

## Study of Traditional Housing Typology, Lahori Mandi Bazar, Walled City Lahore, Pakistan

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Keywords	Abstract
Housing, Traditional, Typology.	<i>Traditional houses, serving as living archives of the past, predominantly make up the walled city of Lahore. Beyond their architectural significance, these dwellings encapsulate the socio-cultural norms, religious values, and lifestyles of the periods in which they were constructed. As such, they not only serve as residences but also as vital historical records, offering valuable insights into the cultural and urban evolution of the city. This study examines the typology of traditional houses in Lohari Mandi Bazar, Walled City Lahore. The research focuses on classifying these housing typologies based on size, architectural features, and spatial arrangements. It further investigates the interplay between architectural elements, climatic comfort, and the everyday lifestyles of inhabitants, highlighting their mutual influence. The study also analyzes the impact of historical periods—including the Sultanate, Mughal, Sikh, and British colonial eras—on housing design. Findings reveal that traditional housing principles prioritized ventilation, privacy, and craftsmanship, featuring intricate woodwork and masonry techniques. These principles may offer sustainable solutions to several contemporary challenges in modern housing.</i>

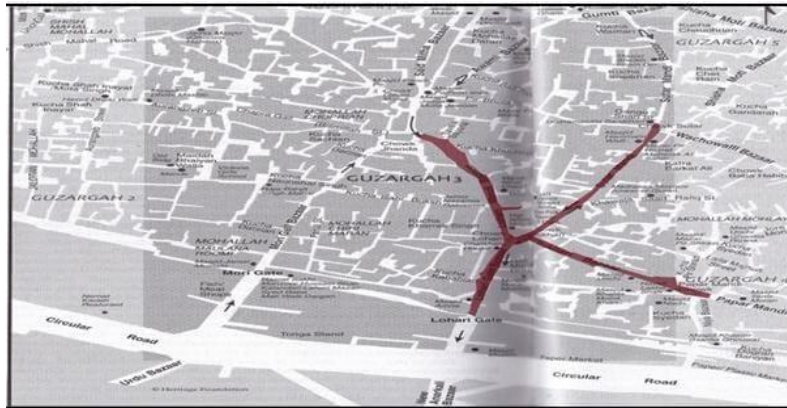
### INTRODUCTION

Housing is one of the basic human necessities in society. The way people live directly influences social structures and religious practices. Traditional housing from any era reflects the culture and norms of its people. By studying different living spaces, one gains insight into the architectural features and construction techniques of the time. House design involves not only physical aspects but also cultural values, social norms, and symbolic meanings (Erdoğan, 2017).

Lahore, the provincial capital of Punjab in Pakistan, is a historic city rich in culture and heritage (Ševčenko & Makhdom, 2009). The Walled City of Lahore possesses a unique urban character. Its dense structure and traditional houses reflect socio-cultural values from past eras (Ali & Qi, 2019). Traditional architecture here is a cultural product closely linked to local customs and has been passed down through generations, including aspects of space, appearance, and decoration. The city's courtyard house typology fulfils important ecological, socio-cultural, and economic needs (Gulzar, 2017). Examples of these dwellings can be found in Lohari Mandi Bazar, accessible through the Lohari Gate of the Walled City of Lahore.

## Study Area

The Lohari Gate is the southernmost gate of the walled city of Lahore. This historic enclave features a mix of residential and commercial activities and serves as a useful case study of how traditional housing adapts to urban change (Ovais, 2016). Buildings from Chowk Bukhari to Lohari Mandi (Fig. 1) still exhibit signs of historical character. Many house facades display intricately carved wooden balconies, bukharchas, and tall entrances.



**Figure 1:** A Map Showing the Study Area. (Source: Authors)

The Walled City of Lahore Project (2009) documented many houses in the Lohari Gate area from a conservation perspective. They published both altered and present-day plans, showing that the ground floor is mostly occupied by shops and that an additional floor was added to the original structure (Ševčenko & Makhdum, 2009).

Research on the traditional housing of Lahore has largely been limited to some of the most famous havelis. A haveli is the regional term for a courtyard house. The word “haveli” (حویلی) is of Persian origin and denotes a grand mansion associated with status, wealth, and size (Qureshi, 2015). However, there is a gap in scholarship concerning a detailed study of the spatial organization and functions within ordinary traditional houses. This study aims to document the housing typologies found in the Lohari Gate area and to describe the various traditional house types, with a focus on spatial arrangement, architectural elements, shape, and size. It also provides an account of how traditional living patterns influence space formation and planning. Additionally, the study briefly discusses the materials, techniques, and craftsmanship of that era.

## Objectives

The primary objectives of this research are to analyse housing typologies in terms of special development, types of spaces, architectural elements, shapes, and sizes; to examine the relationship between traditional living patterns and their influence on spatial organization; and to investigate the passive design techniques employed in havelis to enhance thermal comfort.

## METHODOLOGY

This study adopts a qualitative research approach to examine the typology of traditional houses in Lohari Mandi Bazar, part of the Walled City of Lahore. The

methodology combines historical inquiry, field documentation, and spatial analysis. A sample of seven houses within a compact cluster was selected to capture variations in plan forms and architectural features within a dense urban fabric. The classification of housing typologies is based on size, architectural characteristics, spatial arrangements of rooms, thermal comfort strategies, and the everyday lifestyles of inhabitants, highlighting the interrelationships among these factors. The study aims to contribute to heritage conservation and provide insights for sustainable housing practices in historic urban contexts.

