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An Analysis of the Plans and Construction Techniques of Traditional Houses in Güdül

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Abstract
Traditions, lifestyle, and production styles determined by geography and religious beliefs, are among the factors that determine traditional architecture. Traditional houses built in different cities of Anatolia exhibit great diversity based on these factors. Ankara Province's Güdül District is a settlement consisting of unique houses constructed using stone and mud-brick masonry as well as timber framed system. Settlements that have preserved their original construction techniques and traditional way of life until today constitute important examples of Anatolia's rural architecture and cultural heritage. Güdül received the title of the first Cittaslow in the Central Anatolia Region, with its traditional houses located within the urban conservation area, prehistoric caves carved into rocks, Mzinos City, and Sorgun Pond. This study includes an examination and analysis of traditional settlement characteristics, traditional material and construction techniques, and plan schemes of Güdül. The study involves a literature review on Turkish houses and Güdül as well as documentation studies on building elements, construction techniques, and building materials in the field. The historical settlement and traditional houses of Güdül have been mostly protected from the rapid changes caused by tourism and the traditional settlement texture has been preserved to a great extent. However, the number of deterioration and destruction of houses in traditional settlements has been increasing recently, especially due to migration to Ankara city center, fire and neglect. This study aims to document the unique examples of traditional housing in Güdül before they disappear and to shed light on the intervention decisions that will be taken in the future for their preservation.
Keywords: Güdül, Traditional architecture, traditional construction techniques, timber-framed system, traditional material.

1. INTRODUCTION
Eldem defines the Turkish house as a type of house that emerged and developed in Rumelia and Anatolia within the boundaries of the Ottoman Empire, maintaining its characteristic features for 500 years (Eldem, 1954). Kuban, on the other hand, describes the Turkish house as a housing type that has responded to the needs of the Turkish people for many years, shaped in form and plan according to the living culture of the traditional Turkish family (Kuban, 1975).

Arseven (1928) states that the Turkish house's most mature and classical form is in Istanbul and Bursa and defines Istanbul and its surroundings as the area where the classical Turkish house developed and pioneered other regions (Arseven, 1928). Koyunoğlu (1928) emphasizes that Turkish houses in western and eastern provinces show different types depending on factors such as traditions and climate. Koyunoğlu sees natural and geographical conditions as the reason for the differences between Ankara houses and houses in Istanbul and its surroundings (Koyunoğlu, 1928). According to Gabriel, the climate and materials are important factors in the various forms of the Turkish house in

Turkey, which has various climates and production areas (Gabriel, 1938). Eldem (1954), who shares the same view as Gabriel (1938), associates the regional differences and diversity that emerge in defining the Turkish house with factors such as materials and climate. Another issue that Eldem insists on is that the shape of the *sofa*[1] directly determines the type of the house (Eldem, 1954). Kafesçioğlu (1949) and Beken (1949) consider regional house culture in terms of materials, and they believe that different types of houses emerge in each region due to the impact of dividing Anatolia into different geographical regions on the plan and structural arrangements of houses (Kafesçioğlu, 1949; Beken, 1949).

Kömürcüoğlu suggests that the most mature form of the Turkish house is in Istanbul, but also states that Ankara houses have characteristics that reflect the Turkish character and spirit, just like in Bursa, Edirne, and Istanbul (Kömürcüoğlu, 1950). Aksoy (1962) drew attention to the cultural issue of the Turkish house for the first time by linking the data that shaped the Ottoman house in Anatolia to both the nomadic traces of the Turks and the cultures such as Mesopotamia, Hittite, Ancient Greek, and Byzantine in pre-Islamic Anatolia (Aksoy, 1962). Aksoy was also the first researcher to classify the Turkish house according to different climatic regions. He mentioned that Turkey is fundamentally divided into seven geographical climate regions, but in practice, it can be reduced to three climate regions due to common and similar data. Aksoy classified structures as stone, wood, and mud brick, stating that stone is used in the southeast, mud brick is used in the high inner plateaus, and wood is used in the Marmara and Aegean regions, and massive wooden structures can be found in the northwestern ends of northern Anatolia and the interior plateau with abundant forests (Aksoy, 1963).

Like Aksoy, Küçükerman argues that the origin of the Turkish house is related to "nomadic" Turkish traditions and expresses that the basic element of the *oba*[2] order is in the Anatolian Turkish house. Küçükerman believes that the different natural data of Anatolia, especially the climate, affect the formation of the structure. He says that the changes affecting the formation of the Turkish house are mostly seen in the relationships between rooms and common areas (sofa, *hayat*[3], courtyard) (Küçükerman, 1973). Although Küçükerman divides Anatolia into five regions, he explains these differences through three different regional examples like Aksoy. Many researchers, starting with Aksoy and continuing with Küçükerman in the 1970s, have examined the characteristic elements of the Turkish house in Anatolia, and have made classifications and definitions by attributing the resulting contrasts to factors such as climate and materials (Gökçe, 1983; Erpi, 1991)
Kazmaoğlu and Tanyeli state that the main element affecting the shaping of residential architecture is the socio-cultural structure, which results in the formation of two main regions caused by physical factors. These regions are classified as the "Region Reaching the Original Anatolian Synthesis" and the "Transition Area Region" (Kazmaoğlu and Tanyeli, 1979). Tanyeli and Kazmaoğlu's approach deviates from the traditional Eldem doctrine, implying that the Turkish house did not originate in a specific location and gradually diversified among regions, but rather each region derived its structure.

Kuban highlights that the housing architecture built using the *hımış* construction technique is the true representative of the Turkish age housing culture in Anatolia, dividing Anatolia into seven regions in terms of residential architecture (Kuban, 1982). The purpose of Kuban's classifications is to demonstrate the difficulty of approaching traditional regional housing in Anatolia with a concept such as the "Turkish house," and in later periods, he names the houses "Turkish-Life Houses (Türk-Hayatlı)" to overcome this difficulty (Kuban, 1995).

[1] The *sofa* is a common area between and in front of the rooms.
[2] *Oba* means the community of nomadic families living in tents, the people of tents.
[3] The place where the rooms are opened on the entrance or first floor of a traditional Turkish house, covered, facing the courtyard, and open on one or more sides is called "*hayat*".

There are many studies on Turkish houses at regional and urban scales. Hatun (1947) and Karpuz (1984) studied the houses in Erzurum, Tomsu (1950) the houses in Bursa, Kömürcüoğlu (1950), and Akok (1951) the houses in Ankara, Akok (1951) the houses in Trabzon, Akok (1953) the houses in Çankırı, Çakıroğlu (1952) the houses in Kayseri, Erginbaş (1954) the houses in Diyarbakır, and Özgüner (1970) the houses in Eastern Black Sea. If the examined houses do not comply with the typology studies conducted, this is attributed to the effect of climate and materials (Sakaoğlu, 1978; Sözen and Eruzun, 1992; Ayan, 1997).

Cerasi (1998) researched the formation of Ottoman house types, and their relationships with neighboring cultures, and analyzed them comparatively, opposing attempts to explain the formation of these house types based on national borders, climatic conditions, and ethnic differences. The "core region" defines the center of this house type that spans a very large geography including Anatolia, Rumelia, and the Balkans. This core region covers the same area as the "Region that Reached the Original Anatolian Synthesis" defined by Kazmaoğlu and Tanyeli but extends to the Balkans, northern Greece, and the western coasts of the Black Sea.

