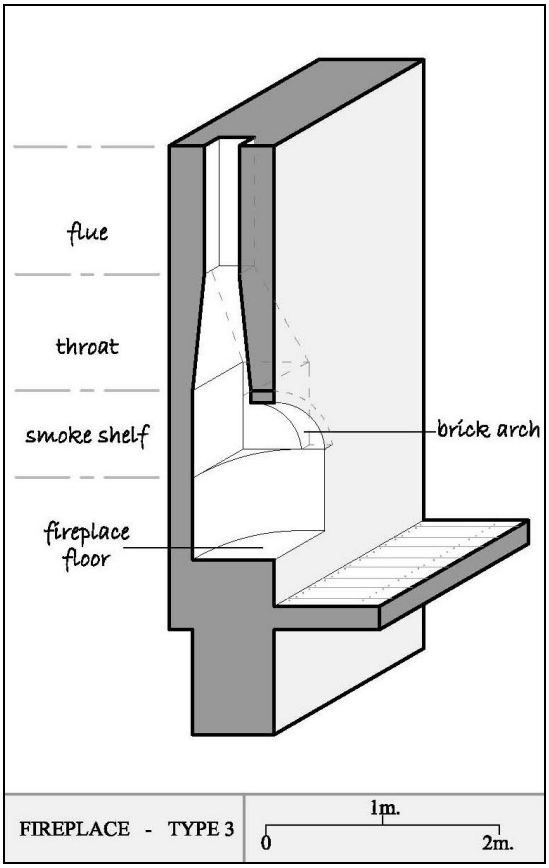

Figure 133, Fireplace Type 3

3.7.4. SEKİ

All *seki*s, which are a type of sitting platform, used in rooms and *sofa*s, have a timber structure. They can be divided into 4 groups in terms of their construction techniques and finishing types.

Type 1: 40cm high uncovered *seki*

In one of the examples (see Fig. 182: 1-3), Type 1 *seki*s are used along the shorter side of the exterior *sofa*. It is 40 cm wide, 260 cm long and 40 cm height. On the lower floor girder, 5-5 cm square cross-sectioned studs are placed one in every 60 cm. 2 cm thick planks are placed on 5-5 floor girders, nailed at one end to the studs

and at the other end to the timber element surfaces used in *sofa* façade. *Seki* front façade is left as it is; no covering is applied (see Fig. 134, 139).

Type 2: 60-80cm high covered *seki*

This is the most common *seki* type used in Birgi traditional houses. They are used along the short side of the exterior *sofa* (see Fig. 135, 136). They are 60-150 cm wide, 200-300 cm long and 60-80 cm high. 5-7 cm wide girders, placed between posts, are supported by means of studs, one in every 70 cm in short sides, and one in every 1 m in long sides. On top of these girders, 4-6 cm wide floor girders are placed in a parallel way to a short side of the *seki*. The upper surface is then covered by means of 1.5-2 cm thick planks. The front face, on the other hand, is covered by nailing 1.5-2 cm thick floor boards, placed vertically in between the girders among posts and timber blocks among posts and studs (see Fig. 135, 136, 139).

Most of the examples, on a part of the upper or front face coverings, hinged lids are mounted in the same level with the coverings (see Fig. 135, 136). These are used as in-*seki* cupboards. In some examples, on the other hand, a timber staircase is found at the side of *seki* (see Fig. 135).

Type 3: 20-25cm high *seki*

Type 3 *seki*s are used in two of the surveyed examples (see Fig. 137, 182: 1-4, 1-9). They are used along the short side of the *sofa* or in the main room. Their widths and length depends on the room size and *seki* shape. They are 20-25 cm high. *Seki* girders placed on floor girders in perpendicular direction are 10-15 cm wide. On these elements, 5-8 cm thick floor girders are placed and platform faces are covered by means of 2 cm thick floor boards (see Fig. 137, 139).

Type 4: 20-25cm high *seki* supported by wall

In one of the surveyed examples (see Fig. 138, 182: 1-8), the traces of a *seki*, constructed in a different manner in comparison to the others, are observed. This *seki* is used in the main room. The width of the *seki* is not readable and its length depends on the room size. It is 23 cm high (see Fig. 138, 139).

The floor girders in the timber frame system with stone infill, placed in such a way that they are supported by the timber structure, are either broken or cut at the ends (see Fig. 138, 139). The 1.5 cm thick planks nailed on the floor girders are adjacent to the timber frame system and the plaster and paint, applied on the timber frame wall, discontinue on timber boards. The presence of a timber element with a rounded cross-section, 13 cm in diameter, makes it possible that floor girders sit on this element. However, no information regarding the level, in which this element is placed, and its relation with the main load-bearing elements could not be obtained.

Figure 134, *Seki* Tip 1 (Camikebir Quarter 3. Beyzade Street No:15)

Figure 135, *Seki* Type 2 (Kurtgazi Quarter 3 Eylül Street No:6)

Figure 136, *Seki* Type 2 – Use of lids on the upper surface (left) (Camikeir Quarter İmam Birgivi Street No:36), Use of lids on the front surface (right) (Camikeir Quarter İmam Birgivi Street No:6)

Figure 137, *Seki* Type 3 (Gaziumurbey (Demirbaba) Quarter Demirbaba Street No: 35)

Figure 138, *Seki* Type 4 (Kurtgazi Quarter Ufuk Street No:5)

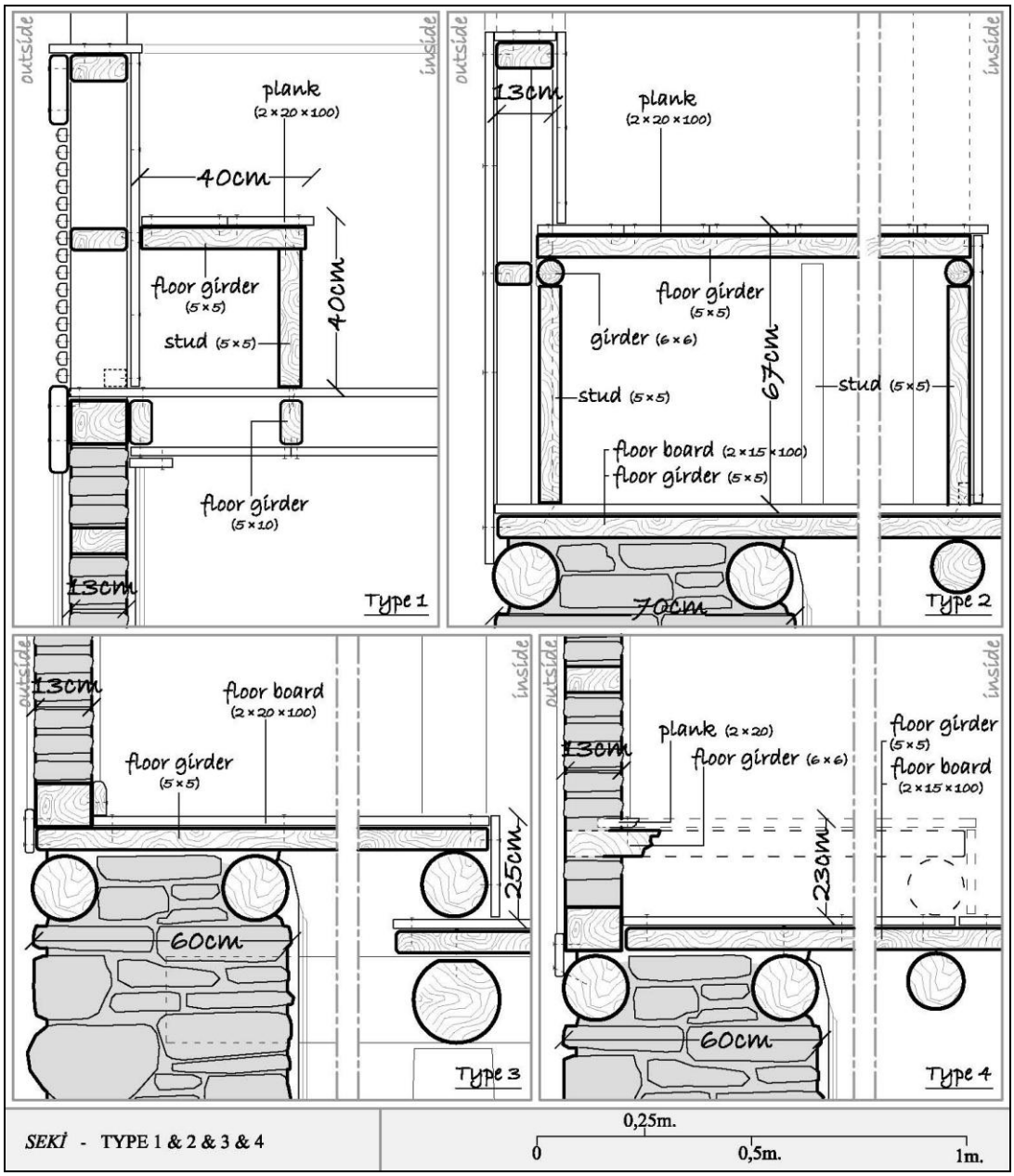

Figure 139, *Seki* Type 1, 2, 3, and 4

3.7.5. ABDESTLİK

Even though there are examples where *abdestlik*s are used along the short side of the *sofa*, in the majority of the cases, they are used along the long side of the *sofa*, facing courtyard or garden (see Fig. 140).

The total width of the *abdestlik*s placed between two successive two posts is 50-70 cm, while their length is 100-150 cm and their height is 150-185 cm (see Fig. 140, 141, 142). *Abdestlik*s are composed of a washing section, where a suitable surface to water usage is formed, and cupboard and shelves located on top of or at sides of the washing section.

Two main systems are followed in bearing *abdestlik*s. The differentiation among these systems depends on whether *abdestlik* forms a projection towards outside, or both towards outside and inside (see Fig. 141, 142).

In the former of these systems, 5x7-8 cm lintels are placed between 5x5 cm studs sitting on floor girders, and 5x7-8 cm braces sitting on floor girders, girders and foot plates, in such a way that they form a projection of about 5 cm (see Fig. 141, 142). 2 cm thick timber boards are nailed on the lintels. At four sides of this surface, on timber boards or lintels, 3-5 x 7-10 cm timber blocks are placed and nailed to the load bearing elements. The height of this area, designed for water usage, changes between 70 and 85 cm. No information regarding the original insulation and slope of this area could be obtained. Today, these areas are covered with concrete or tinplate with a certain slope towards one corner. Water accumulating at the lowest point of this area is discharged directly to the street, garden or courtyard by means of a pipe projecting by 5-10 cm from the system (see Fig. 141, 142).

In the latter of these systems, 5-8 cm thick lintels are placed on 5-10 x 10-15 cm tie beams, which are found at a height of 70-75 cm, in a projecting way at both sides by 25 cm. On top of the lintels, the water usage area is formed with the same technique as the first system (see Fig. 141, 142).

In both systems, around or at a side of the washing area and cupboard and /or shelves located on timber blocks. The width of these elements changes between 20 and 40 cm and their height changes between 80 and 100 cm. The outer façades of the cupboards and shelves are covered using lattice fences formed by 1 cm thick timber boards placed with an angle of 45 degrees or 1.5 cm thick timber laths (see Fig. 140, 141, 142).

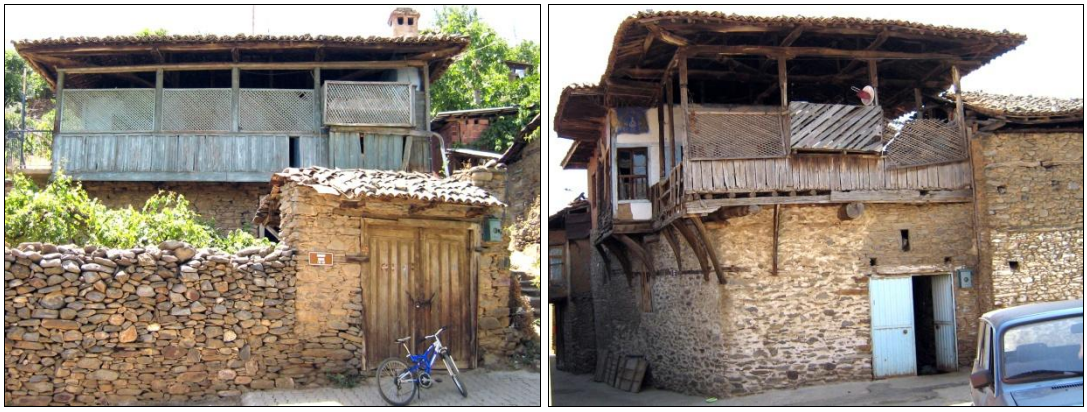

Figure 140, Examples of *abdestlik*s (Kurtgazi Quarter Hıdırbey Street No:11, Camikebir Quarter Meydanbaşı Street No:1)

Figure 141, Different techniques of *abdestlik*s (Camikebir Quarter Meydanbaşı Street No:1, Camikebir Quarter Meydanbaşı Street No:13)

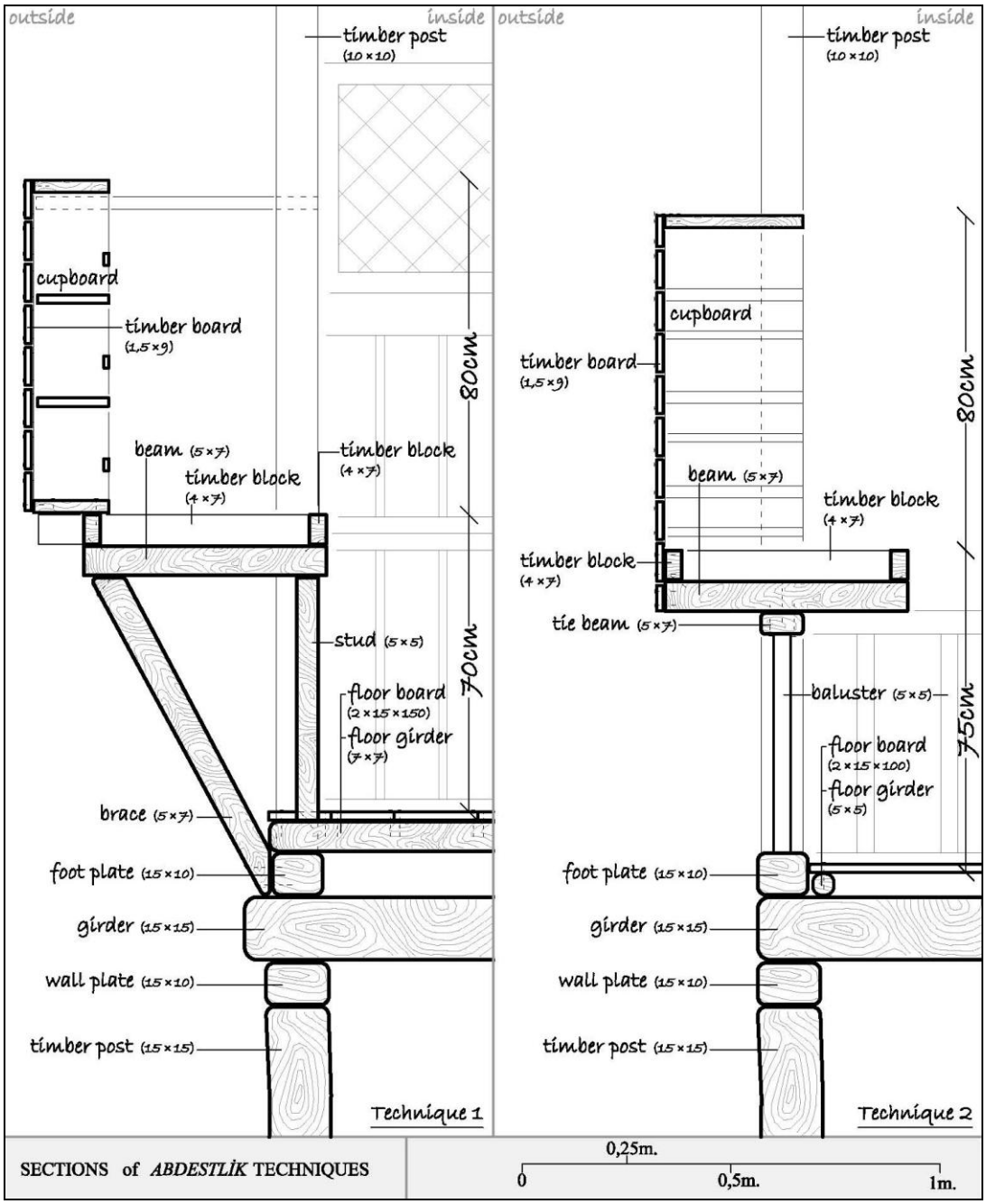

Figure 142, Sections of different *abdestlik* techniques

3.7.6. CEILING COVERINGS

Ceiling coverings used in rooms and some *sofa*s are constructed with the same technique (see Fig. 143). The ceiling surface is covered using 1.5-2 cm thick, 5-15 cm wide and 100-200 cm long ceiling boards, nailed at floor girders. The cross-sections and assembly of ceiling boards vary from each other.

In the first technique (see Fig. 143: Detail 1), 15 cm wide ceiling boards with rectangular cross-section are set next to each other and nailed on floor girders. There are examples where these elements are placed perpendicular to each other or with an angle of 45 degrees. In the second technique (see Fig. 143: Detail 2), 15 cm wide ceiling boards sit on each other by means of half lap scarf joints and nailed to floor girders at lapping levels. There is another version of this system. In the third technique (see Fig. 143: Detail 3), A part of floor girders are 15 cm wide and there are grooves formed at their bottom faces in both sides for lapping. The other floor girders have rectangular cross-section and their width is 5, 10 or 15 cm. Boards with rectangular cross-sections sit between the others and nailed to each other and at floor girders at the lapping level.

Ceiling coverings can be divided into 2 groups in terms of their shape of section.

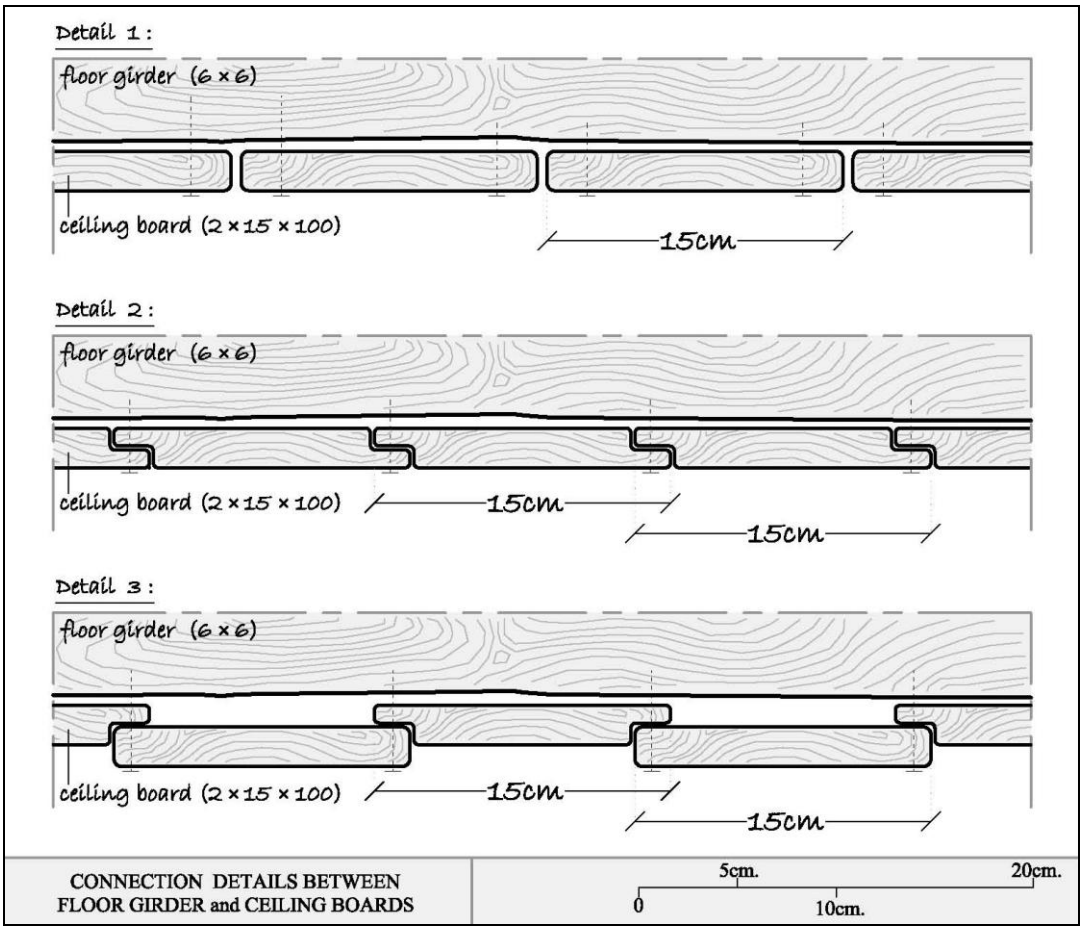

Figure 143, Connection details between floor girder and ceiling boards

Type 1: Plain ceiling

The ceilings in this type have a plain section (see Fig. 144). 1.5-2 cm thick ceiling boards are nailed on the bottom of floor girders. At the level where ceiling covering intersects with the wall, 1row of 2 cm thick and 10-15 cm wide timber boards or 2-3 rows of timber boards projecting over each other by 3-5 cm. The distance between molding and ceiling coverings do not exceed 7 cm.

Type 2: Caisson ceiling

This type of ceilings is called caisson ceilings due to their section shape (see Fig. 144). 15-25 cm moldings, used at the sides, and composed of straight or circularly

profiled timber boards, have a stepped or sloped section. Timber elements used in moldings are nailed on top to the load-bearing timbers and ceiling coverings.

Figure 144, Plain ceiling and caisson ceiling (Cumhuriyet Quarter Arif Çelebi Street No:2 (left), Camikebir Quarter İmam Birgivi Street No:6(right))

Ceiling coverings are divided into 3 classes in terms of their finishing.

Type A: Simple ceiling covering

This type of ceiling coverings are composed of ceiling boards and moldings and no decorative element is used (see Fig. 145).

Type B: Ceiling covering decorated with laths

These types of ceiling coverings are decorated by nailing 1.5 cm thick laths placed in a perpendicular way or with a certain angle (see Fig. 145). There are some examples where the laths are profiled. They may have rounded sides or may be cut in S or C shape. The examples, where laths are only used in one direction at the intersections of ceiling boards and form equal rectangles, continuous along ceiling length, are in majority. In a small number of examples, on the other hand, laths are used in such a way that they form diamond shaped areas or rectangular or square areas of different sizes. In a part of the oldest surveyed houses, these areas having different shapes are also colored to accentuate the decorative effect.

Type C: Ceiling covering decorated with *göbek*

These ceiling coverings are the same as the previous group, except the use of a *göbek* at the geometrical center of the ceiling (see Fig. 146). *Göbek*s are special areas in square, circular or hexagonal shapes, which are limited by laths. There are examples where areas delimited by laths in *göbek* are colored or left as they are.

Figure 145, Ceiling covering Type A and Type B (Camikebir Quarter İmam Birgivi Street No:3 (left), Camikebir Quarter İmam Birgivi Street No:24 (right))

Figure 146, Ceiling covering Type C (Cumhuriyet Quarter Arif Çelebi Street No:2 (left), Camikebir Quarter 3. Beyzade Street No:15 (middle and right))

3.7.7. FLOOR COVERINGS

Floor types in Birgi houses are varied according to type of load-bearing elements and function of spaces. It is used that natural ground in all surveyed houses. In the meantime, three different floor coverings types are observed among the surveyed houses in terms of the construction techniques and materials.

Type 1: Mud floor covering

After leveling the natural ground, a dense mixture composed of soil, and a small amount of straw and water, is applied to the surface so as to provide the desired slope and compressed. The slope changes between 1-3%, depending on the function of the space. No information regarding the thickness of this mud based mixture could be obtained, however, based on the space sizes and used slopes, it was determined that this cannot be less than 5 cm. This type of floor coverings are used on the ground floor spaces except *taşlık* and in service spaces.