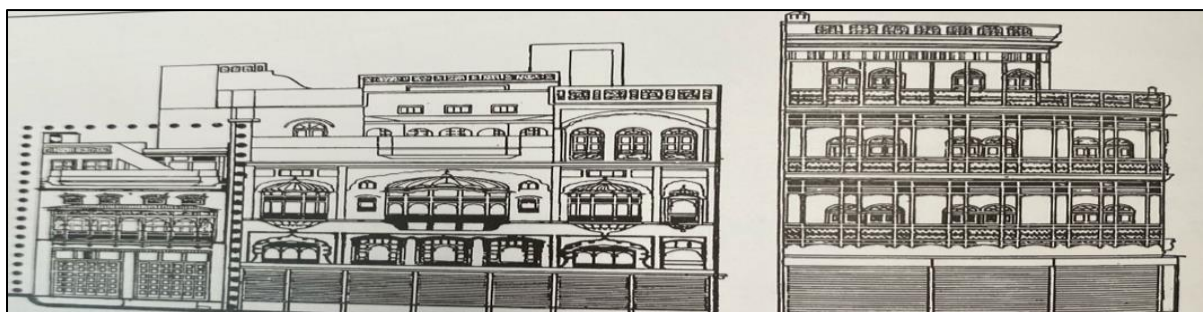
## FINDINGS AND DISCUSSIONS

The analysis of the selected houses in Lohari Mandi Bazar reveals a strong correlation between architectural form, spatial organization, and socio-cultural practices. Across all typologies, elements such as courtyards, jaalis, and jharokhas served both functional and aesthetic roles—promoting ventilation, thermal comfort, and privacy. The findings also indicate a clear adaptation to irregular plot configurations through inventive use of wall thickness and internal zoning.

**Housing Typology at Lohari Mandi Bazar:** The selected residential buildings retain traces of decorative elements such as niches, arches, jharokhas, intricate tile work, and wood carvings along the borders of dalans (semi-enclosed spaces). Jaali (latticework) and jharokhas were used not only for privacy and decoration but also to facilitate ventilation. Jharokhas functioned as climatic moderators, allowing airflow while restricting direct sunlight, thereby enhancing natural heating, cooling, and cross-ventilation.

The houses are typically attached on three sides, opening only to the street. Consequently, most rooms are arranged around a central courtyard to provide light and ventilation. In smaller houses, a mugh (مکھ)—a small floor opening above the ground floor—also facilitates ventilation and lighting. Despite irregular plot shapes, interior rooms are made regular by varying wall thickness (Shahzad, 2002). Rooftops are spacious and level, reflecting the social practice of sleeping outdoors during the summer. They also serve as spaces for neighborhood interaction and often accommodate pigeon cages. A rooftop room, called a *Barsati*, is used for storage during the rainy season. Roof parapets are typically 4 to 5 feet high, and a *Shahnashin* (sitting platform) is built along the parapet—usually facing the street—for winter sun exposure and evening gatherings. Traditional planning reflects cultural continuity and has strongly influenced house layouts. Spatial names were often assigned based on quality rather than function. For instance, dalan refers to the open space adjacent to the courtyard, while the corner where two dalans meet is called a kothri or hujra (Arshad, 1988).

Thick brick walls provided both security and insulation, helping to regulate temperature during extreme weather. Privacy was integral to the layout: only the deorhi (entrance lobby) and baithak (male guest room) were visible from the outside, while internal spaces remained private yet functionally interconnected. In this study, houses are classified into three categories based on their size: Type-A (small houses), Type-B (medium houses), and Type-C (large houses) selected as case studies fall into these categories. All are located on a street adjacent to one another, where differences in sizes are clearly visible. The seven buildings were selected as case studies for this specific research. All the categories of houses mentioned above are located on a street adjacent to one another. The differences in the sizes of the houses are clearly visible, as in figure 2.

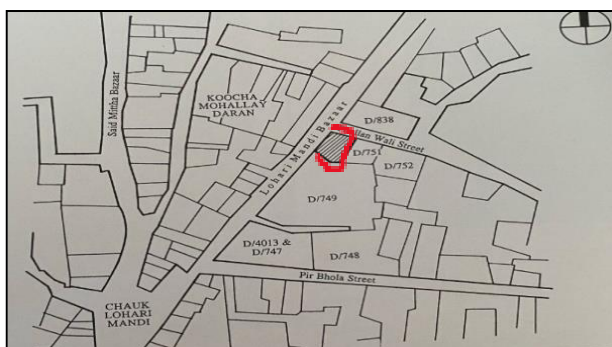


**Figure 2:** Housing Type-A (D/750), Type-C (D/749), Type-B (D/747)  
(Source: Ševčenko & Makhdum, 2009)

The three types are discussed as follows:

### Type-A (Small Houses)

In this category, two houses \_D/750 and D1510\_ were selected for study. Their locations are distinctive: one is adjacent to the famous *Lal Haveli*, while the other is at Chowk Sootar Mandi, a prominent urban landmark visible from three thoroughfares (Figs. 3 and 4).

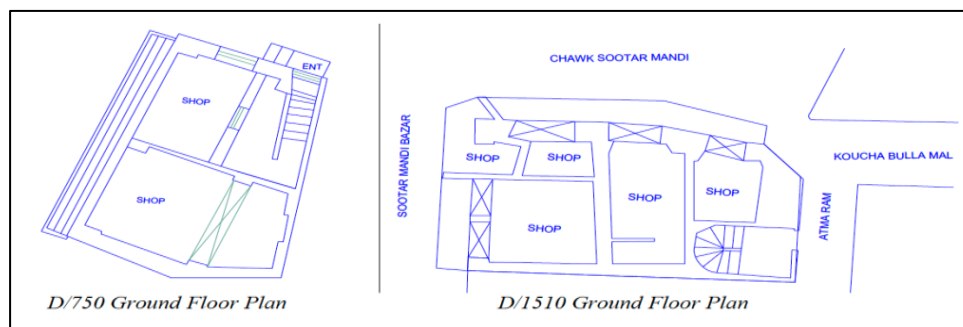


**Figure 3:** Location Plan of House No.750  
(Source: Authors)



**Figure 4:** Location Plan of House No. 1510  
(Source: Authors)

The size of the Type-A houses ranges from one to three marlas (1 marla = 225 square feet). The floor plans of both houses are irregular in shape; however, the plan of House D/750 is more irregular than that of D/1510. Wall thickness varies on all sides but is adjusted to create room with as regular a shape as possible. House D/750 is a two-storey structure, whereas House D/1510 has three storeys. Both houses contain residential units on the first floor with a commercial zone or shop at street level (Fig. 5).