Asatekin (2005) examined typologies on Turkish houses that have been developed based on the spatial element called *sofa* and the grouping based on the position of rooms (Eldem, 1954; Küçükerman, 1973; Eruzun, 1989; Kuban, 1995), grouping based on regional characteristics (Eldem, 1984; Bektaş, 2001; Kuban, 1975; Sözen and Eruzun, 1992), and grouping based on construction techniques and materials (Eriç, 1979; Günay, 1999; Kuban, 1975; Aksoy, 1963). Asatekin emphasized that due to the coexistence of cultures belonging to different religious and ethnic roots within the Ottoman Empire, the classification of these houses cannot be based solely on Turkish identity characteristics and therefore sought a new method. She analyzed the architectural relationships in the third dimension according to activity patterns developed from family/housing relationships to generalize (Asatekin, 2005). Tuztaşı, who conducted studies on the confusion between the terms "Turkish House" and "Ottoman House," compared different perspectives on Turkish houses and emphasized that the common point among these perspectives is culture (Tuztaşı, 2010).

There are studies on Turkish houses in future periods as well (Sağıroğlu, 2017; Yağcı and Mazlum, 2015; Güçhan, 2018). Yağcı and Mazlum examined the value and preservation issues of wooden traditional houses in Istanbul, Güçhan explored the history and construction techniques of traditional Ottoman wooden houses, and Sağıroğlu studied the characteristics of rural settlements in Akseki Bucakalan Village and the construction techniques of houses in this area. However, there is no study on the traditional houses of Güdül, which is the subject of this study, except for the Master's Thesis by Ayaz (2010), which examines the historical urban fabric of Güdül, the Master's Thesis by Celen (2019) on the construction techniques of the houses in Güdül, and the article prepared by Altınsoy et al. on the structures with log facades in Güdül.

This research examines thirty-four surviving traditional houses in Güdül in terms of their plan and facade features and construction techniques (Table 1). It is believed that this study will provide important data for the preservation of these houses and future intervention decisions and may serve as a fundamental resource. The most important feature of the selected structures is that they reflect the characteristics of Güdül's regional architecture and continue to maintain their originality to a significant extent. The study begins with a literature review of Güdül and continues with the examination of sample structures located within the Güdül urban conservation area.

Table 1. List of houses examined.

INVENTORY NUMBER	ADDRESS	FACADE
ENV 1	Yeni Neigbourhood Yediler Street No:2-4	
ENV 2	Aşağı Neigbourhood Çınarlı Street No:6	
ENV 3	Aşağı Neigbourhood Bayraktarçeşme Street No:5	
ENV 4	Emirler Neigbourhood Yağcılar Street No:4	
ENV 5	Emirler Neigbourhood Meydan Street No:26	
ENV 6	Yukarı Neigbourhood Gençlik Street No:20	
ENV 7	Emirler Neigbourhood Sarayönü Street No:4	
ENV 8	Emirler Neigbourhoodi Ağaçeşme Street No:19	
ENV 9	Emirler Neigbourhood Yağcılar Street No:2	

INVENTORY NUMBER	ADDRESS	FACADE
ENV 10	Emirler Neigbourhood Derebaşı Street No:30	
ENV 11	Yeni Neigbourhood Ordu Street No:24	
ENV 12	Emirler Neigbourhood Başöğretmen Street No:12	
ENV 13	Yeni Neigbourhood Yediler Street No:10	
ENV 14	Yeni Neigbourhood Mithatpaşa Street No:3	
ENV 15	Emirler Neigbourhood MeydanStreet No:41	
ENV 16	Emirler Neigbourhood Ağaçeşme Street No:8	
ENV 17	Emirler Neigbourhood Ağaçeşme Street No: 6	
ENV 18	Emirler Neigbourhood Ağaçeşme Street No:1	

Table 1. List of houses examined (cont.)

INVENTORY NUMBER	ADDRESS	FACADE
ENV 19	Emirler Neigbourhood İnkılap Street No:34	
ENV 20	Emirler Neigbourhood İnkılap Street No:28	
ENV 21	Emirler Neigbourhood Yağcılar Street No:20	
ENV 22	Aşağı Neigbourhood Gökmen Street Cavide Gökmen House	
ENV 23	Yukarı Neigbourhood Yenipınar Street No: 12	
ENV 24	Emirler Neigbourhood İnkılap Street No:36	
ENV 25	Emirler Neigbourhood Derebaşı Street No:32	
ENV 26	Emirler Neigbourhood Bayraktar Çeşme Street No:4	

INVENTORY NUMBER	ADDRESS	FACADE
ENV 27	Yukarı Neigbourhood Karaman Street No:13	
ENV 28	Yukarı Neigbourhood Albayrak Street No:24	
ENV 29	Emirler Neigbourhood Meydan Street yada Tiftikçi Street No:2	
ENV 30	Emirler Neigbourhood Hamamönü Street No:5	
ENV 31	Aşağı Neigbourhood Bayraktar Çeşme Street No:33	
ENV 32	Aşağı Neigbourhood Büyükbaşı Street No:2	
ENV 33	Aşağı Neigbourhood Çınarlı Street No: 2/A Mustafa Rakım Tekin Evi	
ENV 34	Emirler Neigbourhood Meydan Street No:24	

2. HISTORY OF GÜDÜL

Güdül, which is in the northwest of Central Anatolia and is connected to Ankara, is 82 km away from the capital. It is surrounded by Çamlıdere to the northeast, Kızılcahamam to the east, Ayaş to the southeast and south, Beypazarı district to the west, and Bolu to the north (Figure 2). The region where Güdül is located is a transitional zone between the mountainous and forested areas of the Black Sea region and the hills of Central Anatolia (Kaplan, 2005: 10-13).

Figure 1. General view of Güdül (URL 1)

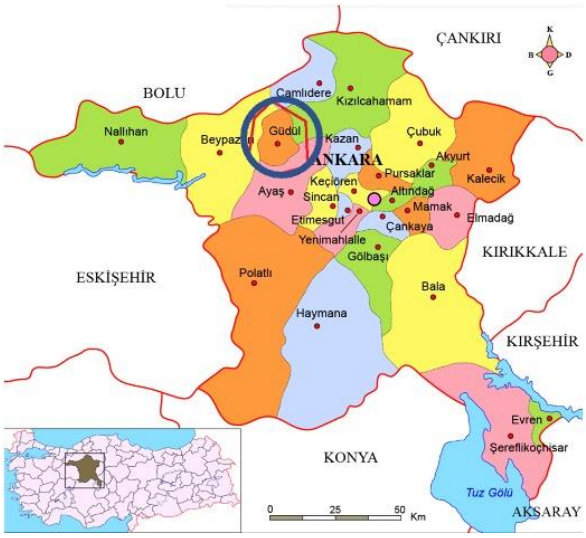


Figure 2. The map of Güdül (URL 2)

Archaeological studies conducted in an area of 60 km2 around Ankara indicate the existence of prehistoric life (Aydın et al., 2005). Ceramics found in the village of Güneyce, which is connected to Güdül, show that this region was a settlement during the Early and Late Bronze Ages. Ceramics belonging to the Iron Age were found in the village of Sarıkaya, located west of Güneyce. Roman-period ceramics were also found in the same area (Omura, 1996).

Due to its geographical location, Güdül is situated on a topography suitable for water and agriculture-based economic activities. For this reason, it has been used as a settlement since ancient times (Sırakaya, 1993). Research shows that the settlement around Güdül dates to 3500-3000 BC. There are areas considered Hittite settlements along the slopes of the valley, including areas carved into rocks along the Kirmir Stream (Sırakaya, 1993). An archaeological area with carved spaces dating back to the Hittite period was discovered in the village of Kamanlar, 4 km north of the present settlement (Kiper et al., 1997a). After the Hittites, the region was inhabited by the Phrygians until the 8th century BC. Later, it remained within the boundaries of the Bithynia Kingdom (Kaplan, 2005).