Type 2: Stone floor covering

After leveling the natural ground, the mud based mortar is applied and then river rubbles and slates are inserted in the mortar (see Fig. 147). The used stones are inserted horizontally and vertically into the mud mortar, depending on the stone sizes. The thickness of the mud mortar applied on the ground change between 10 and 15 cm, depending on the widths of the inserted stones and requirements. During the site survey, the content of the mortar could not be defined. This type of floor covering is used at a part of the ground floor and service spaces, as well as in all *taşlık*s. In Demirbaba Quarter, in which the oldest houses located (1st and 2nd group houses), a special system is used for the discharge of water out of *taşlık*s (see Fig. 148). 8-10 cm wide gutters, covered with stone, are formed at the water accumulation levels. On the stone covered platforms on high elevations, on the other hand, water is drained by means of the hole formed with slates to the gutters used in lower elevations (see Fig. 148, 149). Clay pipes must be used between this hole and lower floor gutters. At the point where gutter intersects wall structure, waste water is transferred to outside by means of clay pipes placed in a protected volume in the

wall. This volume is limited by stones at four sides. The upper stones transfer the wall load to the side stones, so that the clay pipe does not bear the wall load. Stones and clay pipe forms a projecting part at the wall exterior face by approximately 5 cm (see Fig. 148, 149). In one example (see Fig. 149, 182: 1-1) where the clay pipe is located 30 cm above the street level, to prevent water damaging the wall, slates are placed below and at the sides of the water discharge point in a sloped manner.

Type 3: Timber floor covering

Floorings of the upper floors are covered using 1.5-2 cm thick, 15-35 cm wide and 100-200 cm long floor boards, placed on floor girders in a perpendicular manner. Floor boards having a rectangular cross-section are placed next to each other and nailed on floor girders. In all upper floor spaces and in only one example (see Fig. 182: 2-6) also in the ground floor, these type of ground coverings are used.

Figure 147, Stone floor covering (Gaziumurbey (Demirbaba) Quarter Demirbaba Street (left), Kurtgazi Quarter Kızılmescid Street No: 2(right))

Figure 148, Water drainage system on higher part of *taşlık* (left), main part of *taşlık* (middle), exterior masonry wall of *taşlık* (right) (Gaziumurbey (Demirbaba) Quarter Demirbaba Street No: 35)

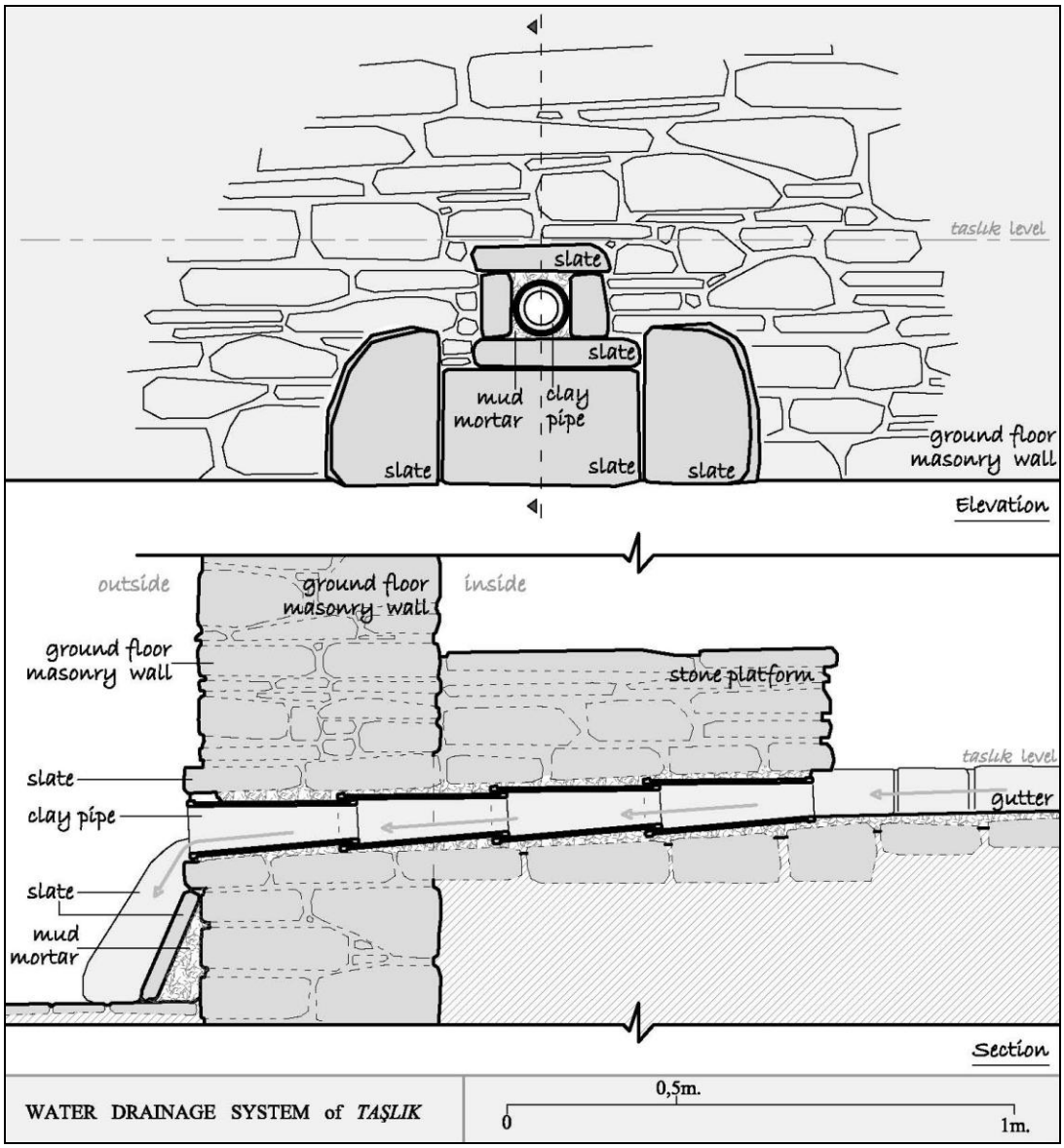

Figure 149, Water drainage of *taşlık* (Gaziumurbey (Demirbaba) Quarter Demirbaba Street No: 35)

3.7.8. DOORS

Doors can be surveyed in two groups in terms of the locations they are used in. In the first group, they provide the transition between the house and the street, while in the second, between different spaces in the house.

There are some single wing doors as entrance doors; however, in the majority of the case they are double wing. In the single wing examples, door openings are 80-120 cm wide and 200-210 cm high. In the double wing examples, on the other hand, these values are 180-210 and 210-250, respectively. The top of the doors located in courtyard wall are covered with an eave covered with tiles. In a small number of houses (2/32), there are top windows at the entrance doors (see Fig. 151, 158, 182: 2-6, 2-9). As a result of *taşlık* plan configuration, a door opens to the courtyard at least on one façade and the need for light in the space is met in this way. In the examples where latticed top windows are used, the short side of the *taşlık* opens to the courtyard and the inner spaces are not sufficiently lightened (see App. A: 2-3).

There are used both single and double wing doors between different spaces. In the single wing examples, door openings are 80-90 cm wide and 180-200 cm high. In the doors used in the ground level service spaces, the door widths and heights are reduced to 70 and 160 cm, respectively. In the double wing examples, on the other hand, door openings are 100-120cm wide and 180-210cm high. In some of the doors used in main room in upper floors, the opening height reaches 220 cm.

Doors are composed of timber casing, leaves, thresholds and metal components. The door casings used in masonry walls are composed of 2 timber posts with rectangular and square cross-sections, whose width changes between 8 and 15 cm. Door posts are placed on both sides of the opening, into the grooves of 3-7 cm on the front face of the upper door sills. They sit directly on the stone ground. In most of the examples, 3 faces of door casings and the front face of the upper door sill along the door width are covered using 1.5 cm thick timber boards. At door leaves, nailed system is used. The 15-40 cm wide and 3-4 cm thick timber elements are placed next

to each other and 6-8 cm wide lintels are nailed to these elements at the interior face. In some examples, this system is framed using 10-15 cm wide timber elements. There are examples where the exterior surfaces of the doors are decorated by means of the laths used especially in the intersections of timber elements forming the door, however in most of the cases the decoration is provided only by forged nails. Thresholds placed between timber posts, on the ground, are 5-10 cm high and 5-15 cm wide. There are also examples where thresholds are not used. At the interior and exterior façades of door opening, 2 cm thick and 15-20 cm wide casing and fascia are used.

The door casings used in timber frames walls are 5-15 cm wide and composed of 2 timber posts with rectangular cross-sections. Door posts are placed at both sides of the opening between upper door sill and foot plate. The door casing and upper door sill width is covered at three sides using 1.5 cm thick timber boards. Nailing and lapping technique are used in door leaves. In the leaves formed by nailing are formed by means of 10-20 cm wide and 3-4 cm thick timber elements nailed to a 6-8 cm wide timber block. There are also examples which are frames by means of 10-15 cm wide. The external faces of a part of leaves formed this way are decorated using laths used especially at the intersections of the timber elements forming door. The leaves formed by lapping technique, on the other hand, are constructed with timber elements of different sized lapping to the frames composed of 3-4 cm thick and 10-15 cm wide timber elements. Timber thresholds placed between door posts on the ground are 5-10 cm high and 5-15 cm wide. They are covered around by means of 1.5 cm thick timber boards. In some of the doors placed on the interior walls of the houses, 2 cm thick profiled *yasmak*s are used at the upper parts of the openings. At the interior and exterior faces of the door openings, 1-2 cm thick and 10-20 cm wide casing and fascias are used.

The fascias used in the interior faces are, in some examples, used only at the door width. In some other examples, on the other hand, they unite with window fascias and continue along the room interior façade. In most of these examples, shelves, called *sergen*s, placed on the fascia upper level and nailed to the upper door and

window sills, are used. *Sergen* widths change between 13 and 18 cm. In some examples, while *sergen*s are placed at the intersecting corners with the wall, approximately 5 cm thick timber blocks are used for supporting purposes.

The main differentiation between doors concerns the construction techniques and configuration of the openings. Doors used in Birgi traditional houses are divided into 6 groups in terms of construction techniques of their openings.

Type 1: Door opening placed on masonry wall

At the faces of the area where the door opening is to be formed at the masonry wall, stones and bricks having straight edges are used (see Fig. 150, 157). At least 3 upper door sills are used at the upper part of the opening, whose width changes between 6 and 15 cm. Nearly all entrance door openings (30/32) are constructed using this technique.

Type 2: Door opening placed on masonry wall with top window

The difference between Type 1 and Type 2 doors is that in Type 2 doors, 100-180 cm wide and 50-60 cm high top windows are used at top of the opening (see Fig. 151, 158). At top of the opening, formed using the same technique as in Type 1 doors, at least 3 upper window sills are placed. The width of these sills change between 6 and 15 cm. 50-60 cm below, in the front part of the wall, a 10-15 cm wide upper door sill is placed. In window opening, timber or metal balustrades are used. This type of door openings is used only at the transitions between street and *taşlık* in two examples (see Fig. 151, 158, 182: 2-6, 2-9).

Type 3: Door opening placed on masonry wall with brick arch

In only one example among the surveyed houses (see Fig. 182: 1-3), this type of a door opening is observed at the *taşlık* façade of the ground floor deposit area. The opening is formed using the same technique as Type 1, but at the *taşlık* side, a 145

cm high wall and 35 cm high arch are constructed by using 3.5-4x16x24cm bricks (see Fig. 152, 159). These two walls are connected to each other by means of slates used one in every 5-8 bricks. The locking system of this wall is dissimilarly formed together with the masonry wall (see Fig. 152, 159). The system is composed of a 20x20 cm square cross-sectioned gap formed within the wall, and a log, which is 10 cm in diameter. The gap continuous for 80 cm inside one wall and for 40 cm inside the other, and at its interior faces 2.5 cm thick timber boards are placed.

Type 4: Door opening placed on timber framed wall

The door openings are configured according to the width of areas formed between timber elements composing of the timber frame load-bearing system (see Fig. 153, 160). This type of examples is used at the wall level and at the sides or midpoint of the wall. This type of door openings is used in the ground floor partition walls and in upper floor.

Type 5: Door opening placed on the corner of timber framed wall

In some of the houses (8/32), where two walls, perpendicular to each other, are constructed with timber frame construction, the door of the room is placed the the intersecting edge of these walls. In these examples, timber frame wall and foot plates are in the same level, however the intermediate part between them is left empty. In the level of posts, the door opening is formed by placing door posts on the plate, connecting the foot plates perpendicular to itself. Posts located at both sides of the opening are connected to each other at the top level of the opening and 50-60 cm below wall plates, by means of beams. 3-4 rows of studs are placed between beams (see Fig. 154-156). With the usage of profiled braces between the upper beam and the intersection of wall plates, the connection between load bearing elements is completed. A suitable surface for plastering is obtained by means of timber laths nailed in front of braces (see Fig. 154).

Nearly all openings of this type are used in doors connecting the upper floor rooms to *sofa*. In only one of the surveyed examples (see Fig. 182: 2-6), this type of opening is used at the door of a ground floor room, opening *taşlık*.

Figure 150, Door openings Type 1 (Camikebir Quarter İmam Birgivi Street No:3) – exterior appearance (left), interior appearance (right)

Figure 151, Door openings Type 2 – example of door top window with metal balustrade (left) (Camikebir Quarter İmam Birgivi Street No:6), example of door top window with timber balustrade (right) (Kurtgazi Quarter Ufuk Street No:16)

Figure 152, Door openings Type 3 (Camikebir Quarter 3. Beyzade Street No:15) – *taşlık* façade (left), stone threshold (middle), timber mortise lock housing (right)

Figure 153, Door openings Type 4 (Camikebir Quarter 3. Beyzade Street No:15) –exterior elevation (left), interior elevation (middle), timber threshold and timber wing connection (right)

Figure 154, Door openings Type 5, Sandıkoğlu Konağı Main room door

Figure 155, Door openings Type 5 (Camikebir Quarter İmam Birgivi Street No:6 (left), sağda Camikebir Quarter Meydanbaşı Street No:13(right))

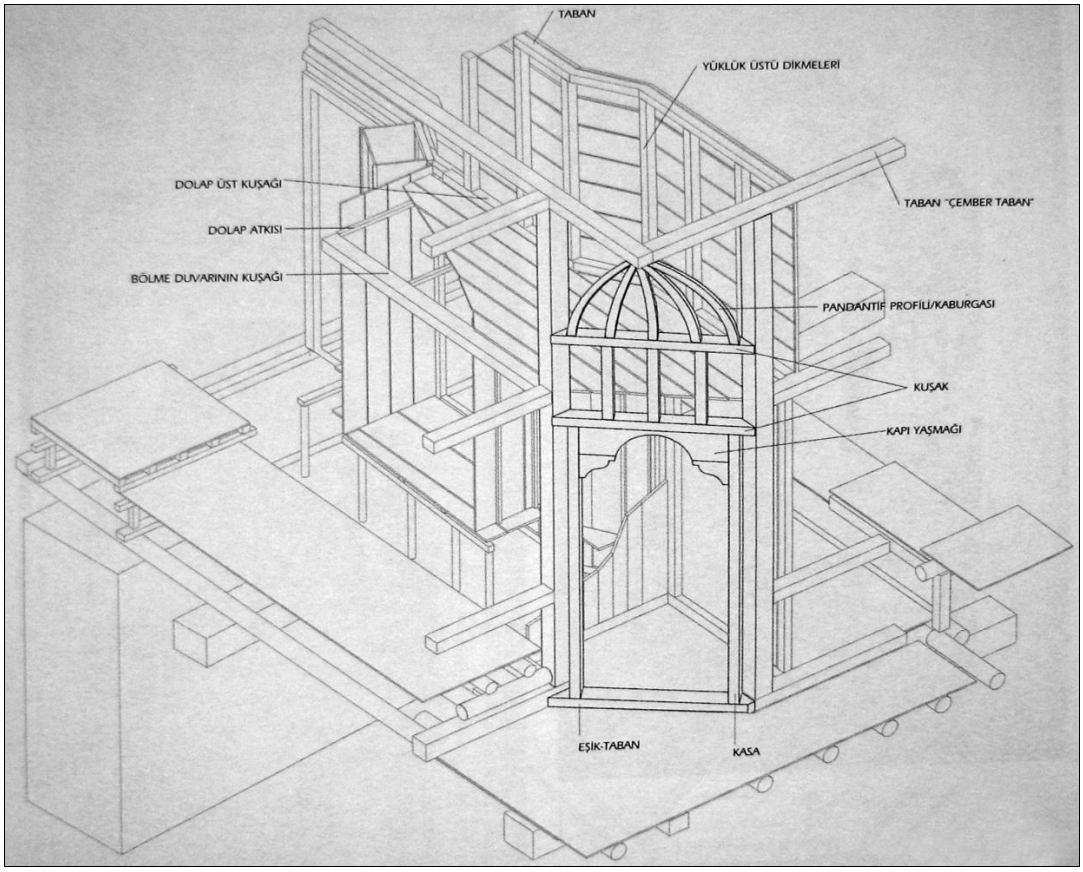

Figure 156, Door openings Type 5, Sandıkoğlu Konağı Main room door (Ekinci, 2005: 78)

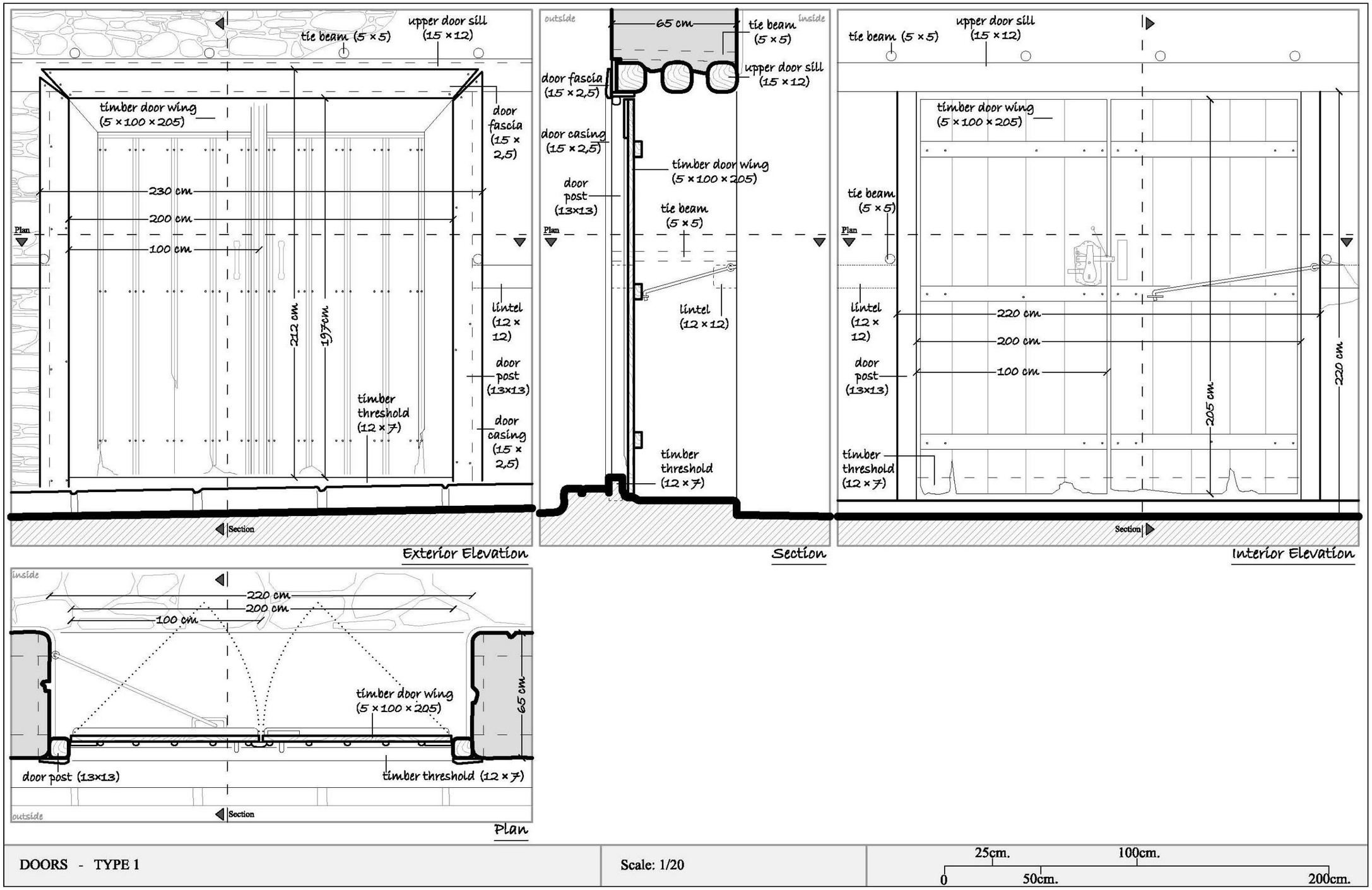

Figure 157, Door openings Type 1 (Camikebir Quarter İmam Birgivi Street No:3

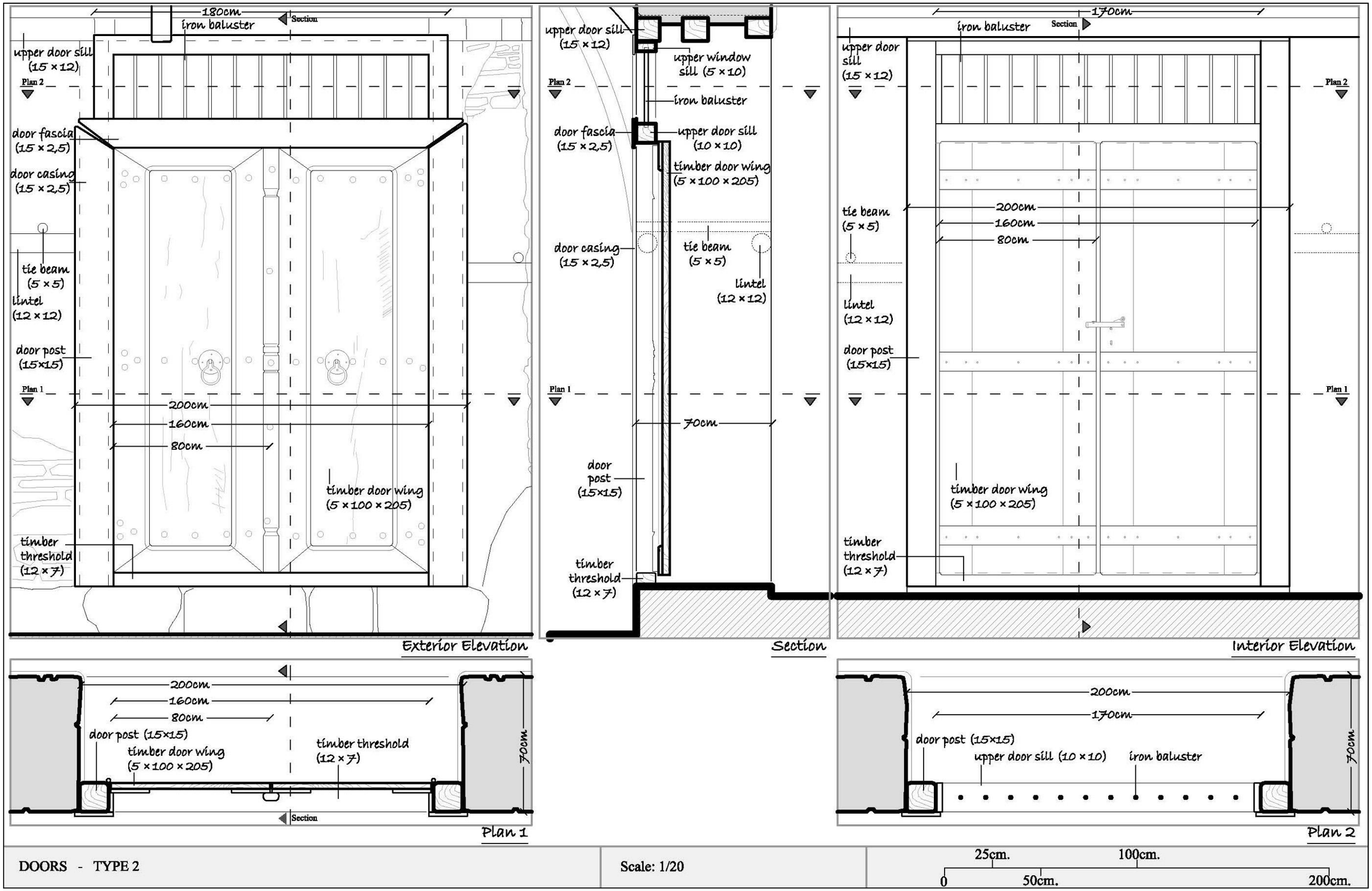

Figure 158, Door Type 2 (Camikebir Quarter İmam Birgivi Street No:6)