**Figure 5:** A Drawing Showing Plans of Smaller Houses (Source: Authors)



The architectural features on the facades of the houses reflect styles from two distinct eras. House D/750 (Fig. 6) is a British-period building, showcasing features typical of colonial architecture, whereas House D/1510 (Fig. 7) displays characteristics more closely associated with the late Sikh period. Elements such as mouldings, wood carvings, and geometric details on the facade bear a strong resemblance to the Haveli of Naunahal Singh, located in Mori Gate, which was also constructed during the Sikh era. The facades further incorporate wooden jharokhas with arches, wooden columns, lattice work, and traces of stucco decoration. However, the ground-floor facades have been altered to meet contemporary needs, with wooden elements replaced by modern materials, such as metal shopfront structures.



**Figure 6:** House No. D/750 (Source: Authors) **Figure 7:** House No. S/1510 (Source: Authors)

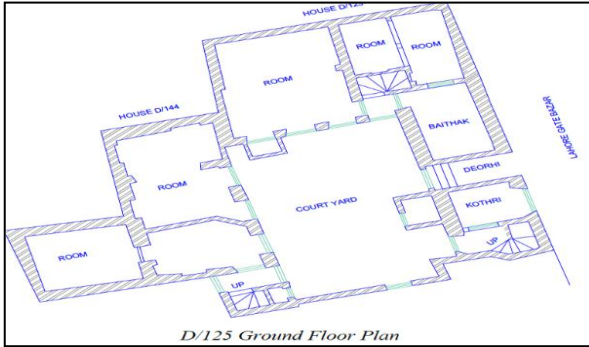
### Type-B (Medium-Sized Houses)

Most of the structures in Lohari Mandi Bazar fall into this category. Three buildings were selected for analysis under Type B: Houses No. D/125, D/747, and D/3265. These houses are situated at the junction of Lohari Mandi Bazar and Peer Bhola Street. Each structure occupies an area of approximately four to seven marlas.



**Figure 8:** House No. D/125, **Figure 9:** House No. D/747, **Figure 10:** House No. D/3265 (Source: Authors)

**House no. D/125** was constructed during the British period. Its facade features three projecting jharokha windows on the first storey, though only the wooden structural members remain. The building is currently in a dilapidated condition, with exposed masonry visible in several areas. Two of the jharokha openings have been sealed with brick masonry (Fig. 12), and the parapet is missing. The floor plan follows the traditional Haveli layout, with rooms arranged around a central courtyard. This courtyard functions as the heart of the house, providing light and ventilation to the adjoining rooms. Wall thickness varies across different sections to create a more regular interior layout. Windows open either onto the street or into the courtyard (Fig. 11).

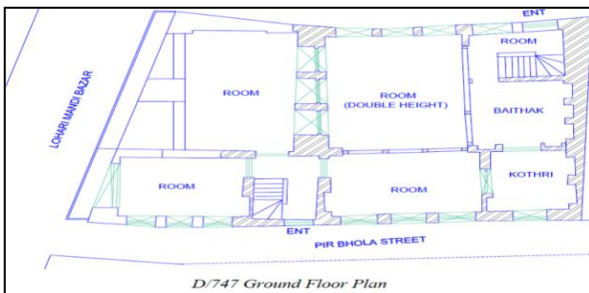


**Figure 11:** Plan of House No. D/125.,  
(Source: Authors)



**Figure 12:** Facade of the house No. D/125  
(Source: Authors)

**House No. D/747** is the tallest in the Lohari Mandi Bazaar, comprising four-storeys. It is in comparatively better condition than House No. D/125 and represents a British-period structure with an irregular floor plan. Positioned on a corner plot, the house incorporates windows on three sides, thereby eliminating the necessity of a courtyard or mug. It contains two entrances, and the central room is constructed with a double-height ceiling (Fig. 13). The façade is distinguished by a projecting wooden bukharcha, which remains in use and is preserved in relatively good condition (Fig. 14). Consistent with type-A houses, the wall thickness varies across different sections, accommodating the irregular plot shape while producing regularly shaped rooms within.

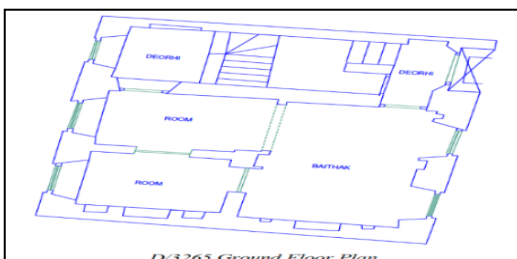


**Figure 13:** House No. D/747 Plan  
(Source: Authors)

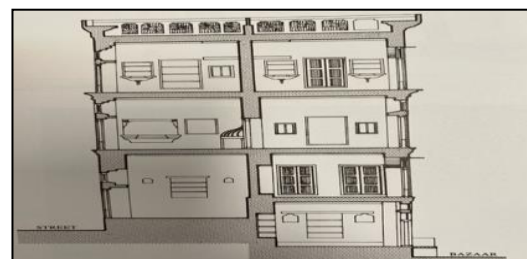


**Figure 14:** House No. D/747 Elevation  
(Source: Authors)

**House No. D/3265** is a four-storey British period structure with two entrances: one opening onto Sootar Mandi Bazaar and the other onto Koucha Maan Singh. Owing to the level difference between the bazaar and Koucha, the façade facing Sootar Mandi Bazaar appears as a semi-basement (Fig. 16). The floor plan is comparatively more regular than others in the vicinity, roughly square in form, with most walls maintaining a uniform thickness (Fig. 15). The entire building has been whitewashed by its residents, leading to the loss of several traditional architectural details.



**Figure 15:** Plan of House No. D3265,  
(Source: Authors)



**Figure 16:** Section of House No. D/3265  
(Source: Authors)



The facade exhibits damaged brickwork but retains traces of Sikh-period features (Fig. 17). A distinctive element on the facade is a projecting miniature structure resembling a jharokha window (Fig. 18). Although its precise function remains uncertain, its form suggests a resemblance either to pigeon houses or to a chiragh-dan (a niche for placing oil lamps).