The area located 2 km north of Güdül, known as the In-Önü Caves, resembles a village with a church and another living area at its center. The walls of these caves feature signs specific to Roman-era Christians. These caves, like the Ürgüp-Göreme caves in Central Anatolia, were places where Christian monks lived during the Byzantine period. Stones, animal figurines, and pottery found in archaeological research conducted in Güdül and its villages indicate that the area was settled by the Byzantines after the Roman period (Kaplan, 2005). A similar settlement is seen in the village of Yeşilöz, located 8 km north of

Güdül. There are underground passages between the caves in Yeşilöz and Güdül (Kiper et al., 1997a).

Ankara and its surroundings came under the control of the Anatolian Seljuks after the Battle of Malazgirt (1071). Güdül was founded in the first half of the 12th century by Şehabüldevle Güdül Bey, who was the brother-in-law of I. Mesut (Kaplan, 2005). In the early years of the Ottoman Empire, this area was the fief (tımar) of "Binari Bey", "Turasan Bey", and "Paşacık Bey". Additionally, some important members of the *Ahi*[4] organization also owned property in this area. In 1496, Sultan II. Bayezid prepared a *vakfiye*[5] (foundation charter) for the *külliye* in Amasya, and the villages of Yeşilöz and Hacılar, which are now part of Güdül, were included in this *vakfiye*. Furthermore, a foundation charter dated 1530 refers to Güdül as a village in the Ayaş district. There are two more foundation records from the same year that mention Güdül and its surroundings (Erdoğan, 2008). Settlements developed in Güdül and its surroundings with the construction of two bridges over Kirmir Stream, and new farms were established. Over time, the population of Güdül increased, and as a result, forest areas were cleared to create cultivated fields, and agriculture began to be practiced in these areas. In addition to these developments in the 16th century, transportation, commercial activities, and animal husbandry also developed (Sırakaya, 1993). According to the population census conducted in 1831, Güdül was the largest village in the Ayaş district (Tunç, 2018). The Güdül Municipality was established in 1903 during the Ottoman period. During the Republic era, it was a sub-district of Ayaş, and on September 1, 1957, it became a district with the law numbered 7030 (Tunç, 2018). The first Master Plan prepared by Nazif Sohtaoğlu for Güdül was approved by the Ministry of Construction and Settlement in 1971. The Master Plan approved in 1980 was revised in 1990 due to the population reaching 7,650 (Kiper et al., 1997a). Due to population growth and development that was incompatible with the prepared plans, Güdül Municipality applied to the İller (Provincial) Bank in 1996 to prepare a new Master Plan (Kiper et al., 1997b).

With the decision numbered 4705 and dated June 27, 1996, Güdül was declared an "Urban Site" by the Ankara Cultural and Natural Heritage Preservation Board under the Ministry of Culture. A part of the Aşağı Neighborhood, the Emirler Neighborhood, and the Yukarı Neighborhood make up the urban site area, and the traditional urban fabric and settlement center are located in this area. With the decision numbered 6 and dated July 30, 1996, the construction of the Conservation Plan was given to the Iller Bank. According to this plan, decisions were made at the building scale regarding the use of natural data, land use and transportation systems, population, and density. The additional-revised and conservation plan at a scale of 1/1000 was approved by the Iller Bank in 1997, and the conservation plan at a scale of 1/500, prepared by Kiper and his team, was approved in 1998. During the one year until this plan was prepared, transitional development conditions were followed, which were not clearly defined. Although these unclear conditions continued in the conservation plan, some new provisions were introduced in the conservation plan (Kaplan, 2005). In the conservation plan for the urban site area at a scale of 1/500, registered structures within the conservation area, structures that will be renewed while preserving their location and facade characteristics, facades to be preserved, facades to be renewed, trees to be protected, and cobblestone streets that may be opened to vehicle traffic if necessary were determined. With a project conducted jointly by Güdül District Governorship and Güdül Municipality and support from the Ministry of Culture and Tourism, simple repairs were made in about 30 buildings with traditional architectural features located within or on the periphery of the urban conservation area as of December 2005, and all buildings were painted white, while wooden elements on facades were painted brown. In April 2006, all roads within the conservation area were paved with cobblestones by the provisions of the conservation plan.

[4] *Ahilik* is a tradesman solidarity organization founded by Ahi Evran with the advice of Hacı Bektaş-ı Veli.
[5] A *vakfiye* (foundation charter) is a document that shows that the endowment gave his/her property and that includes the judge's decision on the foundation.

3. ANALYSIS OF TRADITIONAL HOUSES IN GUDUL

In this study, thirty-four traditional houses located in the center of Güdül were examined in terms of their plans, facade features (such as the number of floors, projections, etc.), and construction techniques. Thirty-two of these buildings are located within the urban conservation area, while two are located outside the conservation area (Figure 3).

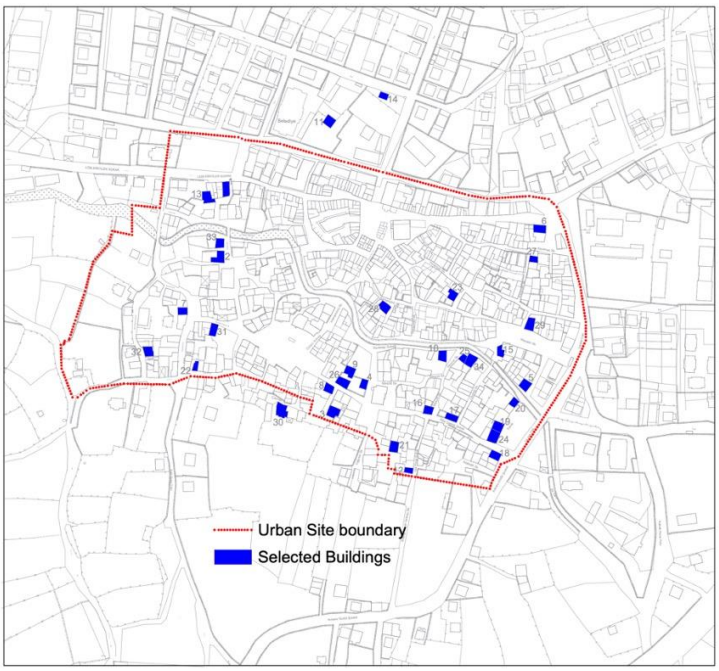


Figure 3. Map showing the location of the studied houses

The settlement of Güdül center consists of four neighborhoods: Yeni Neighborhood, Aşağı Neighborhood, Emirler Neighborhood, and Yukarı Neighborhood (Figure 4). After the fire in Emirler Neighborhood in 1952, some parts of the traditional settlement were damaged, and the Yeni Neighborhood developed on the north side of the traditional settlement (Kaplan, 2005). In the traditional fabric of Güdül, roads reflect the regional characteristics of the period and are tightly connected to the function as well as the neighborliness and landscape factors in an organic structure. In some places in this fabric, streets narrow down to two meters, and in some places, they expand to form an organic square (Figure 5). The wall and square fountains, and upper floor projections that integrate with cherry, mulberry, and plum branches that protrude from garden walls, create a strong street landscape and a rich street appearance.