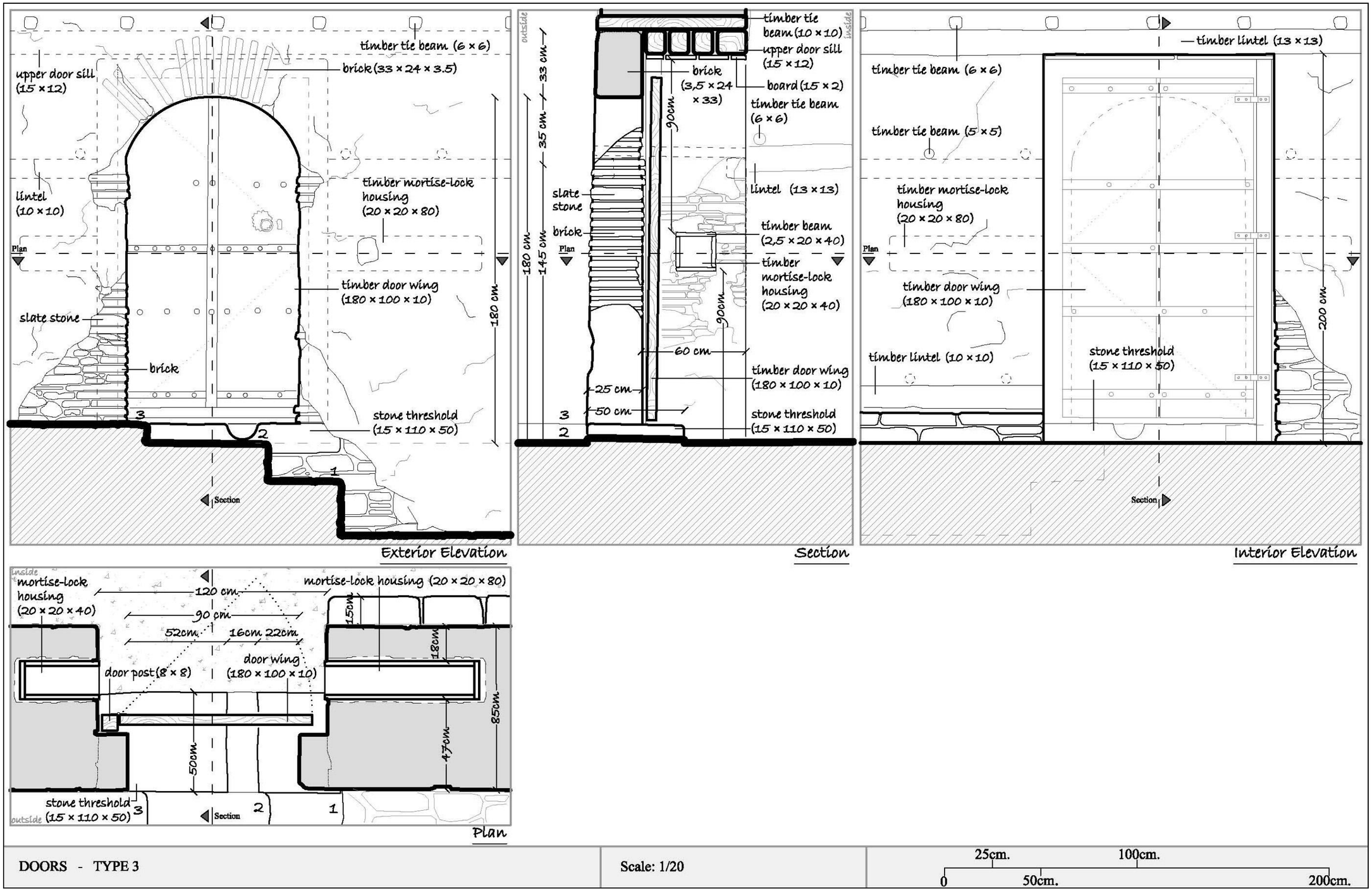

Figure 159, Door openings Type 3 (Camikebir Quarter 3. Beyzade Street No:15)

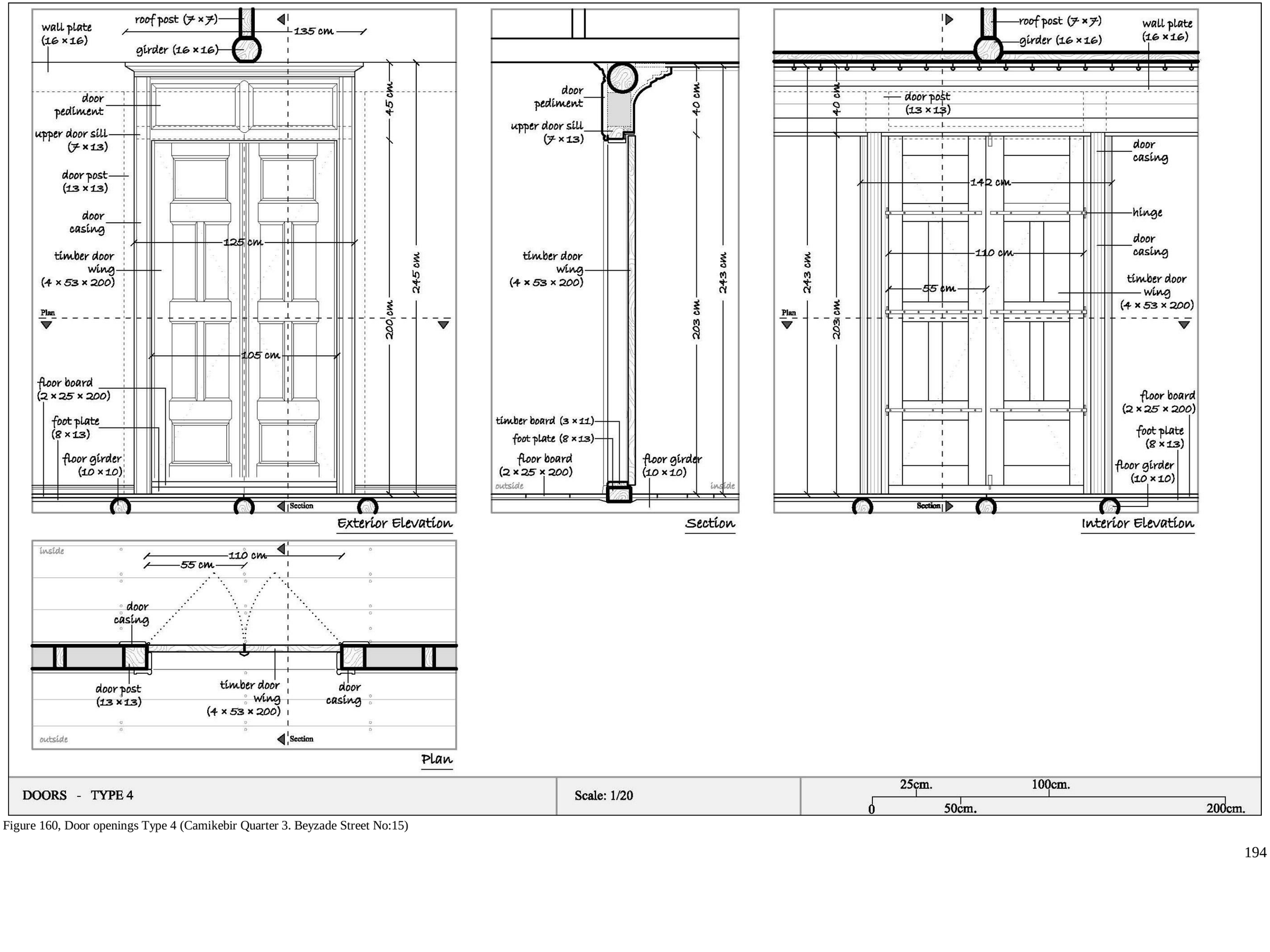

Figure 160, Door openings Type 4 (Camikebir Quarter 3. Beyzade Street No:15)

3.7.9. WINDOWS

The window sizes, opening to the exterior space, *sofa* or *taşlık*, depend on the construction date and function of the architectural elements. The differentiation in the used materials and construction techniques, on the other hand, depend primarily on function. Windows used in Birgi traditional houses can be divided into 7 groups in terms of the construction techniques of the openings.

Type 1: Window opening on masonry wall

These type of window openings are constructed on the ground floor and upper floor masonry walls (see Fig. 161, 168). In some examples (7/12), Type 1 window openings are located on ground floor exterior walls and all of them are observed in the houses dated to late periods (3rd group houses).

At the faces of the area where the window opening is to be formed at the masonry wall, stones and bricks having straight edges are used (see Fig. 161, 168). 6-15 cm wide lower window sills are placed at the opening's lower level, and 6-15 cm wide upper window sills at the opening's upper level. These are connected to each other by means of 5-7 cm wide lintels (see Fig. 161, 168). The opening sizes are 70-90 cm to 110-140 cm (see Fig. 168). Their starting level is at 40-70 cm above the floor level.

Type 2: Top window opening on masonry wall

These top window openings are constructed on upper floor masonry walls, over the Type 1 windows (see Fig. 162). At the faces of the area where the window opening is to be formed at the masonry wall, stones and bricks having straight edges are used. At the bottom level of the opening, there is the upper sill of the window located below. At the upper level of the opening, on the other hand, there is the upper floor wall plate. These elements are connected to each other by means of 5-7 cm wide lintels. The opening sizes are 30-40cm to 40-60 cm (see Fig. 162).

Type 3: Oblique window opening on masonry wall

A Type 3 window is used in only one of the surveyed examples (see Fig. 182: 1-3), on the upper floor masonry wall at the street façade. At the faces of the area where the window opening is to be formed at the masonry wall, stones and bricks having straight edges are used. At the upper level of the opening, inside there is upper floor timber frame wall foot plate and outside there is girder (see Fig. 163, 169). At the lower level of the opening, on the other hand, there is the masonry wall lintel. The upper and lower faces of the opening are covered with 1 cm thick timber boards, and the side faces are plastered with mud mortar and whitewashed. The outer opening sizes are 50 x 80 cm and inner opening sizes are 50 x 60 cm. Their starting level is at 150 cm above the floor level (see Fig. 163, 169).

Type 4: Embrasure window opening on masonry wall

This type of window openings are constructed on the ground floor masonry walls and called as embrasure (see Fig. 164). They are divided into two in terms of their sizes.

In the first group, while masonry wall is constructed, in the area where the window opening is desired to be placed, a gap that widens towards inside is formed (see Fig. 164). In some examples, vertical slates are also used on side surfaces of the opening. There are examples where masonry wall timber lintels or timber blocks at lower and upper levels of the opening, however the most common technique is the use of slates. The opening sizes are 10-15 x 40-60 cm on the exterior façades and 40-60 x 50-60 cm on the interior façade. Except for a small number of exceptions, their starting level is at least 150 cm above the street level.

The second group examples are used in the masonry ground floor walls facing *taşlık*, courtyard or garden. While masonry wall is constructed, in the area where the window opening is desired to be placed, a gap that widens towards inside is formed between lintel and window upper sill (see Fig. 164). The lintels corresponding to this gap are ceased in the beginning of the opening and lintels connecting these elements

to each other are placed at the side surface level. The opening sizes are 100-110 x 140-150 cm on the interior façades and 75-80 cm on the exterior façade. Their starting level is 55-70 cm above the ground level and opening interior height is 140 cm.

Type 5: Window opening on timber framed wall

The Type 5 window openings are used in the ground and upper floor timber frame walls. These window openings are configured according to the areas between load-bearing posts of timber frame walls (see Fig. 165, 170). In between load-bearing posts, at most three window openings are formed and these areas are limited by window sills and posts. The opening sizes are 70-90 x 110-140 cm. The width of the openings used at the short sides of the projections, which are 1 meter wide or narrower, is 35-55 cm. Their starting level is 40-75 cm above the floor level (see Fig. 165, 170).

Type 6: Top window opening on timber framed wall

These type of top windows are constructed on upper floor timber frame walls, on top of the Type 5 windows (see Fig. 166). In most of the surveyed examples, the upper and lower windows are adjacent to each other. In this case, the opening is limited at the top by the upper sill of the lower window and at the bottom by the wall plate of the timber frame wall. In case where two windows are apart from each other by 20-30 cm, the opening is limited at the bottom by window lower sill and at the top by the wall plate of the timber frame wall (see Fig. 166). The opening sizes are 30-40 / 40-60 cm.

Type 7: Oblique window opening on timber framed wall

These windows are used in only one of the surveyed examples, on upper floor Type 3 timber frame walls on the street façade (see Fig. 167). They are called as oblique windows. These window openings are configured according to the areas between the

of timber frame walls as in the case of Type 5 window openings. The opening is limited by window post and sills (see Fig. 167, 171). On the exterior face, on the other hand, an opening, which is about 5 cm narrower than the interior face, is formed. It is limited by upper and lower window sills. The interior opening width is 100 cm and the exterior opening width is 90 cm. The opening height is 180 cm. Their starting level is 55-60 cm above the floor level (see Fig. 167, 171).

Figure 161, Windows Type 1

Figure 162, Windows Type 2

Figure 163, Windows openings Type 3

Figure 164, Windows openings Type 4

Figure 165, Windows openings Type 5

Figure 166, Windows openings Type 6

Figure 167, Windows openings Type 7

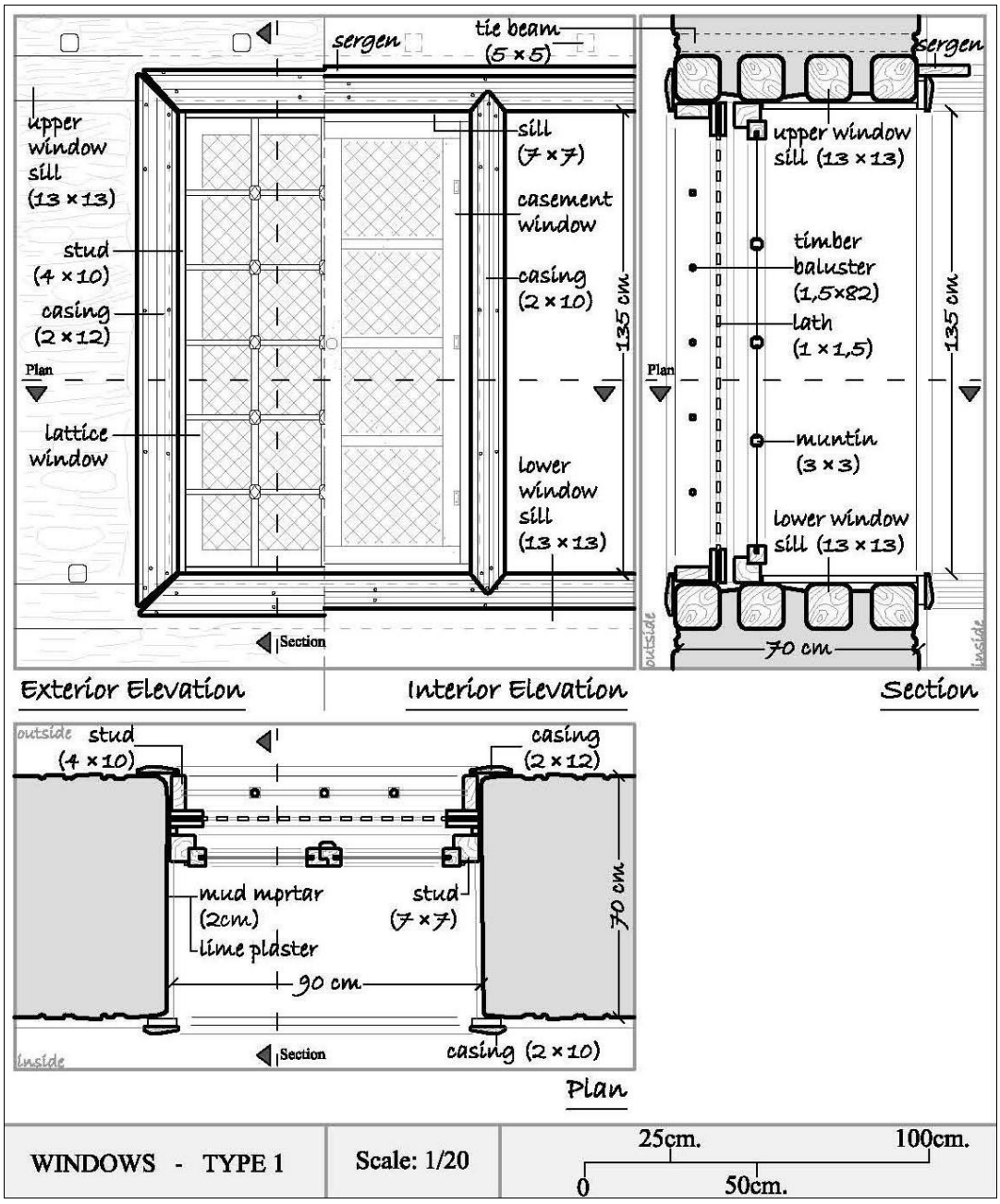

Figure 168, Window openings Type 1(Camikebir Quarter 1. Beyzade Street No: 10)

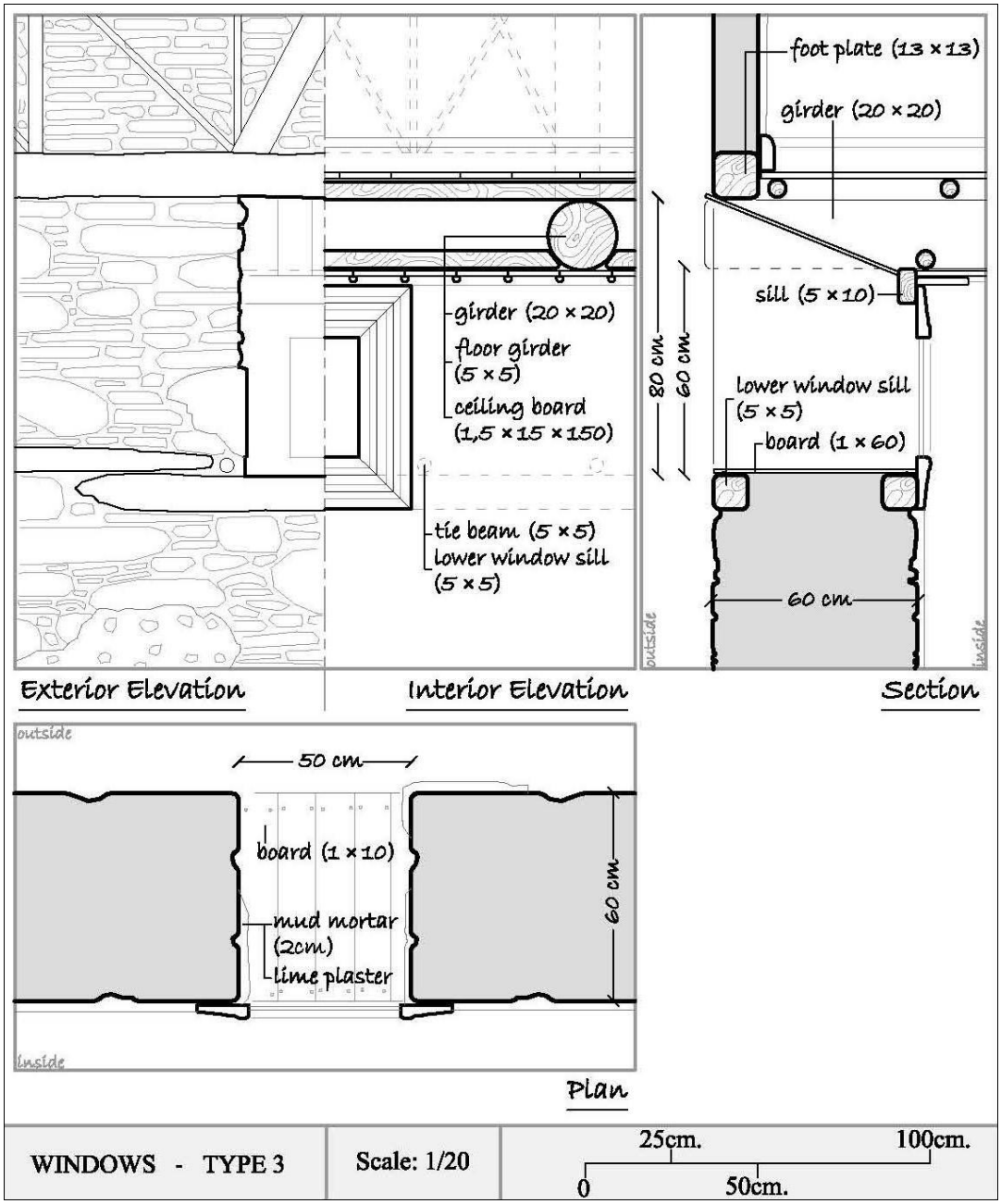

Figure 169, Window openings Type 3 (Camikebir Quarter 3. Beyzade Street No:15)

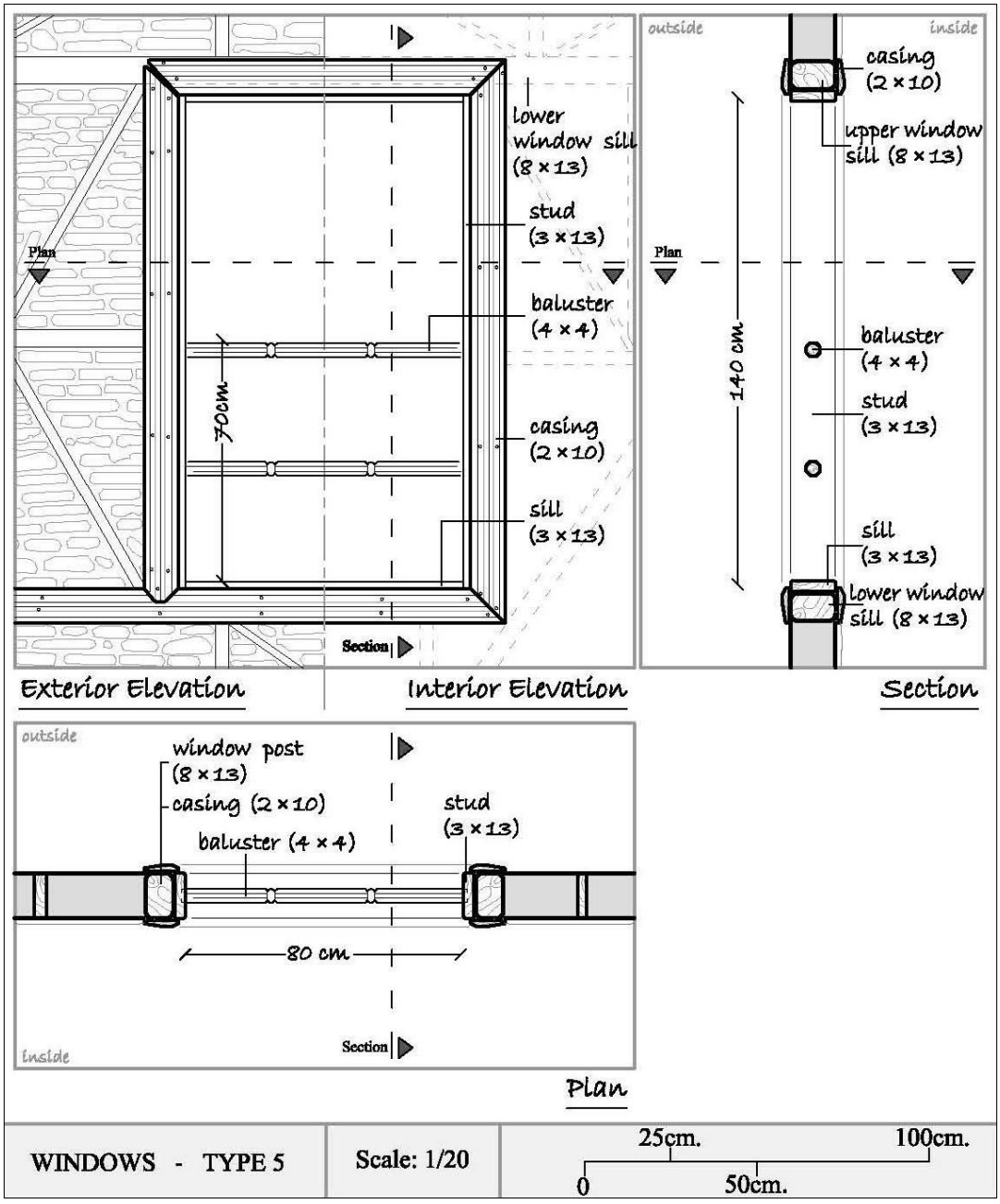

Figure 170, Window openings Type 5 (Camikebir Quarter 3. Beyzade Street No:15)