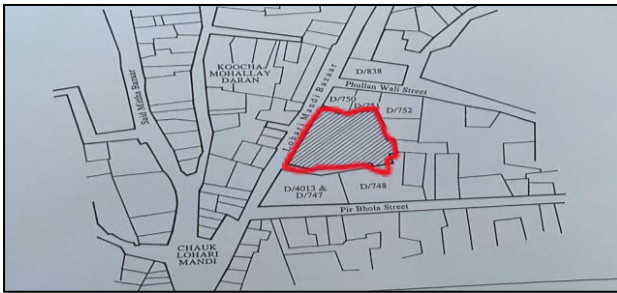
**Figure 17.** View of House D/3265 from, Koucha Maan Singh (Source: Authors)



**Figure 18.** View of House D/3265 from Sootar Mandi Bazar (Source: Authors)

### Type-C (Large-Sized Houses)

Two houses selected as case studies in this category, located in the Lohari Mandi Bazar area, are D/749 and D/3264 (Figs. 19 and 20). The plot sizes of these houses range from approximately eight to twelve marlas.

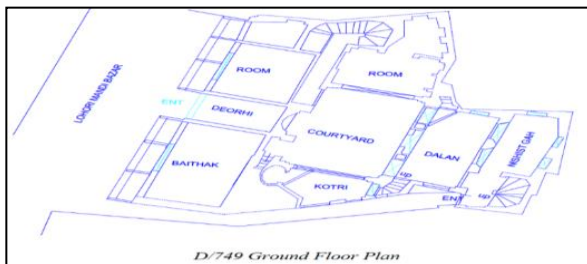


**Figure 19:** Location Plans of House No.D/749 (Source: Authors)



**Figure 20:** Location Plan of House No. D/3264 (Source: Authors)

**House No. D/749** is constructed during the British period, and is known as Mai Daru's Haveli, also referred to as the Lal Haveli of Lohari Mandi Bazaar. This three-storey structure, distinguished by its decorative character, features two entrances and is renowned for its finely executed cut and chased brickwork, jharokhas, and mouldings. While the overall plan is irregular in form, the front facade maintains a linear alignment with the street. Both examples of this large house-type are organized around a central courtyard, serving as the spatial core of the plan.

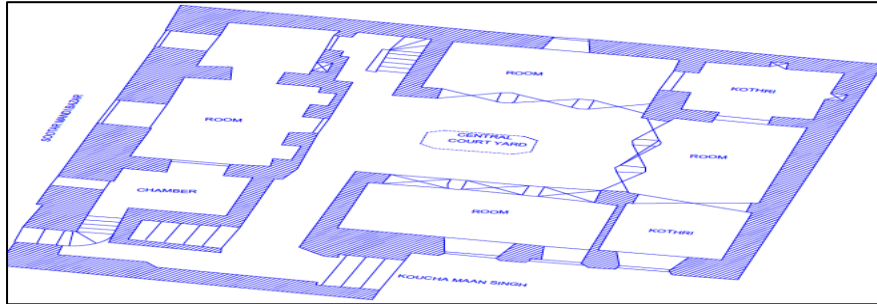


**Figure 21:** Plan of House No. D/749 (Source: Authors)

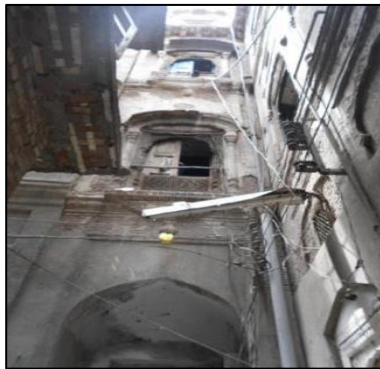


**Figure 22:** Elevation of House No. D/749 (Source: Authors)

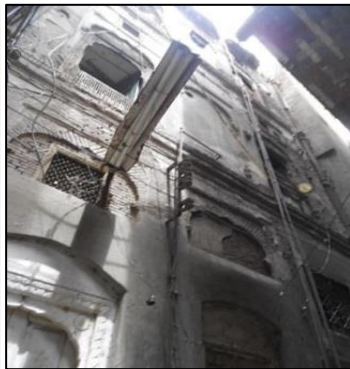
**House No. 3264** is located adjacent to B-Type House D/3264. Based on its architectural character, it appears to date from the Sikh period. Unlike the irregular layout of House D/749, this house has a highly regular plan, almost square in form. Although currently in a dilapidated state, it retains nearly all the spatial and architectural features characteristic of traditional houses. The structure rises four storeys and contains two entrances. The façade facing Sootar Mandi Bazaar is directly connected to that of House D/3265.



**Figure 23:** D/3265 Ground Floor Plan. (Source: Authors)



**Figure 24:** View of D/3264 from Koucha Maan Singh (Source: Authors)



**Figure 25:** View of D/3264 from Koucha Maan Singh (Source: Authors)



**Figure 26:** View of D/3264 from Sootar Mandi (Source: Authors)

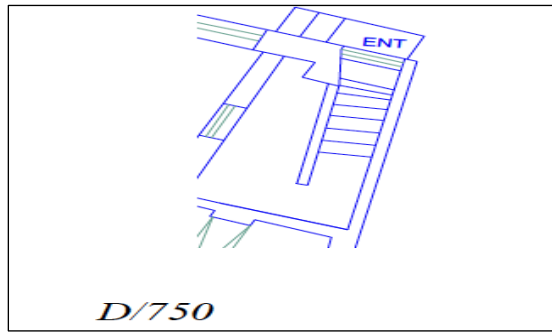
### Classification of Traditional Architectural Spaces and Features in Types A, B, and C

This section concludes the discussion on the interior spaces and other architectural features of these houses, as well as the spatial variations relative to house size.