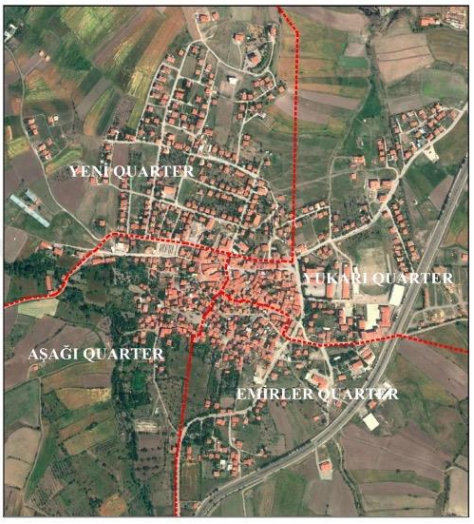


Figure 4. Four neighborhoods (quarters) in the central of Güdül (Celen, 2019)

Figure 5. Street and square images from Güdül

3.1. Plan and space features

Traditional Ottoman houses built in the 17th century were constructed within a courtyard surrounded by high walls, considering privacy issues. By the second half of the 18th century, houses were placed along the street. In later periods, the entrances of the houses were provided directly from the street instead of the courtyard (Şahin & Karakul, 2016). According to Ayaz's (2010) master's thesis, the building plot relationship is mainly divided into two main groups: houses built on plots with gardens and houses built on plots without gardens (Ayaz, 2010).

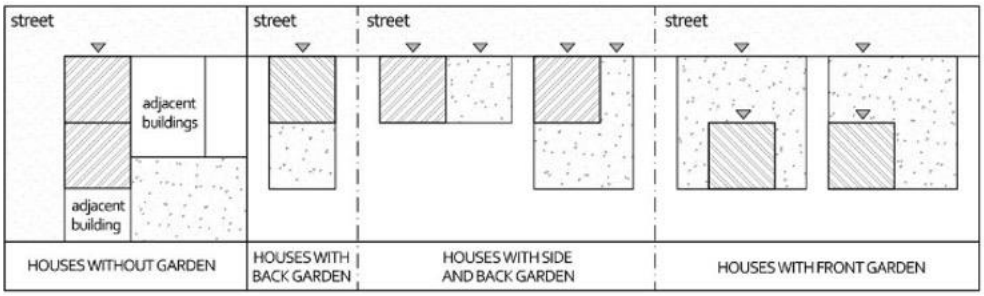


Figure 6. Relations between parcel and buildings (based on prepared by Ayaz 2010 and Celen 2019)

Most of the houses within the historical area of Güdül are entered directly from the street. The double-winged wooden door on the front facade leads to the *taşlık* (stone-paved area) on the ground floor. The flooring of this area is made of stone in its original form. Most of the houses examined in this study do not have a direct relationship with a courtyard or garden. Houses with backyards have an exit from the *taşlık* area to the garden.

Traditional houses in Güdül generally consist of an entrance floor, a mezzanine (intermediate) floor, and a living floor/floors. The entrance floor contains spaces such as a stable, a hayloft, and a storage area. Depending on the size of the building, one or two rooms are opening to the *taşlık* area. One of these rooms is called *dam* and is used as a stable, while the other room, called the hayloft, is used for storing hay and other materials. In some houses, the mezzanine floor is reached from the ground floor by a staircase (Figure 7). The mezzanine floor contains spaces such as a winter room, a kitchen, and an employee room. In some buildings, the mezzanine floor is only used as a transition space (Kiper et al. 1997b). There are fewer openings on the ground floors of traditional houses compared to the upper floors. In some examples of Güdül houses, especially the ones with intermediate floors, there is a wooden or iron-railed window opening above the entrance door for ventilation and lighting purposes.

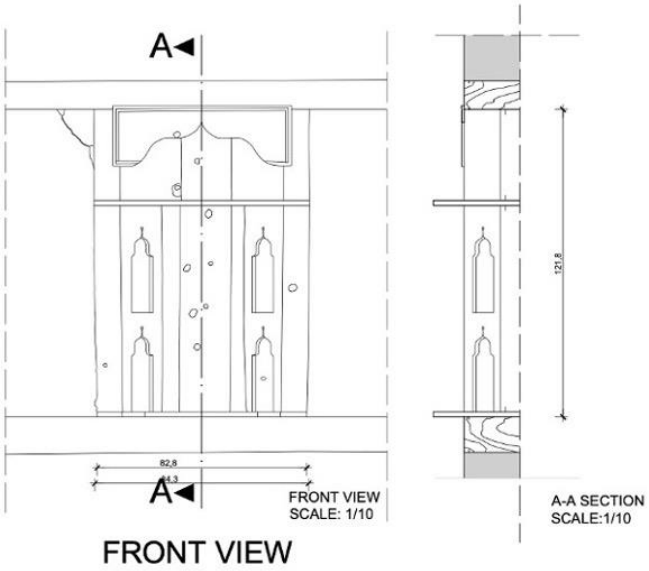
Figure 7. Ground and mezzanine floor

The upper floors are more expanded with projections and have higher ceiling heights than the lower floors. Because wood is a material that is suitable for leaving gaps and is easily modular, the upper floors are spaces that are illuminated with numerous windows and open to the street. The *sofa,* which is the most important space on the living floor, is used for both circulation and living purposes. There are examples where niches and fireplaces are located on one wall of the sofa*. Sedir*[6] has been built in front of the windows facing the street (Figure 8). On one side of the *sofa*, there are service areas with a toilet, a sink counter, and wooden shelves. Rooms can have different sizes and architectural elements. In at least one or two of the rooms on the upper floor, there is a fireplace in the stone wall. There are niches or cabinets on both sides of the fireplace (Figure 9-10). In one or two rooms, one wall is covered with a wooden cabinet called a *yüklük*. There are ablution areas (*gusülhane*) and various storage areas inside this cabinet (Figure 11). In some rooms, there are window openings on the walls facing the *sofa* for light and visual communication. These windows are also intended to heat the *sofa*. In some houses, there is a guest room, which can be described as the *başoda* (master bedroom), adorned with wooden bars on the ceiling, and gypsum moldings, and is the most glamorous among the other rooms in the house. In three-story examples, there is another living area instead of an intermediate floor, depending on the users' needs.

Figure 8. *Sedir* examples in rooms and *sofa*

[6] In old Turkish houses, it is a fixed, high-floor seating item, usually made of wood, adjacent to the wall.

Figure 9. Niche and fireplace examples



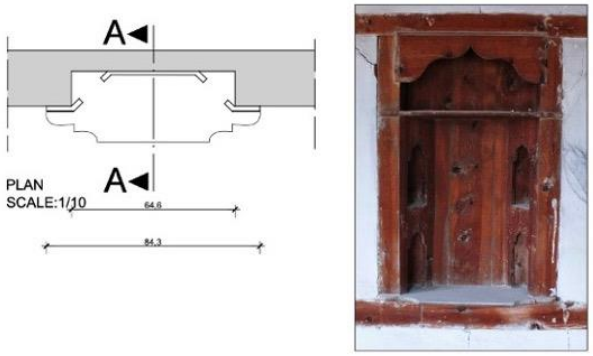


Figure 10. Drawing an example of a niche in one of the houses

Figure 11. Wooden cabinet examples

In traditional Güdül houses, the ceilings in the upper floor rooms and *sofas* are generally wooden, and various ornamentations can be seen on these ceiling coverings. Wooden panels with a thickness of 2-2.5 cm, a width of 10-30 cm, and up to 200 cm in length are used in the ceiling coverings. Wooden slats with a width of 4-5 cm are used with the wooden panels on the ceilings. In some examples, decorative elements called *göbek* (wooden hubs) in different colors and forms can be found in the center of the ceiling (Figure 12). The ceilings on the ground floor are generally not covered and the floor joists are left exposed (Figure 13). The floors on upper floors are covered with wooden panels. In some examples, a thin layer of soil and straw mixture was spread over wooden panels in one of the rooms on the upper floor to provide insulation and then covered again with wood. Larger houses have more ornate ceilings and decorative architectural elements compared to smaller ones.