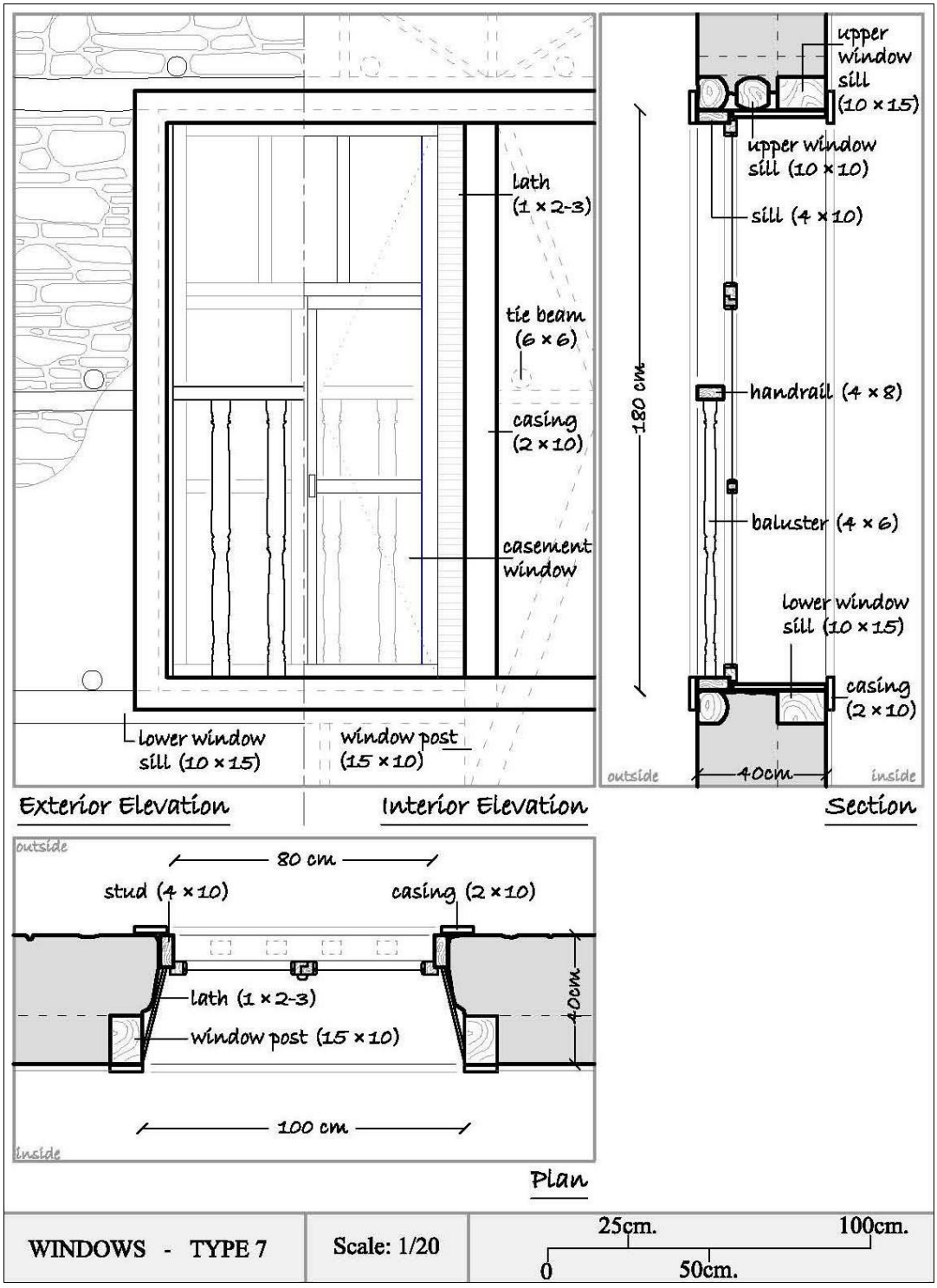

Figure 171, Window openings Type 7 (Camikebir Quarter Okul Street No:2)

To be able to obtain smooth surfaces in the opening, the sides are covered using 1-2 cm thick timber boards or plastered with mud plaster. Parts of the plastered surfaces are lime washed. Only in Type 4 openings, no effort is made to adjust the opening surfaces and they are not covered.

In Type 4 openings, no subsidiary element is used. In Type 3 examples, on the other hand, no information regarding the original elements could be obtained. In all the other cases, a variety of subsidiary elements is used for the enclosure of the opening, decoration, and for the privacy and/or security purposes (see Fig. 161-162, 168, 165, 171). These elements are connected to the window casing, placed inside the opening and composed of 2-5 cm thick timber studs and sills.

Casement window:

Casement windows are used in window openings Type 1, 5 and 7. Casement frame, which is wide as half of the opening, is formed by using 4-6 cm wide and 2.5-5 cm thick timber elements (see Fig. 162, 165, 171). By means of 2.5-4 cm wide and 2.5-4 cm long muntins, casement unit is divided into pieces. Window glasses placed in these areas are fastened by nails driven in timber elements.

These elements are connected to the studs using hinges or two mingling metal rings. The constant level of these elements is the side of the stud, and they are opened towards the interior space. When closed, they are locked by latches. In only one window among the surveyed examples, casements are connected to the outer studs. Beveled timber blocks of 4 cm x 6 cm, nailed at the bottom parts of the exterior façades of window units, are used.

Guillotine window:

Guillotine windows are used in Type 1, 5 and 7 window openings. Sash frame, which is wide as half of the opening, is formed by using 4-6 cm wide and 2.5-3 cm thick timber elements. These elements are placed within two beds formed laths nailed on

studs. They can move along the beds and movable hook or latch is used to fix them whenever necessary.

Lattice window:

Lattice windows are used in Type 1, 5 and 7 window openings (see Fig. 161, 165). They can be divided into two groups in terms of the material used for their construction. In the first group of lattice windows, laths are used. A casement frame is formed using timber elements that are 5-6 cm wide and 5-6 cm thick, if they are used in a single row, and 4 cm thick, if they are used in double rows. 1.5 cm wide and 1 cm thick timber laths are placed in two rows perpendicular to each other, one in every 3 cm and with an angle of 45 degrees, and are nailed to each other and to the frame.

In most of the examples, lattice windows are as long as the half of the window openings and are placed within a bed formed laths nailed on studs. They can move along the beds and movable latches or thin sticks are used to fix them whenever necessary. They are used at different elevations depending on the position of sun. This element is used not only in window openings but also between posts located in the façades facing street, courtyard or garden.

In a small number of examples, these elements are used in two, each of which is as wide as the half of the window opening, and in one, which is as wide as the window opening. The lattice window, as wide as the window opening, is fixed to window sill and studs, and cannot be moved. Those, as wide as the half of the opening, on the other hand, can be opened towards the interior space, and are placed using two mingling metal rings. The constant level of these elements is the side of the stud, and they are opened towards the interior space. When closed, they are locked by latches.
In the second group of lattice windows, timber boards are used. A casement frame is formed by means of the timber elements having a profiled rectangular cross-section of 4 x 6 cm. 3-5 cm wide and 2 cm wide profiled timber boards are connected to each other and to the window units by means of lap joints.

These elements are sized in such a way that they perfectly fit into the window opening. They are placed between window sills and studs and nailed; they cannot be moved.

Revzen:

They are used in Type 2 and 6 window opening (see Fig. 162, 166). *Revzen*s are composed interior and exterior parts. In both parts, inside the frame, of 30-40 cm x 40-60 cm, formed by 2.5-4 cm thick timber elements, patterns are formed by stucco lines. In between these lines, pieces of glass are placed. In the surveyed examples, of the part glasses used in the interior part are colored, while those used in the exterior part are not. The interior parts are located in the interior side of the opening and the exterior parts in the exterior side. They are nailed to the timber load-bearing elements.

Shutter:

Shutters are used in Type 1, 5 and 7 window openings (see Fig. 161, 162). Four different techniques are used in the formation of double casement shutters, which are as wide as the half of the window opening. In the first technique, approximately 3 cm wide one-piece timber elements are used as shutter. In the second, shutters are formed by assembling 2 cm thick and 15-25 cm wide timber boards, and then by nailing 3-5 cm thick timber blocks to these elements. In the third technique, 1-2.5 cm thick timber boards of different sizes are assembled together by means of *kundekari* technique and shutters are formed in this way. In the fourth technique, on the other hand, shutters are formed by placing jalousies inside a frame of 2.5 x 4 cm.

On the exterior façade of the opening, these elements sit on the beds between window frame and casings. They are connected to studs with a system composed of hinges and or two mingling metal rings. The constant level of these elements is the side of the stud, and they are opened towards the interior space. When opened, they

are fixed by latches mounted on the wall or by a thin stick. When closed, they are locked by hooks.

Balustrade:

Balustrades are used in Type 1, 5 and 7 window openings (see Fig. 161-162, 165, 167, 170-171). Balustrades are composed of a single or double timber handrails and 4-5 timber balusters placed below them. Handrails have a rectangular cross-section of 4-6 x 6-7 cm or a square or circular one of 6-7 cm. Profiled examples are very few. They are placed and nailed either directly on window studs or on the grooves of 0.5-1 cm opened on these studs. In the examples where only handrails are used, the window is placed 60-70 cm above the ground. In some examples, a 30-35 cm high second handrail is also used.

Even though there are cases where balusters have e 4-6 cm wide square of rectangular cross-section, they are normally circular in cross-section. Most of the examples are profiled. Balusters are placed and nailed either directly on handrail and lower window sills or on the grooves of 0.5-1 cm opened on them. In the examples where only handrails are used, the window is placed 60-70 cm above the ground. The distance between balusters is 10-18 cm. The total height of this type of balusters is 60-75 cm. In only one example, the height is 90 cm.

Railings:

Railings are used in Type 1 window openings and in the upper floors (see Fig. 161, 168). The window rails can be divided into 2 depending on the material used. In the first group, timber bars are used (see Fig. 172). The diameter of those used horizontally is approximately 1.5 cm. Vertical bars have *lokma*s and horizontal bars pass through the holes in these *lokma*s. The diameter of the cylindrical parts of the vertical bars is 2.5 cm, and the thickness of the prismatic *lokma*s is 3 cm. Vertical and horizontal bars are placed in the grooves of approximately 2 cm, formed on the window sill and studs. In the second group, iron bars are used. The diameter of those

used horizontally is approximately 1 cm. Vertical bars have *lokma*s and horizontal bars pass through the holes in these *lokma*s. The diameter of the cylindrical parts of the vertical bars is 1.5 cm, and the thickness of the *lokma*s is 2 cm. Vertical and horizontal bars are placed in the grooves of approximately 2 cm, formed on the window sill and studs.

Figure 172, Timber Rails

3.7.10. NICHES

Niches used in Birgi traditional houses can be divided into 7 groups in terms of the construction techniques of the openings.

Type 1: Niche on masonry wall

These niches are placed on ground and upper floor masonry walls. The niche plans are square or rectangular shaped and rectangular in cross-section (see Fig. 173, 174). On the masonry wall, at the faces of the area where the niche is to be placed, straight edged stones and bricks are used. At the upper sections of the openings, slates or sills are used. On the bottom sections, on the other hand, sills or straight edged are used. They are 20-90 cm wide and 20-140 cm high. Niche depth changes between 35 and 40 cm.

Niches used in the ground floor are generally not covered and/or plastered so as to form smooth surfaces (see Fig. 173, 174). In a small number of examples, on the other hand, all interior faces or only the top and bottom faces are covered using 1-2 cm thick timber boards. In another finishing technique, a box, suitable to fit inside the niche which is prepared previously with1.5-2 cm thick timber boards in such a way that its one face is open, is placed inside the gap. The gaps between the wall and the box are filled using mud mortar (see Fig. 173, 174). In a part of timber-board-covered niches or niches with the box system, the opening is framed using profiled or non-profiles casings.

All the interior faces or only the top and bottom faces of the niches used in upper floors are covered using 1-2 cm thick timber boards, or the mentioned box system is used (see Fig. 173, 174). In almost all these examples, the opening is framed using profiled or non-profiles timber casings.

Figure 173, Niches Type 1

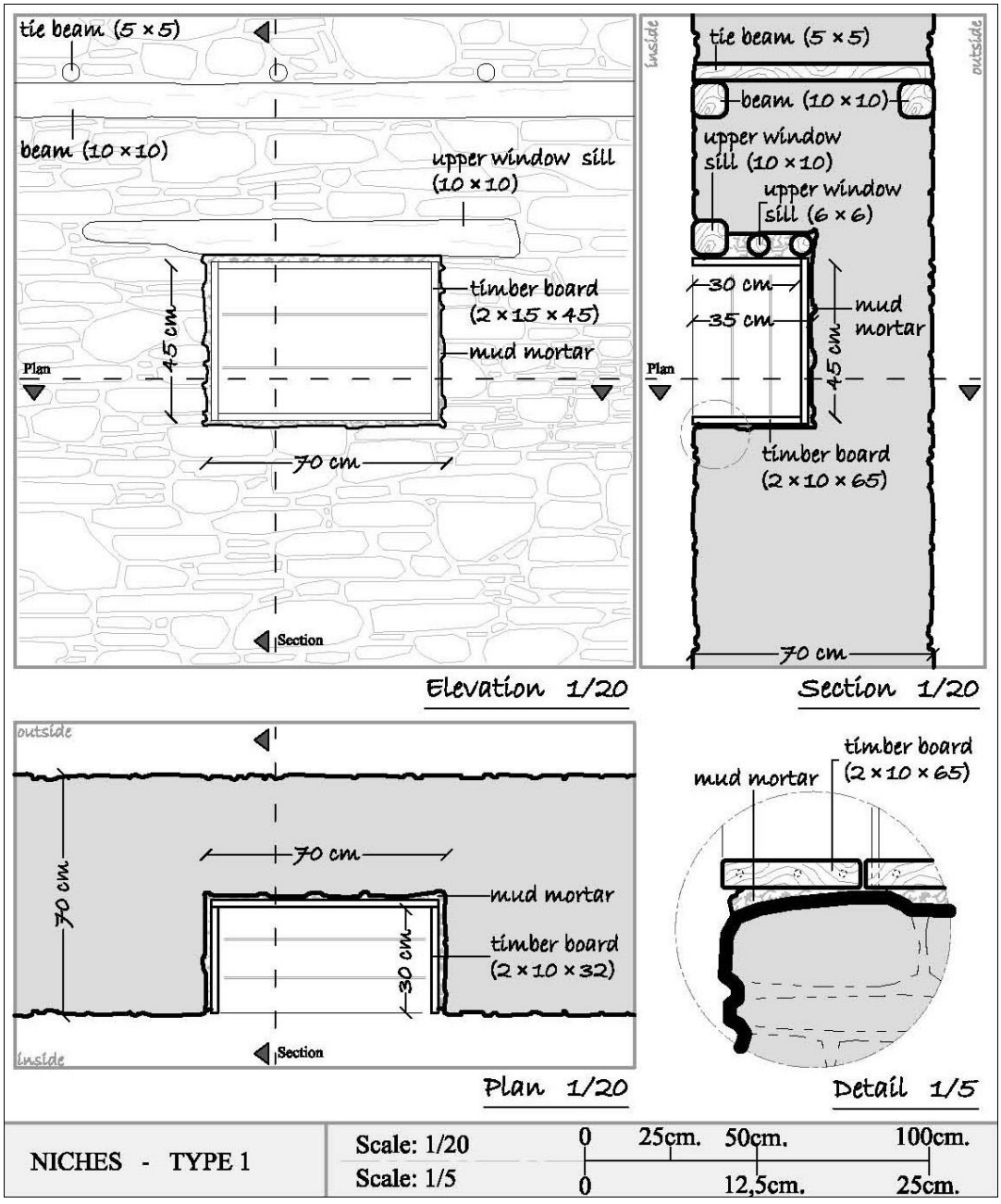

Figure 174, Niches Type 1 (Camikebir Quarter Gül Street No:15)

Type 2: Curved niche on masonry wall

The Type 2 niches are all placed on upper floor masonry walls. The back and top faces of the niche are curved (see Fig. 175). They are constructed in such a way that their bottom and top levels conrrespons to the window sills. Since in the surveyed examples all faces are plastered and painted, no sufficient information could be gathered regarding the construction technique. The width and height of the front façade, which is the largest face, is 60 cm and 40 cm, respectively. The deepest part of the niche is 40 cm.

Type 3: Niche on timber framed wall

The Type 3 niches are placed in the ground and upper floor timber frame walls. The plans and cross-sections of niches are rectangular (see Fig. 176, 177). The timber frame system is placed between sill, post and studs. Their width and heights change between 25-90 cm and 100-140 cm, respectively. The niche widths are 2 cm shorter than the thickness of the non plastered timber frame walls.

The interior faces of these niches are covered by nailing 2 cm thick timber boards to the timber frame load-bearing elements (see Fig. 176, 177). The widths of timber boards are 2 cm shorter than the thickness of the non plastered timber frame walls, and they are placed by leveling them to the front façade. The back faces of these niches are covered by nailing 2 cm thick timber boards to the timber frame load-bearing elements. The timber boards may be placed in horizontal, vertical or diagonal ways (see Fig. 176, 177). The exterior face of the niche is plastered and painted together with the timber frame wall, while the interior faces are mostly not plastered, and painted in a small number of examples.

Figure 175, Niches Type 2

Figure 176, Niches Type 3

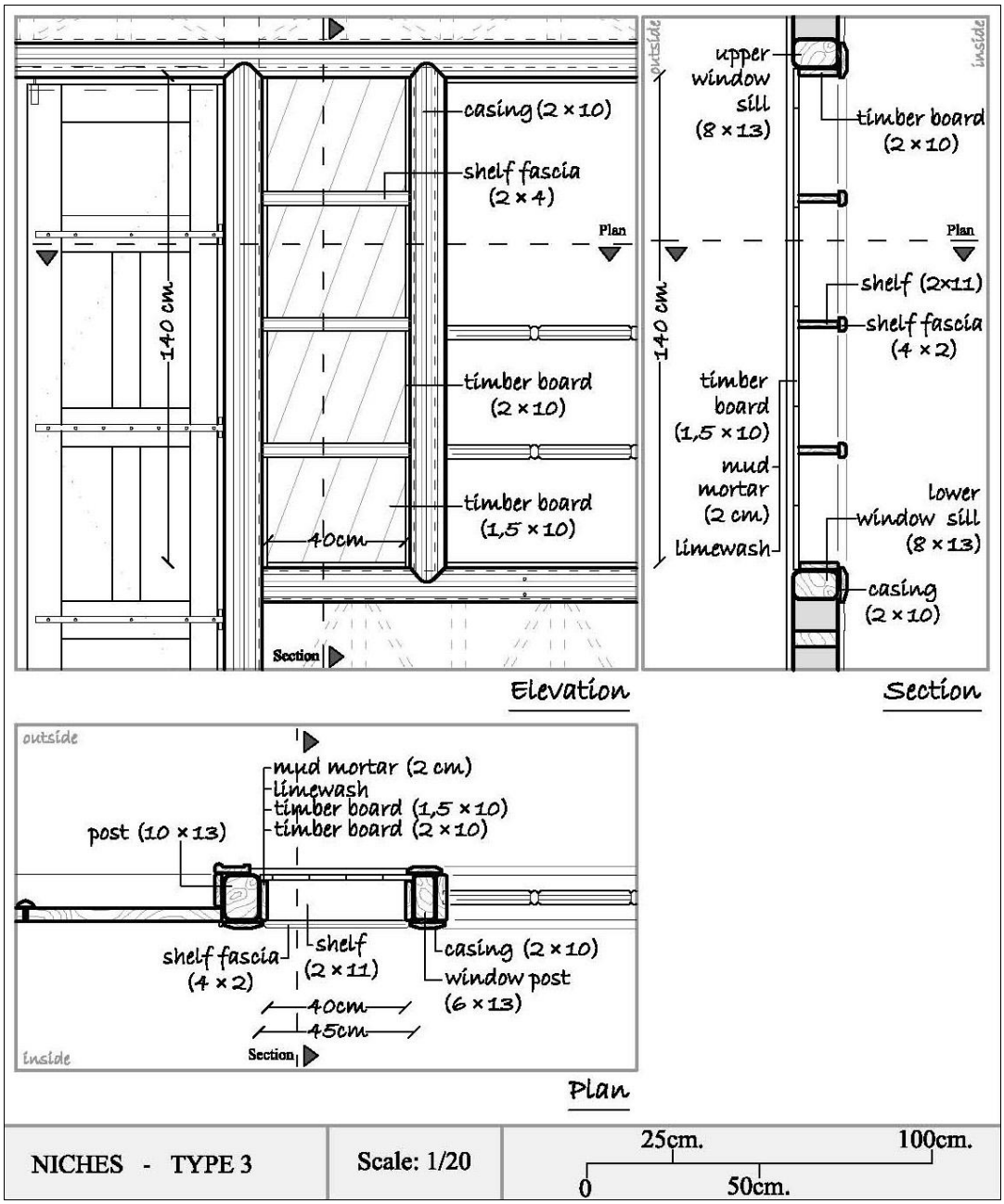

Figure 177, Niches Type 3 (Camikebir Quarter 3. Beyzade Street No:15)

Type 4: Projected curved niche on timber framed wall

The Type 4 niches are located on an upper floor projection facing the street (see Fig. 178). The exterior part of the niches has a half regular octagonal plan and an irregular trapezoid cross-section. The back and front faces of the interior part, on the other hand, are curved (see Fig. 178).

The niche opening is formed in between sill and posts. 5 cm thick 3 lintels are extended from the bottom and top faces of the frame between window sill and posts. The length of the side and middle lintels is approximately 40 cm and 50 cm, respectively. Between the lintels at the same level, only at tips in case of middle lintels and at the tips and at the bottom point of wall-niche intersection in case of side lintels, 5 cm thick and approximately 110 cm long studs are placed. 5 cm thick braces extending towards the tips and bottom intersection of lower lintels are connected to the level of the lintel in the middle of the footplate. The same procedure is applied to the area between upper lintels and the middle of the wall plate. The exterior face of the prismatic timber lattice formed in this way is covered using 1.5 cm thick and 2-4 cm wide laths.

In the interior part of the niche, which is the main usage area, the widest distance in the front façade is 80 cm, and the height is 110 cm. The deepest part of the niche is 40 cm. the bottom face is covered using 2 cm timber boards nailed on lintels. In the front face, on the other hand, timber boards, profiled in such a way that a depressed arch appearance is formed, are placed at the upper edges of the frame limited by sills and posts. In the interior part of the niche, the construction technique of the curved surfaces formed in top and back cannot be seen.

Straw is put inside the gaps between two surfaces, as in the case in most of timber frame walls without infill. The interior and exterior faces are plastered with a mud-based plaster and whitewashed together with the surfaces of timber frame walls (see Fig. 178).

Figure 178, Niche Type 4

3.7.11. CUPBOARDS

Cupboards used in Birgi traditional houses can be divided into 7 groups in terms of the construction techniques of the openings.

Type 1: Cupboard on masonry wall

The Type 1 cupboards are placed on the ground and upper floor masonry walls. The cupboard plans are square or rectangular, and their cross-section is rectangular (see Fig. 179). At the faces of the area where the cupboard is to be formed at the masonry wall, straight edged stones and bricks are used. At the upper and lower levels of the opening, on the other hand, timber sills are used. They are 30-90 cm wide, 40-140 cm high and 35-40 cm deep.

All the interior faces or only the top and bottom faces of the cupboards are covered using 1-2 cm thick timber boards or , a box (see Fig. 179), which is prepared previously with 2 cm thick timber boards in such a way that its one face is open, is

placed inside the gap. The opening is framed using profiled or non-profiles timber casings.

Figure 179, Cupboards Type 1

Type 2: Cupboard on timber framed wall

The usage area and construction techniques of Type 2 cupboards are the same as that of niche on masonry wall (Niche Type 3) (see Fig. 177). However, in this type of architectural elements, the opening is closed using movable timber wings connected to posts and studs by means of hinge or mingling metal rings. They are 30-90 cm wide and 70-140 cm high. They are 2 cm less wide than the timber frame wall without infill.