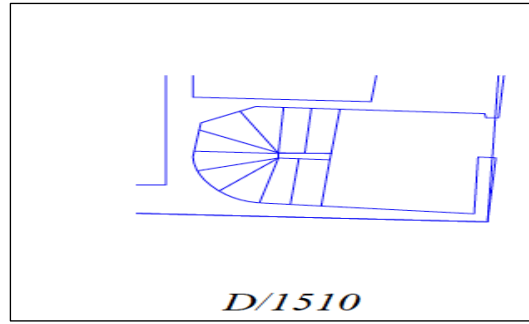
**The *Deorhi*** (دیوڑھی), or entrance lobby, serves as the traditional foyer between the domestic interior and the outside world. It is deliberately designed to obstruct direct views into the inner spaces, thereby safeguarding the privacy of the household. In larger houses, the *deorhi* is often a prominent feature, typically square or octagonal in plan, with a double-height volume surmounted by a dome. Its walls are frequently adorned with multi-foil arched niches, emphasizing its architectural significance. In contrast, in smaller houses the *deorhi* usually takes the form of a simpler, single-storey entrance corridor. From the *deorhi*, one commonly gains access to the central courtyard and the *diwan khana* (or *baithak*), while a staircase often rises from this space to the upper floors. The overall spatial arrangement is carefully organized to maintain privacy, with only the *deorhi* (entrance lobby) and *baithak* (guest room) remaining visible to visitors. This architectural approach reflects the socio-cultural emphasis on family sanctity and the clear separation of private domestic life from public interaction, a defining characteristic of traditional South Asian dwellings (Formolly &



Saraei, 2024). In Type-A houses, the overall plan is on a smaller scale, as is the deorhi, which leads to the upper residential area. In D/750, there is virtually no proper deorhi.

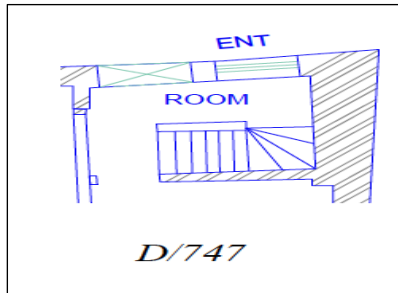


**Figure 27:** Deorhi of House No. D/750  
(Source: Authors)

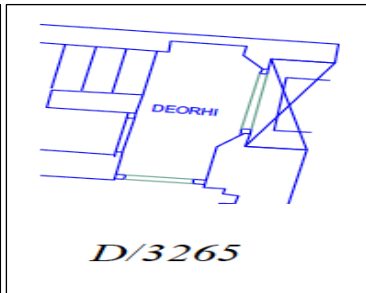


**Figure 28:** Deorhi of House No. D/1510  
(Source: Authors)

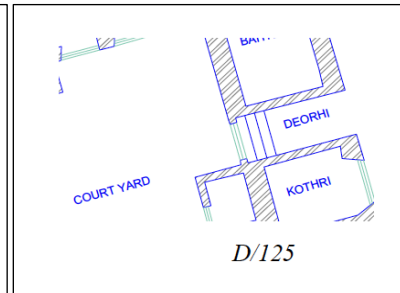
In Type-B, the deorhi is narrow and compact, leading to staircases in two selected case studies. However, in D/125 it opens directly into the courtyard.



**Figure 29:** Deorhi Plan of D/747 (Source: Authors)

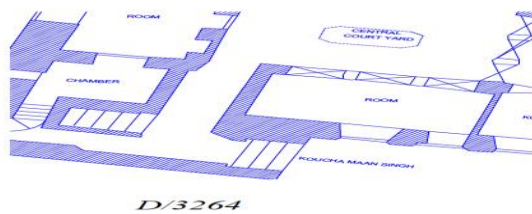


**Figure 30:** Deorhi Plan of D/3265 (Source: Authors)

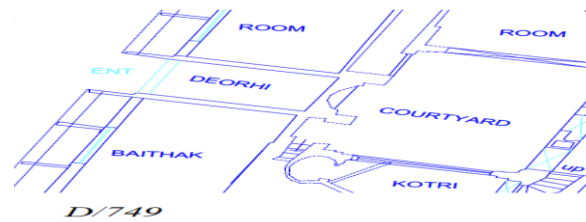


**Figure 31:** Deorhi Plan of D/125 (Source: Authors)

In both examples of Type-C, the deorhi it functions as a transitional space. In Lal Haveli (D/749), a long deorhi leads to the courtyard, whereas in D/3264, it blocks the inner view of the house from the street, ensuring privacy.



**Figure 32:** Deorhi Plan of D/3264  
(Source: Authors)



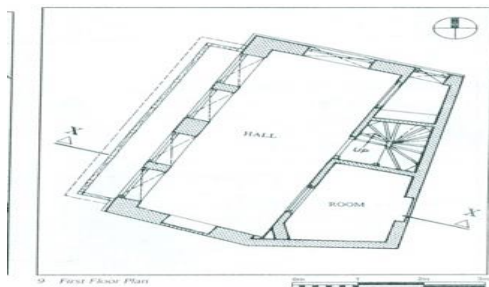
**Figure 33:** Deorhi Plan of D/749  
(Source: Authors)

**Dewan Khana** دیوان خانہ was the guest room designated for males in large houses or havelis. It was part of the mardan khana (men's quarters) and was typically located on the ground floor near the main entrance. The Dewan Khana served as the primary social space of the house. Usually, this space took the form of a large hall with a double-height ceiling. Women could observe various ceremonies—including wedding celebrations, festivals, and other social events—from the mezzanine floor's screened windows overlooking the Dewan Khana. This room was the most ornate and well-lit in the house, as it reflected the family's financial

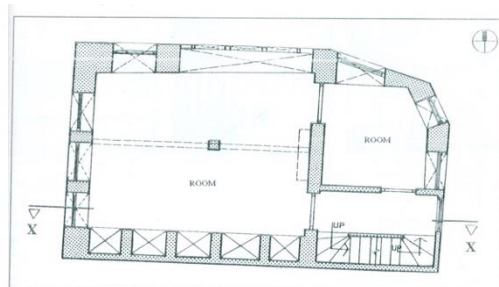
status and housed their most valuable possessions. Its walls and ceiling were adorned with frescoes and mosaics made from mirror fragments.