Figure 12. *Ahşap göbek* (wooden hub) examples

Figure 13. The ceiling of the ground and mezzanine floor

The upper floor consists of a sofa and surrounding rooms. The upper floor *sofa* is located on top of the *taşlık* ground floor. According to Ayaz's (2010) master's thesis, based on Eldem's work on Turkish houses, there are four types of floor plan schemes for the upper floor *sofa* and rooms in traditional Güdül houses. In the *outer sofa* plan type, the rooms are either arranged along one side of the sofa or surround the sofa from two or three sides. In the *inner sofa* plan type, the rooms are located on two opposite sides of the *sofa*. One wall of the *sofa* is a solid masonry wall used for service purposes, while the other wall has large openings facing the street. In addition to these two plan schemes, there is also a *center sofa* plan type, where the rooms are located at the four corners of the sofa. As a fourth plan scheme, Ayaz describes examples with narrower sofas as a corridor plan scheme. Of the 34 structures studied, 23 were identified as having an *inner sofa* plan type, 8 as an *outer sofa* plan type, and 3 as the atypical plan type named by Ayaz (2010) as corridor plan type (Figure 14, Table 2). As noted by Karakuş & Çalışkan (2022), the socio-economic and socio-cultural structure of the family living in the house is more influential in shaping the floor plan typology.

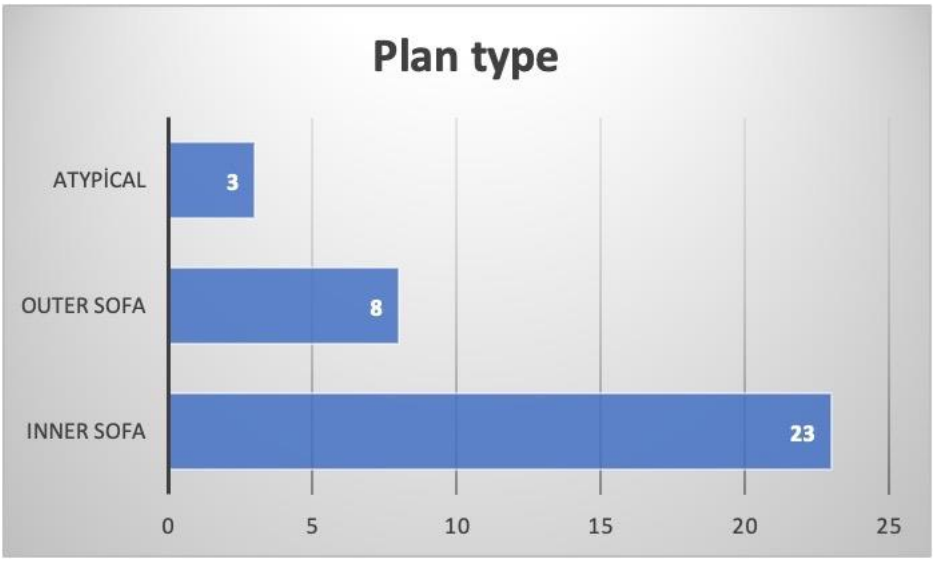
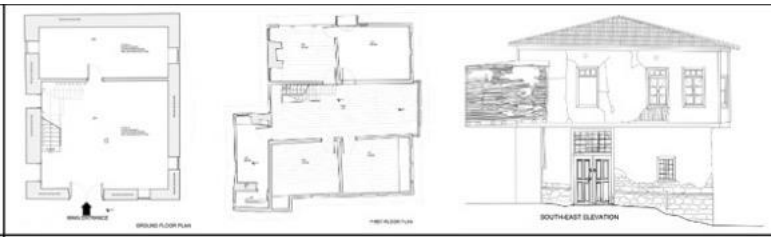
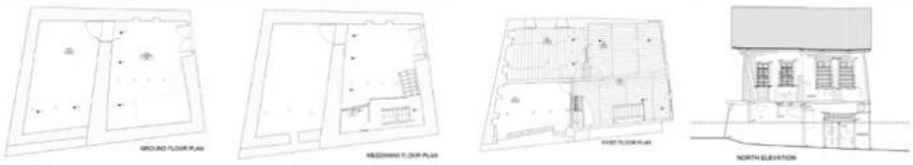
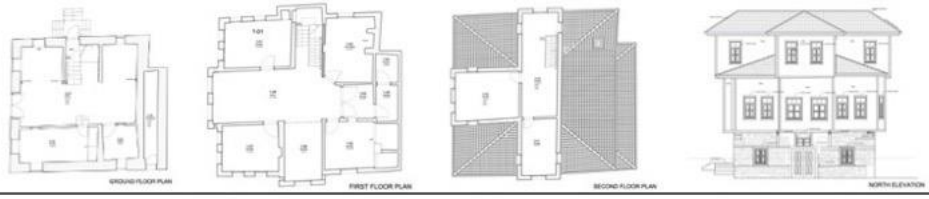
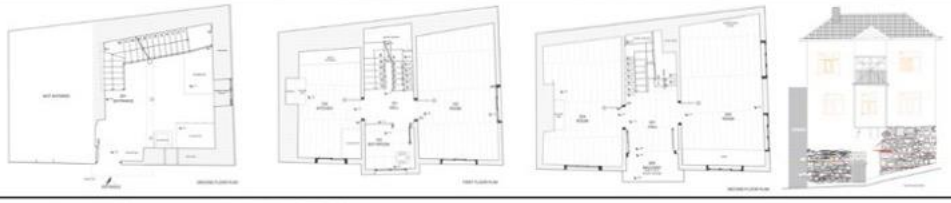
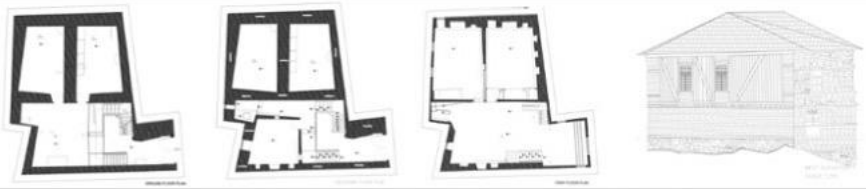


Figure 14. Distribution of houses by plan types

Table 2. Plan and facades of traditional houses examined[7]

[7] Some of the projects of the buildings were drawn within the scope of Architectural Survey course at Ankara Yıldırım Beyazıt University and some of them were prepared with the help of Ayaz's (2010) master's thesis.

Table 2. Plan and facades of traditional houses examined (cont.)