Type 3: Projected cupboard on timber framed wall

The Type 3 cupboards are located on the short sides of an upper floor projection facing the street (see Fig. 180). Two different examples are observed in site research. These cupboards have rectangular plan and sections and can be divided into two groups in terms of their exterior configuration (see Fig. 180). The exterior part of the former type of cupboards has a rectangular plan and irregular trapezoidal cross-section. The exterior part or the former type, on the other hand has an irregular trapezoidal plan and section.

The cupboard openings are formed between sills at the same level with window sills used in the projection and posts used at the corners of shorter sides. 5 cm thick 2 beams are extended from the bottom and top faces of the frame between sills and posts. The beams are approximately 30 cm long. Between the beams at the same level, at the tips and at the bottom point of wall-cupboard intersection, 5 cm thick and approximately 110 cm long studs are placed. 5 cm thick braces extending from the tips of lower beams are connected to the footplate. The horizontal distance between the two tips of the braces is approximately 15 cm. The same procedure is applied to the area between upper beams and the wall plate. The exterior face of the timber lattice is formed in this way.

The exterior face of the lattice of the first cupboard is covered using 2 cm thick and 10-15cm wide timber boards. The exterior surface of the lattice of the second cupboard as well as the side surface facing the masonry wall are covered using 1-1.5 cm thick and 2-5 cm wide laths placed on the braces and studs. The other side surface, on the other hand, is covered using laths placed on studs, braces and projection corner post.

In the interior part of the cupboard, which is the main usage area, the opening width is 45 cm, the height is 145 cm and the depth is 25 cm. The interior surfaces are covered using 2 cm thick timber boards nailed on beams and studs.
In the second cupboard, straw is put inside the gaps between interior and exterior covering surfaces, as in the case in most of timber frame walls without infill. No such an application was observed in the first type of cupboards.

The exterior faces are plastered with a mud-based plaster and whitewashed together with the timber frame wall surfaces (see Fig. 180).

Figure 180, Niches Type 3(Kurtgazi Quarter Ufuk Street No: 5(left), Kurtgazi Quarter Ufuk Street No: 4 (right))

Type 4: Built-in cupboard

The Type 4 cupboards are used in ground and upper floor rooms, along the wall (see Fig. 181). They continue along the room height or are ceased 45-60 cm below the ceiling coverings. Their depth changes between 60 and 75 cm. *Yüklük* (built-in cupboard) frames formed using 5-6 cm thick timber elements are placed on floor covering boards and are fixed to the timber load-bearing elements of the wall at the back (see Fig. 181). Inside the frame, cells of a variety of sizes depending on their function are formed by means of 3-6 cm thick elements. The surfaces of these cells are covered using 1.5-2 cm timber boards. In some examples, lids and coverings are used at the front face, while in some others the front faces are left open.

A part of these cells are separated from each other by their sizes and finishing. The first those is the cells where objects requiring large spaces such as mattresses and blankets are kept. The cell, called *döşeklik*, starts approximately 60 cm above the ground level and continue through the *yüklük* height. The front face of these cells is left open.

The 60 cm high area below *döşeklik*, continue only at the *döşeklik* level in some example, while in some others, they continue all through *yüklük*. This cell is used for keeping firewood and coal. There are examples where lids and coverings are used, and those where the front face is left open (see Fig. 181).

Another cell located at the tip of *yüklük*, is specialized for bathing purposes. This cell, called *gusülhane* (see Fig. 181), is generally as wide as the short side of *yüklük*. In a small number of examples, on the other hand, they are 15-20 cm wider. As a part of this cell, sills used at the bottom level of *döşeklik* continue and a sitting area is formed along the whole depth or a part of it. The cell ground is plastered using a mud-based material with a certain inclination. Water flowing through the gap found at the lowest point is discharged from the structure by pipes or clay pipes.

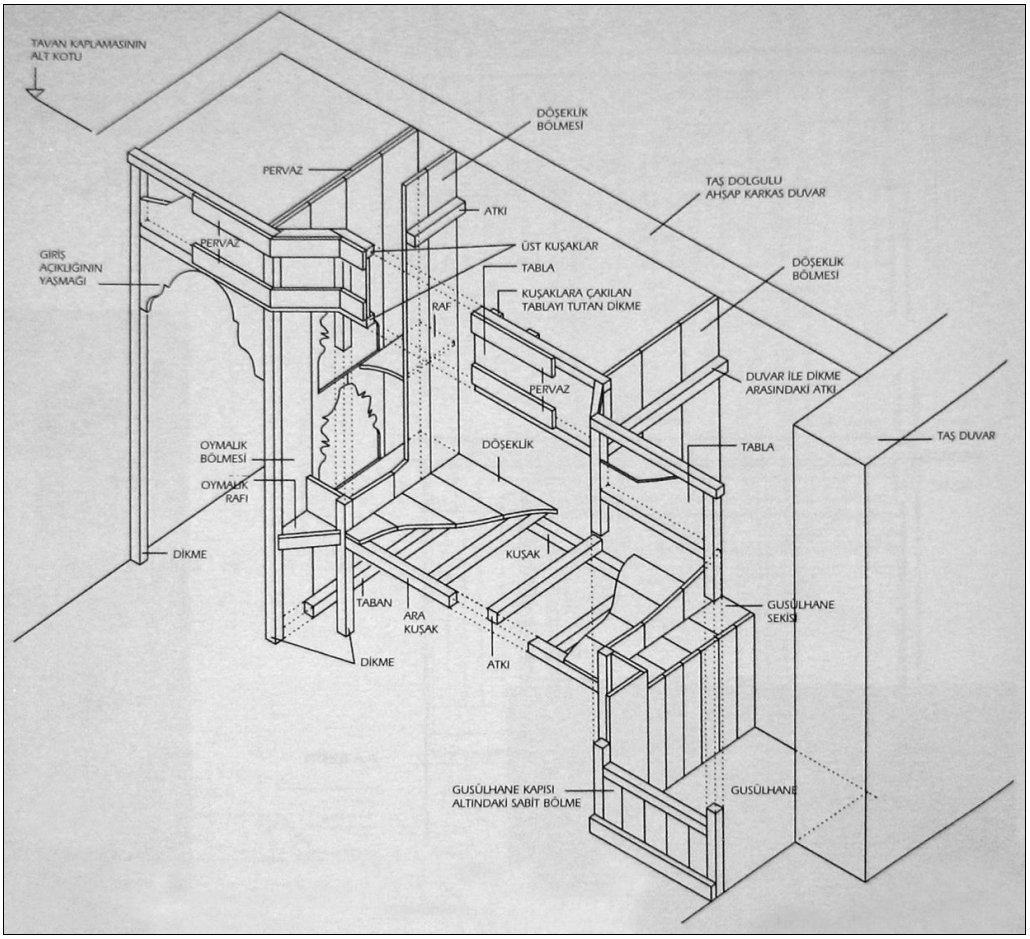

Figure 181, Cupboard Type 4, Sandıkoğlu Konağı winter room (Ekinci, 2005: 68)

CHAPTER 4

EVALUATION OF CASE STUDY

The same typed load bearing and architectural elements were gathered and grouped depending on their varying characteristics in Chapter 3. This classification was formed based on their construction techniques, forms, or finishings. The components and the functional principles of these groups were defined. To evaluate these informations, the literature and site studies were evaluated together and the techniques, frequency, and regional intensity, which are used for the construction of the houses, were identified (see Fig. 182).

The conclusive remarks obtained from the studies can be summarized as follows:

- The forms of the traditional Birgi houses and the construction systems used for these houses are formed by means of the topography of the settlement area, the climatic characteristics of the area, and the physical features of the easily available materials.

- These houses are generally two storey high, but also there are the examples of single or three storey high or two flored with mezzanine.

- Three different foundation systems are used. In all of these foundation systems, masonry walls are used in the same scheme as ground floor plan. Continuous foundation types (Type 1), those having masonry footings (Type 2) are preferred in accordance with the house types. The examples where rocks are used as a part of foundations (Type 3) are nearly always used in Kurtgazi Quarter.

- The difference in construction techniques between ground floor and upper floor(s) (Arel, 1982: 34), which is a general characteristic of Ottoman Traditional Houses is met also in Birgi.

- Foundations, ground floor exterior walls, most of the ground floor interior walls, at least one of the upper floor exterior floors and all service walls are constructed using masonry system with timber lintels.

- In at least one of the upper floor exterior walls, in the upper floor interior walls and projections, timber skeleton system is used. In a small number of examples, this system is used also at the ground floor interior walls.

- Timber posts, which are another vertical load-bearing element, are used at the ground floor, upper floor(s) and at the points where no massive component is used in the transfer of roof loads to the ground. Its use is observed especially in the ground floor courtyard-garden façades and upper floor(s) façades facing courtyard-garden or street.

- Masonry walls are divided into 3 in terms of their bonding types , 3 in terms of finishing types, and 3 in terms of changes in wall thickness in the same floor. Alternating walls (Type 3) are used at only 1st group houses (probably constructed before the second half of the 19th century, which are rich in terms of the quality of architectural elements) and 2nd group houses (probably constructed before the second half of the 19th century). This type of masonry walls are generally used in Demirbaba Quarter and Arif Çelebi Street and its close vicinity placed in Cumhuriyet Quarter. The most frequently used bond type in the 1st and 2nd group houses is semi-alternating type (Type 2), while in the 3rd group houses (probably constructed after the second half of the 19th century) it is coursed rubble masonry (Type 1).

- Except a small number of examples, almost all masonry walls are used without coverings (Type A) and continue with the same width along their height (Type I).

- Symbols used in masonry walls or on plaster are generally seen in 1st group houses. They are rarely used in 2nd group houses.

- Timber frame walls are divided into 3 in terms of construction techniques and 4 in terms of finishing. In 1st group houses, generally timber covered walls (Type B) without infill (Type 1) and uncovered walls (Type A) with infill (Type 2) are seen, while in the other houses, for most of the times, uncovered walls (Type A) with infill (Type A) are used. Two layered timber frame technique (Type 3), on the other hand, is used only in 3rd group houses.

- Walls covered with timber laths (Type C) are only seen in 1st and 2nd group houses and walls covered with reed (Type D) are only seen in 2nd group houses.

- Differences in timber posts are only in details. The most frequently used one is simple detail (Detail 1). The most elaborate one among detail is profiled detail (Detail 3) and it is used generally in 1st and rarely in 2nd group houses.

- Roofs are divided into 2 groups according to the number of sloped surfaces they are composed of. Even though there are examples with gable roofs (Type 1), the most common type is hipped roofs (Type 2).

- Roof windows, used only in 1st and 2nd groups houses, are constructed using the same technique and differ from each other according to finishing. The most frequent type is roof windows with simple details (Detail 1).

- Eaves can be grouped in 5 classes according to construction techniques and finishing. 100-130 cm wide uncovered timber eaves (Type 1) are used in 1st and 2nd group houses, 100-130 cm wide covered timber eaves (Type 2) in 1st group, 50-60 cm wide uncovered or covered timber eaves (Type 3 or 4), or 20-40 cm wide eaves formed by 2-4 courses of slate (Type 5) are used in 3rd group houses. In only one of 2nd group houses, Type 3 eave is used. Since the type of the wall used under eaves is different from the other walls, it is probable that the roof and eaves were changed.

- The sections of the streets located in Camikebir and Demirbaba Quarters, where mostly 1st and 2nd group houses are seen, differentiate among the other regions in the settlement for the eave widths.

- Projections are divided into 3 groups according to their load-bearing systems. Projections supported by simple consoles (Type 1) and timber braces (Type 2) are used in all houses nearly in the same number of occurrences. The projections supported by lath covered timber braces (Type 3), on the other hand, are used only at a part of 3rd group houses. Their use is very limited in comparison to the use of other types throughout the house zone.

- Staircases are divided into 2 according to construction techniques and material. While timber staircases (Type 2) are used in nearly all 1st and 2nd group houses, the use of stone staircases (Type 1) is more limited.

- Fireplaces are constructed in 3 different ways according to the design of the partition where fire takes place. Examples where fire is lit directly on fireplace bottom surface (Type 1 and 2) are used in all house types, while those where fire is lit in another element, which is then placed inside the fireplace, (Type 3) are used only in 1st and 2nd group houses.

- *Seki*s are divided into 4 groups according to construction techniques and finishing. 40 cm high uncovered *seki*s (Type 1) are used in all types of houses. In 3rd group houses, only this type of *seki*s are used. 60-80 cm high *seki*s, covered with timber boards, (Type 2) are used only in 2nd group houses and they are the most frequently used *seki* type in this type of houses. 20 cm high *seki*s, where horizontal load/bearing elements are placed inside the wall, (Type 4) are used only in one of the 1st group houses.

- *Abdestlik*s may exhibit stylistic differences but they are all constructed using the same construction technique. These elements are used in most of the houses.

- Ceiling coverings are divided into 2 according to their sections and into 3 according to their finishing types. Flat ceilings (Type 1) are used in all houses. A small number of examples to caisson ceiling (Type 2), on the other hand, are used only in 2nd group houses. Ceilings formed only by covering boards (Type 1) and by boards and nails driven on them (Type 2) are used in all houses, while ceilings, covered using laths, with *göbek* at the plan's geometrical center are used only in 1st and 2nd group houses. In 1st and 2nd group houses, almost always ceilings covered with laths are used.

- Floor coverings are divided into 3 according to construction techniques and material. In the ground floor, compressed mud (Type 1) or stone coverings (Type 2) are used in all spaces except *taşlık*. In only one of the surveyed examples, timber covering (Type 3) is used in these spaces. In all *taşlık*s stone covering is used. In all upper floor spaces, on the other hand, timber covering is seen.

- There are 5 different types of doors differentiating according to their openings. Rectangular openings used in the middle or sides of walls (Type 1 and 4) are used in all houses. Except 2 of the investigated houses, all entrance door openings are constructed in Type 1. Doors constructed in the same way with Type 1 doors, but having top windows above (Type 2), in two of the surveyed houses, are used to provide the access from the street and *taşlık*. The brick arched door (Type 3) on the ground floor masonry wall of a 1st group house, providing access between the deposit area and *taşlık*, is the only example. Nearly all door openings constructed at the intersection of two perpendicular timber frame walls (Type 5) are used for connecting upper floor rooms to *sofa*. This type of door opening is used on ground floor for the access between a room and *taşlık* for only in one studied house. Door openings placed on the corner of timber framed wall (Type 5) are used only in 1st and 2nd group houses.

- Windows are divided into 7 groups according to the shape and construction techniques of their openings. The most frequently used examples are 110-140 cm high rectangular window openings on masonry or timber frame walls (Type 1 and 5,

respectively). Type 1 windows are used on ground and upper floor(s). The use of Type 1 windows on the ground floor exterior walls is only seen in 3rd group houses. Type 5 windows are used on ground floor interior and upper floor interior and exterior walls.

- In the 1st and 2nd group houses, Type 1 and 5 windows are used alone or with top windows (Type 2 and 6, respectively). Embrasures (Type 4) are used only on the ground floor exterior walls facing the street. The window type where the upper level narrows towards inside (Type 3) is used only on the upper floor masonry wall of one of the 1st group houses, facing the street. An oblique window (Type 7), on the other hand, is used on the upper floor Type 3 timber frame wall of one of the 3rd group houses, facing the street.

- Niches can be divided into 4 classes according to construction techniques and forms. The most commonly used niche type is the one having a rectangular sectioned opening (Type 1 and 3). Curved niches on masonry walls (Type 2) are used twice in 1st group houses and twice in 2nd group houses. Projected curved niches formed in timber frame walls (Type 4) are used in one of the 1st and one of the 2nd group houses.

- Cupboards are divided into 4 groups according to the techniques used in forming the openings. The most frequent two of these are formed inside the wall and are not projected (Type 1 and 2). Projected cupboards inside timber frame walls (Type 3), on the other hand, are used in once in one of the 1st group houses and once in one of the 3rd group houses. Other cupboards are formed outside the wall (Type 4) and are connected to the timber load-bearing elements of the back wall. This type of cupboards is used in all types of houses. However, their use is more frequent in 1st and 2nd group houses in comparison to 3rd group houses.

- Stones used for construction are picked from river beds or taken from the ruins of historical houses. These materials are used either as they are or in broken

pieces. Slate, on the other hand, comes from stone quarries in Bozdağ (Ekinci, 2005: 16).

- Terra cotta materials must be provided from traditional tile kilns that are commonly present in the villages surrounding Birgi. Within the framework of the needs of walls or architectural elements, where terra cotta materials are used, complete or half units, as well as pieces or fragments of these materials may be used.

- Timber material is provided from poplar or chestnut trees in the region (Ekinci, 2005: 16). Timber obtained from chestnut trees is very durable but expensive. For this reason, it is used in the elements requiring fine workmanship or in main load bearing components. Timber obtained from poplars, on the other hand, is not very durable but economical. It is used in the elements not requiring fine workmanship or in secondary load-bearing components.

- In cases where timber elements are used as load-bearing elements, these elements are connected to each other by means of simple lap or half lap connections. In the examples having half interlaced lap joints, in all or only one of the elements, perpendicular, inclined or circular grooves are used. In these connections, metal nails are also used. In the connections of timber elements used in woodwork, on the other hand, techniques used in timber load-bearers are used together with wooden or metal nails. *Kündekari* technique is also used in woodwork.

			Foundations			Masonry walls									Wall symbols	Timber framed walls							*Kalemişis*	Timber posts			Roofs		Roof windows	
			1	2	3	1	2	3	A	B	C	I	II	III		1	2	3	A	B	C	D		1	2	3	1	2	1	2
1th GROUP HOUSES	1-1	Camikebir Qtr. Meydanbaşı St. No:13	could not survey				●		●	●		●	●	●	●		●		●					●				●	●	
	1-2	Camikebir Qtr. Meydanbaşı St. No:1	could not survey				●		●			●				●			●				●	●	●			●		
	1-3	Camikebir Qtr. 3. Beyzade St. No:15	●			●				●	●	●		●	●	●			●					●				●		●
	1-4	Camikebir Qtr. 3. Beyzade St. No:3	could not survey			●			●			●				●				●	●		●	●	●	●	●			
	1-5	Camikebir Qtr. 1. Beyzade St. No:10	could not survey				●		●	●		●				could not survey								●			●		●	
	1-6	Camikebir Qtr. Fatih Mehmet Bey St. No:26	could not survey			●			●			●				could not survey								●				●		
	1-7	Cumhuriyet Qtr. Arif Çelebi St. No:2	could not survey					●	●			●			●	could not survey								could not survey				●	could not s.	
	1-8	Kurtgazi Qtr. Ufuk St. No:5	could not survey				●		●			●	●				●		●					●		●		●		
	1-9	Gazi Umurbey Qtr. Demir Baba St. No:35	could not survey				●		●			●				●	●		●	●				●		●		●		
		9	1	-	-	3	5	1	8	3	1	9	2	2	3	4	3	-	5	2	1	-	2	8	2	3	2	7	2	1
2nd GROUP HOUSES	2-1	Camikebir Qtr. İmam Birgivi St. No:36	could not survey				●		●			●				●	●			●	●			●				●		
	2-2	Camikebir Qtr. İmam Birgivi St. No:9	could not survey				●		●	●		●			●	could not survey								●				●		
	2-3	Camikebir Qtr. Karanfil St. No:23	could not survey				●			●		●					●		●					●			●			
	2-4	Camikebir Qtr. İmam Birgivi St. No:5	could not survey				●		●	●		●	●				●		●									●		
	2-5	Camikebir Qtr. 3. Beyzade St. No:31	could not survey				●		●			●					●			●				●			●			
	2-6	Camikebir Qtr. İmam Birgivi St. No:6	could not survey			●	●		●	●		●					●		●					●				●		
	2-7	Camikebir Qtr. Dere St. No:8	could not survey			●			●			●				could not survey								could not survey				●	could not s.	
	2-8	Cumhuriyet Qtr. Arif Çelebi St. No:1	could not survey					●	●			●					●		●					●		●		●		
	2-9	Kurtgazi Qtr. Ufuk St. No:16	could not survey				●			●		●	●			could not survey								●	●			●		
	2-10	Kurtgazi Qtr. Hıdırbey St. No:14	could not survey				●		●			●				could not survey								●				●		
	2-11	Kurtgazi Qtr. 3 Eylül St. No:6	could not survey				●		●			●				●						●		●				●	●	
		11	-	-	-	2	9	1	9	5	-	11	2	-	1	2	6	-	4	2	1	1	-	9	1	1	2	9	1	-
3rd GROUP HOUSES	3-1	Camikebir Qtr. İmam Birgivi St. No:3	could not survey				●		●			●		●		could not survey								●			●			
	3-2	Camikebir Qtr. İmam Birgivi St. No:24	could not survey			●			●			●				could not survey												●		
	3-3	Camikebir Qtr. Gül St. No:15	could not survey			●			●			●				could not survey								●				●		
	3-4	Camikebir Qtr. Camiönü St. No:20		●		●			●			●				●	●		●	●								●		
	3-5	Kurtgazi Qtr. Akmescit St. Lot No:	could not survey			●			●			●				●	●		●	●				●				●		
	3-6	Cumhuriyet Qtr. Okul St. No:2	●			●			●			●						●	●					●			●			
	3-7	Cumhuriyet Qtr. Umur Bey St. No:27	could not survey			●			●			●				could not survey												●		
	3-8	Cumhuriyet Qtr. Umur Bey St. No:23	could not survey				●		●			●					●		●					●				●		
	3-9	Kurtgazi Qtr. Ufuk St. No:4	could not survey				●		●			●				●				●				could not survey				●	could not s.	
	3-10	Cumhuriyet Qtr. Umur Bey St. No:51	could not survey				●		●			●						●	●									●		
	3-11	Kurtgazi Qtr. 3 Eylül St. Lot No:1301			●	●			●			●	●				●		●					●				●		
	3-12	Kurtgazi Qtr. Kızıl Mescid St. No:2	could not survey				●		●			●	●				●		●					●	●			●		
		12	1	1	1	7	5	-	12	-	-	12	2	1	-	3	5	2	7	3	-	-	-	7	1	-	2	10	-	-
		32	2	1	1	12	19	2	29	8	1	32	6	3	4	9	14	2	16	7	2	1	2	24	4	4	6	26	3	1