**Baithak** (بیٹھک) was the guest room designated for males in small houses. Functionally, this space is similar to a dewan khana but smaller in size. It was typically a single-storey room. The baithak's windows extend to the floor, and when open, the building practically merges with the street it faces. Sitting in the baithak, household members interact with visitors and passersby standing in the street. The street itself is a private lane within the neighborhood, and the baithak's windows remain open almost all day. In this way, the baithak serves as a primary social space. In A-type plans, there is generally a hall on the first floor that can be used for multiple purposes, such as a baithak or nishist gah. In contrast, Type-B plans do not have a dewan khana; however, rooms located near the entrances may have served as baithaks at the time of construction. In Type-C plans, the location of the dewan khana or baithak is more certain. A well-sized room with windows facing the street, adjacent to the entrance, appears to be the dewan khana or baithak.

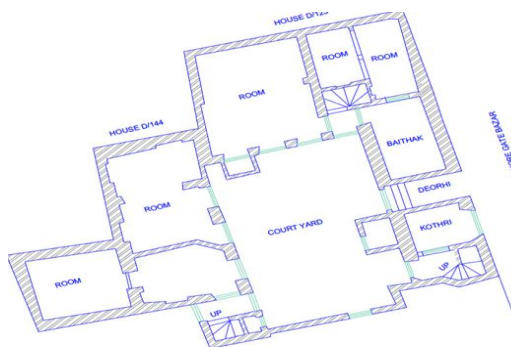
**Nishist Gah/Bala Khana** نیشست گاہ (Living Room) is a chamber that faces the main street or market. It is located on the first or upper floor and is part of the family quarters. Women primarily use this area as a living or sitting room and to observe street activities. The Nishist Gah is always equipped with a bukharchi or jharokha (bay window) that protrudes into the street and is supported by ornamental stone or wooden brackets. Ornate and intricately carved wooden jalis (lattices) featuring various geometric and floral motifs protect the jharokha from public view. This design allows women to watch street activities from the Nishist Gah in complete privacy.



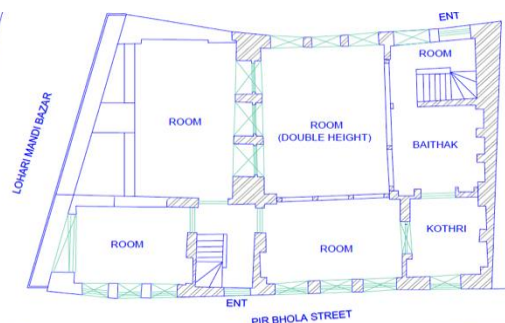
**Figure 34:** Hall at First Floor used for Baithak Nishist Gahat Houses D/750 (Ševčenko & Makhdum, 2009)



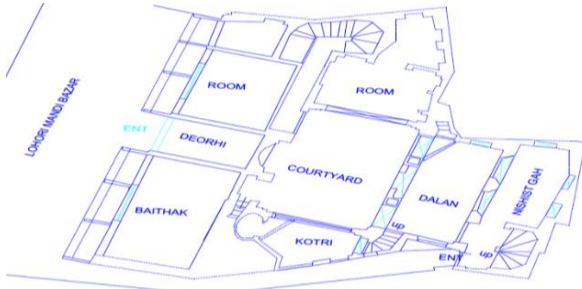
**Figure 35:** Hall at First Floor used for Baithak Nishist Gahat Houses D/1510 (Ševčenko & Makhdum, 2009)



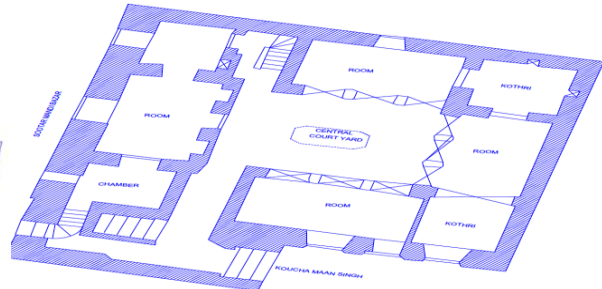
**Figure 36:** Baithak/Dewaan Khana in Type -B Houses D/125 (Source: Authors)



**Figure 37:** Baithak/Dewaan Khana in Type -B Houses D/747 (Source: Authors)



**Figure 38:** Baithak/Dewaan Khana in  
Type -C Houses D/749  
(Source: Authors)



**Figure 39:** Baithak/Dewaan Khana in  
Type -C D/3264  
(Source: Authors)

**Hujra حجره (Men's Retiring Room)** was typically part of the Mardan Khana and located on the ground floor. Traditionally, the Hujra contained no furniture; instead, bolsters and masnads (floor seats) were used. The ceilings often featured decorative treatments. Hujras or Kotris were common in Types B and C, though their ornamentation often deteriorated over time.

**Khawb Gah (خواب گاه)** refers to the bedrooms of the house. Typically located at the rear of the house on the first or upper floor, these rooms were accessible from the central courtyard. The walls contained decorative niches that also served as storage spaces, and the ceilings were often made of carved wood featuring geometric patterns.

**Jharokha جھروکا (Bay Window)** and Bukharcha are distinctive architectural features of traditional homes. The Jharokha, a projecting bay window, allowed women to observe street life while maintaining privacy. It was supported by sandstone or wooden brackets and capped with a segmented dome roof, often decorated with carved wooden Jali (lattice). Jharokha varied in shape and size—curved, octagonal, or rectangular—and were left in natural wood or painted blue or green. On house facades, the projecting Jharokhas and Bukharchas cast deep shadows, creating a picturesque interplay of light and shade in Lahore's bright sunlight. Smaller houses usually featured a single Jharokha, while larger havelis displayed a composition of three on the facade.

In Type-C havelis, Lal Haveli (D/749) features beautifully crafted brick Jharokhas on the first floor—a large central Jharokha flanked by two smaller ones, each with decorative moldings at the base. In D/125, a medium-sized house, the Jharokhas are in dilapidated condition but still retain traces of their exquisite original carvings. In D-747, adjacent to Lal Haveli, the wooden Bukharchas formed a distinctive and elegant façade, different from but equally graceful as Lal Haveli.



**Figure 40:** Jharokhas at D/749 (Source: Authors)





**Figure 41:** Jharokhas at D/125 (Source: Authors)

In D-747, adjacent to Lal Haveli, the wooden Bukharchas formed a distinctive and elegant façade, different from but equally graceful as Lal Haveli.