ENV 9	
ENV 10	
ENV 11	
ENV 12	
ENV 13	
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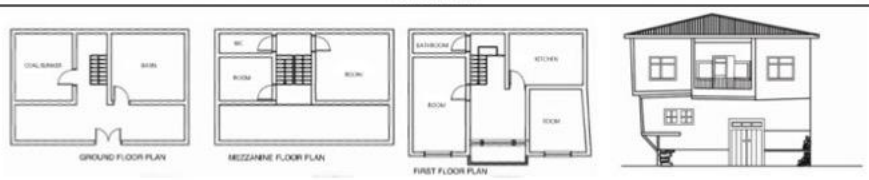
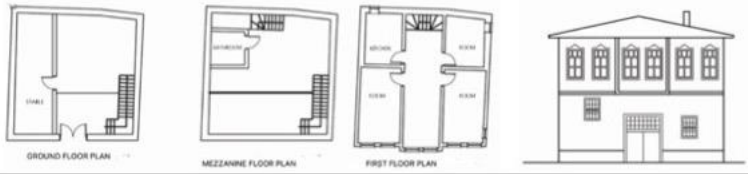
ENV 15	
ENV 16	
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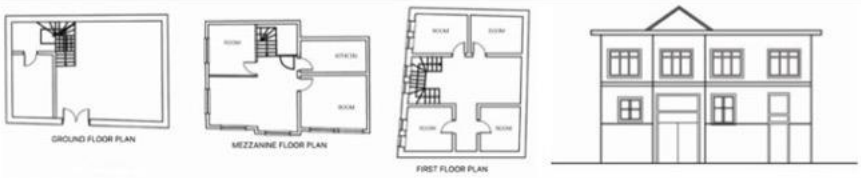
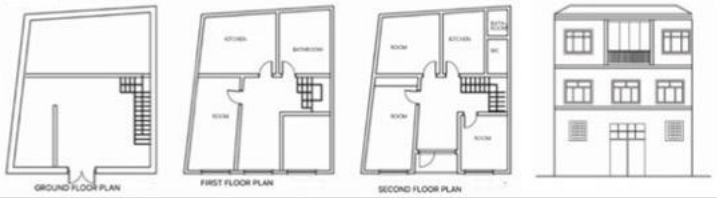
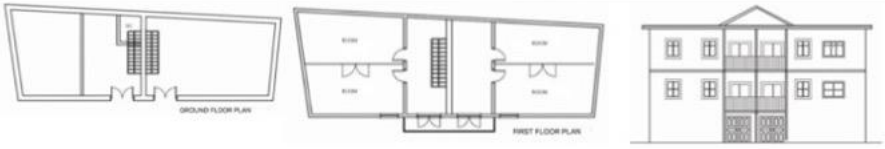
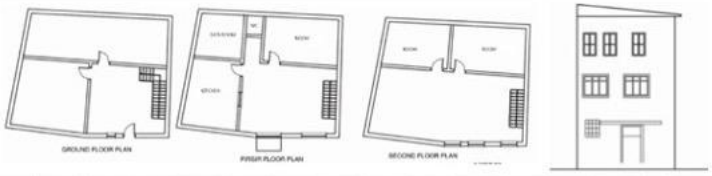
Table 2. Plan and facades of traditional houses examined (cont.)

ENV 18	
ENV 19	
ENV 20	
ENV 21	
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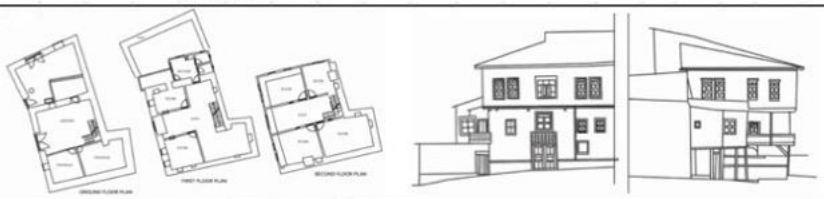
ENV 23	
ENV 24	
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ENV 26	

Table 2. Plan and façades of traditional houses examined (cont.)

3.2. Construction techniques

The traditional timber-framed houses in Anatolia are mostly built with a hybrid construction technique called *hımış*. These houses consist of three main parts: a stone foundation and ground floor, a timber-framed section, and a wooden roof (Şahin, 1995; Şahin Güçhan, 2007; Şahin Güçhan, 2018). Masonry stone is used in the foundation and ground floor walls, which are defined as the base. Although it is known that the examined houses have

stone foundations, precise information about their foundation systems cannot be provided. In six of the examined houses, the filling material of the timber-framed system is wood. In one building, the filling material is brick, and in others, it is mud brick. In the scope of the study, the wall types seen in traditional Güdül houses were examined in detail.

3.2.1. Masonry stone walls: Above the stone foundations, the load-bearing walls are constructed of masonry stone up to at least 50 cm above the exterior ground level. In some examples on sloping lands, masonry stone walls 200-250 cm above the ground level are observed on the ground floors (Figure 15). The masonry stone walls were built using rough stone or rubble stone. Large-sized stones were used on the outer walls of the wall and the spaces between them were filled with mud mortar or small stones. In most of the examples, the ground floor walls are 70-85 cm thick, and on sloping terrains, the wall thicknesses are between 85-110 cm. When the wall height reaches between 100-170 cm above the interior floor level, a wooden lintel with a cross-section of 10-15x8x10 is placed. In some buildings, the stone walls were plastered, while in others they were not.

Figure 15. Examples of masonry stone walls

3.2.2. Masonry mud brick walls: The tops of the masonry stone walls on the ground floors, the load-bearing walls on the upper floors, the common walls with the neighboring buildings, and the service walls with architectural elements such as hearths and load-bearing shelves were built of masonry mud brick with wooden beams (Figure 16). Whole and half mudbrick blocks were used in different arrangements in the masonry (construction) of the mudbrick walls. Mud mortar was used between the mudbrick blocks as binding material. The outer walls constructed with masonry mudbrick vary between 70-90 cm and the inner walls between 50-70 cm. The masonry mudbrick walls were built with wooden beams placed on both sides of the wall. Above the wooden beams, there are tie beams perpendicular to the beams to connect the beams. The mudbrick walls were plastered with mud mortar and whitewashed.

Figure 16. Examples of masonry mud brick walls

3.2.3. Timber-framed walls: In traditional Güdül houses, except for the service walls on the upper floors and the common walls with the neighboring buildings, the exterior walls of the upper floors and most of the interior walls are timber-framed systems. The timber-framed system consists of a main timber frame system and the infill material that fills this frame. The main elements of the frame consist of horizontal elements (piers and wall plates), vertical elements (posts), and diagonals. Walls in timber-framed systems are divided into three groups in terms of the material used and construction technique:

- Timber-framed system with timber infill: In this system (Öztank, 2010), besides the main elements of the frame, uprights, beams, and struts, wooden elements in horizontal and vertical directions are also used as filling material to form the wall surfaces (Figure 17). In this case, the timber elements used as filling material in the vertical direction also serve as secondary load-bearing elements such as uprights. In some examples of this type, where the timber-framed wall is built on a ledge, a floor beam, which is also used as a footing for the frame, is sometimes placed under the wall, and vertical timber infill elements are placed on this beam.

Figure 17. Examples of timber-framed systems with wood infill

- Timber-framed wall with mud brick or brick infill: In this wall type, the gaps between the load-bearing elements of the frame are filled with mud brick or brick and the binding material is mud (Figure 18). Depending on the distance between the two load-bearing elements, the brick blocks are placed in a single row or two rows in opposite directions.

Figure 18. Examples of timber framed systems with brick and adobe infill

- Timber-framed wall filled with rubble stone and mud plaster: This type of timber-framed wall is used on both ground and upper floors. In this system consisting of foot (base) boards, wall boards, wooden posts, wooden slats nailed on the posts, adobe, rubble stone, and mud mortar are used as filling materials.

3.3. Facade features

The traditional houses of Güdül generally consist of a ground floor, a mezzanine, and a living floor. While some buildings have a single living floor, some buildings have two living floors. Of the 34 buildings analyzed, one consists of basement + ground floor and first floor, two consist of ground floor + mezzanine and two living floors, nine consist of ground floor + mezzanine and first floor, sixteen consist of ground floor + first and second floor, and five consist of a ground floor and first floor (Figure 19). The main element that determines the facade typology in Güdül is the projections. Apart from this, doors and windows are other important facade elements.