			Eaves					Projections			Stairs		Fireplaces			*Sekis*				*Abdestlik*s	Ceiling coverings					Floor coverings			Door					Window							Niches				Cupboards			
			1	2	3	4	5	1	2	3	1	2	1	2	3	1	2	3	4		1	2	A	B	C	1	2	3	1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	4	1	2	3	4
1th GROUP HOUSES	1-1	Camikebir Qtr. Meydanbaşı St. No:13	●					●			●	●	●	●						●	●		●	●			●	●	●			●	●	●			●	●			●	●	●	●	●	●		
	1-2	Camikebir Qtr. Meydanbaşı St. No:1		●				●	●			●								●	●			●				●					●					●	●				●			●		●
	1-3	Camikebir Qtr. 3. Beyzade St. No:15	●								●	●	●			●				●	●			●	●	●	●	●	●		●	●		●	●	●		●				●	●		●	●		●
	1-4	Camikebir Qtr. 3. Beyzade St. No:3	●						●		●	●		●	●			●		could not surv.	●		●	●		●	●	●	●			●	●	●				●	●		●		●		●	●		●
	1-5	Camikebir Qtr. 1. Beyzade St. No:10	●									●	●	●							●			●		●	●	●	●			●	●	●				●					●		●			●
	1-6	Camikebir Qtr. Fatih Mehmet Bey St. No:26	●						●			●		●							●			●				●	●			●		●				●			●				●	●		
	1-7	Cumhuriyet Qtr. Arif Çelebi St. No:2	●					●			c. n. s.		●	●		could not surv.				could not surv.	●			●	●	●	●	●	●			●	●	●			●	●			●		●		●	●		
	1-8	Kurtgazi Qtr. Ufuk St. No:5		●					●		●	●	●	●					●		●			●		●	●	●	●			●		●			●	●	●		●		●		●	●	●	●
	1-9	Gazi Umurbey Qtr. Demir Baba St. No:35		●							●			●				●			●			●		●	●	●	●			●		●				●	●						●			●
		9	6	3	-	-	-	3	4	-	5	7	5	7	1	1	-	2	1	3	9	-	2	9	2	6	7	9	8	-	1	8	5	8	1	1	3	9	4	-	5	2	7	1	8	7	1	6
2nd GROUP HOUSES	2-1	Camikebir Qtr. İmam Birgivi St. No:36	●					●				●		●			●			●	●	●		●				●				●						●					●	●	●			
	2-2	Camikebir Qtr. İmam Birgivi St. No:9	●						●			●	●								●		●	●		●		●	●			●		●				●			●				●			●
	2-3	Camikebir Qtr. Karanfil St. No:23	●					●				●	●							●	●		●	●			●	●	●			●		●				●	●		●		●			●		●
	2-4	Camikebir Qtr. İmam Birgivi St. No:5	●					●				●		●	●					●	●			●		●		●	●			●	●	●				●					●		●			●
	2-5	Camikebir Qtr. 3. Beyzade St. No:31	●					●				●		●							●		●					●				●	●	●	●			●	●				●			●		●
	2-6	Camikebir Qtr. İmam Birgivi St. No:6	●						●			●		●			●			●	●	●		●			●	●	●	●		●	●	●				●				●	●		●			●
	2-7	Camikebir Qtr. Dere St. No:8			●						c. n. s.		could not surv.			could not surv.				could not surv.	could not survey					could not s.			could not survey					●	●						could not surv.				could not surv.			
	2-8	Cumhuriyet Qtr. Arif Çelebi St. No:1	●						●		●	●		●				●		could not surv.	could not survey					●	●	●	●			●		●			●	●			●		●	●	●	●		●
	2-9	Kurtgazi Qtr. Ufuk St. No:16	●					●			●	●	●	●		●					●	●		●	●		●	●	●	●		●		●				●			●		●		●	●		●
	2-10	Kurtgazi Qtr. Hıdırbey St. No:14	●								●		●							●	●		●			●	●	●	●			●		●				●			●							●
	2-11	Kurtgazi Qtr. 3 Eylül St. No:6	●									●	●	●			●			● could not surv.	● could not survey		●	●				●				●		●				●				●	●			●		●
		11	10	-	1	-	-	5	3	-	3	9	5	7	1	1	3	1	-	6	9	3	5	7	1	4	5	10	7	2	-	10	3	10	2	-	1	10	2	-	5	2	8	2	6	5	-	9
3rd GROUP HOUSES	3-1	Camikebir Qtr. İmam Birgivi St. No:3			●							●	●	●						●	●		●				●	●	●			●						●			●		●					●
	3-2	Camikebir Qtr. İmam Birgivi St. No:24			●						●										●			●				●	●			●		●							●				●			
	3-3	Camikebir Qtr. Gül St. No:15			●						●		●							●	●		●			●	●	●	●			●		●				●					●		●			●
	3-4	Camikebir Qtr. Camiönü St. No:20				●	●					●									●		●					●				●		●			●	●			●							●
	3-5	Kurtgazi Qtr. Akmescit St. Lot No:			●						c. n. s.		could not surv.			could not surv.					●			●		●		●	could not survey					●				●			●		●			●		
	3-6	Cumhuriyet Qtr. Okul St. No:2					●					●	●	●							●			●		●	●	●	●			●		●				●		●	●		●			●		●
	3-7	Cumhuriyet Qtr. Umur Bey St. No:27			●					●		●	could not surv.			●					●			●			●	●	●			●		●				●			●		●		●	●		
	3-8	Cumhuriyet Qtr. Umur Bey St. No:23			●						●	●	●							●	●		●	●		●	●	●	●			●		●			●	●			●		●		●	●		
	3-9	Kurtgazi Qtr. Ufuk St. No:4			●			●	●		c. n. s.		could not surv.			could not surv.				could not surv.	could not survey					could not s.			could not survey					could not surv.							could not surv.						●	
	3-10	Cumhuriyet Qtr. Umur Bey St. No:51					●				c. n. s.		could not surv.			could not surv.					●			●				●	●			●		●				●			could not surv.				could not surv.			
	3-11	Kurtgazi Qtr. 3 Eylül St. Lot No:1301			●						●	●	could not surv.			could not surv.				●	could not survey						●	●	●			●		●				●			●		●		●	●		
	3-12	Kurtgazi Qtr. Kızıl Mescid St. No:2			●						●		● could not surv.	●						●	●			●		●	●	●	●			●		●				●			●					●		
		12	-	-	9	1	3	1	1	1	5	6	5	3	-	1	-	-	-	5	10	-	4	7	-	5	7	11	9	-	-	10	-	10	-	-	2	10	-	1	9	-	7	-	5	6	1	4
		32	16	3	10	1	3	9	8	1	13	20	15	17	2	3	3	3	1	14	28	3	11	23	3	15	19	30	24	2	1	28	8	28	3	1	6	29	6	1	19	4	22	3	19	18	2	19

Figure 182, Comparison between different groups of the houses, load bearing systems and the arcitechtural elements used in Birgi historical settlement

CHAPTER 5

CONCLUSION

The construction techniques used in Birgi houses were investigated in detail, aiming to determine the required interventions regarding historical houses. Within the framework of the experiences gained at the end of this thesis, the main conclusions that can be driven are listed as follows:

- Collecting data regarding the history of the settlement where the structures under investigation are located, past event that may have affected these structures as well as previous conservation work, and comparatively examining them carry great importance from the viewpoint of a correct analysis of information and traces that are obtained in the advancing phases of the study.

- Studies regarding the superset, which the houses under investigation belong to, and the general characteristics of this superset should be put together, and the position of the surveyed houses within the superset should be correctly analyzed. In this study, for instance, Ottoman houses, or more specifically traditional Western Anatolian houses is the superset of the set composed of traditional Birgi houses. Such an approach is required also for the aim of dating the houses and the evaluation of differentiations in the construction techniques of these houses that may have happened in due course.

- It is advantageous to examine the settlement, which the houses under investigation are located in, as well as the general characteristics of the houses. The similarities and differences observed in the houses, and also the grouping made

according to these similarities and divergences should be investigated in terms of main features and regional intensity.

- Definition of similarities and differences of the houses on the basis of the whole settlement is important while, during such an investigation, defining the characteristics and intensity of their use. During such an investigation, in the definition of local construction techniques, selection of sufficient number of examples representing the settlement, and detailed investigation and documentation of the cases have primary importance. It should also be ascertained if there are construction techniques peculiar to the structures under investigation.

- The regions (stone quarries, brick kilns, wooded areas etc.), which the construction materials used in traditional houses are obtained from, and the characteristics of the local materials should be determined. Information obtained at the end of laboratory analyses is of great importance for an accurate definition of the local materials as well as for the future conservation practices. In addition, it is crucial to search for the availability of the local materials for future interventions in the settlement.

- In this study, masons that have worked in Birgi could not be reached, however, it is advantageous to seek for the masons that might have worked in the region, where the houses under investigation are found, having a good command of traditional techniques. Information regarding construction process, phases of material acquisition and preparation, local names of systems, materials and tools used in the construction of the houses may be obtained by the interviews with these masons.

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APPENDIX A

LOCATION OF STUDIED HOUSES

Figure 183 is given in the following page.

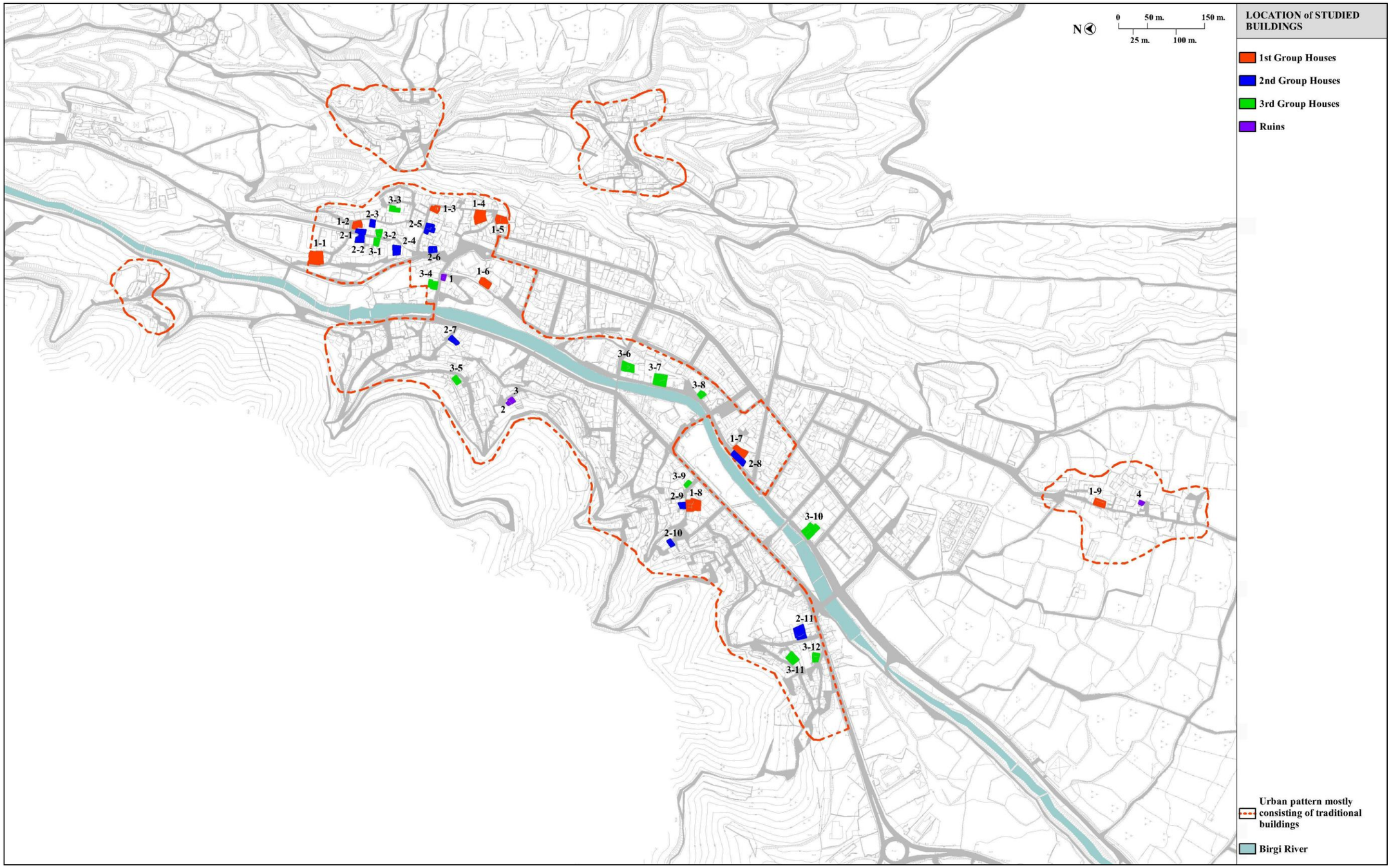


Figure 183, Location of studied houses

APPENDIX B

DRAWINGS OF SURVEYED HOUSES

Figure 184-201 are given in the following pages.

Figure 184, Drawing of House 1-2

1-3

MIDDLE EAST TECHNICAL UNIVERSITY

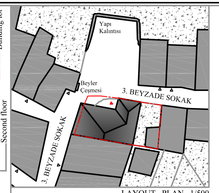
GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF HISTORIC TIMBER HOUSES"

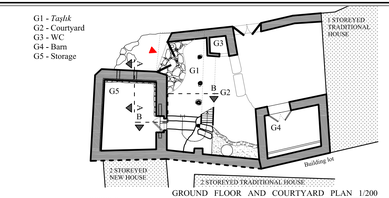
prepared by: FILIZ DIRI / supervisor: Assoc. Prof. Dr. NURMAN SAHİN GÜÇHAN

Address : 3. Beyzade Street Number: 15 | Building Lot: 914 | Building ID : Beklenda Konağı

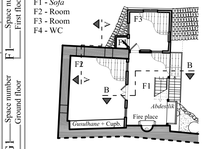
SCHEMATIC STRUCTURAL SYSTEM DRAWING 1/200 | PLAN DRAWINGS N | 1/200 : Space number F1 First Floor, Space number G1 Ground Floor | 1/500 : Space number S1 Second Floor | Building lot | Surveyor: Filiz Diri



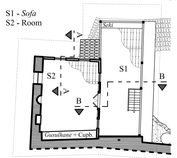
LAYOUT PLAN 1/500



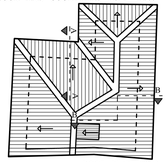
GROUND FLOOR AND COURTYARD PLAN 1/200



FIRST FLOOR PLAN 1/200



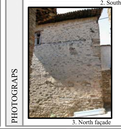
SECOND FLOOR PLAN 1/200


ROOF PLAN 1/200

PHOTOGRAPS


1. East façade


2. South façade


3. North façade


4. North façade wall texture


5. East façade wall textures


6. East façade wall textures


7. Timber frame


8. North east corner


9. Post base


10. Post base


11. Post base


12. Staircase base


13. G5 door


14. G5 south wall

15. The locking system of G5 door


16. F1 abdestlik


17. F1 fire place


18. F1 fire place


19. F1 ceiling


20. F2 ceiling


21. F2 windows


22. S1 staircase


23. S1 north


24. S2 south wall


25. S2 north wall


26. S2 ceiling


27. S2 ceiling

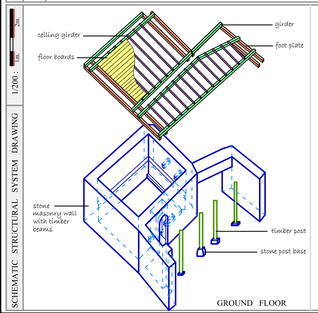

28. S2 cupboard


29. S1 roof

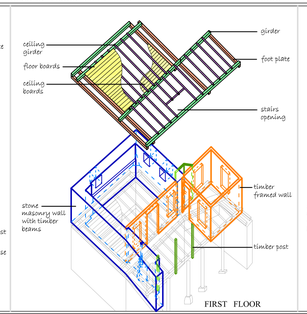

30. S2 roof

31. S2 roof

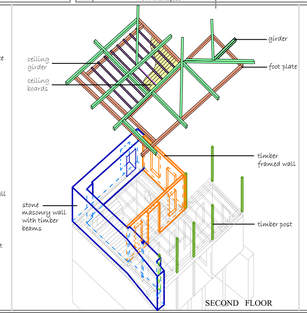

32. S2 roof



GROUND FLOOR



FIRST FLOOR



SECOND FLOOR

ROOF

SECTION DRAWINGS

Figure 185, Drawing of House 1-3

1-5

MIDDLE EAST TECHNICAL UNIVERSITY
GRADUATE PROGRAM IN RESTORATION
"CONSTRUCTION SYSTEMS OF HISTORIC HAMAMS IN ANKARA"
prepared by: FILIZ DIRI / supervisor: Assoc. Prof. Dr. NURHAN SATIN GUCHAN

Address: Cumhuriet Quarter 1. Beycade Street Number: 10 | Building Lot: 551 | Building D.: Beklenen Konağı | Surveyor: Filiz Diri

SCHEMATIC STRUCTURAL SYSTEM DRAWING | 1/200: | 1/50: | 1/20: | 1/10: | 1/5:

PLAN DRAWINGS | N | 1/200: | 1/500: | Building lot | 1m | 2m | 5m | 10m

F1 — Space number / First floor
G1 — Space number / Ground floor

1. BEYZADE STREET
2. BEYZADE STREET
3. BEYZADE STREET
Yapı Kalıntısı

LAYOUT PLAN 1/500

3 STOREYED TRADITIONAL HOUSE
2 STOREYED TRADITIONAL HOUSE
YAPI KALINTISI

G1 - *Taşlık*
G2 - Courtyard
G3 - Storage
G4 - Barn
G5 - Storage
G6 - WC
G7 - Storage
G8 - Storage

GROUND FLOOR AND COURTYARD PLAN 1/200

M1 - BathRoom
M2 - Room
M3 - Drying area

MEZZANINE FLOOR PLAN 1/200

F1 - *Sofa*
F2 - Room
F3 - Room
F4 - Room
F5 - Kitchen

FIRST FLOOR PLAN 1/200

ROOF PLAN 1/200

PHOTOGRAPHS

1. East façade
2. North façade
3. External view of F4 window on the north wall
4. External view of F2 window on the north wall
5. Relation of north wall and adjacent building wall
6. Entrance door
7. East wall texture
8. North wall texture
9. South façade
10. Entrance door interior view
11. Entrance door detail
12. Entrance door detail
13. G1 post and girder
14. G1 ceiling structure
15. G2 fountainand watercourse
16. M3
17. M3 niche
18. G2 timber post and base
19. G2 stone post base
20. G2 stone post base
21. M1 niche
22. M2 door and window
23. General view of G1
24. G1 staircase
25. F1 west side
26. F1 east side
27. F1 balustrated detail
28. F1 door structure
29. F2 door detail
30. F2 door detail
31. F2 door detail
32. F2 door detail
33. F2 door detail
34. F2 window
35. F2 window detail
36. F2 timber fence detail
37. F2 timber fence detail
38. F2 window
39. Doors of F3 and F4
40. F3 window detail
41. F3 window detail
42. F4 door and niche
43. F4 window and cupboard
44. F4 cupboard
45. F4 fireplace
46. F4 fireplace niche
47. F4 window on the south wall
48. Roof and roof window
49. Roof and roof window

stone masonry wall with timber beams
timber post
stone post base
ceiling girder
wall plate girder
floor boards

GROUND FLOOR

timber post
brick masonry wall with timber beams
stone masonry wall with timber beams

MEZZANINE FLOOR

wall plate girder
ceiling girder
floor boards

timber post
brick masonry wall with timber beams
timber framed wall
stone masonry wall with timber beams

FIRST FLOOR

purlin
angle rafter
ridge purlin
king post
collar beam
roof board
over - under tile
roof window
post
angle rafter
rafter
end purlin
chimney

ROOF

SECTION DRAWINGS | 1/50: | 1m | 2m | 5m

over - under tile
roof board (2 × 10 × 100)
rafter (6 × 10)
end purlin (10 × 10)
girder (15 × 15)
collar beam (6 × 10)
purlin (10 × 10)
post (10 × 10)
wall plate (15 × 15)
tie beam (6×6)
upper window sill (10 × 15)
roof mortar
girder (15 × 15)
ceiling girder (6 × 6)
ceiling boards (2 × 15 × 100)
lime plaster (1cm)
upper niche sill (15 × 15)
timber boards (2cm)
lower niche sill (15 × 15)
balustrade (6 × 6)
shutter (2 × 45 × 130)
floor boards (2 × 15 × 100)
floor girder (6 × 6)
girder (15 × 15)
lower window sill (10 × 15)
wall plate (15 × 15)
tie beam (6×6)
upper door sill (15 × 15)
timber door wing (5 × 30 × 140)
tie beam (6-8 × 6-8) repeated in axis 50cm)
timber post (15 × 15)
lintel (10 × 10 × 90-200; repeated in vertical direction, in axis 100-150cm)
threshold timber (160 × 10 × 20)
stone post base
350 cm
155 cm

A-A SECTION

Figure 186, Drawing of House 1-5

Figure 187, Drawing of House 1-6

Figure 188, Drawing of House 1-9

MIDDLE EAST TECHNICAL UNIVERSITY
GRADUATE PROGRAM IN RESTORATION
"CONSTRUCTION TECHNIQUES OF HISTORIC TURKISH HOUSES"
prepared by: İLİZ DİRİ / supervisor: Assoc. Prof. Dr. NİRMAN SAHİN GÜCİAN

2-1

Surveyor: Filiz Diri

Building ID:

Building Lot: 939

Address: Cumhuriyet Quarter, Imam Hatipoglu Street Number: 36

SCHEMATIC STRUCTURAL SYSTEM DRAWING

1/200 | 1/500 | 1/50

PLAN DRAWINGS

N

G1 — Space number — Ground floor

F1 — Space number — First floor

MEYDANBAŞI STREET

İMAM HATİPOĞLU STREET

KAVANOZ STREET

LAYOUT PLAN 1/500

F1 - Sofa
F2 - Room
F3 - Room
F4 - Room

FIRST FLOOR PLAN 1/200

G1 - Taşlık
G2 - Courtyard
G3 - Barn
G4 - Kitchen
G5 - Storage
G6 - WC

2 STOREYED TRADITIONAL HOUSE

2 STOREYED TRADITIONAL HOUSE

GROUND FLOOR AND COURTYARD PLAN 1/200

ROOF PLAN 1/200

PHOTOGRAPS

1. North façade
2. West façade
3. Ground floor wall texture
4. Ground floor wall texture
5. West façade upper floor
6. Projections and niche detail on the west façade
7. Projections and niche area on the west façade
8. Timber frame system on the west façade detail
9. Entrance door exterior façade
10. Entrance door interior façade
11. Entrance door detail
12. Ent.d.detail
13. Entrance door detail
14. G1 timber post and stone base
15. G5 and G6
16. West façade of G4 and F4
17. G1 ceiling
18. G3 window
19. G3 ceiling
20. G3 northeast corner
21. G5 fire place
22. Sofa
23. North façade
24. F2 exterior façade
25. F3 exterior façade
26. F2 door detail
27. F2 door and niche
28. F2 window
29. F2 window and niche
30. F2 window
31. F2 cupboard
32. F3 door detail
33. F3 ceiling covering
34. F3 fireplace
35. F3 window
36. F1 roof structure
37. F1 roof structure
38. F1 roof structure

SECTION DRAWINGS

1/50 | 1m | 2m

over-under tile
roof board (2 × 10 × 100)
rafter (5 × 10)
purlin (10 × 10)
post (10 × 10)
girder (15 × 15)
ceiling girder (6 × 6)
ceiling boards (2 × 15 × 100)
chimney
brace (5 × 10)
wall plate (15 × 15)
kerpiç
upper window sill (15 × 15)
lime plaster (1cm), mud mortar (1-2 cm), timber boards (3-4 cm)
first place niche made of sidgy tile
balustrade (6 × 6)
niche projection
lower window sill (10 × 15)
first place
timber framed wall (15 cm)
skirting board (3 × 4 × 100)
floor boards (2 × 15-30 × 100-150)
floor girder (8 × 8)
girder (15 × 15)
foot plate (15 × 15)
girder (15 × 15)
lintel (15 × 15 × 150-200, repeated in vertical direction, in each 200cm)
tie beam (3 × 3, repeated in each 60 cm)
270 cm
560 cm

A-A SECTION

ring post (10 × 10)
abdestlik
sedir
niche
tie beam (3 × 3, repeated in each 60 cm)
lintel (15 × 15 × 150-200, repeated in vertical direction, in each 200cm)
lime plaster (1cm), mud mortar (20m)
60 cm
365 cm
timber post (15 × 15)
stone post base

B-B SECTION

GROUND FLOOR

stone masonry wall with timber beams
timber post
girder
ceiling boards
ceiling girder
foot plate

FIRST FLOOR

stone masonry wall with timber beams
timber framed wall
timber post
ceiling girder
ceiling boards
girder
foot plate

ROOF

roof board
pantile roof covering
chimney
end purlin
purlin
post
corner post
brace
angle rafter
rafter

Figure 189, Drawing of House 2-1

2-2

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF TRADITIONAL BİRGİ HOUSES"

prepared by: FİLİZ DİRİ / supervisor: Assoc. Prof. Dr. NERİMAN ŞAHİN GÜÇHAN

Surveyor: Filiz Diri

Building Lot: 673

Address: Camikebir Quarter Imam Birgivi Street Number: 9

PLAN DRAWINGS

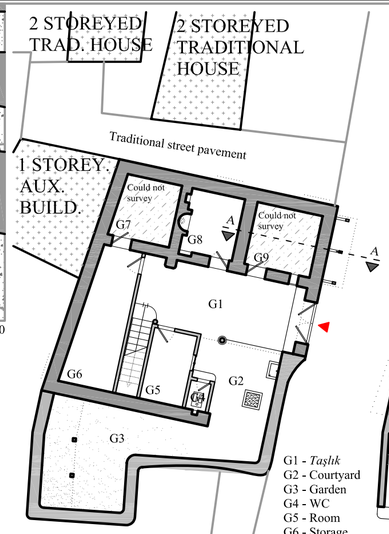
1/200 : 1m 2m — 1/500 : 1m 5m — Building lot