**Figure 42:** Wooden Bukharchis at D-747 (Source: Authors)

**Shah Nashin** (شاه نشین) is a prominent feature of traditional houses, consisting of an elevated platform on the roof or terrace level overlooking the main street or bazaar. It served as a seating area for observing street life. Usually made of masonry and integrated with the parapet wall, large havelis could have two or three Shah Nashins, whereas small houses generally had one. The platform extended over the street, supported by ornamental stone brackets.



**Figure 43:** Shah Nashin at D-747  
(Source: Authors)



**Figure 44:** Shah Nashin at D-3265  
(Source: Authors)

**Teh Khana** تہ خانہ (Basement) is designed to serve as a concealed underground storage space for valuables. This area, located at the back of the house, can be accessed from the ground floor through a hatch with sliding wooden shutters. Large houses often featured multiple chambers, while single-family homes typically had only one.

**Neem Chhati** (نیم چٹھی) is the mezzanine floor located between the ground and first floors, featuring a low ceiling and ornate screened windows that overlook the dewan khana (men's guest room) and the central courtyard. Women used this space to observe family ceremonies, such as weddings, in privacy. It is usually accessed via the main staircase, although a separate stairway is sometimes included to ensure private circulation for women.

The **roof terrace** is a distinctive feature of traditional homes. In summer, it is used for sleeping under the stars, while in winter, it provides a sunny spot to enjoy the warmth. It also serves practical purposes, such as drying clothes, fruits, and vegetables. The roof parapets are built to man-height for privacy and incorporate terracotta grills to allow ventilation. Activities like kite flying and pigeon keeping commonly take place here. The roof floor is finished with fine lime and gently slopes toward spouts and drains to prevent water damage to the walls.



**Figure 45:** Roof terrace at D/125  
(Source: Authors)



**Figure 46:** Terracotta Grills at parapet wall of D/747 (Source: Authors)

**Barsati** (برساتی), or the "summer house", was a roof-level pavilion designed to provide shelter during the summer and monsoon seasons. It could take the form of a porch, verandah, loggia, or enclosed chamber, varying in size from small shelters in modest homes to expansive areas in havelis. The walls were adorned with ornamental terracotta grills to promote cross ventilation, creating captivating patterns of light and shadow under the bright Lahore sun. The Barsati is a defining Architectural element, often dominating the top storey façade.



**Figure 47:** Barsati at D/3264 (Source: Authors)

**Sehan** (صحن), or **courtyard**, formed the central open space around which the house was organized. Surrounded by colonnades, arches, Dalans (semi-open spaces), and rooms, it created a private outdoor environment suited to the climatic, social, and cultural needs of the

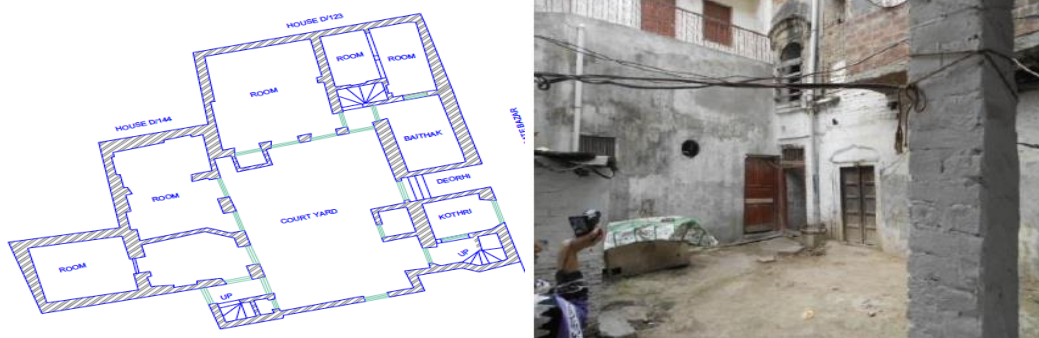


family. The Sehan was the heart of domestic life, accommodating cooking, dining, entertaining, and everyday interactions. Rooms opened directly onto it through the Deorhi.

The size of the Sehan depended on the scale of the house—spanning the entire plot in large homes, while smaller homes replaced it with mugs (small light wells) for light and ventilation. In irregular plots, wall thickness was adjusted to regularize interior spaces (Shahzad, 2002). In some cases, a central hall with a roof opening substituted for the courtyard function.

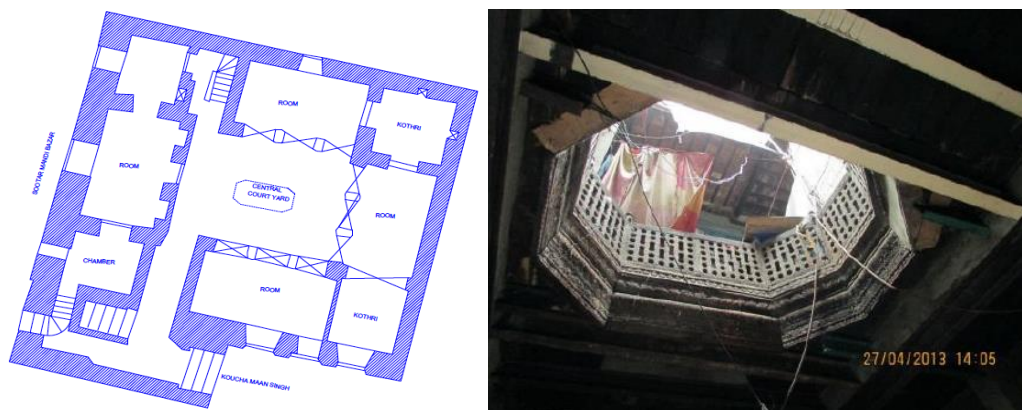
Courtyards were regular in shape—rectangular or square, regardless of plot irregularity. They served as air shafts and light wells, ensuring ventilation, illumination, and outdoor privacy within the home.