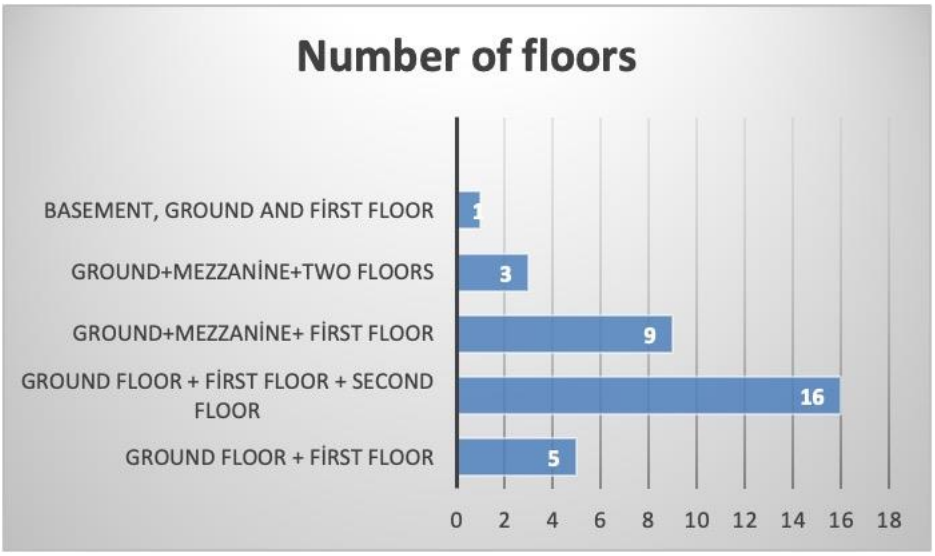

Figure 19. Building distribution by number of floors

3.3.1. Doors

As stated by Yıldırım (2006), "the entrance door, which accesses the house from the street and initiates the relationship between inside and outside, has a special position in the building symbolically in terms of both passage and control function (Yıldırım, 2006). The doors of the analyzed houses are generally single or double-winged. The double-leafed one of these doors, which has simple details or a few ornamental elements, opens onto the *taşlık* (Figure 20). In some houses, windows with wooden lattice or iron bars were used above the door to ventilate the *taşlık* and provide natural light (Figure 21). Single-leaf doors open to the staircase leading to the living floor (Figure 22). There are also examples of single-leaf doors with windows above the door with elements such as lattice and iron bars.