N

F1 — Space number: First floor

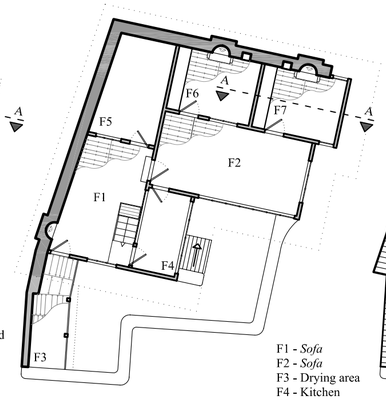
G1 — Space number: Ground floor

LAYOUT PLAN 1/500



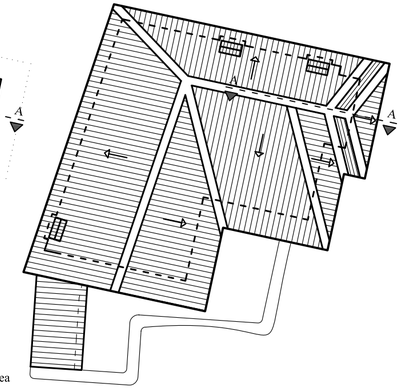
GROUND FLOOR AND COURTYARD PLAN 1/200

G1 - *Taşlık*
G2 - Courtyard
G3 - Garden
G4 - WC
G5 - Room
G6 - Storage
G7 - Storage
G8 - Barn
G9 - Room



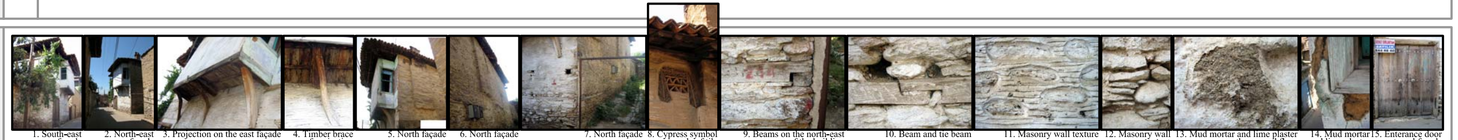
FIRST FLOOR PLAN 1/200

F1 - *Sofa*
F2 - *Sofa*
F3 - Drying area
F4 - Kitchen
F5 - Room
F6 - Room
F7 - Room



ROOF PLAN 1/200

PHOTOGRAPHS



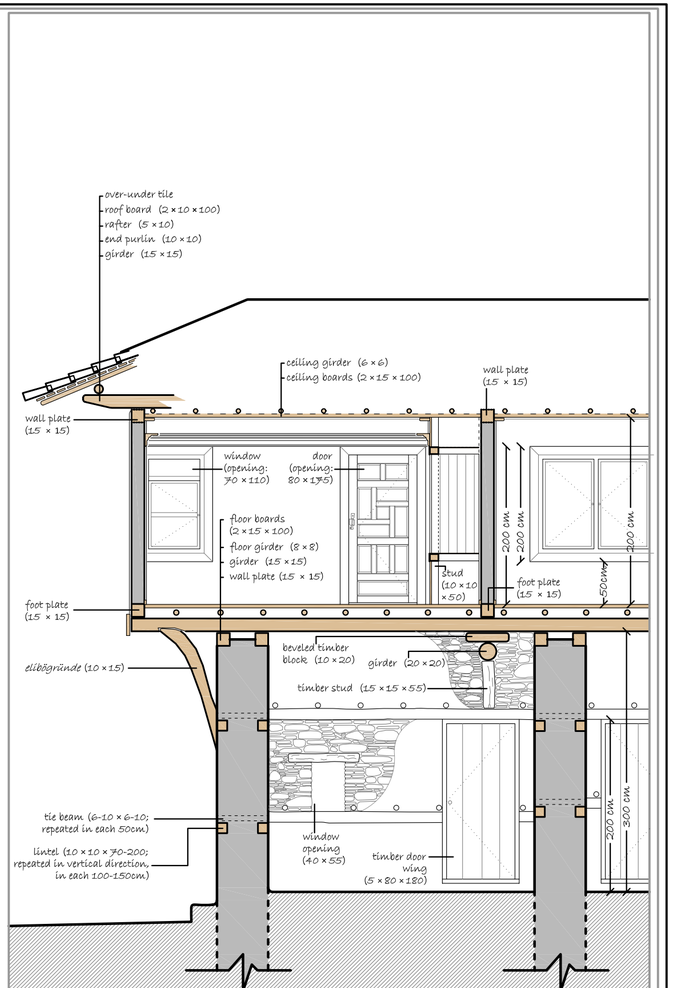
1. South-east façade
2. North-east façade
3. Projection on the east façade
4. Timber brace of projection
5. North façade
6. North façade
7. North façade
8. Cypress symbol made of tile on the south wall
9. Beams on the north-east corner of the building
10. Beam and tie beam
11. Masonry wall texture
12. Masonry wall texture
13. Mud mortar and lime plaster on the ground floor
14. Mud mortar and lime plaster on the first floor
15. Enterance door external façade

16. Enterance door detail
17. Enterance door detail
18. Enterance door detail
19. Enterance door internal façade
20. Post & post base
21. Western side of G1
22. Doors of G8 and G9
23. G8 door detail
24. G8 fireplace
25. North-west corner of G8
26. Drying area (F3)
27. Eastern side of F1
28. F6 door detail
29. F6 door detail
30. F6 door detail
31. F6 door detail

32. F6 ceiling covering
33. F7 door
34. F7 door detail
35. North wall of F7
36. F7 window detail
37. F7 window detail
38. F7 window detail
39. F7 window detail
40. F7 niche on the east wall
41. F7 *sergen*
42. F7 ceiling covering
43. Roof
44. Roof detail
45. Traditional street pavement

SECTION DRAWINGS

1/50 : 1m 2m



A-A SECTION

Figure 190, Drawing of House 2-2

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF TRADITIONAL BİRGİ HOUSES"

prepared by: FİLİZ DİRİ / supervisor: Assoc. Prof. Dr. NERİMAN ŞAHİN GÜÇHAN

2-4

Surveyor: Filiz Diri

Building ID:

Building Lot: 666

Address: Camikebir Quarter İmam Birgivi Street Number: 5

PLAN DRAWINGS

N

1/200 : 1m. 2m.

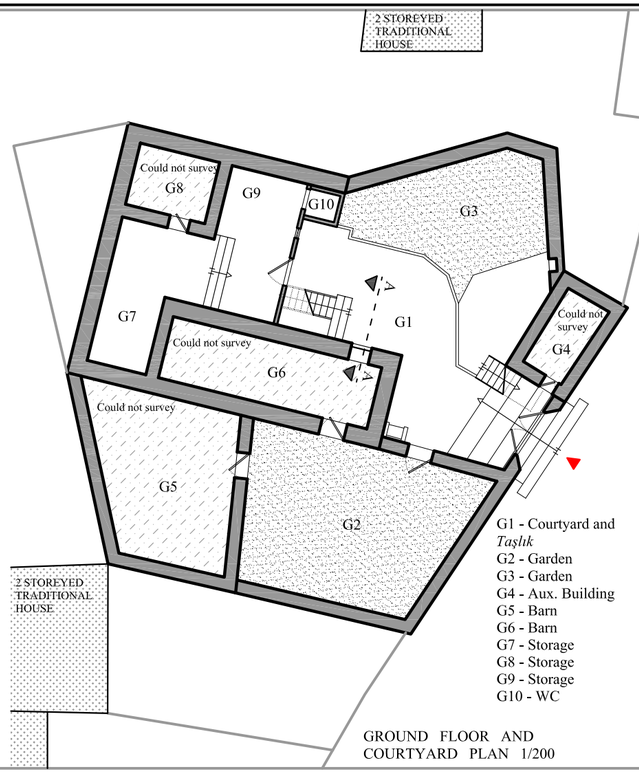
1/500 : 1m. 5m.

G1 Space number — Ground floor

F1 Space number — First floor

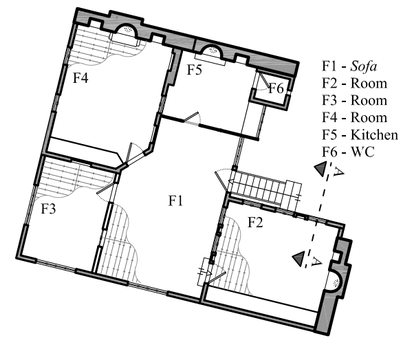
Building lot

LAYOUT PLAN 1/500



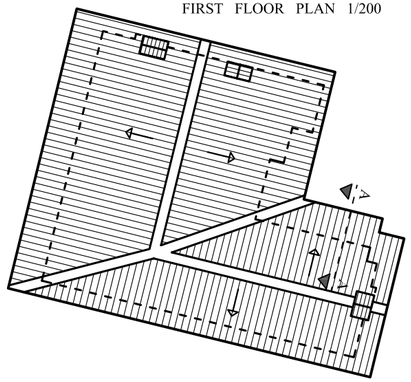
G1 - Courtyard and *Taşlık*
G2 - Garden
G3 - Garden
G4 - Aux. Building
G5 - Barn
G6 - Barn
G7 - Storage
G8 - Storage
G9 - Storage
G10 - WC

GROUND FLOOR AND COURTYARD PLAN 1/200



F1 - *Sofa*
F2 - Room
F3 - Room
F4 - Room
F5 - Kitchen
F6 - WC

FIRST FLOOR PLAN 1/200



ROOF PLAN 1/200

PHOTOGRAPS

SECTION DRAWINGS

1/50 : 1m. 2m.

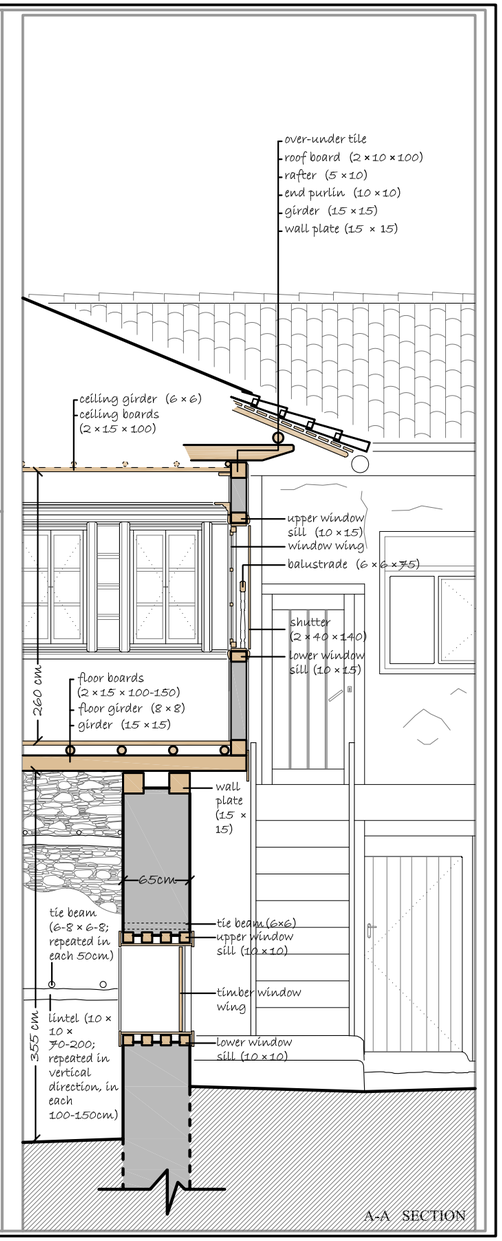


Figure 191, Drawing of House 2-4

Figure 192, Drawing of House 2-5

Figure 193, Drawing of House 2-6

Figure 194, Drawing of House 2-10

Figure 195, Drawing of House 2-11

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF TRADITIONAL BİRGİ HOUSES"

prepared by: FİLİZ DİRİ / supervisor: Assoc. Prof. Dr. NERİMAN ŞAHİN GÜÇHAN

3-1

Surveyor: Filiz Diri

Building ID:

Building Lot: 664

Address: Camikebir Quarter İmam Birgivi Street Number: 3

PLAN DRAWINGS

N

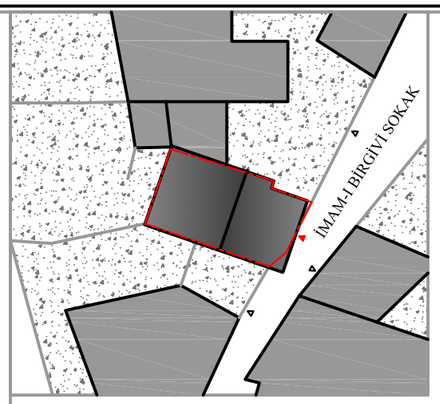
1/200 : 1m. 2m.

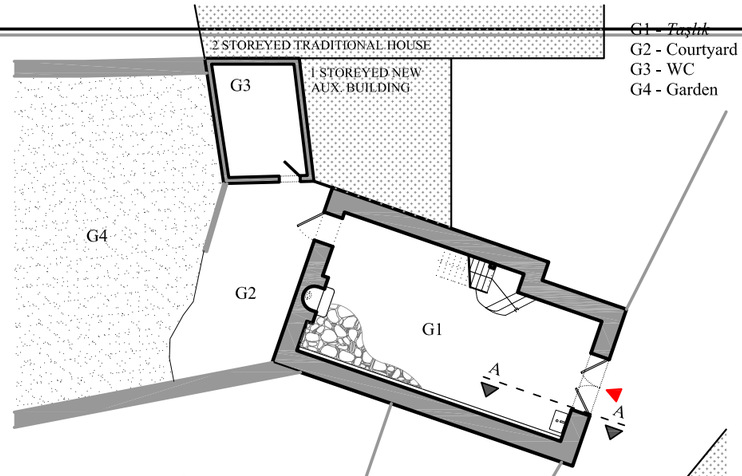
1/500 : 1m. 5m.

Building lot

G1 — Space number — Ground floor

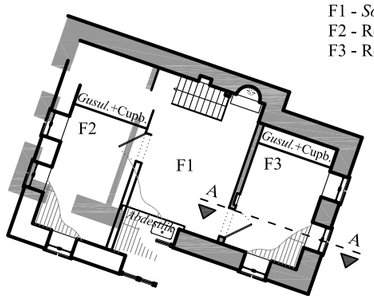
F1 — Space number — First floor



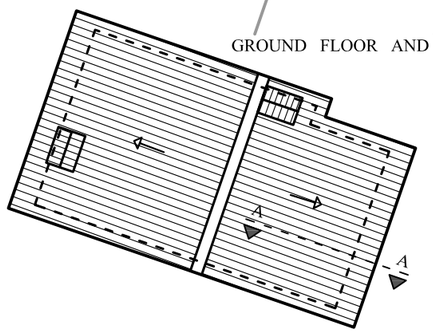


GROUND FLOOR AND COURTYARD PLAN 1/200

F1 - *Sofa*
F2 - Room
F3 - Room



FIRST FLOOR PLAN 1/200



ROOF PLAN 1/200

PHOTOGRAPS


1. South façade


2. Ground floor wall texture


3. Ground floor wall texture


4. North façade window shutter


5. South façade window and window shutter


6. South façade enterance door


7. Enterance door

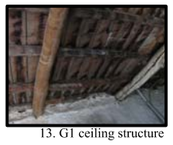

8. Enterance door


9. upper door sill of enterance door


10. Enterance door detail


11. G1 fireplace


12. Door open into the garden


13. G1 ceiling structure

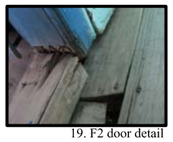

14. G1 staircase


15. F1 staircase detail


16. F1 staircase and fireplace


17. F1 *abdestlik*


18. F2 door and niche


19. F2 door detail


20. F2 door detail


21. F2 window


22. F2 window detail


23. F2 window detail


24. F2 window detail


25. F2 window detail


26. F3 door

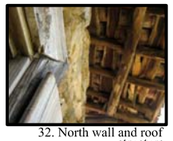

27. F3 window


28. F3 window detail


29. F3 window detail

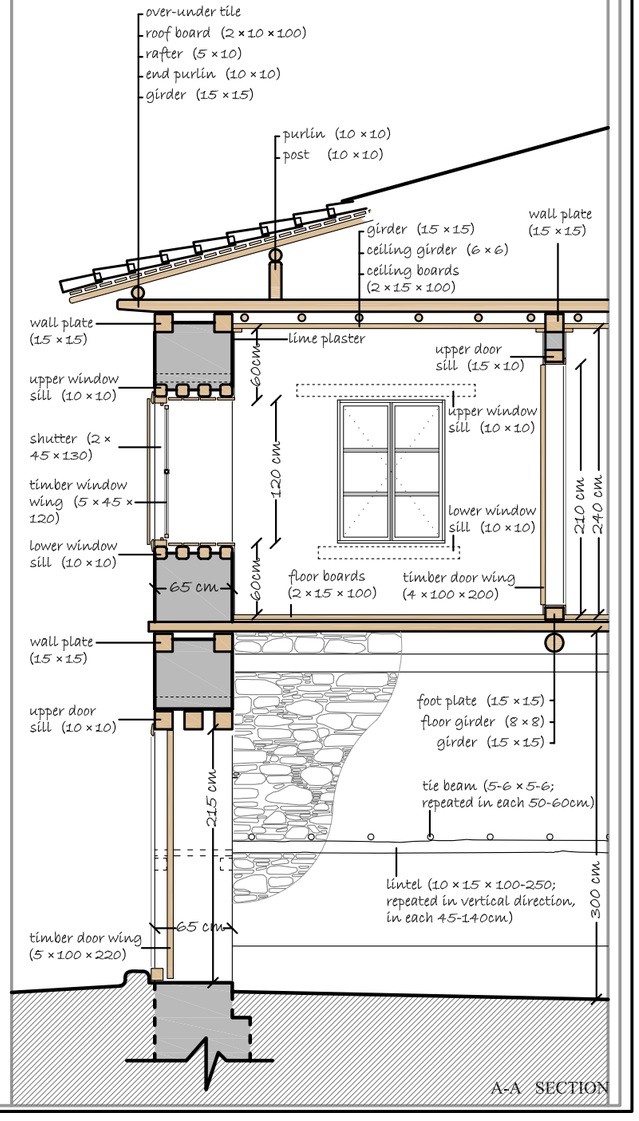

30. F3 ceilind covering


31. South wall and roof structure


32. North wall and roof structure

SECTION DRAWINGS

1/50 : 1m. 2m.



A-A SECTION

Figure 196, Drawing of House 3-1

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF TRADITIONAL BİRGİ HOUSES"

prepared by: FİLİZ DİRİ / supervisor: Assoc. Prof. Dr. NERİMAN ŞAHİN GÜÇHAN

3-2

Surveyor: Filiz Diri

Building ID:

Building Lot: 631

Address: Camikebir Quarter İmam Birgivi Street Number: 24

PLAN DRAWINGS

N

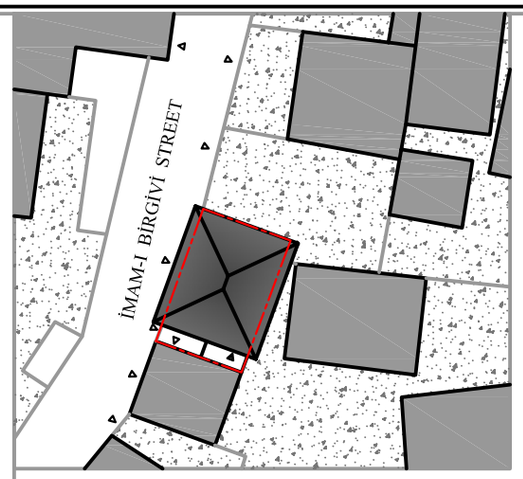
1/200 : 1m. 2m.

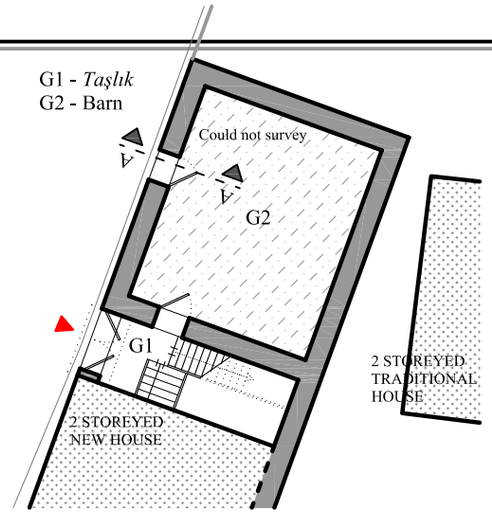
1/500 : 1m. 5m.

Building lot

G1 — Space number / Ground floor

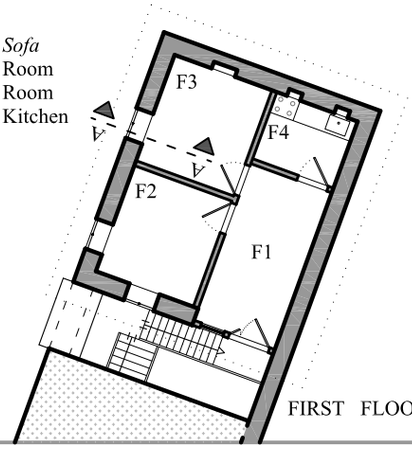
F1 — Space number / First floor



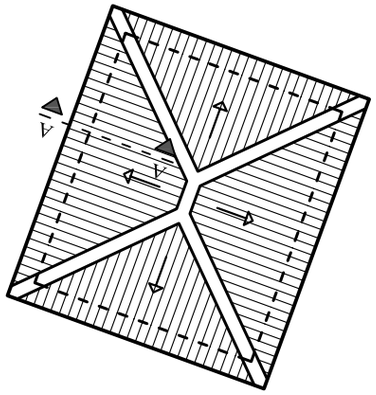


GROUND FLOOR AND COURTYARD PLAN 1/200

F1 - *Sofa*
F2 - Room
F3 - Room
F4 - Kitchen



FIRST FLOOR PLAN 1/200



ROOF PLAN 1/200

PHOTOGRAPS

1. West façade

2. G2 door

3. First floor window

4. Enterance door

5. Enterance door detail

6. Enterance door detail

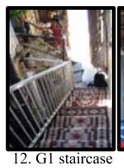
7. Enterance door detail

8. Enterance door detail

9. Enterance door detail

10. Enterance door detail

11. Ground floor wall texture

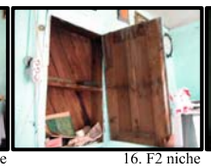


12. G1 staircase

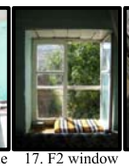
13. F1 enterance door

14. F2 and F3 doors

15. F2 niche



16. F2 niche



17. F2 window

18. F2 window detail

19. F2 window detail

20. F2 window and shutter detail

21. F2 ceiling covering

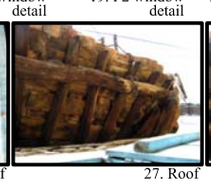
22. F2 ceiling covering

23. F3 niche

24. F3 window

25. F4 north wall

26. Roof



27. Roof

28. Roof

SECTION DRAWINGS

1/50 : 1m. 2m.