**Dalan** (دالان) refers to a semi-enclosed area open on one side, typically facing the Sehan or courtyard. It consisted of a colonnade or screen of arches, often arranged in odd-numbered bays such as three or five, supported by slender wooden or stone pillars. The Dalan was generally rectangular and symmetrically positioned around the courtyard. Behind the open Dalans were enclosed rooms used for storage. Smaller houses usually had a single medium sized Dalan, while larger havelis contained multiple double-layered Dalans of considerable scale.



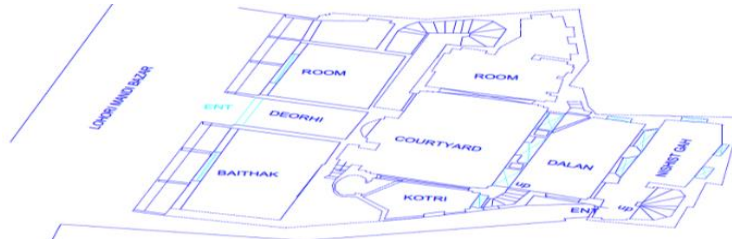
**Figure 48:** Regular Courtyard Plan at Irregular Plot at D/125 (Source: Authors)

In the case studies, there are three courtyard houses featuring Dalans. Despite variations and irregularities in overall plan forms, the courtyards themselves remain geometrically regular, serving as the central hub of household activities. All rooms are interconnected through the courtyard, reinforcing its role as the spatial and social core of the dwelling.



**Figure 49:** Courtyard plan at D/3264 (Source: Authors)





**Figure 50:** Courtyard plan at D/749 (Source: Authors)

## Thermal Comfort Devices

Traditional residential architecture within Lahore’s Walled City exhibits a remarkably advanced understanding of passive environmental design, particularly in achieving thermal comfort. These historic houses continue to demonstrate noticeable indoor temperature moderation and effective natural ventilation, underscoring the success of vernacular climatic strategies. Architectural elements such as Jharokhas, Jaalis, ventilators, and courtyards were not merely ornamental but integral components of climate control. Jharokhas, in particular, facilitated cross-ventilation while reducing solar heat gain, maintaining comfortable indoor environments suitable for Lahore’s climate. Likewise, the strategic positioning of courtyards—a defining characteristic of traditional dwellings in hot and dry regions—enabled natural airflow and daylight, creating a microclimatic buffer that acted as a passive cooling system (Gunasekaran & Priya, 2025).

Cross-ventilation directly influenced the spatial organization of houses. Strategically placed windows, ventilators, Mughls (light wells), fanlights, and terracotta grills enhanced airflow through the interior. Even small rooms and narrow corridors incorporated Jaalis, or ventilation openings, to sustain air movement. Courtyards and Dalans served as shaded, cooler areas, thereby reducing reliance on mechanical cooling systems.

Thermal strategies also varied with house size, orientation, and plot condition. Larger houses, often enclosed on three sides, featured central courtyards to optimize air circulation and daylight penetration. Medium-sized houses, particularly those with dual street-facing facades, relied on cross-ventilation through openings at opposite ends. Regardless of the typology, Jaalis and ventilators were extensively integrated into design, as evident in House No. D/747 and D/3264 (Figs. 51–53).

Material selection further reinforced climate responsiveness. Thick brick masonry walls provided natural thermal insulation, buffering interiors from extreme outdoor temperatures. These indigenous construction techniques, based on local knowledge and materials, proved to be durable, sustainable, and climatically adaptive—offering valuable insights for contemporary design practices (see Fig. 54).



**Figure 51:** Wooden Jaalis at D/747  
(Source: Authors)



**Figure 52:** Wooden Jaalis at D/3264  
(Source: Authors)



**Figure 53:** Wind Catchers at D/3264 (Source: Authors)



**Figure 54:** Windows with fanlight at D01510 (Source: Authors)

## CONCLUSION

The study of traditional residential buildings in Lohari Mandi, located within the Walled City of Lahore, reveals a rich architectural heritage that encapsulates the socio-cultural, environmental, and historical character of the city. The research identifies three primary house typologies—Type A (small), Type B (medium), and Type C (large)—classified according to scale, spatial organization, and functional zoning. Each typology reflects a consistent yet evolving vocabulary of architectural elements, demonstrating regional craftsmanship and climate-responsive design.

Defining features such as carved wooden Jharokhas, Jaalis, arched niches, Dalans, courtyards, and Bukharchas served both aesthetic and functional purposes, regulating light, ventilation, and privacy while showcasing the artistic identity of the region.

These architectural components exhibit a profound understanding of passive environmental control long before the advent of modern HVAC systems. For instance, Jharokhas and Jaalis acted as natural climatic moderators, promoting air circulation while shielding interiors from direct solar radiation—a highly effective strategy for Lahore’s hot and humid summers. Additionally, terracotta grills, fanlights, and thick masonry walls improved thermal comfort by enhancing airflow and providing insulation.

Courtyards (Sehan), particularly in medium and large dwellings, functioned as both spatial and social anchors. Despite the irregular configurations of urban plots, the courtyards were geometrically regular, underscoring their conceptual and functional importance. The variation

in wall thicknesses was an ingenious spatial solution, used to regularize interior layouts within these irregular plot boundaries.

Spatial nomenclature and organization reflected indigenous logic and cultural practices. Terms such as Deorhi, Dalan, Hujra, Khawb Gah, and Nishist Gah denoted spatial characteristics and social roles rather than simple functional definitions. Each space was symbolically and functionally tied to the inhabitants' lifestyles, accommodating gender segregation, social rituals, and multifunctional daily activities rooted in tradition and family structure.

Rooftops were adaptively utilized as multifunctional spaces for social gatherings, sleeping, celebrating festivals (e.g., Basant), and storage. Architectural features such as the Shah Nashin (elevated viewing platform) and Barsati (summer pavilions) illustrated how everyday life was harmoniously integrated with climate, culture, and urban rhythm.

In conclusion, traditional housing in Lahore's Walled City represents more than historical architecture—it embodies a living model of sustainable and culturally embedded design. Through typological and spatial analysis, this research highlights how vernacular architecture holistically addressed environmental, social, and cultural needs. Preserving and learning from these traditions is not only vital for heritage conservation but also for informing future urban housing models that are resilient, climate-responsive, and culturally grounded.

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