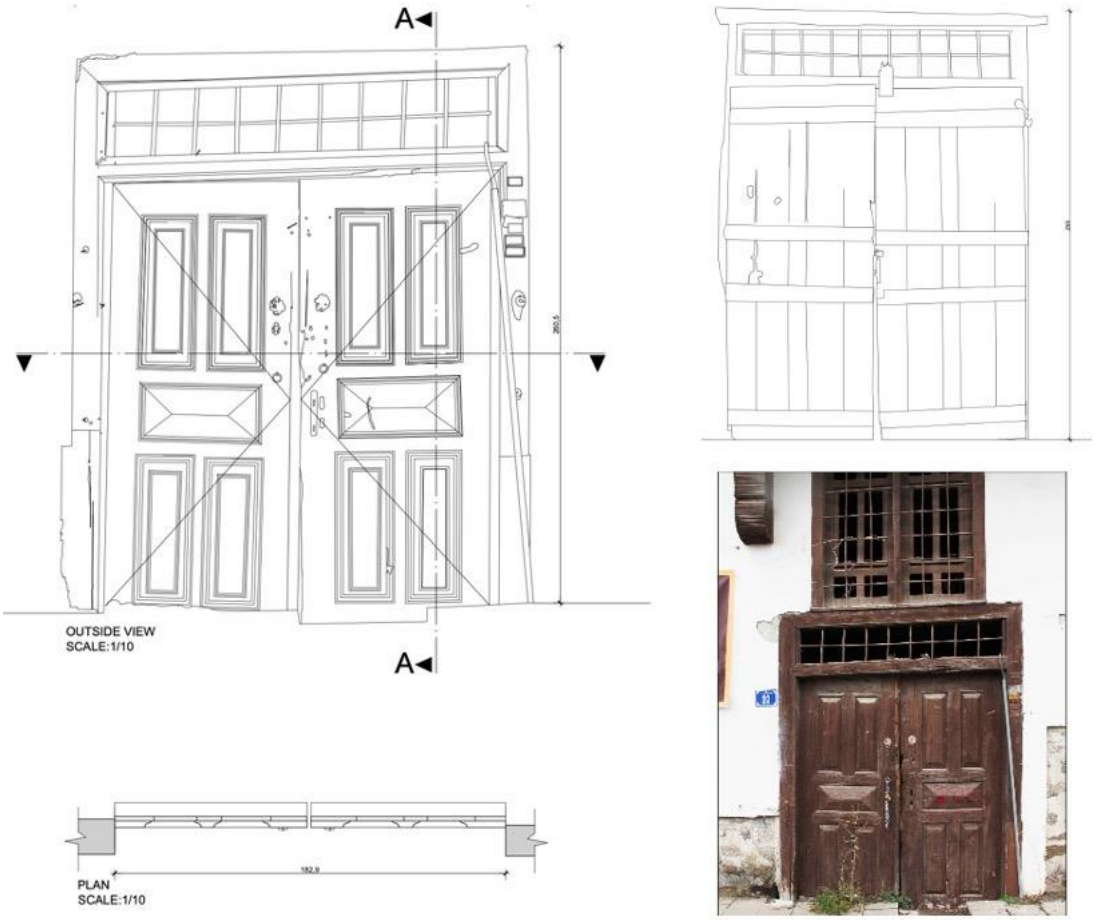

Figure 20. Drawing of an example of an entrance door in one of the houses

Figure 21. Examples of wooden entrance doors and over-door lighting

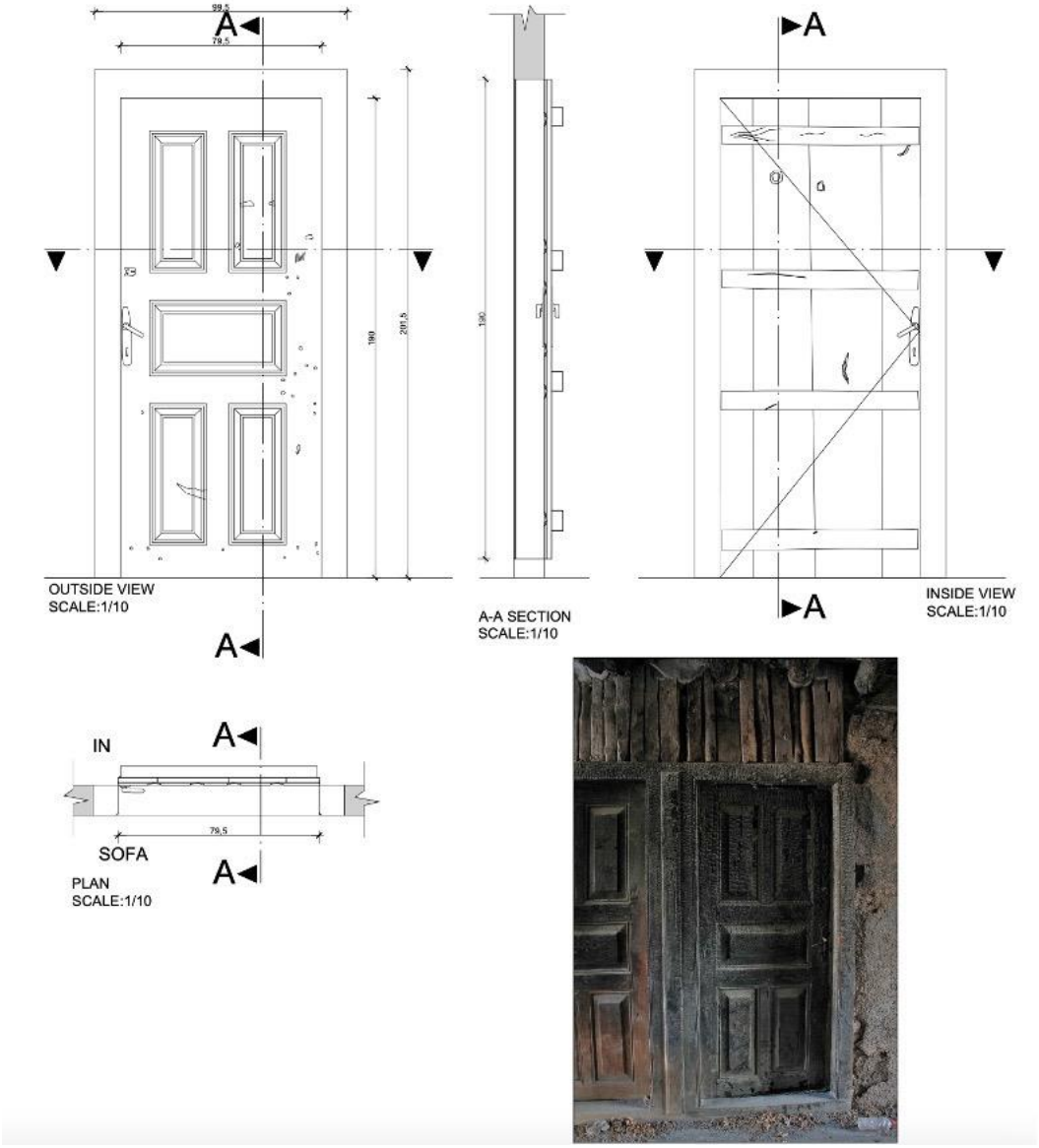

Figure 22. Drawing of an example of a single-leaf door

3.3.2. Windows

Windows are architectural elements that ventilate the spaces in traditional houses, opening them to light and view, and significantly affecting the character of the facade. The windows in the traditional houses in the study area can be analyzed in two groups: guillotine and casement (Figure 23). Guillotine windows are of two different types: arched and flat. Over time, some of the windows have been changed, the window openings have been enlarged and their proportions have been distorted.

Figure 23. Guillotine and casement windows

3.3.3. Projections:

Out of the 34 buildings in the study area, two have no projections, two have open projections (balconies), 21 have closed projections, and nine have both open and closed projections. Among the 32 buildings with projections, 11 have projections along the facade, four have projections along the facade and open projections, two have only open projections, nine have along facade projections and central projections (bay window), two have a bay window and balcony, and four have along facade projections and central or side bay windows/*cumba* (Figure 24-25).

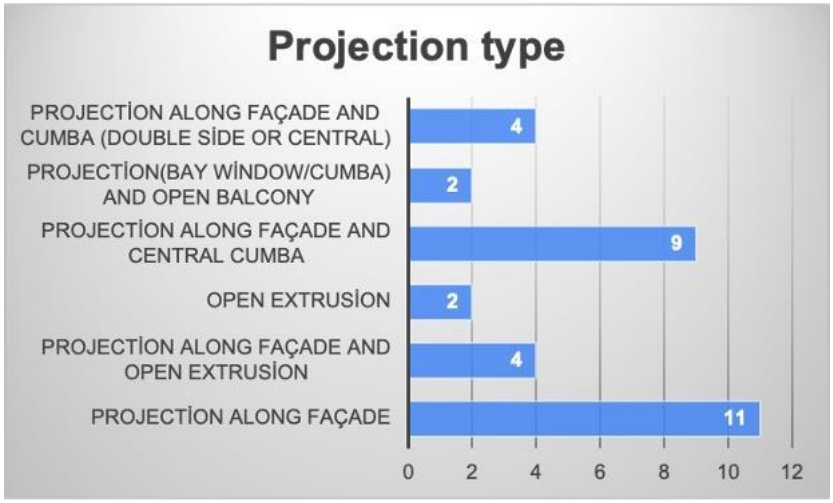

Figure 24. Building distribution depending on the type of projections

Figure 25. Projections along the façade and central bay window/cumba

Some of the wide projections on the simple brackets, and some on the embroidered consoles are features that reflect the traditional architecture of Güdül houses. In these houses, the projections are built as part of the wooden flooring structure. Projections are made on a part of the facade, the entire facade, or only on the corners. Rectangular projections are usually used to expand the space in the living room and to have a wider street view. Triangular projections, on the other hand, are used to provide rectangular spaces on upper floors when the walls of the ground floor follow the street and plot forms, and there are no right angles at the corners. There are three types of projections in the construction system in the working area:

- Simple projection: These types of projections are constructed by extending wall panels and the floor beams above them toward the street on top of the outer walls of the lower floor. The extension from the outer line of the wall varies between 30 cm and 75 cm.

- Bracket-supported projections: These projections are created by extending the beams and floor beams from the outer wall surface of the lower floor towards the street and supporting them with brackets placed diagonally underneath (Figure 26). The protrusion from the wall surface varies between 75 cm and 155 cm. Rectangular and square cross-sectioned wood is used in the brackets, with dimensions ranging from 10 cm to 14 cm. The brackets placed under the beams transfer the load to the load-bearing walls through wooden lintels. The upper part of the diagonal is placed in a groove on the beam and the lower part is nailed to the load-bearing wall through a wooden lintel.

Figure 26. Examples of bracket-supported projections

- Corbelled projection: In this type of projection, at least two rows of beams, including floor beams, are placed on top of each other so that they overlap (Figure 27). The upper row is projected about 20-35 cm away from the edges of the lower beams by placing a beam vertically on them. The total protrusion towards the street is between 70 cm and 150 cm from the outer surface line of the lower floor. Information about the connection with the load-bearing wall at the back is limited to details seen from the facade. The gaps between the beams on the facade are either left empty or covered with wooden panels.

Figure 27. Examples of corbelled projections

4. PROBLEMS of the BUILDINGS AND THEIR CURRENT CONDITION

Güdül being far from the main roads, its historical settlement and traditional houses have been mostly protected from the rapid changes caused by tourism, so the traditional settlement texture has survived to the present day to a great extent. However, there are some problems identified during the field studies:

- The number of buildings in poor condition, abandoned houses, and ruins in traditional settlements is increasing due to various reasons such as migration to nearby urban centers, fires, and neglect.

- With the changing living standards and livelihoods of the inhabitants, mass additions and changes are seen in traditional houses.
- It is very difficult to protect the original Güdül houses made of mud brick and wood, which are traditional materials, against the natural damages that occur over time. The loss of the original and highly protective plasters used in these houses has accelerated the wear and tear of materials such as wood and mudbrick, which are less resistant to destruction than stone.
- Güdül's location on a branch of the Silk Road enabled the development of trade in the district and its commercial power continued until recent times. However, after the 1960s, production, and trade weakened and as a result, people migrated especially to Ankara. Although chickpea production and *sof*[8] production, which once held an important place in the economy, are among the original commercial and cultural riches, these productions are disappearing in the face of competition and new products (Kaplan, 1995).
- Some buildings have been abandoned because they cannot provide minimum comfort conditions. Buildings that are used only during the summer months and those used as warehouses by people who own more than one house are damaged due to lack of maintenance. Some buildings are not used due to ownership problems that arose after the death of the original owner.
- The stream running through the urban protected area is the most effective natural resource in the area. The arrangement of its section through the site as a concrete channel reduces its impact as a landscape and natural element. In addition, garbage thrown into the streambed hurts the area.

5. CONCLUSION

Gudul's traditional houses contain important and unique examples in terms of floor plans, the relationship between the ground floor and the living floor, social life and sofa relationships, original construction techniques, and building materials. In these important structures of vernacular architecture, various problems, and deteriorations have occurred in recent years due to the migration to the city center of Ankara. It is important to provide financial and technical support to homeowners for the implementation of practices that ensure minimum comfort conditions in these buildings and for the repairs to be carried out in buildings where the plaster has fallen off and has become exposed to atmospheric conditions. Additionally, various practices for adaptable reuse should also be considered for both Gudul and the preservation of these houses.

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[8] *Sof* is a plain fabric woven from mohair wool with fine twisted yarn. Also known as Ankara Sofu

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