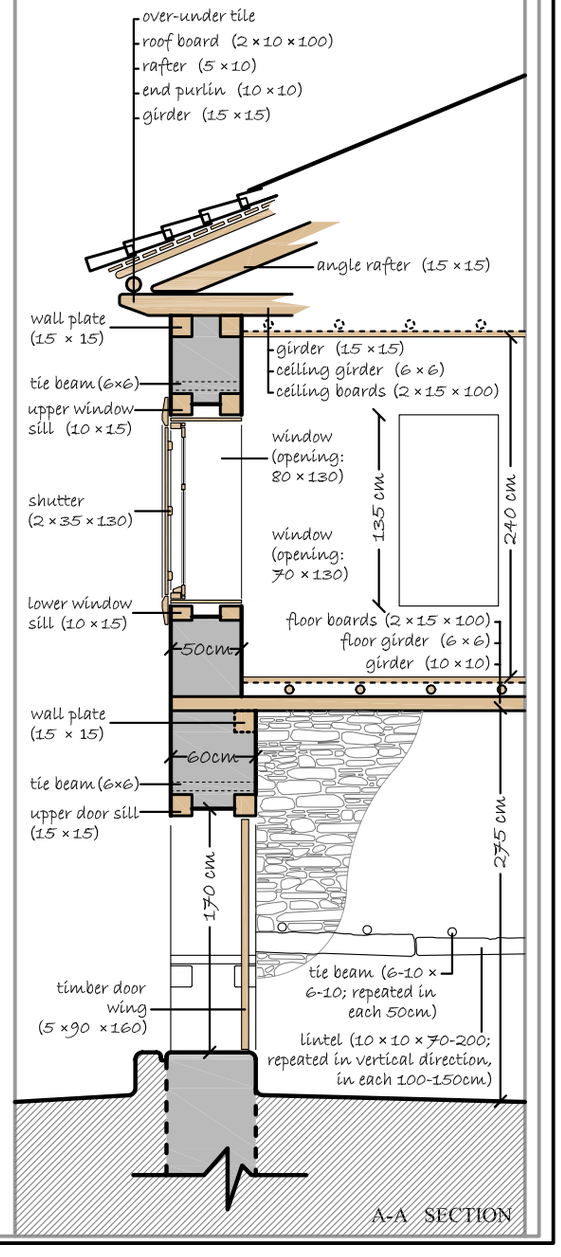


Figure 197, Drawing of House 3-2

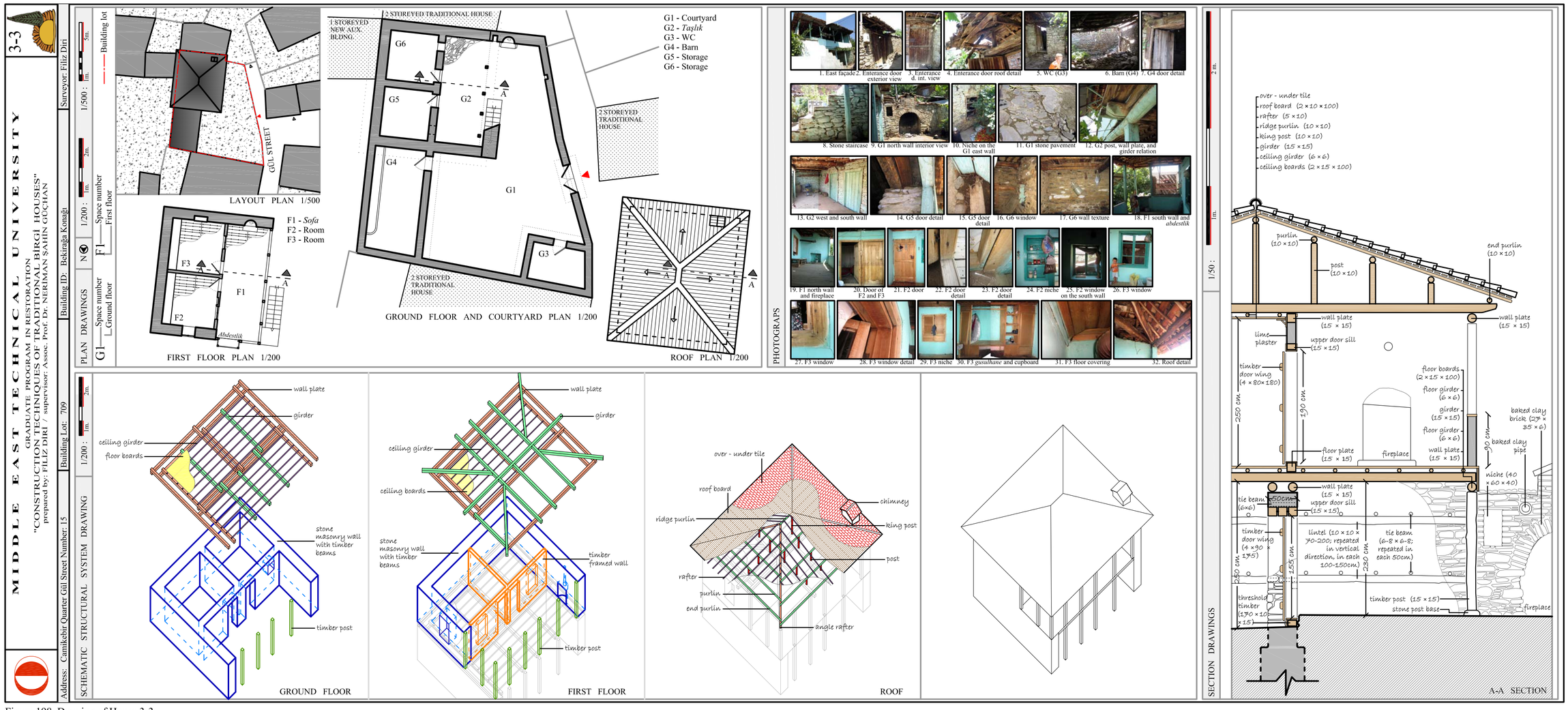


Figure 198, Drawing of House 3-3

3-4

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF TRADITIONAL BİRGİ HOUSES"

prepared by: FİLİZ DİRİ / supervisor: Assoc. Prof. Dr. NERİMAN ŞAHİN GÜÇHAN

Building ID:

Surveyor: Filiz Diri

Address: Camikebir Quarter Camiönü Street No: 20

Building Lot: 657-658

PLAN DRAWINGS

Fo1 — Space number
Foundation

G1 — Space number
Ground floor

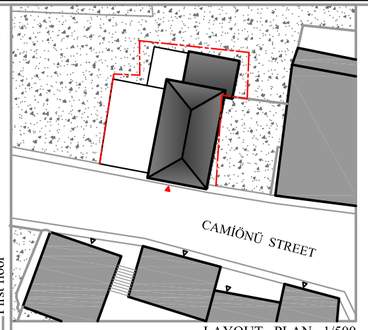
F1 — Space number
First floor

Building lot

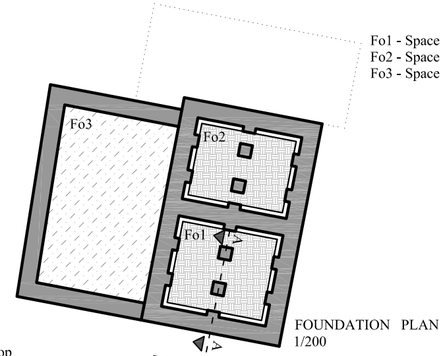
N

1/200 : 1m. 2m.

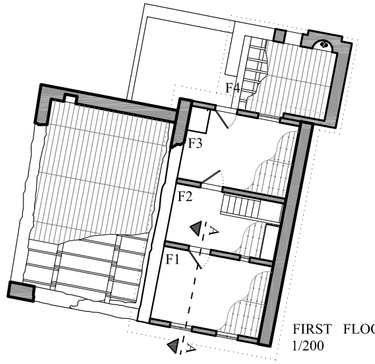
1/500 : 1m. 5m.



LAYOUT PLAN 1/500

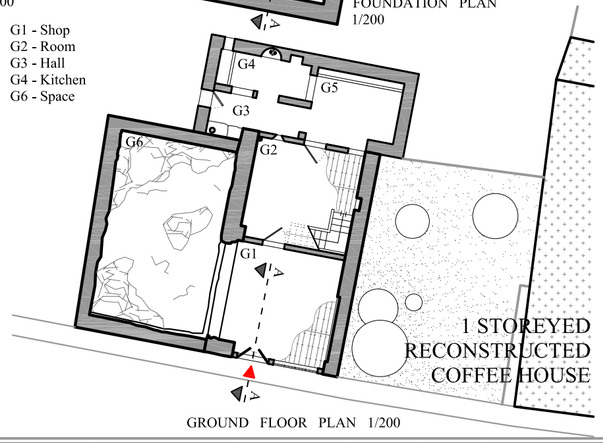


FOUNDATION PLAN 1/200

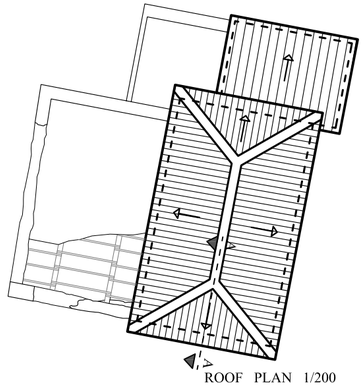


FIRST FLOOOR PLAN 1/200

G1 - Shop
G2 - Room
G3 - Hall
G4 - Kitchen
G6 - Space



GROUND FLOOR PLAN 1/200



ROOF PLAN 1/200

PHOTOGRAPS


1. South façade


2. West façede

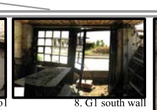

3. Western side

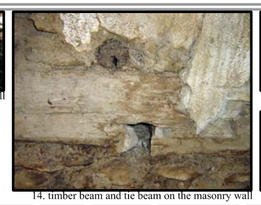

4. Space G6


5. Space Fo1


6. Space Fo1


7. Space Fo1 girder


8. G1 south wall


14. timber beam and tie beam on the masonry wall


15. G2 north wall


16. G2 south-west corner


9. G1 enterance door


10/11. G1 enterance door detail


12. G1-G2 door


13. G1 ceil. struct.


17. G2-G5 door opening


18. G2 niche


19. G2 mud mortar


20. Staircase


21. Staircase detail


22. G2 ceiling structure


23. G5 tim. post and stone base


24. G3


25. G3 timber post


26. G4 west wall


27. G5 north-east corner


28. F2 cupbo.


29. F2 ceiling pavement


30. F1 door


31. F1 door detail


32. F1door detail


33. F1 door detail


34. F1 door detail


35. F1 door detail


36. F1 north-east wall

37. F1 window

38. F1 window detail

39. F1 window detail

40. F1 window detail

41. F1 window detail

42. F1 window detail

43. F3 door

44. F3 door

45. F3 door detail

46. F4 door

47. F4 door detail

48. F4 door detail

49. F3 timber fr. wall texture

50. F4 south side

51. Eaves

SECTION DRAWINGS

1/50 : 1m. 2m.

Figure 199, Drawing of House 3-4

MIDDLE EAST TECHNICAL UNIVERSITY
GRADUATE PROGRAM IN RESTORATION
"CONSTRUCTION TECHNIQUES OF TRADITIONAL BIRGI HOUSES"
prepared by: FİLİZ DİRİ / supervisor: Assoc. Prof. Dr. NERMAN ŞAHİN GÜÇHAN

3-6

Address: Cumhuriyet Quarter Okul Street Number 2 | Building Lot: 391 | Building ID: Hacı Himmet Evi | Surveyor: Filiz Diri

SCHEMATIC STRUCTURAL SYSTEM DRAWING 1/200 : 1m 2m

PLAN DRAWINGS N | 1/200 : 1m 2m | 1/500 : 5m

G1 Space number / Ground floor
F1 Space number / First floor
Building lot

Dervişağa Darülhadisi
OKUL STREET
UMURBEY CADDESİ

LAYOUT PLAN 1/500

G1 - *Taşlık*
G2 - Courtyard
G3 - Storage
G4 - Storage
G5 - Storage
G6 - Storage

F1 - *Sofa*
F2 - Room
F3 - Room
F4 - Room
F5 - Room

DERVİŞAĞA DARÜLHADİSİ
2 STOREYED TRADITIONAL HOUSE
Could not survey
Granulh. + Cupb.
fire place

GROUND FLOOR AND COURTYARD PLAN 1/200

FIRST FLOOR PLAN 1/200

ROOF PLAN 1/200

PHOTOGRAPHS

1. North façade
2. North façade
3. Northeast corner
4. Eave detail
5. Mortar of first floor
6. Northwest roof corner
7. First floor exterior window
8. Lintel of entarance door
9. Enterance door opening
10. North façade of ground floor wall texture
11. G3 window and door
12. G3 window
13. Lower sill of G3 window
14. G4 door
15. G4 door lintel
16. Beam and tie beam of G4 door join detail
17. G3 southeast corner
18. G3 ceiling structure
19. G4 fire place
20. G5 niche
21. G1 stons-timber staircase
22. F1 timber staircase door
23. Timber newel post
24. Location of original timber staircase trace
25. F1 northeast corner
26. plaster of interior wall
27. F2 east wall
28. F4 southeast corner
29. F3 south wall and window
30. F4 fire place
31. General view of roof
32. Roof detail
33. Chimney

stone masonry wall with timber beams
timber post
timber framed wall
upper door sill

GROUND FLOOR

ceiling girder
stairs opening
girder
floor boards
supporting girder
foot plate

timber framed wall
timber post
stone masonry wall with timber beams

ceiling girder
girder
girder
foot plate
ceiling boards

FIRST FLOOR

angle brace
brace
post
king post
angle rafter
rafter
roof board
sanatile roof covering
chimney

ROOF

SECTION DRAWINGS

2m. 1m. 1:50 :

over-under tile
roof board (2 × ±0)
rafter (10 × 8)
angle rafter (10 × ±0)
girder (10 × 15)
over-under tile
mud mortar
slate-brick fragment
slate
beat (10 × 10)
wall plate (13 × 13)
upper window sill (10 × 10)
250cm
baluustrade (6 × 6 × 85)
lower window sill (10 × 15)
stone masonry wall; stone infill (10cm), mud mortar (2 cm), lime plaster (1 cm)
upper door sill (15 × 15)
floor boards (2 × 20-30 × ±50-200)
floor girder (10 × 10)
girder (15 × 15)
lintel (15 × 15 × 50-250; repeated in vertical direction, in each ±80cm)
tie beam (10 × 10; repeated in each 50cm)
250cm
75cm

A-A SECTION

Figure 200, Drawing of House 3-6

Figure 201, Drawing of House 3-12

APPENDIX C

SHOWING THE DETAIL TYPE OF THE DRAWN HOUSES WITH CODES

Figure 202 is given in the following pages.

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF TRADITIONAL BIRGI HOUSES"

prepared by: FILIZ DIRI / supervisor: Assoc. Prof. Dr. NERIMAN SAHIN GUCHAN

SHOWING THE DETAIL TYPE OF STUDIED BUILDINGS WITH CODES

CODES

$F2d_4$: F — First floor; 2d — Architectural element (Door); 2 — Location of detail; 4 — Type 4 (Type of detail)

SYMBOLS

— Not exist

— Could not survey

Δ *Köşe pahı*

φ Symbol

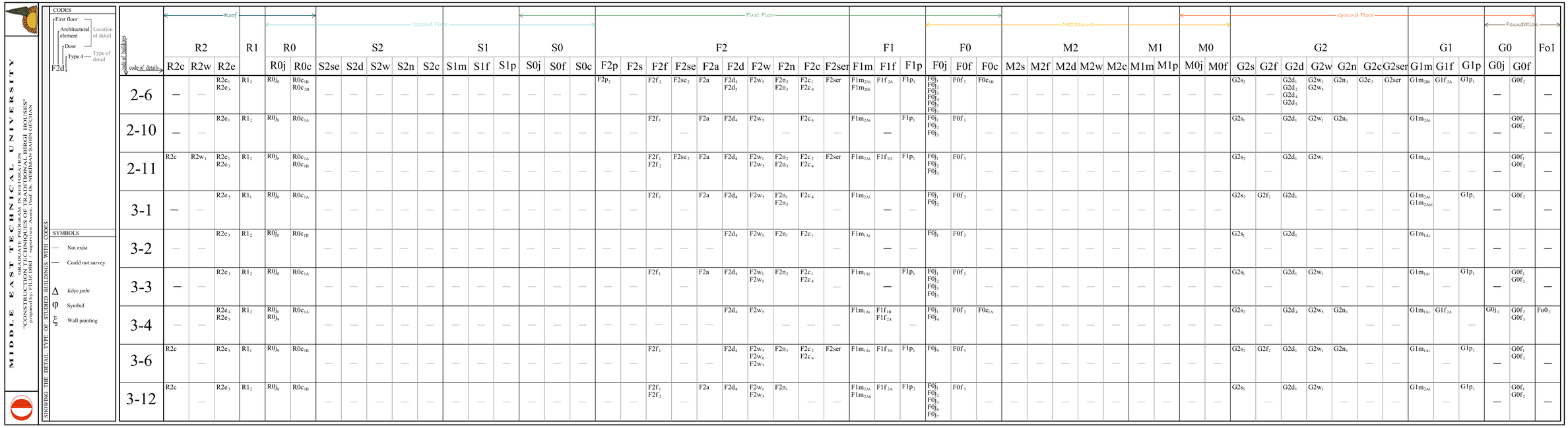
ξ Wall painting

code of buildings / code of details	R2c (Roof, R2)	R2w	R2e	R1	R0j (R0)	R0c	S2se (Second Floor, S2)	S2d	S2w	S2n	S2c	S1m (S1)	S1f	S1p	S0j (S0)	S0f	S0c
1-2	—	—	$R2e_1$ $R2e_2$	$R1_2$	$R0j_8$	$R0c_{1B}$	—	—	—	—	—	—	—	—	—	—	—
1-3	—	$R2w_1$	$R2e_1$	$R1_2$	$R0j_8$	$R0c_{1C}$	$S2se_1$	$S2d_2$	$S2w_1$ $S2w_5$	$S2n_2$ $S2n_3$	$S2c_1$ $S2c_2$ $S2c_4$	$S2m_{1Bi}$ $S2m_{1Ci}$ φ	$S2f_{1A}$	$S2p_1$	$S1j_1$ $S1j_1$ $S1j_4$ $S1j_5$ $S1j_7$	$S1f_3$	$S1c_{1B}$ $S1c_{1C}$
1-5	—	$R2w_1$	$R2e_1$	$R1_1$	$R0j_8$	$R0c_{1B}$	—	—	—	—	—	—	—	—	—	—	—
1-6	—	—	$R2e_1$	$R1_2$	$R0j_8$	$R0c_{1B}$	—	—	—	—	—	—	—	—	—	—	—
1-9	—	—	$R2e_2$	$R1_2$	$R0j_8$	$R0c_{1B}$	—	—	—	—	—	—	—	—	—	—	—
2-1	R2c	—	$R2e_1$	$R1_2$	$R0j_8$	$R0c_{1B}$ $R0c_{2B}$	—	—	—	—	—	—	—	—	—	—	—
2-2	R2c	—	$R2e_1$ $R2e_3$	$R1_2$	$R0j_8$	$R0c_{1A}$ $R0c_{1B}$	—	—	—	—	—	—	—	—	—	—	—
2-4	R2c	—	$R2e_1$ $R2e_3$	$R1_2$	$R0j_8$	$R0c_{1B}$	—	—	—	—	—	—	—	—	—	—	—
2-5	—	—	$R2e_1$	$R1_1$	$R0j_8$	$R0c_{1A}$	—	—	—	—	—	—	—	—	—	—	—

code of buildings / code of details	F2p (First Floor, F2)	F2s	F2f	F2se	F2a	F2d	F2w	F2n	F2c	F2ser	F1m (F1)	F1f	F1p	F0j (F0)	F0f	F0c
1-2	$F2p_1$ $F2p_2$	—	—	—	F2a	$F2d_5$	$F2w_5$ $F2w_6$	$F2n_3$	$F2c_2$ $F2c_4$	F2ser	$F1m_{2Ai}$ ξ	$F1f_{1A}$	$F1p_2$	$F0j_2$ $F0j_3$ $F0j_6$	$F0f_3$	—
1-3	—	$F2s_2$	$F2f_1$	—	F2a	$F2d_2$	$F2w_2$ $F2w_3$ $F2w_5$	$F2n_3$	$F2c_2$ $F2c_4$	—	$F1m_{1Biii}$ $F1m_{1Ciii}$	$F1f_{1A}$	$F1p_1$	$F0j_1$ $F0j_2$ $F0j_6$ $F0j_7$	$F0f_3$	—
1-5	—	—	$F2f_1$	—	—	$F2d_4$ $F2d_5$	$F2w_1$ $F2w_5$	$F2n_3$	$F2c_1$ $F2c_4$	F2ser	$F1m_{2Ai}$ $F1m_{2Bi}$	—	$F1p_1$	$F0j_1$ $F0j_2$ $F0j_7$	$F0f_3$	$F0c_{1B}$
1-6	$F2p_2$	—	$F2f_2$	—	—	$F2d_4$	$F2w_5$	$F2n_1$	$F2c_1$ $F2c_2$	F2ser	—	—	$F1p_1$	$F0j_1$ $F0j_2$ $F0j_3$	$F0f_3$	—
1-9	—	—	$F2f_2$	$F2se_3$	—	$F2d_4$	$F2w_5$ $F2w_6$	—	$F2c_1$ $F2c_4$	—	$F1m_{2Ai}$	$F1f_{1B}$ $F1f_{2A}$	$F1p_1$ $F1p_3$	$F0j_1$ $F0j_2$ $F0j_3$ $F0j_6$ $F0j_7$	$F0f_3$	$F0c_{1B}$
2-1	$F2p_1$	—	$F2f_2$	$F2se_2$	F2a	$F2d_4$	$F2w_5$	$F2n_3$ $F2n_4$	$F2c_{1A}$	F2ser	$F1m_{2Ai}$	$F1f_{1B}$ $F1f_{1C}$ $F1f_{2B}$	$F1p_1$	$F0j_1$ $F0j_2$ $F0j_7$	$F0f_3$	—
2-2	$F2p_2$	—	$F2f_1$	—	—	$F2d_4$	$F2w_5$	$F2n_1$	$F2c_1$ $F2c_4$	F2ser	$F1m_{2Ai}$ $F1m_{2Bi}$ φ	—	—	$F0j_1$ $F0j_2$ $F0j_6$	$F0f_3$	—
2-4	$F2p_1$	—	$F2f_2$ $F2f_3$	—	F2a	$F2d_4$ $F2d_5$	$F2w_5$	$F2n_3$	$F2c_1$ $F2c_4$	F2ser	$F1m_{2Ai}$ $F1m_{2Bi}$	$F1f_{2A}$	—	$F0j_1$ $F0j_2$	$F0f_3$	—
2-5	$F2p_1$	—	$F2f_2$	—	—	$F2d_4$ $F2d_5$	$F2w_1$ $F2w_2$ $F2w_5$ $F2w_6$	$F2n_3$	$F2c_2$ $F2c_4$	F2ser	$F1m_{2Ai}$	$F1f_{2B}$	$F1p_1$	$F0j_1$ $F0j_2$ $F0j_3$ $F0j_4$ $F0j_6$	$F0f_3$	—

code of buildings / code of details	M2s (Mezzanine, M2)	M2f	M2d	M2w	M2c	M1m (M1)	M1p	M0j (M0)	M0f	G2s (Ground Floor, G2)	G2f	G2d	G2w	G2n	G2c	G2ser	G1m (G1)	G1f	G1p	G0j (G0)	G0f	Fo1 (Foundation)
1-2	—	—	—	—	—	—	—	—	—	$G2s_2$	—	$G2d_1$	$G2w_1$ $G2w_4$	—	—	—	$G1m_{2Ai}$	—	$G1p_1$	—	$G0f_1$ $G0f_2$	—
1-3	—	—	—	—	—	—	—	—	—	$G2s_2$	—	$G2d_1$ $G2d_3$	—	—	—	—	$G1m_{1Biii}$ $G1m_{1Ciii}$ Δ	—	$G1p_1$	—	$G0f_1$ $G0f_2$	—
1-5	$M2s_2$	$M2f_2$	$M2d_1$	$M2w_1$	$M2c_1$	$M1m_{2Ai}$ $M1m_{2Bi}$	$M1p_1$	$M0j_1$ $M0j_7$	$M0f_3$	$G2s_2$	—	$G2d_1$	—	—	—	—	$G1m_{2Ai}$ $G1m_{2Bi}$	—	$G1p_1$	—	$G0f_1$ $G0f_2$	—
1-6	—	—	—	—	—	—	—	—	—	$G2s_2$	—	$G2d_1$	$G2w_1$	—	—	—	$G1m_{1Ai}$	—	—	—	—	—
1-9	—	—	—	—	—	—	—	—	—	$G2s_1$	$G2f_2$	$G2d_1$	$G2w_1$	—	—	—	$G1m_{2Ai}$	—	$G1p_1$	—	$G0f_1$ $G0f_2$	—
2-1	—	—	—	—	—	—	—	—	—	$G2s_2$	$G2f_1$	$G2d_1$	$G2w_1$	—	—	—	$G1m_{2Ai}$	—	$G1p_1$	—	$G0f_1$ $G0f_2$ $G0f_3$	—
2-2	—	—	—	—	—	—	—	—	—	$G2s_2$	$G2f_2$	$G2d_1$	$G2w_1$	$G2n_1$	—	—	$G1m_{2Ai}$ $G1m_{2Bi}$	—	$G1p_1$	—	$G0f_1$	—
2-4	—	—	—	—	—	—	—	—	—	$G2s_2$	—	$G2d_1$	$G2w_1$	—	—	—	$G1m_{2Ai}$ $G1m_{2Aiii}$ $G1m_{2Bi}$	—	—	—	$G0f_1$	—
2-5	—	—	—	—	—	—	—	—	—	$G2s_2$	—	$G2d_1$ $G2d_4$	$G2w_1$ $G2w_5$	—	—	—	$G1m_{2Ai}$	$G1f_{2B}$	$G1p_1$	—	$G0f_1$ $G0f_2$ $G0f_3$	—

Figure 202, Showing the detail type of studied houses with codes



"Figure 202 (continued)"